ENVIRONMENTAL IMPACT ASSESSMENT

Feasibility Study for Establishment of State-of-The Art Tertiary care at Gilgit

CONSULTANTS

GRAND SQUARE CONSULTANCY | Pakistan Office: House No. 9-A, Itehad Colony, Allama Iqbal Town, Lahore; UAE Office: Khalidiya Tower, Office No. 5, M-22, Al Khalidiya St., Abu Dhabi, UAE

Web: www.gscons.com ; Email: info@gscons.com;

Tel: +92 42 37805259; +92 304 8144088

GRAND SQUARE CONSULTANCY

Itehad Colony, Allama Iqbal Town, Lahore
UAE Office: Khalidiya Tower, Office No. 5, M-22, Al Khalidiya St., Abu Dhabi, UAE

T: + 924237805259
E: info@gscons.com
W: www.gscons.com

Document Title: Environmental Impact Assessment of Feasibility Study for Establishment of State-of-The Art Tertiary care at Gilgit				
Prepared For: Ministry of National Health Services Regulations and Coordination				
Prepared By: Grand Square Consultancy (GSCON)				
Document No: **GSCON/EIA/TH-GB/222/05-25**	**Distribution:** ☑Official □Public ☑Confidential		**Date:** May 2025	
Report Summary: This document presents findings of Environmental Impact Assessment (EIA) regarding construction of Tertiary Care Hospital by Ministry of National Health Services Regulations and Coordination at Gilgit, GB in compliance with Section 16 of and GB review of IEE/EIA Regulations 2000.				
0	Report	GSCON	RR	SMM
Revisions	**Description**	**Originator**	**Reviewed**	**Approved**

(Signature) Sr. Environment Manager – GSCON Date

TABLE OF CONTENTS

Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

GLOSSARY

a. **Act:** An act is a formal written document that is passed by a legislature, like a parliament or congress, and becomes law.

b. **Dust:** are fine powdery material such as dry earth/ pollen that can be blown in the air.

c. **Discharge:** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping

d. **Environment:** means air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned.

e. **Environmental Impact Assessment:** means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed.

f. **Effluent:** means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour.

g. **Hazardous Substance:** a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics causes, or is likely to cause, directly or in combination with other matters, an adverse environmental effect; and any substance which may be prescribed as a hazardous substance.

h. **Hazardous Waste:** means waste which is or which contains a hazardous substance or which may be prescribed as hazardous substance or which may be prescribed as hazardous waste, and includes hospital waste and nuclear waste.

i. **Industrial Activity:** means any operation or process for manufacturing, making, formulating, synthesizing, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose.

j. **Industrial Waste:** means waste resulting from industrial activity.

k. **Incineration:** The thermal destruction of waste for the primary purpose of disposal, with or without recovery of energy.

Note: the term incineration generally means 'the act of burning to ashes'.

l. **Initial Environmental Examination:** means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a

proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment.

m. **Leachate:** A liquid that has percolated through and/or been generated by decomposition of waste material. It includes water that come in contact with waste and is potentially contaminated by nutrients, metals, salts and other soluble or suspended components and products of decomposition of waste.

n. **Landfill:** A waste disposal site used for the controlled deposit of solid waste onto or into land.

o. **Mitigation Measure:** means measure for control, reduce or elimination of an adverse impact of a development on environment, including a restorative measures.

p. **National Environmental Quality Standards:** means the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste.

q. **Regulations:** means the Azad Jammu and Kashmir Environmental Protection Agency, Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2009.

r. **Recycling:** Set of processes (including biological) for converting recovered materials that would otherwise be disposed of as waste into useful material and/or products

s. **Reuse:** using a waste product again for the same or different purpose without further manufacture.

t. **Suspended Solids:** are solid particles suspended in water or air that can be removed by filtration or settlement.

u. **Sustainability:** means such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs.

v. **Waste:** means any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process.

LIST OF ABBREVIATIONS

EA	Environmental Approval/Executive Agency
AJK	Azad Jammu and Kashmir
NOC	No-Objection Certificate
NOx	Oxides of Nitrogen
PC	Public Consultation
PM	Particulate Matters
SPM	Suspended Particulate Matters
SOx	Oxides of Sulphur
NO	Nitrogen monooxide
NO_2	Nitrogen dioxide
WHO	World Health Organization
ADB	Asian Development Bank
AIP	Access to Information Policy
AMSL	Above Mean Sea Level
BC	Before Construction
BOQ	Bill of Quantities
IBAT	Integrated Biodiversity Assessment Tool
CSC	Construction Supervision Consultation
DC	During Construction
DO	During Operation
EGL	Existing Ground Level
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GoP	Government of Pakistan
GRM	Grievance Redress Mechanism
IA	Implementing Agency
IEE	Initial Environmental Examination
IFC	International Finance Corporation
KPI	Key Performance Indicators
LAA	Land Acquisition Act (of 1984)
LARP	Land Acquisition and Resettlement Plan
Lea	Equivalent sound pressure level
MSDS	Material safety Data Sheet
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards
OHS	Occupational Safety and Health
O&M	Operation and Maintenance
PC	Public Consultation
PEPC	Pakistan environmental protection Council

PPE	Personal protective Equipment
AJK-EPA	Azad Jammu and Kashmir Environmental Protection Agency
SOPs	Standard Operating Procedures
SS	Suspended Solids
TDS	Total Dissolved Solids
TMP	Traffic Management Plan

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. TITLE & LOCATION OF PROJECT:

The healthcare delivery system in GB is comprised of BHUs, RHCs, dispensaries, and centers. The total number of beds in these facilities is proximal 1393, with a population of 1043 per bed (GB Department of Health, 2023)

Gilgit-Baltistan (GB) has made significant progress in healthcare over recent years, yet the region continues to face major challenges due to its rugged geography, dispersed population, and limited resources. As of 2020, GB had a total of 557 health facilities, which include 1 Provincial Headquarters Hospital, 3 Regional HQ Hospitals, 3 District Headquarter (DHQ) Hospitals, 3 Rural Health Centers (RHCs), 37 Civil Hospitals, 61 A-Class Dispensaries, 242 C-Class Dispensaries, 22 Basic Health Units (BHUs), 163 Maternal and Child Health (MCH) Centers, 123 First Aid Posts (FAPs), and 134 Expanded Program on Immunization (EPI) Centers. In addition, there are 6 private hospitals, 2 Human Resource Development Centers, and 2 midwifery schools. The region has a total of 1,341 indoor hospital beds, resulting in a population-to-bed ratio of approximately 1,043 people per hospital bed—well below global health standards.

In terms of healthcare personnel, the Gilgit-Baltistan Health Department reported in 2020 that there were 42 sanctioned positions in the health administration cadre (25 filled), 169 specialist doctor posts (85 filled), 323 sanctioned General Duty Medical Officer (GDMO) posts with 330 available doctors, and 51 sanctioned dental surgeon posts with 57 filled. The number of paramedics was 2,307 sanctioned and 2,203 filled, while the nursing cadre had 57 sanctioned positions, but only 32 nurses were available. The supporting and clerical staff included 2,958 sanctioned roles with 2,650 filled, and the National Program staff, including Lady Health Workers (LHWs), Lady Health Supervisors (LHSs), and other outreach staff, had 1,613 sanctioned positions with 1,588 filled. In total, 7,570 healthcare posts were sanctioned in the region, with 7,003 of them actively filled.

In Gilgit city specifically, several key healthcare institutions are operational. The District Headquarter (DHQ) Hospital in Gilgit is the largest in the region, currently operating with 200 beds, with a government plan to expand it to a 400-bed facility. Another prominent facility, the Aga Khan Medical Centre, is being expanded from 46 to 112 beds and will offer comprehensive services such as emergency medicine, dermatology, cardiology, dialysis, CT scanning, ophthalmology, and telemedicine. Additionally, the City Hospital Gilgit, a 50-bed

facility, was developed from a community-led effort to provide neutral healthcare access amidst sectarian tensions in the city.

Despite these efforts, the doctor-to-population ratio in Gilgit-Baltistan remains low, with only about one doctor per 2,898 residents. To address this gap, in 2023, the GB Health Department launched a large-scale recruitment campaign, hiring 267 specialist doctors and 557 medical officers to strengthen the public health system. These developments reflect an ongoing commitment to healthcare improvement, but sustained efforts and investment will be necessary to overcome the structural challenges and ensure accessible and quality healthcare for all residents of Gilgit-Baltistan.

Location map of proposed hospital is given as Figure 0-1.

Site	Coordinates:	35°51'28.4"N

Figure Location map of proposed Hospital 1-0

As per legal requirement under Section 16 of Gilgit Baltistan Environmental Protection Act, 2014 this project require Environmental Approval from Gilgit Baltistan Environmental Protection Agency (GB EPA), Government of GB.

2. PROJECT PROPONENT

Ministry of National Health Services Regulations and Coordination is the executing agency of this project.

Mr. Shah Jehanwill be the contact person for the proposed project **"Feasibility Study for Establishment of State-of-The Art Tertiary care at Gilgit".**

Detail of the proponent is given hereunder.

Name:	**Shah Jehan**
Designation	Director (Planning & Development)
Address:	Kohsar Block, 3rd Floor, Constitution Avenue, Pak Secretariat, Islamabad
Contact Details:	**+92-51-9245998**

3. CONSULTANTS:

Grand Square Consultancy (GSCON)

Address – Pakistan: House No. 9-A, Itehd Colony, Allama Iqbal Town, Lahore

UAE Office: Khalidiya Tower, Office No. 5, M-22, Al Khalidiya St., Abu Dhabi, UAE

Email: info@gscons.com; Web: www.gscons.com

Tel: +92 42 37805259; +92 304 8144088

4. PROJECT PARTICULARS:

Estimated cost the proposed hospital is 3718 million rupees. Land required for proposed project is 60 kanals (326760 Sq.ft. detail of covered area of the hospital is given below;

- Ground floor plan = 88770 sft
- First floor plan = 46088 sft
- Total Covered area = 134858 sft

Following is the detail of main facilities available at hospital;

- Emergency Department
- Gynecology Department
- General Surgery Department
- Medicine Department
- Pediatric Department
- Cardiac Department
- ENT Department
- Orthopedic Department
- CCU
- ICU
- Eye Department
- Neurology & Neurosurgery Department

Layout of the proposed hospital is given below as Figure 0-2.

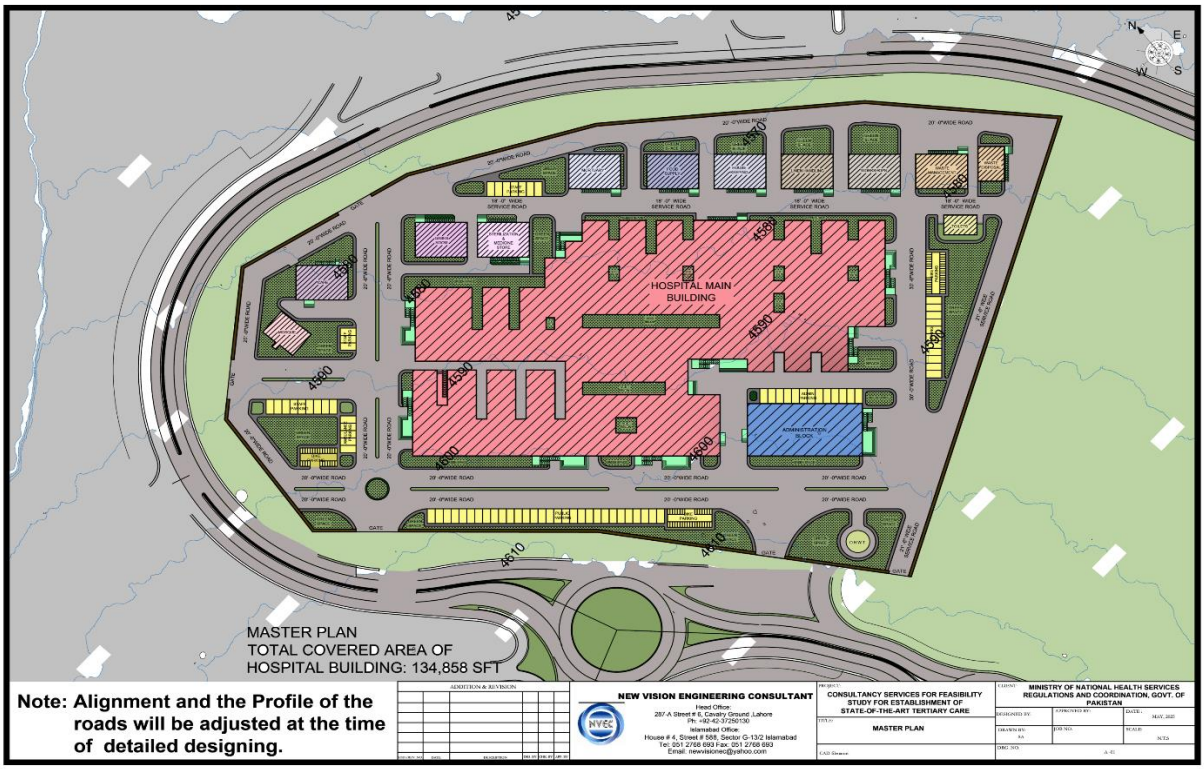


Figure 2-0 Layout of proposed Hospital

Keeping in view the cost and size of proposed development, detailed Environmental Impact Assessment has been carried out.

5. ENVIRONMENTAL ASSESSMENT:

Considering the potential impacts of the Proposed Project, existing baseline environmental conditions of the proposed project's Corridor of Impact (CoI) has to be used as a benchmark for comparison of the physical, ecological and socio-economic conditions before and after construction phases of the Project. This baseline will also provide the datum for assessing the impacts and suggesting the mitigation measures, which will be implemented effectively at various phases of the proposed project activities.

Impact The impacts of the project activities on environment during construction and operation phases have been considered in this EIA report.

The mitigation measures have been proposed to minimize / eliminate the adverse/negative impacts of the project on the environment. Regular environmental monitoring, by a third party will also ensure environmentally sound construction of the project. The proponent / contractor will hire trained staff to ensure the enforcement of Environmental Management Plan. No trees will be cut down for this project as the project site is devoid of any trees. Rather, new plantations will be carried out. The equipment will be kept in proper condition to save the environment from any damage. During construction and operation phase; air and water quality will be monitored

The data has been collected from the primary and secondary sources. For primary data acquisition, the Environment and Social team conducted the field visit during the month of

May 2025. The secondary data was collected from published sources/reports and relevant departments, which were also verified through visual observations during detailed surveys. Data has been collected for following elements of environment.

- Physical Environment
- Biological Environment
- Socioeconomic environment

The impacts of the project activities on environment during construction & operational phases of proposed project have been considered. The mitigation measures have been proposed to minimize / eliminate the negative impacts of the project on the environment. A complete Environmental Monitoring and Environment Management Plan have been recommended to regulate the requirements of GB Environmental Protection Act, 2014.

The impacts on environment which are likely to be generated during Pre-construction / Planning and Designing Stage are summarized in table below:

ACTIVITY	ENVIRONMENTAL IMPACTS	MITIGATION MEASURES
Installation of construction camps	- Damage to local vegetation/ trees - Mobility of Heavy machinery	The camps, mobility of machinery should be proper planned and well designed to avoid any loss to local green cover; - It is recommended to establish the construction camps where no or minimum vegetation exists. - The location of construction camp should be selected so, as to have limited environmental impact during construction phase and to reduce the cost and land requirement. - Compensation to the forest department for all type of plants (saplings, sub-mature, mature trees and other green assets) will be paid by the proponent as desired by the Forest Department and as per law of land.
Selection of location for the construction Hospital building	- Improper Designing of hospital building, treatment plant or incinerator	- Factors such as site capacity, accessibility, acceptability, stability, environmental sensitivity, land use, socio-economic receptors and climate hazards have been studied and site has been selected accordingly. - The hospital location and design shall facilitate the patients/visitors and made their visit hassle free.

The impacts on environment which are likely to be generated during Construction Stage are summarized in table below:

ACTIVITY	ENVIRONMENTAL IMPACTS	MITIGATION MEASURES
Execution on Project designing and planning	- Cutting of trees - Involvement of forest	- Cutting and / or disturbance of trees shall be avoided, as far as possible; - The site is clear and no full grown trees are observed on the site. - A tree plantation program shall be implemented with the recommendations and technical support of Forest Department for the enhancement ecological condition of the area; - There is no protected forest situated in and around the Project area.
Construction of Hospital building, wastewater treatment plant, waste storage facility and incinerator	- Improper method of construction;	-The project is designed by certified engineers / architects based on the reliable data. -Prior to starting of work, the contractor shall prepare a method statement for construction work. This shall be simple and explain the contractor's work process that is actually conducted on site, with safety and safeguard concerns. -Method Statement is very important, particularly for construction of wastewater treatment plant and incinerator. - Details of Plant, equipment & machinery, vehicles, work duration (total and activity-wise, for example for excavation of foundation, material storage, ground and above ground-level construction activities, PPE (helmet, gloves, boots, etc.) details for each type of work - Details of materials at each site (type & quantity) - Risks/hazards associated with the work (for example, Trench excavation will have risks such as trench collapse, persons/vehicles falling into trench, structural risk to nearby buildings, damage to buildings, infrastructure etc.) - Construction waste/debris generated (details & quantity) - Detail the sequence of work process (step-by-step) including specific details of each work - Contractor's supervision & management arrangements for the work

		- Emergency: Designate (i) responsible person on site, and (ii) first aider - Typical site layout plan including pipe trenching, placement of material, excavated earth, barricading etc.
Traffic Issues	- Movement of vehicles carrying construction materials and equipment/machinery	- Movement of vehicles carrying construction materials and equipment/machinery will be restricted during the daytime to reduce traffic load and inconvenience to the local population; - Construction vehicles, machinery and equipment will be parked at designated areas (at construction camps site) to avoid un-necessary congestions on roads;
Solid Waste	- Open dumping of solid waste; - Disposal of Spoil & Demolition Waste	- All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper solid waste management system. The contractor will coordinate with local representatives and administration of the concerned solid waste management department for the disposal of solid waste; - The contractor must develop a plan of action with the help of concerned solid waste management department for transporting the waste to the disposal site; - Waste to be reused in the project or by any other interested parties. - All material that is produced shall be transported in tarpaulin covered trucks for disposal at the designated site. At the disposal site, the demolition waste will be disposed off in accordance with the best practices to ensure no residual impact. - Disposal trucks will be properly maintained to minimize oil leakages during the construction.
Wastewater generation	- Discharge of wastewater in open area;	- Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks. - Proper monitoring to check the compliance of NEQS will be carried out; and

		- Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit. - The contractor(s) will be responsible to submit details of site-specific wastewater management plan along with details of wastewater collection, transportation and its disposal.
Air Emission	- The main source of air emissions during construction will be vehicles and backup generator	- Preventive maintenance of construction vehicles will be mandatory to control air emission. - Washing of tyres of vehicles to reduce mud on the nearby roads. - Speed limits will be applied to reduce the fugitive dust. - Vehicle washing area will be designated, attached with sedimentation pond for recycling of washing water.

The impacts on environment which are likely to be generated during execution of operations are summarized in table below:

ACTIVITY	ENVIRONMENTAL IMPACTS	MITIGATION MEASURES
Regular operation of Hospital building	- Regular maintenance activates like white wash, replacement of faulty appliances,	- Ensure construction meets applicable standards and industry practices; - Conduct regular inspection and maintenance - Keep records of maintenance - Hire services of environmental expert for day to day operational safety -
Hospital/ infectious waste	- As the environmental debate expands within healthcare, the impact of material waste and emissions in the operating room is under increased scrutiny. The three pillars of environmental sustainability – reduce, reuse, recycle – are not easily applied in operating rooms. Much of the waste generated	- Hospital Waste Management Rules shall be strictly followed - Hospital / Infectious waste management plan shall be developed and implemented. - At source segregation shall be applied - Construction of yellow room for temporary storage of infectious waste at controlled temperature. -

	in ORs cannot be reused due to safety regulations and hygiene concerns. - As a result, materials reprocessing has become a significant focus for the Food and Drug Administration (FDA), with companies encouraged to innovate next-generation environmentally friendly medical devices	
Air emissions from incinerator and generators	- Incineration of infectious waste at controlled temperature - Working of generators during time of grid electricity shutdown	- Incinerator shall be properly designed with double chamber burning system. - Incinerator operation will be regulated under the strict supervision of dedicated staff. - Training staff shall be hired to reduce the chances of accidents. - Replacement of high temperature resistant bricks. - Maintain air to fuel ratio for complete burning of waste to reduce emissions - Maintain records of material incinerators (inflow and outflow). - Proper disposal of bottom ash through certified waste contractors. - Air emissions testing and monitoring will be carried out on a regular basis to ensure compliance with NEQS.
Wastewater	- Wastewater from washroom, kitchen and operation theaters of hospital	- Wastewater treatment plant will be installed with state-of-the-art technology to ensure compliance with NEQS permissible limits for the discharge of liquid effluents. - By adopting the reuse, recycle and reduce policy, a part of treated wastewater will be utilized for watering the plants and lawns and sprinkling on unpaved areas. - The leftover water will be discharged into a nearby drain through a submerged pipeline.

Traffic congestion / Parking	- Wrong parking of vehicles by visitors may lead to traffic congestion on the roads around the hospital	- Dedicated parking facility is provided in the design of proposed hospital at multiple sites to minimize the changes of traffic congestion. - Dedicated staff for parking will enure that no vehicles shall be parked outside the parking areas.

Comprehensive Environmental Monitoring and Environment Management Plans are prepared to satisfy the requirements of GB Environment Protection Act, 2014 and the rules and regulations made thereunder. Regular environmental monitoring by a third party will also ensure environmentally sound construction and operation of the project. The proponent / contractor will hire trained staff to ensure the enforcement of Environmental Management Plan. The equipment will be kept in proper condition to save the environment from any damage.

Project impact evaluation matrixes have been developed to evaluate the potential impacts of the proposed Project during planning, construction and operation phases of the project. Qualitative description of each aspect and the affected environment in both RoW and the project's corridor of impact is prepared.

Environmental parameters such as air quality, noise level, and ground / drinking water quality were analyzed to assess the baseline conditions of the project area. .The test results show that the majority of the parameters of water, air and noise levels are in compliance with applicable National Environmental Quality Standards and other international standards like WHO. These tests were performed by experienced staff from an EPA certified environmental laboratory.

Sensitive receptors have been identified which fall within a radius of 200 meters from the hospital. These receptors include places of worship, educational institutes, health facilities and areas of spiritual value. Mitigation measures have been suggested to control the impacts of construction and operation of the hospital on these receptors.

Beneficial as well as the potentially significant adverse environmental and social impacts of the project are evaluated for design/pre-construction, construction and operation phases of the proposed project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed accordingly.

The EIA has evaluated potential impacts that are likely to arise during the proposed project in detail, both negative and positive impacts at each stage of the project. To minimize the effects of adverse impacts, mitigation measures have been recommended in the Environmental Management Plan (EMP).

The proposed project is of high significance considering the urgent need for health facilities in Bhimber and nearby human settlements. An action plan for different stakeholders with roles and responsibilities has been developed to make the project sustainable. Based on the findings of EIA report, the proposed project is unlikely to cause any significant, irreversible or unprecedented environmental impacts. The

potential impacts are localized, temporary in nature and can be addressed through proven mitigation measures. No further study or assessment is required at this stage.

CHAPTER-1

1. INTRODUCTION

1.1 OVERVIEW

Gilgit-Baltistan (GB), a mountainous region in northern Pakistan, has made notable progress in healthcare over recent years. However, challenges persist due to its rugged terrain, dispersed population, and limited resources.

As of 2020, GB had a total of 557 health facilities, including 1 Provincial Headquarters Hospital, 3 Regional HQ Hospitals, 3 District Headquarter (DHQ) Hospitals, 3 Rural Health Centers (RHCs), 37 Civil Hospitals, 61 A-Class Dispensaries, 242 C-Class Dispensaries, 22 Basic Health Units (BHUs), 163 Maternal and Child Health (MCH) Centers, 123 First Aid Posts (FAPs), and 134 Expanded Program on Immunization (EPI) Centers. Additionally, there are 6 private hospitals, 2 Human Resource Development Centers, and 2 midwifery schools. The region has a total of 1,341 indoor hospital beds, resulting in a population-to-bed ratio of approximately 1,043 people per hospital bed—well below global health standards.

In terms of healthcare personnel, the Gilgit-Baltistan Health Department reported in 2020 that there were 42 sanctioned positions in the health administration cadre (25 filled), 169 specialist doctor posts (85 filled), 323 sanctioned General Duty Medical Officer (GDMO) posts with 330 available doctors, and 51 sanctioned dental surgeon posts with 57 filled. The number of paramedics was 2,307 sanctioned and 2,203 filled, while the nursing cadre had 57 sanctioned positions, but only 32 nurses were available. The supporting and clerical staff included 2,958 sanctioned roles with 2,650 filled, and the National Program staff, including Lady Health Workers (LHWs), Lady Health Supervisors (LHSs), and other outreach staff, had 1,613 sanctioned positions with 1,588 filled. In total, 7,570 healthcare posts were sanctioned in the region, with 7,003 of them actively filled.

In Gilgit city, several key healthcare institutions are operational. The District Headquarter (DHQ) Hospital in Gilgit is the largest in the region, currently operating with 200 beds, with a government plan to expand it to a 400-bed facility. Another prominent facility, the Aga Khan Medical Centre, is being expanded from 46 to 112 beds and will offer comprehensive services such as emergency medicine, dermatology, cardiology, dialysis, CT scanning, ophthalmology, and telemedicine. Additionally, the City Hospital Gilgit, a 50-bed facility, was developed from a community-led effort to provide neutral healthcare access amidst sectarian tensions in the city.

Despite these efforts, the doctor-to-population ratio in Gilgit-Baltistan remains low, with only about one doctor per 2,898 residents. To address this gap, in 2023, the GB Health Department launched a large-scale recruitment campaign, hiring 267 specialist doctors and 557 medical officers to strengthen the public health system. These developments reflect an ongoing commitment to healthcare improvement, but sustained efforts and investment will be

necessary to overcome the structural challenges and ensure accessible and quality healthcare for all residents of Gilgit-Baltistan.

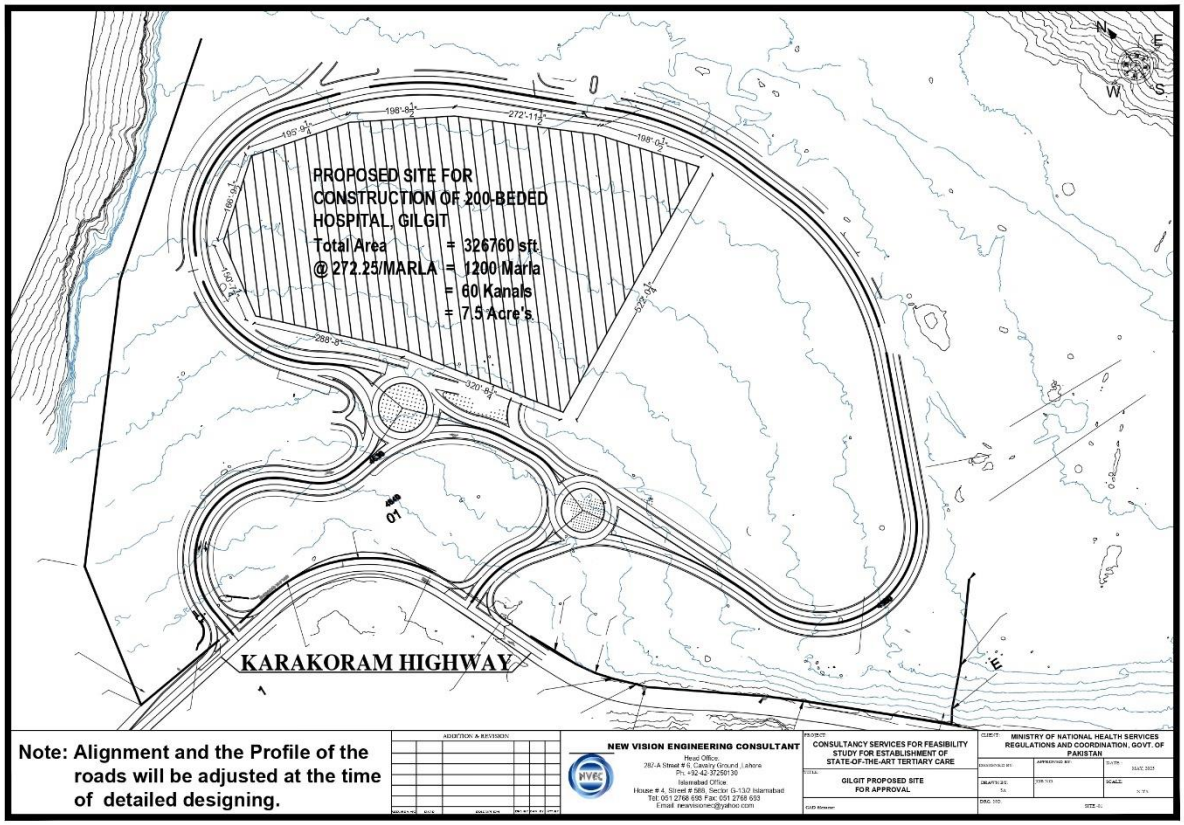
Minawar village, located approximately 8.5 kilometers from Gilgit city along the Karakoram Highway, is home to around 300 families. The village has a middle and high school serving about 450 students. Healthcare facilities in Minawar include a Community Dispensary (CD) in Sakwar Minawar, which provides basic medical services to the local population. However, for specialized treatments and advanced medical care, residents often rely on the healthcare infrastructure available in Gilgit city.

Overall, while Gilgit-Baltistan has made strides in improving its healthcare system, challenges such as inadequate infrastructure, shortage of medical personnel, and limited access to specialized care persist. Continued investment and development are essential to meet the healthcare needs of the region's residents, including those in villages like Minawar.

Keeping in view the increasing demand of health facilities, the Ministry of National Health Services Regulations and Coordination's planned to establish another tertiary care hospital with state-of-the-art technology and facilities covering different dimensions of health care for Bhimber and adjacent areas. The bed capacity of said hospital will be 200 beds. The hospital building will comprise on ground Floor and 2 above-ground floors. Detail of covered area is given below;

- Ground floor plan = 88770 sft
- First floor plan = 46088 sft
- Total Covered area = 134858 sft

Estimated cost of the proposed hospital is rupees 3718 million. Land required for the proposed project is 60 kanals (326760 sq.ft.). Land for the hospital is already acquired for proposed activity.



Location of proposed hospital

1.2 PURPOSE OF THE REPORT

Environmental Impact Assessment (EIA) report is being submitted to the GB Environmental Protection Agency (GB EPA), Government of Gilgit Baltistan in compliance with the legal requirement of Section, 16 of GB Environmental Protection Act, 2014; "Preparation and submission of IEE / EIA" for obtaining the Environmental Approval (EA) before starting project activity. Based on the cost and size of the project, detailed Environmental Impact Assessment has been carried out. Other relevant regulations and guidelines considered while preparing this EIA report include:

- Policy and procedures for filing, review, and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Guidelines for sensitive and critical areas.
- Hazardous Substance Rules, 2003.

This report has been prepared based on detailed engineering designs, pre-feasibility of the project and estimates of health services required in the project area. Different environmental aspects like social, physical, biological etc. and other related features of the project during designing, construction & operational phases are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental

impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, GB EPA in the present case, before issuing the desired Environmental Approval.

1.3 IDENTIFICATION OF THE PROJECT AND THE PROPONENT

a. Contact Person

Mr. Shah Jehan from Ministry of National Health Services Regulations and Coordination will be contact person for this project. He will be the official correspondant from the Ministry for this project. The details of the proponent are given hereunder.

Name:	Shah Jehan
Designation:	Director (Planning & Development)
Address:	3rd Floor, Kohsar Block, Pak Secretariat, Islamabad
Contact Details:	+92-51-9245998

b. Consultant

Grand Square Consultancy (GSCON)

Address: Eithad Colony, Near Scheme Moar, Multan Road, Lahore; UAE Office:

Khalidiya Tower, Office No. 5, M-22, Al Khalidiya St., Abu Dhabi, UAE

Tel: + 924237805259; Email: info@gscons.com; Web: www.gscons.com

1.4 NATURE AND SIZE OF THE PROJECT

As mentioned above, the proposed project is about the construction of a double story hospital with 200 Bed capacity. Land required for the proposed project is 60 kanals (326760 Sq.ft.). The hospital building will be double story with one ground floor and two above ground floor. Detail of covered is given below;

- Ground floor plan = 88770 sft
- First floor plan = 46088 sft
- Total Covered area = 134858 sft

The hospital will be equipped with state-of-the-art health facilities to cater the needs of the local population. Following is the detail of main facilities available at hospital;

- Emergency Department
- Gynecology Department
- General Surgery Department
- Medicine Department
- Pediatric Department
- Cardiac Department
- ENT Department

- Orthopedic Department
- CCU
- ICU
- Eye Department
- Neurology & Neurosurgery Department

Other than the above-mentioned departments, the hospital will be laboratories for diagnosis of diseases. The hospital will also be equipped with an inhouse wastewater treatment plant and incinerator. The incinerator will help to manage the infectious / hazards waste within the premises of the hospital. Hospital waste management is the biggest issue faced by Pakistan. Keeping in view this issue the Ministry has decided to install an incinerator in the hospital as part and parcel of this project. Layout of the proposed hospital is attached hereunder as Figure 1-1. Copy of layout plan is attached as Annexure-I of the EIA report. Sufficient parking space is allocated in the building design for vehicles of visitors and staff.

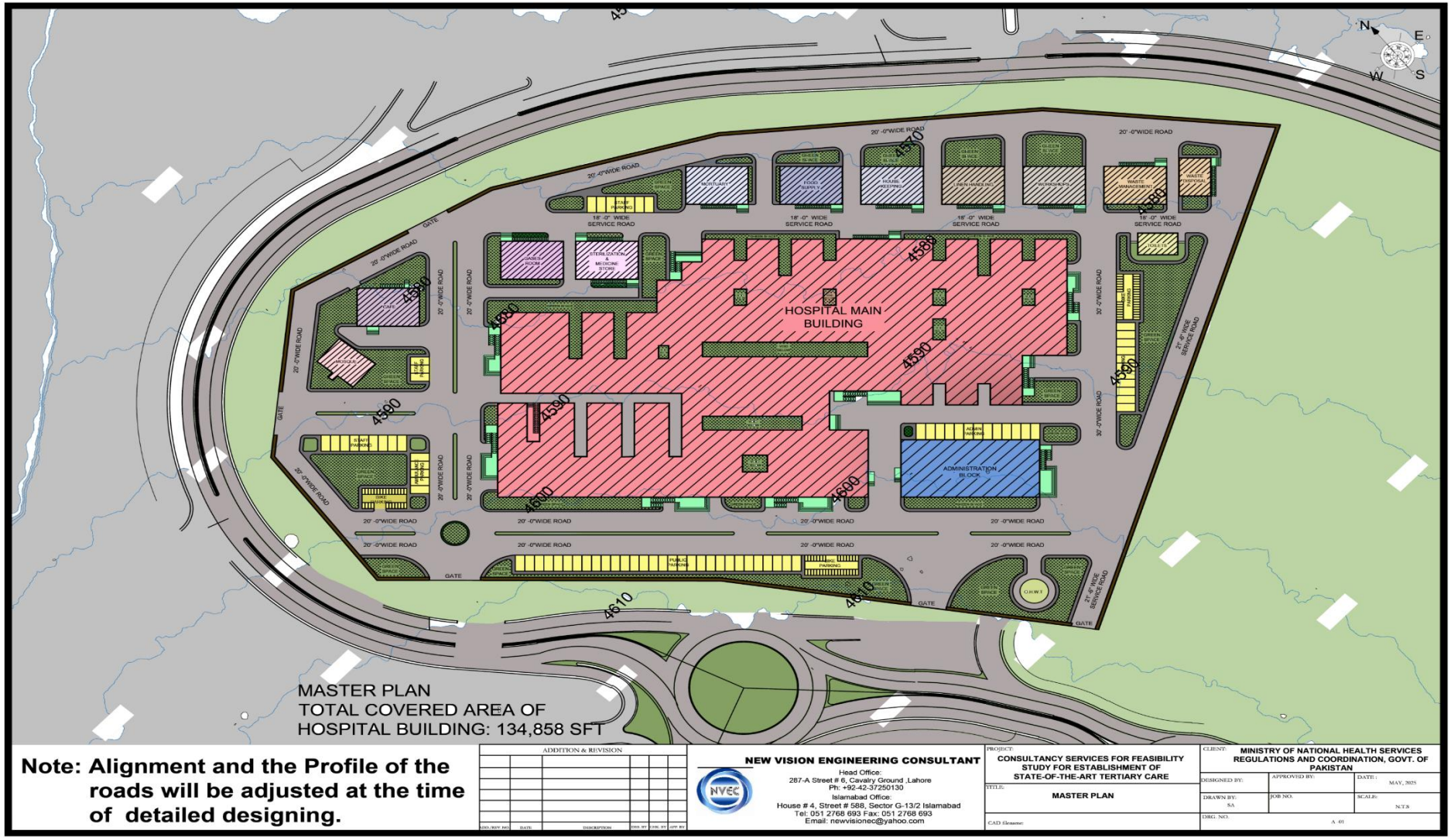


Figure 1-1: Layout Plan of proposed Hospital

1.5 LOCATION OF THE PROJECT

The proposed project will be ideally located next to the already operational hospital of Minawar Village District Gilgit. The site is accessible from main Karakoram Highway. Location map of proposed site is giving here sf Figure 1-2.

Figure 1-2: Location Map of proposed Hospital

1.6 SCOPE OF STUDY

The scope of EIA will include environmental assessment of project activities including design, construction and operation of Hospital building. Following are the objectives of the EIA;

- Assess the existing environmental conditions of project area, including the identification of environmental sensitive receptors and develop a baseline of its prevalent environmental and socioeconomic conditions;
- Identify and investigate all impacts of the proposed project of activity during pre-construction/design, construction, operation phases, on the physical, biological and socioeconomic environment of the project area;
- To propose mitigation measures that would help execution agency (Ministry of National Health Service Regulations and Coordination) in conducting the proposed project activities in an environmentally sustainable manner;
- To uncover the planning and operational phase impacts up to microenvironment levels in which project is proposed to be sited; and
- To develop an Environmental Management Plan (EMP) that would assist execution agency in the effective implementation of the recommendations of the EIA.

The key steps followed while conducting EIA are briefly described below.

1.6.1 Understanding of the Proposed Operation

This involves collecting information from the client, design engineer, desktop study of area, health department of Gilgit etc. on the proposed project activities and understanding the activities to identify potential impacts of implementing these designs.

1.6.2 Review of Legislation and Guidelines

National legislation, international agreements, environmental guidelines both of Pakistan Environment Protection Authority (EPA), and ADB, and best industry practices has been reviewed to set environmental standards for implementation in project during construction and operation phase of the project.

1.6.3 Secondary Data Collection

Available published and unpublished information pertaining to the background environment has been obtained and reviewed. All data sources have been carefully reviewed to collect the following information.

- Physical environment – topography, geology, seismology, geomorphology, soils, surface and groundwater resources and climate;
- Biological environment – habitat types, flora and fauna (particularly rare or endangered species), critical habitats, vegetation and communities within the area;
- Physical cultural resources – sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance; and,

- Socio-economic environment – settlements, socio-economic conditions, infrastructure and land use.

1.6.4 Field Data Collection (Baseline Survey)

Field visits were undertaken consisting of preliminary scoping through survey and assessment activities to establish the potential impacts and categorization of activities. The key environmental sensitive receptors and stakeholders within the project area were identified.

Baseline surveys were conducted to by the multidisciplinary team to identify and establish physical and biological conditions and ecosystems in the project area and results has been incorporated in this report. The socio-economic environment in the project areas has been obtained through the socio-economic profiles and social impact assessment carried out by social safeguard team. Climate risk and vulnerability assessment findings are discussed.

Primary data collection was carried out for ambient noise levels, ambient air quality and ground water quality at the key receptor locations in the project area and particularly in close proximity to the proposed site for hospital.

Review of available secondary information on the physical, biological and ecological aspects, physical cultural resources and infrastructure utilities in the project area has been conducted.

1.6.5 Public Consultation

During the detailed field survey conducted in April 2025; Public consultations (PC) were carried out with all key stakeholders, particularly local communities residing in the project area, local businesses and government and local government bodies. In this EIA, the Public Consultation process was carried out including verbal disclosure regarding the project development with stakeholders to brief them about project and to seek their response/recommendation.

1.6.6 Impact Identification and Assessment

Potential impacts arising from each phase of the proposed project has been identified and assessed on the basis of field data, secondary data, expert opinion and examining previous similar projects in Pakistan. These include effects on physical, biological and socio-economic environment.

1.6.7 Recommendations for Mitigation Measures

Mitigation measures to minimize, eliminate or compensate the potential environmental impacts have been recommended. The mitigation measures have been recommended on the basis of past experiences, best industry practices, legislative requirements and professional judgment.

1.6.8 Development of Environmental Management Plan (EMP)

An Environmental Management Plan (EMP) has been developed for effective implementation of the recommended mitigation measures. The EMP has included controls to minimize the identified impacts and monitoring program to monitor effect of mitigation

measures implemented and residual impacts, if any, during implementation. The EMP has identified roles and responsibilities of all concerned parties during the implementation of the project.

1.7 PERSONS PERFORMING EIA STUDY

EIA study of the project has been conducted by team of Grand Square Consultancy in collaboration with New Vision Engineering Consultants (NVEC), according to the GB Review of IEE/EIA Regulations 2009, and other relevant Regulations and completed this EIA Report. List of names with the roles of team members carrying out the EIA study is given in **Table 1-1.**

NAME & DESIGNATION	QUALIFICATION & EXPERIENCE
Mr. Muhammad Mujahid Principal Consultant (Environment)	**MPhil. M.Sc.** Environmental Sciences, University of the Punjab**.** Over 10 year's working experience
Mr. Rizwan Javed Project Manager	**M.Sc. Environmental Sciences**, University of the Punjab. Over 10 year's working experience
Raja Tariq Mahmood Ecologist	**M.Sc. Forestry; Msc. Participatory Forest Management & Extension (PFM & E).** Over 31 year's working experience.
Miss Rabia Rafiq Sr. Environmentalist	**M.S. Environmental Sciences, University of the Punjab.** Over 5 year's working experience
Mr. Mohsin Zaman Sr. Environmentalist	**M.S. Environmental Sciences,** University of Lahore. Over 2 year's working experience.
Ms. Mehmad Liaqat Environmentalist	**Environmental Sciences,** University of Veterinary and Animal Sciences**.** Lahore.
Ms. Roha Eman Environmentalist	**Environmental Sciences,** University of Veterinary and Animal Sciences**.** Lahore
Ms. Ayesha Sarwar Environmentalist	**Environmental Sciences,** University of Veterinary and Animal Sciences**.** Lahore
Ms. Komal Aroosh	**MS. Chemistry,** GCU Lahore Over 4 years' experience
Mr. Babar Ali Environmentalist	**BS. Environmental Sciences,** University of Veterinary and Animal Sciences. Over 2 year's working experience
Ms. Dua Rehman Environmentalist	**Environmental Sciences,** University of Veterinary and Animal Sciences. Lahore

Ms. Fizza Touqeer Environmentalist	**Environmental Sciences,** University of Veterinary and Animal Sciences**.** Lahore
Mr. Moeez Shafeeq Environmentalist	**Environmental Sciences,** University of Veterinary and Animal Sciences. Lahore
Mr. Daniyal Ahmad Environmentalist	**BS. Environmental Sciences,** University of Veterinary and Animal Sciences, Lahore
Mr. Javed Iqbal Kahlon HSE Specialist	**Master in Occupational Safety and Health, Turin, Italy.** Over 20 year's working experience
Mr. Mudassar Adil HSE Specialist	**BS. Environmental Sciences,** GC University, Faisalabad. Over 6 year's working experience
Mr. Noor Khan Sociologist	**M.Phil.** International Development Studies, **M.Sc.** Sociology. Over 7 year's working experience

Table 1-1 Members of EIA Team

1.8 ROLES AND RESPONSIBILITIES

Role and responsibilities have been proposed in the EIA report. Proposed mitigation measures, as defined in the EMP will be primarily implemented by the management of the project with responsibilities assigned to various departments. Project Proponent will strictly adhere to implementation of all mitigation measures contained in this report in order to minimize any negative impact on any component of environment during and after execution of project. Institutional arrangements have been suggested in Chapter-7 of this document, so that proposed mechanism of environmental protection shall work in time.

1.9 ROLE OF GILGIT BALTISTAN ENVIRONMENTAL PROTECTION AGENCY

The Pakistan Environmental Protection Agency (Pak-EPA) is meant for the enforcement of environmental laws in Pakistan. They have delegated powers to provincial environmental protection departments/agencies for review, approval and monitoring of environmental assessment projects. The proposed project is in Gilgit-Baltistan therefore the GB-EPA will be responsible for reviewing the report, issuing Environmental Approval and overall/broad based monitoring of the proposed project activities to ensure compliance with the Environmental Management Plan.

1.10 ORGANIZATION OF EIA REPORT

The EIA report is divided into following chapter:

Executive Summary

Chapter 1: Introduction - "Introduction" describes introduction, location of project, objective and purpose of the EIA report

Chapter 2: Legal Framework - "Environment Legislative Requirements and Framework" elucidates the current legal framework including national and funding agency's guidelines which is applicable to the proposed project in the context of environment and sustainable development;

Chapter 3: Project Description – "Project Description" furnishes an overall description of the project, including its background, features and key components, timeframe and cost, Alternatives;

Chapter 4: Description of Environment - comprises a detailed narrative of the existing (baseline) conditions of the project area, with respect to its physical, biological and socio-economic environment;

Chapter 5: Stakeholder Consultation - provides summary of consultative sessions with the local community as well as with other stakeholders including local government officials for their opinions and suggestions on the project;

Chapter 6: Impact Identification & Mitigation Measures - elaborates the likely impacts of the project on the physical, biological and socio-economic environment during the construction and operation stages and lays down the proposed measures to mitigate the adverse impacts of the project;

Chapter 7: Environmental Management Plan - provides the mechanism to be adopted for the implementation of measures and monitoring the environment during all stages

Chapter 8: Findings and Recommendations - gives the conclusion of the impact assessment study and recommendations for the construction and operational stages

Chapter 9: Grievance Redressal Mechanism

Annexure

CHAPTER-2

2. POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK

2.1 GENERAL

This chapter provides an overview of the policy framework and legislation that applies to control the environmental consequences as a result of implementation and operation of project "Environmental Impact Assessment of Tertiary Care Hospital with capacity of 200 Beds at Minawar Gilgit" The project needs to comply with all the applicable environmental policies, laws, guidelines, acts and legislations of Government of Pakistan and the provincial government as well as International Environmental Guidelines.

Policy Framework: The Federal Ministry of Environment has been devolved under 18th amendment in the constitution of Islamic Republic of Pakistan and similarly provinces were enabled to legislate on the subject of environment, therefore Gilgit Baltistan assembly under schedule 4 of "Gilgit-Baltistan (Empowerment and Self Governance) Order 2009" can make laws on the list of subjects provided in it. In that context, Gilgit Baltistan has its own Environmental Protection Act and hence the Gilgit Baltistan Environmental Protection Agency (GB-EPA) is the responsible authority for policy making on environmental protection in Gilgit Baltistan. The proposed project will be financed by Govt. of GB which require compliance to the Environmental Policy and Guidelines, so it is obligatory on the part of the Proponent to follow these for environmental assessment.

2.2 EXISTING REGULATIONS AND LEGAL FRAMEWORK STRATEGIES

National Environment Policy, 2005

The National Environmental Policy (2005) provides an overarching framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification etc.) confronting Pakistan. It recognizes the goals and objectives of the Pakistan National Conservation Strategy (PNCS, 1992), National Environmental Action Plans, and other existing environment related national policies, strategies, and action plans. 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.

2.3 Pakistan Environmental Procedures, 1997

Pakistan Environmental Assessment Procedures (1997) is, in fact, a package which contains the following sets of information relevant to the proposed Project:

2.3.1. A) Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

It describes environmental policy and administrative procedures to be followed for filing of environmental assessment reports by the proponents and its review and approval by the concerned environmental protection agency/department.

B) Guidelines for the Preparation and Review of Environmental Reports

These guidelines are developed to facilitate both the proponents and decision makers to prepare reports (inclusive of all the information contained therein) and carry out their review so as to take informed decisions.

C) National Environmental Quality Standards, 2000

The Pakistan Environmental Protection Council first approved these standards in 1993. They were later revised in 1995 and 2000. They furnish information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to control environmental pollution.

D) Other Relevant Laws

i) Land Acquisition Act (1894): Projects may require government procurement of privately owned land and the displacement of land users. Land may be acquired through:

i. Expropriation (Compulsory Acquisition)

ii. Voluntary negotiation with the owners for sale of land

iii. Donation from the land owners The Land Acquisition Act (1894) deals with the government acquisition of private properties for public purposes including large development projects. There are 55 sections in this Act mainly dealing with area notifications, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.

2.3.2. NATIONAL FOREST POLICY PAKISTAN, 2009

The elements of the National Forest Policy Pakistan 2009 are as follows:

- Reducing the impact of socio-economic causes;
- Population planning in critical ecosystems;
- Providing substitutes to firewood in the wooded mountains;
- Reducing poverty, poverty of opportunity and Powerlessness;
- Reducing political interference in the Forestry and Wildlife Departments;
- Renovating and invigorating the institutions of RNR;
- Supporting Local Governments in the sustainable development of their RNR;
- Policies for fragile ecosystems;
- Revering forests;
- Irrigated plantations;
- Preservation of relict and unique forests;
- Wildlife;
- Rangelands and desert ecosystems; and
- Planting of trees and fodders on farmlands.

2.3.3. NATIONAL RESETTLEMENT POLICY

At this point, the only legislation relating to land acquisition and compensation is the Land Acquisition Act (LAA) of 1894. The LAA is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of their livelihoods.

2.3.4. THE GB ENVIRONMENTAL PROTECTION ACT, 2000

The Pakistan Environmental Protection Agency (Pak-EPA) is meant for the enforcement of environmental laws in Pakistan. They have delegated powers to provincial environmental protection departments/agencies for review, approval and monitoring of environmental assessment projects. The proposed project is in Gilgit-Baltistan therefore the GB-EPA will be responsible for reviewing the report, issuing Environmental Approval and overall/broad based monitoring of the proposed project activities to ensure compliance with the Environmental Management Plan.

2.3.5. NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS)

The National Environmental Quality Standards (NEQS), 2000 & 2010, specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities and the sea (three separate sets of numbers);
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources;
- Maximum allowable concentration of pollutants (two (02) parameters) in gaseous emissions from vehicle exhaust; and
- Maximum allowable noise levels from vehicles;
- The NEQS for ambient air quality, drinking water quality and noise has been approved in 2010. These NEQS specify the following:
- Maximum allowable concentration of pollutants (nine (09) parameters) for ambient air;
- Maximum allowable concentration of pollutants (35 parameters) in drinking water; and
- Maximum allowable noise levels during day and night time for residential area, commercial area, and industrial area and silence zones.

2.3.6. REGULATIONS AND GUIDELINES (REVIEW OF IEE & EIA 2009)

Salient features of the regulation, relevant to the proposed Project are listed below:

- Categories of projects requiring lEE and EIA are issued through two schedules attached with the Regulations.

- A fee, depending on the cost of the project, has been imposed for review of EIA and lEE.
- The submittal is to be accompanied by an application in prescribed format included as schedule IV of the Regulations.
- The EPA is bound to conduct a preliminary scrutiny and reply within 10 days of submission of the report **a)** confirming completeness, **b)** asking for additional information, or **c)** requiring additional studies.
- The EPA is required to make every effort to complete the review process for IEE within 45 days and of the EIA within 90 days, of issue of confirmation of completeness.
- EPAs accord their approval subject to following conditions:
- Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
- Before commencing operation of the Project, the proponent is required to obtain from EPA a written confirmation of compliance with approved conditions and requirements of the EIA.
- An EMP is required to be submitted with the request for obtaining confirmation of compliance.
- The EPAs are required to issue confirmation of compliance within 15 days of receipt of request and complete documentation.
- The EIA approval will be valid for three years from the date of accord.
- A monitoring report is required to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operations.

2.3.7. GUIDELINES FOR ENVIRONMENTAL ASSESSMENT (UMBRELLA PROCEDURE)

These guidelines are listed as below:

1. Policy and Procedures for filing, review and approval of environmental assessments.
2. Guidelines for the preparation and review of Environmental Reports
3. Guidelines for public participation
4. Guidelines for sensitive and critical areas
5. Pakistan environmental legislation and the National Environmental Quality Standards (NEQS)

The guideline (I) i.e. Guidelines for the preparation and review of Environmental Assessments, target the project proponents, and specify:

- The nature of the information to be included in environmental reports.
- The minimum qualifications of the EIA conductors appointed.
- The need to incorporate suitable mitigation measures at every stage of project implementation.
- The need to specify monitoring procedures.

2.3.8. 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. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268, which defines and recognizes noise as a public nuisance. "A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right."

2.3.9. PAKISTAN PLANTATION AND MAINTENANCE OF TREES ACT, 1974

The Plantation and Maintenance of Trees Act, (1974) regulates tree plantations and enforces measures for their protection. The requirements of this act are applicable in terms of planting new trees and their maintenance by the occupier of the existing land who would have the physical possession.

2.3.10. HAZARDOUS SUBSTANCE RULES, 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.

2.3.11. OTHER NATIONAL/PROVINCIAL LAWS

The following laws, though originally federal in nature, are either directly applicable, adapted, or mirrored through GB's own legal instruments. They form part of the legal framework for Environmental Impact Assessments (EIAs) and environmental management in the region.

1. The Antiquities Act, 1975

Adopted by GB to protect cultural heritage, historical monuments, and archaeological sites. Under this Act, any development project must ensure that no damage occurs to declared antiquities or heritage sites during construction or operation phases. EIA reports must evaluate potential impacts on such sites.

2. The Motor Vehicles Ordinance, 1965, and Rules, 1969

Applied in GB to regulate vehicle registration, emissions, transport licensing, and traffic safety. These laws are significant when assessing air quality impacts and increased vehicular traffic resulting from proposed projects.

3. The Factories Act, 1934

Extended to GB through administrative mechanisms, this law ensures occupational health and safety, working conditions, and environmental management within factories and industrial facilities. EIAs must assess factory compliance with pollution control and worker safety standards.

4. The Pakistan Penal Code, 1860

Applicable in GB for prosecution of environment-related offenses, such as public nuisance, pollution, and negligence. EIA reports must consider risks of legal violations under this code.

5. The Explosives Act, 1884

Applicable in GB through adaptation, especially relevant to construction, mining, or hydroelectric projects that involve blasting. Environmental assessments must include risk mitigation for explosive use and safety.

6. The Jammu and Kashmir Forest Regulation, 1930

A region-specific law unique to GB that governs forest protection, sustainable use, and afforestation measures. EIAs must evaluate project impacts on forested land and comply with restrictions on deforestation and biodiversity loss.

7. The North-West Frontier Province Wild-Life (Protection, Preservation, Conservation and Management). Act, 1975:

This Act defines rules and regulations for the protection, preservation, conservation and management of wildlife.

8. The Telegraph Act, 1910

Applied in GB for regulating public telecommunication infrastructure. Relevant for projects involving land disturbance near communication lines or requiring relocation of such infrastructure.

9. The West Pakistan Water and Power Act, 1958

Applicable in GB to regulate water resource management, hydropower development, and distribution of power infrastructure. Projects must assess their impacts on water availability, river ecology, and existing water rights.

10. Occupational and Environmental Safety Regulations

While GB does not have a standalone safety code, it follows national guidelines and international best practices for worker safety, hazard control, emergency preparedness, and environmental health. These are integrated into the Environmental Management Plan (EMP) required for all projects undergoing EIA.

2.3.12. 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 project if women are employed for the construction of the proposed Project.

2.3.13. LABOUR LAWS AS PART OF CONSTITUTION OF PAKISTAN 1973

The Constitution of Pakistan contains a range of provisions with regards to labour rights, in particular:

- Article 11 of the Constitution prohibits all forms of slavery, forced labour and child labour;
- Article 17 provides a fundamental right to exercise the freedom of association and the right to form unions;
- Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; and
- Article 37(e) makes provision for securing just and human conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

Labour law is controlled at both provincial and national levels with compulsory employment agreements containing the terms set out by the labour laws. The labour laws are a comprehensive set of laws in Pakistan dealing with the following aspects:

- Contract of Employment;
- Termination of Contract;
- Working Time and Rest Time;
- Working hours;
- Paid Leave;
- Maternity Leave and Maternity Protection;
- Other Leave Entitlements;
- Minimum Age and Protection of Young Workers;
- Equality
- Pay Issues;
- Workers' Representation in the Enterprise;
- Trade Union and Employers Association Regulation; and
- Other Laws.

2.3.14. EMPLOYMENT OF CHILDREN ACT, 1991

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any construction, or any other hazardous employment.

In accordance with this Article, the Employment of Child Act 1991 prohibits child labour (a child is under 14 years old). The relevance of this act to the project will be to prohibit child employment for construction of the proposed project.

2.3.15. INTERNATIONAL PROTOCOLS AND OBLIGATIONS

Since Pakistan is a very active member of a number of international organizations like United Nations Organization (UNO), Organization of Islamic Countries (OIC), South Asian Association for Regional Corporation (SAARC), Economic Corporation Organization (ECO), etc., so it has to follow the international protocols and obligations related to the environmental perspective. The protocols and obligations related to the proposed project are as under:

- The Convention on Conservation of Migratory Species of Wild Animals, 1979
- The Rio Declaration, 1992
- Convention on Wetlands (Ramsar Convention), 1971

2.3.16. 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 where the cutting of tree will be involved.

2.3.17. NATIONAL DISASTER MANAGEMENT ACT, 2010

National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to the whole of Pakistan. The Act was passed in backdrop of 2010 Floods in Pakistan and strengthens Disaster Management system

This act is applicable to the proposed project. The proposed project will require special consideration to disasters and risk management strategies as per the Act.

CHAPTER-3

3. PROJECT DESCRIPTION

3.1 TYPE AND CATEGORY OF PROJECT

Proposed project is about construction of hospital building with capacity of 200 beds. The project will have state of the art technology and will offer wide range of health facilities including OPD, Gynecology, ENT, Pediatric etc.

The proposed project is need of the time and area. District Head Quarter Hospital Gilgit is already operational in the project area. This hospital is not sufficient to cater more than 50,000 population of the region (Jutial, Sakwar, Danyor, Sultan Abad, Khomar, Near Gilgit Airport etc),. As per statement of Doctors of DHQ, patients from Chitral (and other areas of Gilgit) also visit DHQ. Further, the facilities in DHQ Hospital Bhimber are not sufficient to manage the advance levels of diseases. The people of area have to go to bigger cities for treatment of such diseases.

GB IEE/EIA Regulations 2000 has not defined the category for such project, whether they fall under category of projects requiring Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA). Keeping in view the estimated cost of project (3718 million rupees) and size of the land (60 kanals), detailed EIA has been carried out to assess the environmental and social impacts of the proposed project is more detail.

3.2 OBJECTIVES OF THE PROJECT

The prime objective of this project is to enhance the health care system of Pakistan. The number and size of health care facilities are few less as compared to population size of Pakistan and GB. Therefore, Ministry of National Health Services, Regulations and Coordination decided to establish new hospitals in Bhimber AJ&K, Chitral KPK, Kuram Agency KPK, Ayoun GB and Loralai Blochistan.

These hospitals will support the health care system of large population and will help to bring positive change in the lives of local population of these areas.

The objectives of the project are defined below;

- Enhance the health care facilities in different regions of Pakistan
- Provide enhanced and sophisticated health care facilities in Government hospitals to combat increasing number of diseases.
- Provide advance health care facilities to local community in their neighborhood.
- The project will save precious time which they patients took to reach bigger cities to find advance health care facility.

For more details, please refer to “1-Introduction-Nature and size of the project” above.

3.3 ALTERNATIVES CONSIDERED & THEIR REASON OF REJECTION

Project alternatives are studied as a part of this EIA process. Alternatives analysis has been conducted in detail to foresee environmental, economic and social impact of each alternative. This section also provides an overview of various commercially available technological options and siting of proposed project to make the project environmentally sound. Project alternatives have been studied keeping in view number of parameters including no project option, technological / selection of material, construction of new storage facilities. Sustainable and locally available construction materials were prioritized over conventional high-carbon materials. Alternatives involving prefabricated modular structures were also studied, but traditional RCC-based construction was chosen due to its proven strength and durability in high-altitude, seismic-prone zones like Gilgit. Energy-efficient technologies, solar integration, and eco-friendly waste disposal systems have been incorporated to minimize the long-term environmental footprint.

This alternatives analysis ensured that a well-informed, context-specific decision was made to establish the **Tertiary Care Hospital at Minawar, Gilgit**, which is expected to significantly improve healthcare access for thousands of residents across Gilgit-Baltistan. The final selected option balances public health benefits with environmental sustainability and regional development goals.

The alternatives for following project components have been discussed:

- Alternative I: No Project Option
- Alternative II: Location of the hospital
- Facilities at Hospital

3.3.1 Alternative I. No Project Option:

The “no project option” means no action alternative is required to ensure the consideration of the original environment without any development. This is necessary for the decision-makers in consideration of all possibilities. The development will have a minimal effect on the physical environment. In terms of the social environment, the “no-action” alternative would result in shortage of health care facilities because number of populations is increasing and the existing health care facilities are not sufficient to cater the increasing population. The "No Project" option will also eliminate job opportunities, create insecurities of future health cover to local community.

3.3.2 Location of the hospital:

The location of hospital must be ideally located on the main access point for community. The proposed location on Minawar Gilgit and Karakoram highway will make it accessible for local communities.

Further, keeping in view the size of population in local community and the distance of Gilgit from big cities this site is selected. The distance of Gilgit is almost 849.2 kilometers away from Lahore and 491.8km from Islamabad/Rawalpindi. This large distance means

the advance health facilities are minimum 400km from Bhimber. That is why this area is selected by Ministry to build hospital.

3.3.3 Facilities at Hospital:

During planning phase, discussion was made on the number and type of facilities to be provided for this hospital. As there are no tertiary care hospitals available in the nearby area, this hospital was decided to build with full capacities with 200 beds.

3.3.4 Other Considerations

To fulfill the social and environmental aspects of this project, it is to be sited at a place where there are bright prospects and need of the same project. Availability of land at the best convenient place and at affordable cost is yet another equally important factor among other considerations for the site selection. The site is ideally located near Karakoram Highway. Availability communication facilities, electricity, basic infrastructure, sewerage etc. is another necessary requirement which is already available at the proposed site.

Obviously, environmentally sound, neat and clean environment are the other considerations for site selection. The project will also facilitate the people of the area with jobs provision.

All the above stated qualities for an ideal site for project are present in the selected project site of proposed hospital. Keeping these requirements and their feasibility, proposed project is a blend of elegant location, most efficient and cost-effective design, elaborated by quality construction, is simply the best. All the other basic infrastructural requirements are also available at the selected site. Accordingly, the selected site is ideally suited for construction of the hospital.

3.4 PROJECT LOCATION/ SITE LAYOUT

As mentioned earlier, the proposed project is planned in Minawar Gilgit Site location is near the Karakoram highway. Site location given below as Figure 3-1.

Figure 3-1 Location Map of Proposed Hospital

3.5 LAND USE AT THE PROJECT SITE

There are different types of land use i.e. open land near, built-up, DHQ Hospital, private hospitals and medical stores, graveyards, green belt, road/track, stream/ Nullah, residential and commercial structures, and parks etc. Figure 3-1 shows the land use around proposed project site. The hospital is centrally located in residential and commercial area of Bhimber. Essential for the work bases is easy approach, availability of a suitable place for temporary storage of material and availability of water for construction in the vicinity. Presence of shade from trees close to the work bases can add to the comfort of the labor while taking rest during the hot season. The location of storage materials and camps will be critical. Since the project contractor(s) will be responsible for identifying the suitable locations for storage and labor camps from the private sector, thus there will need to be clear guidelines for this process, which will need to be closely monitored by the implementing agency. As far as possible, the project design team shall be assigned the task to identify the suitable location(s) for storage of materials since inappropriate storage of materials may result disruption of the traffic movement. Figure 3-2 shows the pictorial evidence of land use of the area.

Figure 3-2 Photographic Evidence of Land Use Around Proposed Project

3.6 ROAD ACCESS

As mentioned earlier, the proposed site is located in Minawar Gilgit. The access of hospital is from Karakoram highway. However, direct access roads from other streets on the back side of proposed site are also available.

3.7 VEGETATION FEATURES OF SITE

The site for construction of hospital building is clear land with no tree. Couple of trees are present near the boundary of site. These tresses will be conserved and additional tree plantation will be carried out to enhance esthetic beauty of Hospital. No worth mentioned ecological feature has been noticed during site visit and review of literature.

The available literature was thoroughly reviewed to have a better understanding of the project area and its surroundings including habitat, flora and fauna. This survey broadly covers ecosystem sensitivities (If any), vegetation, other flora and fauna.

3.8 ENERGY/ POWER SOURCE

As mentioned above in this EIA report, the project under reference of this EIA construction of Hospital of 200 beds capacity in Gilgit. Keeping in views the nature of project, calculation of exact requirement of electrical requirement is difficult at this stage. However, estimates are made on the basis of past experience and evidences from similar projects. The estimated energy requirements during construction phase will be 20 – 25 KW, depending upon the activities performed. The contractor will be using their own generators for electricity supply during construction phase. Electricity requirements during operational phase of hospital will be around 250 to 300 KW. The electricity will be supplied by The Water and Power Department Gilgit Baltistan (WPDGB). Diesel generators will also be installed as backup arrangement during regular operations of proposed hospital.

3.9 WATER REQUIREMENT

During construction phase, an estimated 150-200 persons consisting of both semi-skilled and skilled human resource will be required. The major component which required larger number of workforces is Civil work of hospital building. It is estimated that per worker use of water will be 80 liters per day. An average of 12000 liters/day water will be required during construction phase while during regular operation phase about 20,000 gallons per day of water will be required.

3.10 SOLID WASTE

The major source of solid waste is construction waste during construction phase. Other source of solid waste will be worker camps. The estimated average quantity of municipal solid waste from worker camps will be 25 to 27 kg per day.

The generation of solid waste during regular operation will depend on the bed occupancy. However, general estimates are made for solid waste generation for a 200-bed hospital. It The estimated quantity of solid waste from proposed project will be 250 to 300 kg per day. Out of this waste, the quantity of infectious waste will around 80 to 100 kg per day. This infectious waste will be sent to in-house incinerator facility. The proposed capacity of incinerator is 50kg per hour.

The major challenge of hospitals is management of solid waste. Procedure for solid waste has been developed and attached as **Annexure-II** of this report. Implementation of this procedure will help the management to handle this waste effectively.

3.11 PROJECT COST & MAGNITUDE OF OPERTAION

The estimated cost of the proposed project is rupees 3718 million. The cost will be borne by Federal Ministry of Health Service, Regulation and Coordination. The cost is inclusive

of infrastructure development and installation of incinerator, wastewater treatment plant and firefighting system.

Table 3.-1 depicts the arrangement of beds in different departments of hospital.

Table 3-1 Departmental Distribution of Beds

Sr. No.	Department	Number of Beds
1.	Emergency Department	30
2.	Gynecology Department	30
3.	Medicine department	25
4.	General Surgery Department	25
5.	Pediatric Department	20
6.	Cardiac Ward	10
7.	ENT Department	10
8.	Orthopedic department	10
9.	CCU	10
10.	ICU	10
11.	Neurology and Neurosurgery	10
12.	Eye Department	10

3.12 SCHEDULE OF IMPLEMENTATION

The designing of Hospital is performed by renowned company "New Vision Engineering Consultants". The activities to be conducted during construction phase of the project are provided below:

- Mobilization of Contractor
- Development of Construction and Labor Camps
- Excavations for foundations work
- Civil work for construction of building
- Installation of water supply, sewerage lines and electricity cables.
- Finishing work of construction phase
- Installation of medical equipment and other hospital appliances
- Opening of hospital for patients

One of the first activities to be completed by the Contractor shall be the establishment of the construction and labor camp. The Contractor will also establish construction yards and sites, offices and a workshop.

The construction activity has to span over approximately twenty-four months. There shall be a number of contracts for a variety of works. The selected Contractors shall have the option to select suitable site(s) located near to the project sites to establish their labor camps. If private land is selected, the contractor shall enter into contract with the private owner. During construction phase, an estimated 150-200 persons consisting of both semi-skilled and skilled human resource will be required.

Essential for the work bases is easy approach, availability of a suitable place for temporary storage of material and availability of water for construction in the vicinity. Presence of shade from trees close to the work bases can add to the comfort of the labor while taking rest during the hot season.

As far as possible, the project design team shall be assigned the task to identify the suitable location(s) for storage of materials since inappropriate storage of materials may result disruption of the traffic movement because the area of I-10 Islamabad and KSS is densely populated.

3.13 DESCRIPTION OF THE PROJECT

The project has been duly described at: "1-Introduction- Nature and size of the Project-Purpose of the report, identification of the project and the project proponent."

3.14 DESCRIPTION OF THE PROCESS

The project has been duly described at: "1-Introduction- Nature and size of the Project-Purpose of the report, identification of the project and the project proponent."

3.15 DETAILS OF RESTORATION & REHABILITATION PLANS

The proposed project is of high significance considering the urgent need of health care facilities in the region.

Major rehabilitation work will include filling back the excavated land, debris disposal according to national sustainable practices, scientific disposal of all sorts of solid wastes and grass plantation on pre-planned areas, cleaning of unpaved areas etc.

Debris or any other wastes resulting from construction of buildings will be disposed-off in environmentally sustainable fashion. The materials capable of recycling/ reuse will be either sold in the market or to be reused for other suitable purposes.

During entire construction period, necessary precautions will be taken to ensure that no damage will be done to the basic infrastructures like power transmission lines telephone lines, roads, private or public property and daily human life as well as discomfort to patients of existing DHQ Hospital. Any utilities if encountered during the excavation work, shall be restored. Restoration of pavements (rigid/flexible) at all roads/streets shall be done.

Safety measures as desired under the code of demolition will be adopted to avoid any harm to humans, property around or the environment in the project area. Dust, to be generated will be minimized by constant sprinkling of water on unpaved area. After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spillover of these materials will be cleared adequately. The land, if and where pitted will be adequately leveled. On the whole, the project site and the area in its near vicinity will be made neat and clean.

3.16 GOVT. APPROVALS AND LEASES REQUIRED BY THE PROJECT

For the proposed project, Ministry of Health Services, Regulation and Coordination will be the Executing Agency (EA) while the project will be handed over to Health Care Commission of GB Government.

Environmental Protection Department (EPD) / Environmental Protection Agency (EPA), Government of Gilgit Baltistan is the concerned authority for issuance of environmental approval. For the purpose this EIA has been submitted to EPA GB.

CHAPTER-4

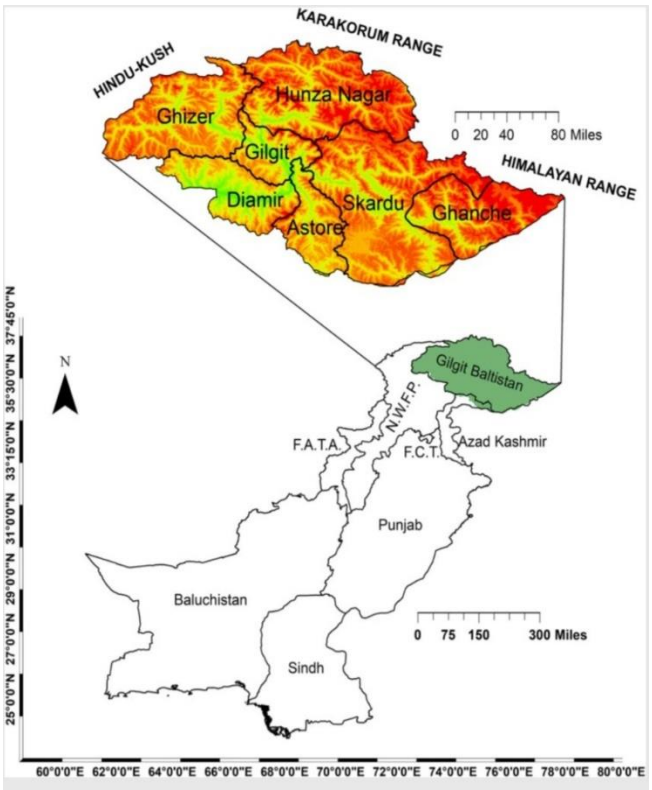
DESCRIPTION OF ENVIRONMENT

General Overview:

Gilgit, the capital city of Gilgit District, is a vital urban center in northern Pakistan. It lies at the confluence of the Gilgit and Hunza Rivers, in a location locally known as *Duo Pani*. Nestled in the rugged terrain of the Karakoram Mountain range, the city serves as a regional hub for trade, tourism, and administration. Although significantly smaller than the broader Gilgit-Baltistan region, Gilgit city holds strategic importance due to its proximity to the China-Pakistan Economic Corridor (CPEC) and the Karakoram Highway. The city is characterized by steep mountains, narrow valleys, and a semi-arid climate. With an estimated population in the hundreds of thousands, it is a growing urban area that blends traditional culture with modern development.

4.1 Physical Resources

4.1.1 Topography



Gilgit city is surrounded by steep, barren mountains and lies at an altitude of approximately 1,500 meters above sea level. The terrain is rugged, with limited vegetation due to the arid conditions. The city is located in the foothills of the Karakoram range, though it is relatively distant from the towering peaks like K2 and Nanga Parbat, which lie further afield in the broader region. The surrounding topography creates natural constraints on expansion and infrastructure development and also contributes to the city's isolation from major urban centers in mainland Pakistan.

4.1.2 Geology and Soil

The geology of Gilgit city reflects its position within the Karakoram Mountain system. The area features steep slopes and narrow valleys formed through glacial and fluvial processes. Soils are typically shallow and composed of sandy loam or gravel, derived from glacial and alluvial deposits. These soils have low organic matter and are highly prone to erosion, particularly during seasonal floods or heavy rainfall. Land degradation is a growing concern due to overgrazing, deforestation, improper waste disposal, and unregulated use of agricultural chemicals. Urban expansion without

proper land management has further exacerbated these issues. Efforts to promote sustainable development and soil conservation are critical for maintaining the ecological health of Gilgit city.

4.1.3 Hydrology (Underground Water, Surface Water, Wetlands)

Water resources in Gilgit city are primarily sourced from glacial meltwater, rivers, and springs. The Gilgit River serves as the main surface water body, providing essential water for agriculture, domestic use, and small-scale hydropower generation. Due to the rocky and steep terrain, groundwater recharge is limited, and water is commonly accessed via shallow wells, hand pumps, and natural springs. However, water quality is a concern, with many sources showing signs of microbial contamination and high turbidity. While Gilgit city lacks significant natural wetlands, small high-altitude ponds and seasonal wetlands exist in its vicinity and play a minor role in supporting local biodiversity. Glacial lakes in the surrounding mountains pose a potential risk of Glacial Lake Outburst Floods (GLOFs), which could impact the city's water infrastructure and safety.

Figure 2: Rivers in Gilgit-Baltistan

4.1.4 Water Supply and Drainage

Water supply in **Gilgit city** primarily relies on glacial meltwater, which feeds into natural channels (*nullahs*) that eventually discharge into the Gilgit River. Key *nullahs* serving the city include **Jalalabad, Oshikhandass, Jutial**, **Konodas**, **Kargah**, and **Danyour**, with **Jutial Nullah** being the main source for both irrigation and drinking water in the city.

Gilgit's urban water infrastructure includes **five major drinking-water supply complexes**, mostly located in the southern parts of the city. These were established in the late 1970s and continue to serve the local population today:

- **Burmus Water Supply Complex**
- **Jutial Water Lift System (Sonikot)**
- **Jutial Lift Water Supply Complex (Zulfiqar Colony)**
- **Water Supply Complex Danyour Chikas (Choke Area)**
- **Gilgit Filtration Plants**: Including the **APSC Filtration Plant** and the **DHQ Hospital Filtration Plant**

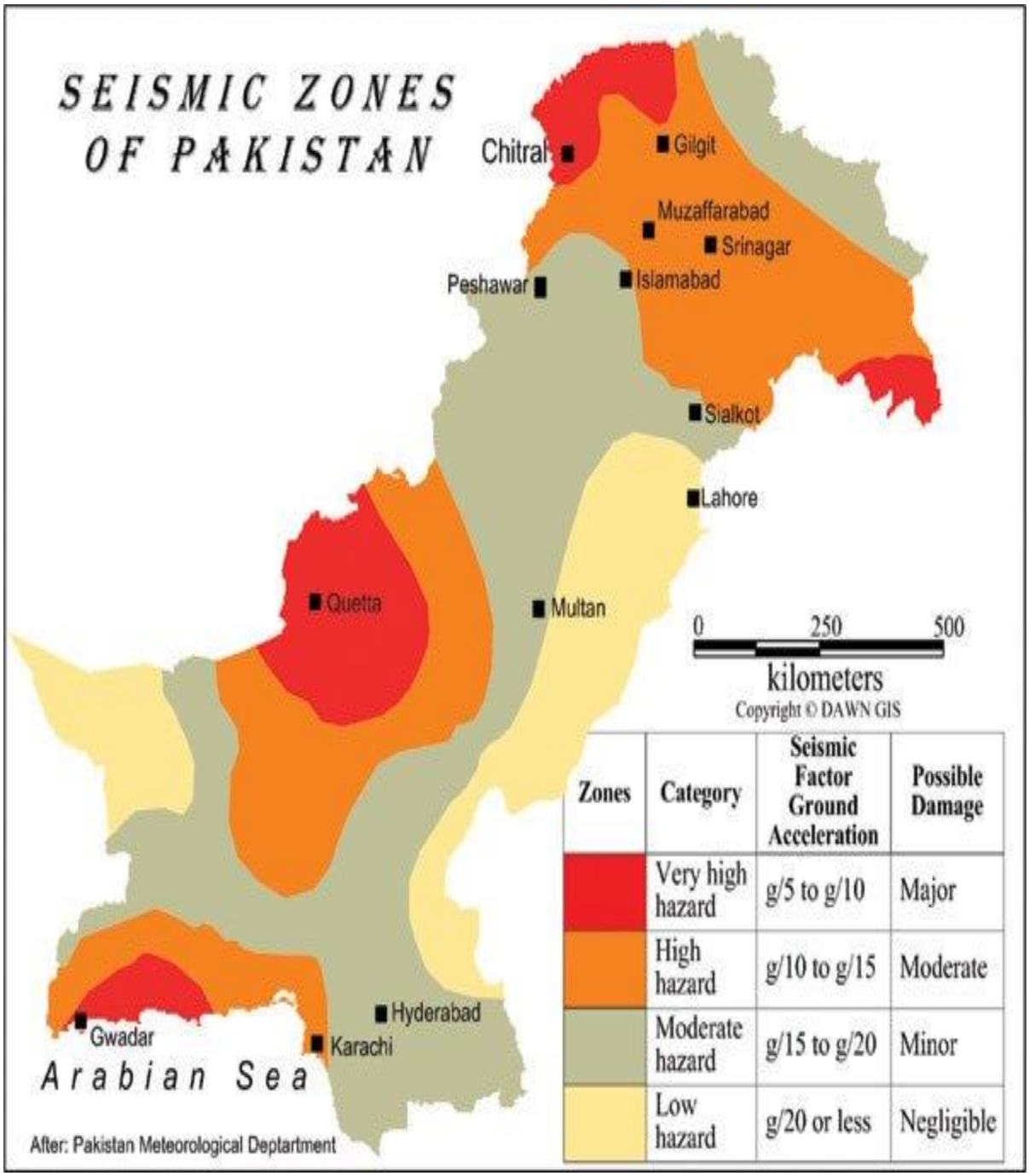
Out of **57 water purification plants** in Gilgit District, **41 are located within Gilgit city**, yet they struggle to meet the growing water demands. The city's existing water supply infrastructure delivers around **67 liters per capita per day**, which falls significantly short of the requirement. According to a survey by IUCN, the storage capacity of all five complexes combined is about **15 times less than the actual demand**, leading to chronic shortages.

The city faces significant water quality issues. A 1999 survey by the **Water and Sanitation Extension Programme (WASEP)** revealed all five water complexes were contaminated with **fecal matter**, posing severe health risks. Water in the distribution channels is further polluted by daily human activities like washing clothes and utensils directly in the streams. As of now, **Gilgit city lacks proper water-treatment plants**, and de-silting and maintenance of water channels are typically carried out by residents through self-help initiatives.

On the **drainage side**, the **Northern Areas Public Works Department (NAPWD)** and the **Frontier Works Organization (FWO)** have constructed roadside storm drains, particularly along main roads like the **Karakoram Highway (KKH)**. However, these are designed for stormwater only—not for greywater or household wastewater. Most **residential drains** within neighborhoods (*mohallas*) are either **kuchha** (unpaved) or **pukka** (paved), and are also built and maintained informally by residents.

Inadequate drainage infrastructure results in the discharge of untreated wastewater directly into the **Gilgit and Hunza Rivers**. Furthermore, the **Jutial and Konodas Nullahs**, which are key water sources, are increasingly contaminated due to

unregulated waste disposal by residents, further degrading water quality and creating public health concerns.



4.1.5 Seismicity

Gilgit city, located in northern Pakistan, falls within **seismic zone 3** as per the Building Code of Pakistan, indicating a **moderate to high risk** of seismic activity. The city's position near the collision boundary of the Indian and Eurasian tectonic plates makes it susceptible to **earthquakes and tremors**, with historical occurrences underscoring the need for earthquake-resilient infrastructure and disaster

preparedness. Urban planning in Gilgit city must factor in this seismic risk to ensure public safety and minimize potential damage.

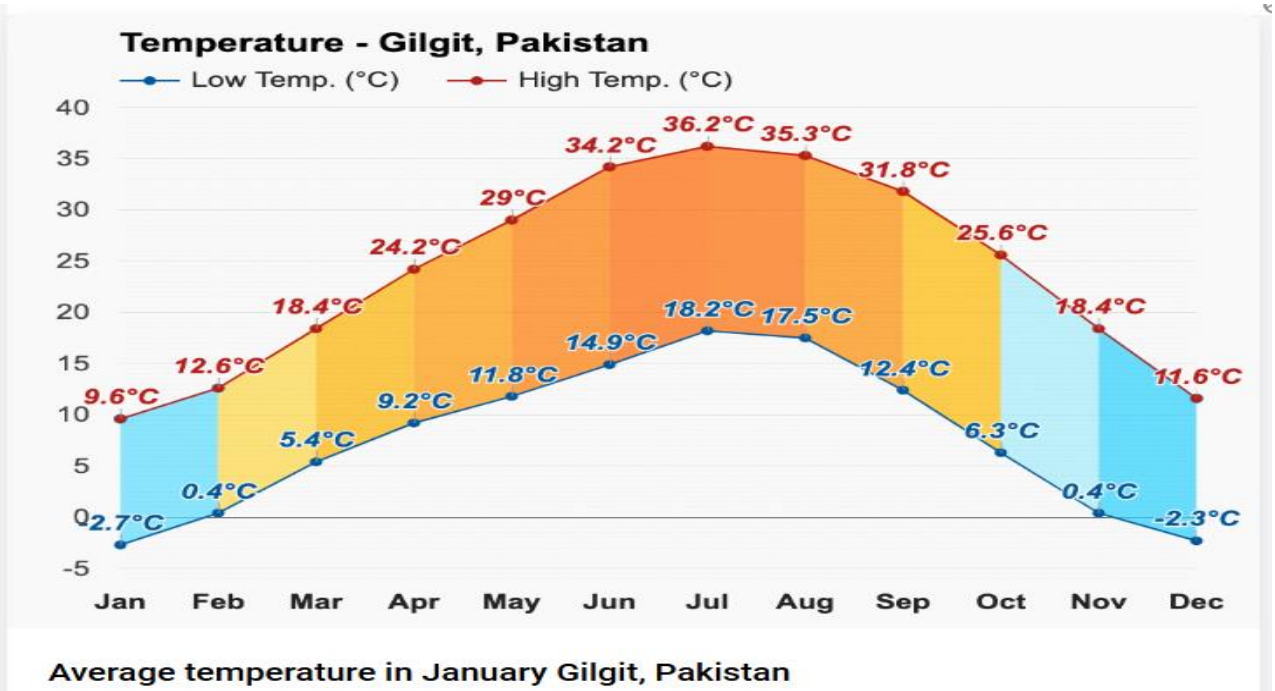
4.2 Climate

Gilgit city experiences a **semi-arid highland climate** with **hot summers**, **cold winters**, and **low annual precipitation**. The city is not significantly influenced by the South Asian monsoon system, resulting in **dry conditions** for most of the year. Summers are relatively warm, while winters can be chilly, though not as harsh as in higher-altitude valleys like Hunza or Skardu.

4.2.1 Temperature

Temperature fluctuations in Gilgit city are notable, especially between day and night. During the **summer months**, daytime temperatures can rise up to **35°C**, while in **winter**, temperatures may fall to around **-2°C**. Unlike the higher-altitude towns of Gilgit-Baltistan, Gilgit city rarely sees heavy snowfall, although light snowfall may occasionally occur between **December and February**. Approximate temperature range in Gilgit city:

- **Summer (June to August):** 28°C – 35°C
- **Winter (December to February):** -2°C – 10°C
- **Spring and Autumn:** Mild and transitional, with pleasant days and cool nights.



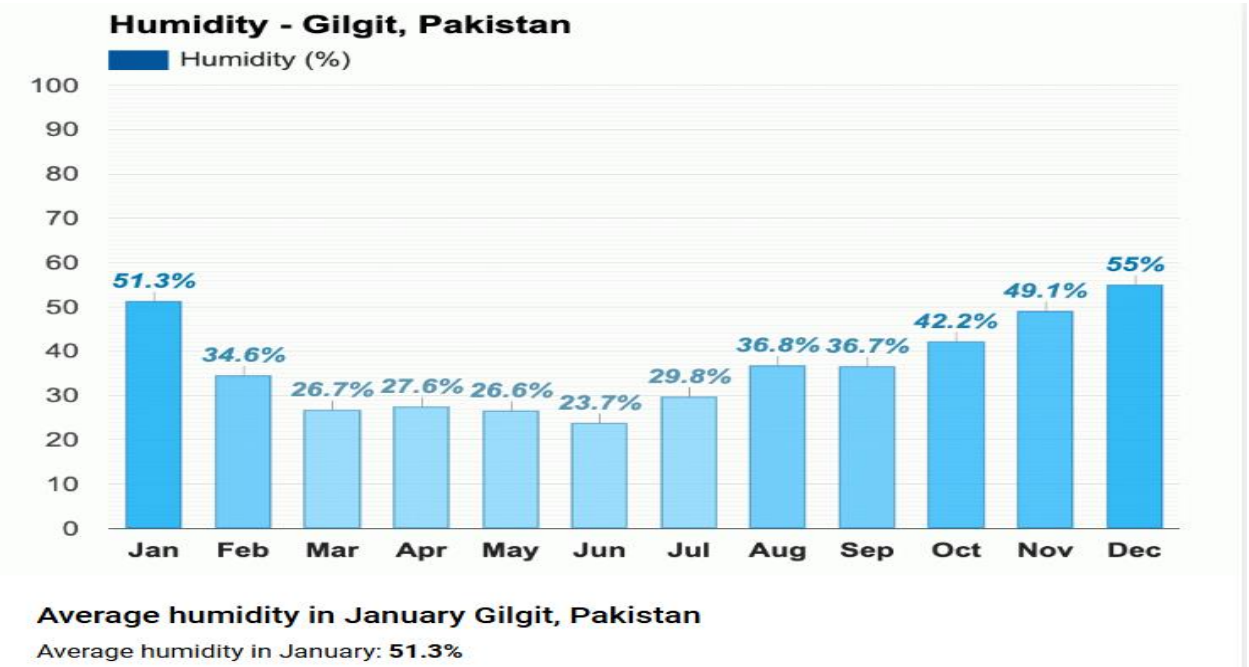
Average temperature in January Gilgit, Pakistan

Source: Weather Atlas

Exhibit 2.2: Mean Monthly Precipitation and Temperature in Gilgit averaged from 1981-2010[12]													
Parameter	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Extreme*
Max Temp (°C):	9.3	12.0	17.9	23.9	28.4	34.3	36.1	35.3	31.6	25.3	17.8	11.0	45.0
Min Temp (°C):	-2.7	0.2	5.4	9.4	11.7	15.2	18.8	18.1	12.7	6.6	.0.6	-2.4	-11.1
Precipitation (inches)	3.9	6.6	12.1	25.5	25.2	11.8	14.7	15.6	8.6	6.8	3.1	6.3	54.6[13]

Humidity:

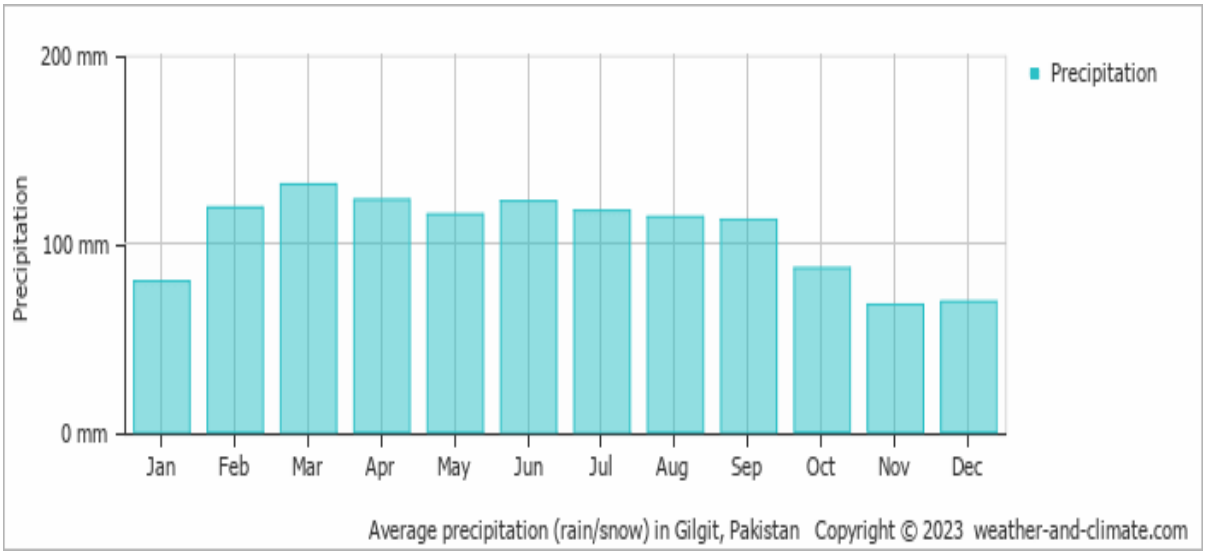
Humidity levels in Gilgit city are generally **low**, typically ranging from **30% to 50%** throughout the year. The air is dry due to the arid environment and limited rainfall, especially outside of the winter season. Occasional increases in humidity occur after light rain or snowfall. The **low humidity contributes to rapid cooling at night**, a notable diurnal temperature variation, and increases the **risk of forest and shrub fires** during the dry summer months. For agriculture, this dry climate demands efficient irrigation systems to support crop production and fruit ripening.



Source: Weather Atlas

4.2.2 Rainfall

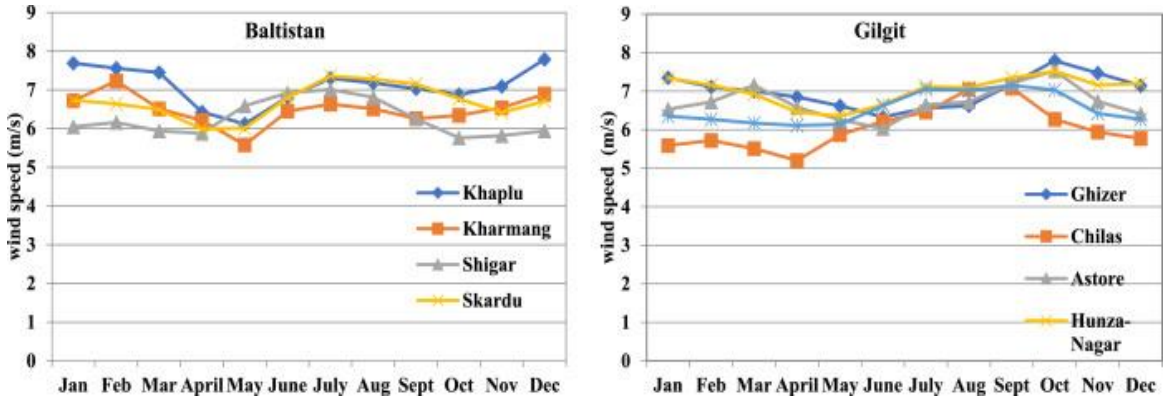
Gilgit city experiences one of the lowest levels of rainfall in Pakistan, averaging between **120 to 240 mm annually**. Most of the precipitation occurs in **winter and**



early spring, often in the form of **snowfall** in the surrounding hills. Due to the **Himalayan barrier to the south**, the city receives minimal influence from the summer monsoon. Rainfall events are typically brief and infrequent.

4.2.3 Wind Direction

Winds in **Gilgit city** are influenced by the surrounding mountainous terrain. The predominant wind directions are **westerly and northwesterly**, especially in **winter**, when cold air masses pass through the valleys. In **summer**, winds shift due to diurnal temperature variations, resulting in **upslope breezes during the day** and **downslope flows at night**. These wind patterns contribute to **dry conditions** and occasional **dust storms** in exposed areas within and around the city.



4.3 Ecological Resources

Source: Techno-economic assessment and sustainability impact of hybrid energy systems in Gilgit-Baltistan, Pakistan

4.3.1 Biodiversity:

Gilgit is located in a river valley in the southwest of the Karakoram Range. The climate is arid, as monsoon systems break against the southern slopes of Himalayas, about 150 km south of Gilgit, and the average annual rainfall ranges from 120 to 240 millimeters (4.7 to 9.4 inches). Agriculture depends on water that is diverted from

mountain streams and rivers fed by snow melt at higher altitudes. The biodiversity of Gilgit and its surroundings is adapted to these extreme variations in climatic and geographical conditions.

The city is urban and largely a degraded habitat. However, the hills in the vicinity of the city and the adjacent valleys, particularly the forests in the Kargah and Jutial Valleys, provide habitat for faunal species, including mammals, birds and herpetofauna. The Gilgit and Hunza Rivers and the smaller nullahs contain both endemic and exotic fish species.

4.3.2 Flora:

Gilgit's flora is influenced by its arid climate and varied elevation. The vegetation falls primarily within the Dry Sub-Tropical Shrub Zone and Dry Temperate Coniferous Forest Zone. Shrub vegetation is prevalent along the valley floors and lower mountain slopes, while higher elevations—especially along the northern slopes—host coniferous forests. Tree species common in the region include *Picea smithiana* (Himalayan spruce), *Cedrus deodara* (Deodar cedar), and *Pinus wallichiana* (Blue pine). Smaller plants and shrubs include *Quercus ilex* (Holm oak), *Juglans regia* (walnut), and aromatic herbs like *Artemisia maritima* and *Indigofera gerardiana*. These forests, particularly around Jutial and Kargah valleys, provide essential ecosystem services, such as watershed protection, habitat for wildlife, and sources of firewood and medicinal plants. Local residents harvest fuelwood in spring and autumn for use during the harsh winters, and wood is also used for tools, utensils, and traditional medicines.

The vegetation in the city falls in the Dry Sub-Tropical Shrub Zone and Dry Temperate Coniferous Forest Zone. The former is located at lower elevations and southern slopes of mountains especially along the Gilgit and Hunza Rivers. The latter consists of forests found in the inner or northern slopes of the Himalayas and are less susceptible to monsoons. The dry temperate coniferous forests occur between elevations of 1,500 to 3,400 meters. These forests are characterized by fewer deciduous tree species, although coniferous species predominate.

Forests occur in the valleys, including the Naltar and Bagrot Valleys and also in the vicinity of the Jutial Nullah. Typical tree species in these forests include Picea smithiana, Cedrus deodara and Pinus willichiana. Smaller shrubs include Quercus ilex and Junglus regia and scattered shrubs of Artimesia maritima, Indigofera gerardiana, Sambucus ebulus, Sorbaria tomentosa, and Plectranthus rugosus. These forests not only provide habitat for faunal species but also provide timber the locals use for domestic and commercial purposes.

4.3.3 Fauna:

Mammals reported in and around the city outskirts include members from the family of Vespertilionidae, Canidae, Felidae, Sciuridae, Muridae and Mustelidae. Large mammals, like the Snow Leopard Panthera uncia, Common Leopard Panthera pardus,

Wolf Canis lupus, and Red Fox Vulpes, have been reported in the city hills. In addition, small mammals, such as bats and rodents, have been reported from inside the city limits.

Mammals included in the **IUCN Red List** are the Woolly Flying Squirrel Eupetaurus cinereus and Snow leopard Panthera uncia, both of which are listed as Endangered. The Common Leopard Panthera pardus, Eurasian Otter Lutra and Royle's Mountain Vole Alticola roylei are listed as Near Threatened. The Snow Leopard Panthera uncia is closely associated with the alpine and sub-alpine ecological zones. They favor steep terrain well broken by cliffs, ridges, gullies, and rocky outcrops.

More than a hundred bird species have been reported around the city. These include passage migrants, vagrant, resident, breeding and irregular visitors. The altitudinal migratory birds descend from higher altitudes during the winter months. Typical bird species found here include Snow Partridge Lerwa, Chukar Alectoris chukar, Common Quail Coturnix, Common Hoopoe Upupa epops, Common Swift Apus, Rock Pigeon Columba livia and Common Kestrel Falco tinnunculus. No Endangered or Critically Endangered bird has been reported from the area. The only bird included in the IUCN Red List is the European Roller Coracias garrulus, which is listed as Near Threatened.

The main water bodies in Gilgit include the Gilgit and Hunza Rivers and smaller streams or nullahs such as the Kargah, Jutial, Sakwar and Bagrot Nullahs. The Hunza River is comparatively smaller and more turbid compared to the Gilgit River, and the latter has a much higher diversity of aquatic fauna due to less turbidity. Most of the fish caught by local people is consumed within households, but it is also sometimes offered for sale.

4.3.4 Protected Areas:

Although Gilgit city itself is not home to a formally designated protected area, its surroundings (like the **Jutial** and **Kargah** valleys) have ecological significance. Some **community-managed conservation zones** exist to support wildlife protection, especially for species like the **Snow Leopard**. Management and protection initiatives are supported by organizations like **WWF-Pakistan**, **IUCN-P**, and the **Snow Leopard Foundation**.

4.3.5 Fisheries:

The freshwater resources of Gilgit support a modest yet ecologically important fish population. The Gilgit River, being less turbid than the Hunza, is a primary habitat for aquatic fauna, including both native and introduced fish species. While brown trout (*Salmo trutta fario*) is more abundant in cooler, upstream waters such as Naltar and Ghizer, some fish species are found in the Gilgit River as well. Fishing is largely subsistence-based, with most of the catch consumed by local households. There are no industrial-scale fisheries within Gilgit city, and fish farming remains underdeveloped.

Description	Details
Net Present Value (NPV)	Rs. 9,348,988
Benefits Cost Ratio (BCR)	1.82
Internal Rate of Return (IRR)	54%
Payback Period (years)	2.31

Grand S

Nonetheless, the clean, cold mountain water has potential for sustainable aquaculture development if proper ecological assessments and conservation practices are implemented. The main nearby village of project location is Jalalabad. Jalalabad is a village in the Gilgit-Baltistan region of northern Pakistan. The settlement is located around 20 km east of Gilgit city. The village has a population of around 40,000 in of some 5,000 households. All of the inhabitants are Shia Muslims. The literacy rate is approximately 96%. The village was the major victim of sectarian violence in 1988, when extra-regional forces consisting of thousands of armed militiamen under the command of General Zia Ul Haq and the Government ruined this village, burned houses, killing many innocent people. After this incident, the village was reconstructed. Now it is the center of Shias in Gilgit. The head of Shias of Gilgit-Baltistan and Khateeb of Gilgit Imamia Masjid Agha Rahat Hussain Al-Hussaini also hails from this village.

4.4 Human and Economic Development:

4.4.1 Population and Community:

According to the 1998 census conducted across Pakistan, Gilgit's population at the time was 57,750 people , which did not include the moza of Danyour (which included Muhammadabad) and the moza of Sakwar (which included Minawar), both of which are within the Gilgit city-limits prescribed by the GDA for the Plan. In 1998, the population growth rate of the city excluding Danyour and Sakwar was, approximately, 2.66%25. A 2011 UN Habitat report provides a projected figure for the same area as 92,365 people in 201826.

Projected Population (GILGIT CITY)					
Year	Annual Growth Rate %	Projected Population	Population Increase Due to Summer Population		Total Population
			Percentage	Persons	
2015		332,251	9%	29903	362,153
2020	5.5%	434,238	15%	65136	499,374
2025	4.5%	541,140	17%	91994	633,133
2030	4.0%	658,379	18%	118508	776,887
2035	3.0%	761,391	19%	144664	906,056

4.4.2 Family Size and Gender Composition:

In Gilgit city, the average household size is estimated to be slightly smaller than the regional average of 8.1 persons, aligning more closely with urban living conditions and infrastructure limitations. Most families in Gilgit consist of 6 to 8 members, often comprising extended family structures due to cultural norms. The urban setting of Gilgit city draws individuals from nearby rural areas for work, education, and health services, creating a demographically diverse population. Based on national

Source: GDA DEVELOPMENT AUTHORITY (GDA)

demographic trends and localized observations, the gender composition in Gilgit city mirrors the national average, with males making up approximately 51% of the

	Residence		
	Urban	Rural	Total
Household headship			
Male	91.7	93.8	93.5
Female	8.3	6.2	6.5
Total	100.0	100.0	100.0
Number of usual members			
1	3.1	0.8	1.1
2	3.4	3.5	3.5
3	5.1	2.5	2.8
4	7.0	5.6	5.8
5	10.7	8.5	8.8
6	11.7	11.9	11.8
7	10.9	13.4	13.1
8	11.6	12.5	12.4
9 +	36.4	41.3	40.6
Total	100.0	100.0	100.0
Number of households	149	922	1071
Average household size	8.3	8.4	8.4

population and females about 49%. The population is relatively young, with a significant proportion under the age of 18, contributing to a high dependency ratio in many households.

4.4.3 Employment:

Unemployment is a growing concern in Gilgit city. While the broader region of Gilgit-Baltistan reports an official unemployment rate of around 1.5%, urban centers like Gilgit experience much higher levels of underemployment and job insecurity. The city's labor market is constrained by limited private sector development and a heavy reliance on public sector employment. Each year, thousands of students graduate from local institutions, but only a fraction are able to secure jobs, primarily in government departments or through contract-based opportunities in NGOs. The increase in population and graduates has intensified competition for a limited number of formal employment positions. Many youths turn to informal work, freelancing, or migrate to larger cities for better prospects. Entrepreneurship and small businesses, though present, remain under-supported due to a lack of financial incentives and infrastructure.

Source: National Institute of Population Studies, Government of Pakistan, Islamabad

4.4.4 Role of Women in Gilgit City:

In Gilgit city, urbanization has shifted the traditional roles of women, though many continue to bear the dual burden of domestic and economic responsibilities. Women are active in household management and contribute significantly to urban agriculture in peripheral areas—engaging in vegetable gardening, poultry farming, and food processing. Additionally, many women work in education, health, and development sectors, particularly in NGOs and private schools. However, cultural norms and safety concerns limit their mobility and access to formal employment, especially in mixed-gender workplaces. While men in the city may work seasonally or travel for work, women are consistently engaged in year-round labor, both visible and invisible.

Studies indicate that women in Gilgit bear a higher proportion of household and community-level responsibilities compared to men, accounting for nearly 47% of all labor activities, highlighting their critical but often undervalued role in sustaining the urban economy.

Table: Share of activities of Men and Women

Tasks	Percentage Share				
	M	F	F/M	M/F	Total
Household Chores	78	20		2	100
Irrigation	31	56	10	2	100
Vegetable Production	52	36	6	6	100
Cereal Crop Production	26	25	6	43	100
Fruit Production	44	35	3	18	100
Forestry	13	38	30	18	100
Livestock	67	22	11	0	100
Poultry Farming	78	22	0	0	100
Wool Management	33	56	0	11	100
Average	47	35	7	11	100

Source: National Institute of Population Studies, Government of Pakistan, Islamabad

4.4.5 Literacy Status:

Gilgit city has a relatively higher literacy rate compared to surrounding rural areas, partly due to the presence of educational institutions and a cultural emphasis on education. According to the school census and KIU enrollment data, thousands of students are currently enrolled at the intermediate and university levels in Gilgit. The Karakoram International University (KIU), based in Gilgit city, hosts approximately 947 students in bachelor's and master's programs, with women making up about 35% of the student population. College-level enrollment within the city also shows promising female participation, with women constituting around 47% of the students. However, access to higher education is constrained by limited seats in professional fields such as medicine and engineering, as no such colleges exist within the city. Many students seek education in other cities like Islamabad, Lahore, or Karachi, despite financial and connectivity challenges. Poor internet infrastructure remains a major obstacle for online learning, affecting academic performance and access to information. The local government has allocated budgetary resources for education, but infrastructure, faculty shortages, and outdated curricula hinder progress.

4.4.6 Industries:

Gilgit city serves as the commercial and administrative hub of the region, with a growing but still modest industrial base. The local economy relies primarily on trade, tourism, small-scale agriculture, services, and handicrafts. Below is a breakdown of the city's main industrial sectors:

Here's a more detailed look at some of the key industries:

- **Agriculture and Dry Fruits**

  Urban agriculture persists in the outskirts of Gilgit, where families cultivate orchards and gardens that produce almonds, apricots, mulberries, and cherries. These dry fruits,

especially almonds and dried apricots, are prized for their organic quality and contribute to household income through small-scale trade and export. Fruit drying and preservation have become home-based industries for many women in the city.

- **Tourism**

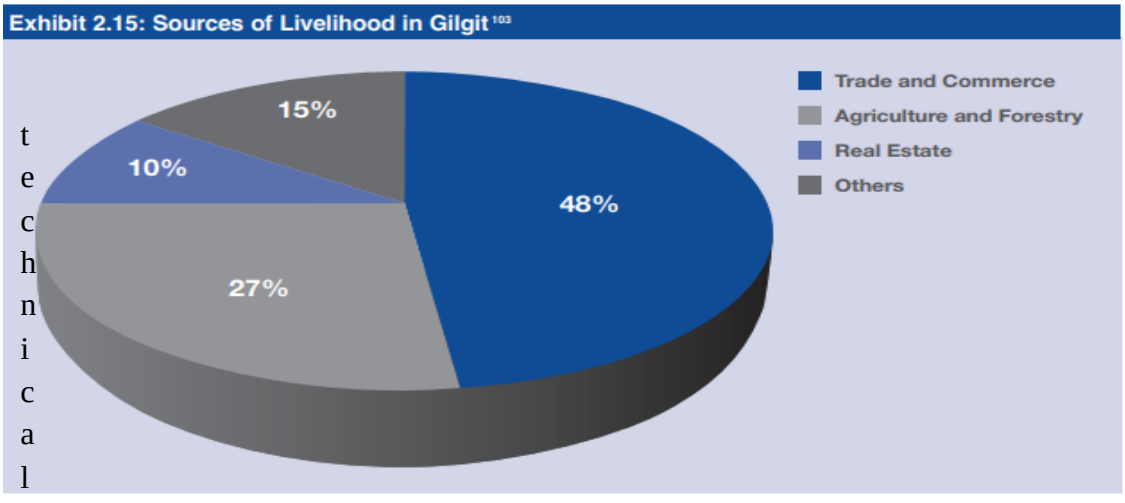
  Tourism is a vital economic driver in Gilgit city, which serves as a gateway to surrounding mountain ranges, trekking routes, and valleys. The city hosts a range of guesthouses, tour agencies, and transport services that cater to domestic and international visitors. However, unregulated tourism has created challenges, including environmental degradation and inadequate waste management. The strain on water and land resources in the city is exacerbated during peak tourist seasons. There is a pressing need for sustainable tourism policies, better infrastructure, and capacity-building for locals involved in the sector.

- **Handicrafts**

  Gilgit city is known for traditional handicrafts, including woolen shawls, embroidered caps, gemstone jewelry, woodwork, and carpets. These crafts are produced by local artisans, many of whom are women operating from home-based workshops. The products are sold in local markets and bazaars, as well as to tourists. Though this sector contributes to cultural preservation and income generation, it faces challenges such as limited access to broader markets and lack of modern design and branding skills.

- **Gemstones and Small-scale Mining**

  While large-scale mining is not prominent within Gilgit city itself, small traders and middlemen often operate from the city, dealing in stones like quartz, aquamarine, and tourmaline sourced from surrounding valleys. The city acts as a trade center where raw and semi-processed stones are bought and sold. There is potential to develop gemstone polishing and value-added services locally, but such ventures require technical training and investment.



Source: Asian Development Bank, Government of Pakistan. (2010). Gilgit-Baltistan Economic Report-Broadening the Transformation.

- **Other Sectors**

  There is modest activity in food processing, tailoring, fish farming, and digital services. Small and medium enterprises (SMEs), particularly in tech and e-commerce, are emerging among educated youth. However, limited digital infrastructure, lack of

financing options, and minimal government support inhibit the growth of these industries.

4.4.7 Infrastructure:

Gilgit city has witnessed gradual infrastructural improvements in recent years, particularly influenced by broader regional development through the China-Pakistan Economic Corridor (CPEC). Despite this progress, the city still grapples with challenges due to its mountainous terrain and susceptibility to natural disruptions. Basic infrastructure—including roads, electricity, water supply, and sanitation—has improved in urban pockets but remains insufficient in peripheral areas. Electricity in Gilgit is primarily sourced from small-scale hydropower plants, but frequent outages occur, especially during winter. Water supply systems serve most formal settlements, while access to clean drinking water is still a concern in informal areas. Internet and mobile connectivity have improved in the city center, but signal reliability drops in hilly or outlying neighborhoods. Construction is often hindered by harsh winter conditions, snow, and landslides.

4.4.8 Institutions:

Gilgit city serves as the administrative and political hub of the Gilgit Division. It hosts key regional government bodies such as the Gilgit-Baltistan Secretariat, divisional offices of the Planning & Development Department, and the regional Environmental Protection Agency (EPA). The city is home to educational institutions like **Karakoram International University (KIU)** and multiple public-sector hospitals and clinics like National College of Arts Gilgit, Directorate of Colleges, Sakwar, Gilgit, Gilgit-Baltistan Al Arif Public School and College, NCCS National College of Commerce and Computer Science. Governance in the city reflects the semi-autonomous framework of Gilgit-Baltistan, but local institutions often face challenges related to limited financial autonomy, staff shortages, and capacity gaps. Civil society, NGOs, and community organizations are active in addressing local development issues, disaster preparedness, and public service delivery.

4.4.9 Transportation:

Gilgit city acts as a transportation hub for the northern region. The Karakoram Highway (KKH) passes through the city, providing a vital connection to Islamabad in the south and continuing northwards toward China. Local roads within Gilgit are narrow and congested in several parts, particularly in the old city center. Public transport consists mainly of minibuses and Suzuki vans, with limited organized traffic management. Air connectivity is provided by the Gilgit Airport, which offers daily flights to and from Islamabad; however, its short runway and unpredictable weather conditions often cause flight cancellations. There are no railway lines in Gilgit city, and due to the topography, river navigation is not possible either.

- **Roads:**

  Gilgit is connected to the national highway network via the Karakoram Highway (N-35), which forms the main artery of movement in and out of the

city. Within the city, key roads include the Airport Road, KIU Road, and Jutial Link Road. These roads link administrative, educational, and residential zones but are frequently impacted by traffic congestion and seasonal landslides. Road maintenance is carried out regularly but is constrained by limited municipal resources.

- **Rails:**

  There is currently no railway infrastructure in Gilgit city. The rugged terrain and high construction costs have impeded development, although long-term planning under CPEC includes proposals for potential rail connectivity in the future.

- **Airports:**

  Gilgit Airport is located within the city and is critical for air access to the region. It supports small aircraft due to its short runway and valley-locked approach. While the airport connects Gilgit with Islamabad, adverse weather—especially fog, snow, or low visibility—frequently disrupts flights. The airport also plays a crucial role in emergency evacuations and medical transport.

4.5 Land Use Planning:

The city spreads longitudinally along the north and south banks of River Gilgit. The historic city center is located in the south bank of the river with commercial areas administrative buildings, an airport, bus stands, historic settlements, open recreation areas and a polo ground. The Konodas Nullah is fed by the river from the north bank and has an administrative core called Konodas. There is a settlement in this region called Mujahid Colony and the newly constructed Karakoram International University (KIU) is also located on this side of the city.

Most of the land in Gilgit is privately owned with two types of Land settlements, formal and informal. Informal settlements are also known as Kachi Abadis10. Such settlements have no land or water rights. Although there are few such settlements in Gilgit, their lack of available water resources is a major concern. Table 1 provides the proportion of areas covered by different uses.

Land Use	**km²**	**Area** (%)
Agriculture Area	21.2	22
Commercial Area	1.0	1
Residential Area	9.4	10
Forestry	3.8	4
Vacant Land	23.8	24
Total	97.9	100

Source: Pakistan Urban Observatory. (2011). City Profile - Gilgit. Retrieved November 20, 2013, from Urban UN-Habitat: http://urban.unhabitat.org.pk/Region/GilgitBaltistan/Gilgit.aspx

4.6 Power Source and Transmission:

Energy is critical for socio-economic development in Gilgit-Baltistan (GB), necessitating coordinated efforts to enhance power supply in remote areas to drive development and improve livelihoods. Despite GB's significant hydropower potential of 60,000 Megawatts, the current capacity is only 170 Megawatts in summer and 110 Megawatts in winter, against a demand of 280 Megawatts, a gap likely to widen with growing tourism. The federal energy policy, now inclusive of GB, aims to establish a robust, secure, and efficient energy system, diversifying sources and ensuring a cost-effective, reliable power supply. The current institutional framework lacks the capacity for comprehensive policy analysis, strategic energy investment planning, resource mobilization, and sustainable infrastructure development, which are essential for energy independence and green growth in GB.

4.7 Agriculture and Mineral Development:

Agriculture in **Gilgit city** remains a key livelihood activity, especially in its peri-urban and surrounding rural areas such as Danyore, Jutial, Konodas, and Sultanabad. Though only a small portion of the land within city boundaries is cultivable, local communities continue to practice subsistence farming that is deeply reliant on seasonal and long-term climatic patterns. Major crops grown include wheat, maize, and barley, with wheat being the dominant winter staple. Fruit orchards are common in the city's outskirts, where cherries, apricots, apples, and walnuts are cultivated both for household consumption and small-scale local sale. While the city itself is not a major exporter, the fruits grown in nearby villages often feed into regional markets. Vegetables such as tomatoes, beans, and potatoes are cultivated on small plots and sold in Gilgit's local bazaars. Due to the urban setting and limited land, high-input commercial agriculture is generally unsuitable, making sustainable, climate-resilient farming practices more important. Unlike the larger region, Gilgit city has not seen extensive mineral development, but gravel, stone, and sand extraction for construction is common along riverbanks, particularly from the Gilgit River, often raising environmental concerns about over-extraction and erosion.

4.7.1 Crops:

Gilgit city, situated near the convergence of the Karakoram, Hindu Kush, and Himalayan ranges, benefits from a relatively favorable microclimate for fruit and nut trees. Almonds and apricots are especially abundant in the suburban settlements, with almonds prized for their rich taste and organic quality. While the total crop volume is lower than district-wide figures, the quality of fruit from Gilgit city orchards is considered premium and mostly consumed locally. Smallholder farmers grow staple cereals such as wheat and maize for home use, and some also cultivate pulses like lentils and peas. The fertile alluvial soil near the river allows cultivation of fodder crops like lucerne and shaftal, essential for feeding the livestock that many households still maintain. While agricultural activity is gradually being encroached

upon by urban expansion, Gilgit city still retains a strong agrarian identity in its fringes.

4.8 Quality of Life Values

4.8.1 Socioeconomic Values:

Gilgit city is the political, economic, and cultural nucleus of the Gilgit Division and serves as the administrative capital of Gilgit-Baltistan. The city's economy is fueled by a combination of agriculture, retail trade, tourism, education, and public sector employment. While agriculture is still relevant, particularly in peripheral zones, the city has diversified economically with a growing number of businesses, service providers, and hospitality ventures linked to tourism. Gilgit is home to major institutions such as the Karakoram International University, government secretariats, and NGOs, which have collectively raised education levels and service accessibility. However, economic disparities persist between the urban core and surrounding underdeveloped pockets. Remittances from residents working in larger Pakistani cities or abroad significantly contribute to household incomes. The city also represents a microcosm of religious and cultural harmony, where diverse Islamic sects coexist peacefully. Despite rapid urbanization, the local population continues to display remarkable resilience in the face of natural hardships such as harsh winters, landslides, and limited connectivity to national markets.

4.8.2 Public Health

Gilgit city, the administrative capital of Gilgit-Baltistan, serves as the central hub for healthcare services in the region. As the most urbanized and populated area within Gilgit Division, it hosts the **District Headquarters Hospital (DHQ) Gilgit**, which is the primary public healthcare facility providing inpatient and outpatient services to the city and its surrounding areas. In addition to DHQ Gilgit, the city accommodates several **Civil hospital in Jalal Abad**, **basic health units (BHUs)**, and **private clinics**, forming a multi-tiered healthcare network that addresses both routine and emergency medical needs. The presence of healthcare-focused NGOs and donor-funded programs has contributed to improvements in maternal and child health, vaccination coverage, and awareness campaigns, particularly in urban neighborhoods like Jutial, Amphery, and Konodas.

Despite these advancements, public health in Gilgit city faces notable challenges. Limited human resources, understaffed facilities, and outdated medical equipment often affect the quality of care.

Source: Google Maps

4.9 Natural Disasters:

Gilgit and its surrounding valleys are highly susceptible to natural disasters such as landslides, flash floods and avalanches, which affect civic life in the city and areas within its vicinity. According to the Pakistan Meteorological Department (PMD), Gilgit is located in a seismically active zone with a shake potential equivalent to an earthquake of magnitude 6 to 7 on the Richter scale. A recent example of the types of natural hazards facing Gilgit is the Ata Abad Lake, which formed due to a massive landslide in 2010 and dammed the Hunza River. The unstable lake poses a threat to the downstream populations of Gilgit and Oshkan Das.46 Exhibit 2.8 categorizes natural disasters according to their frequency of occurrence in Gilgit District. Exhibit 2.9 indicates the percentage of the population in Gilgit District, engaged in different sources of livelihood, at risk from natural disasters. More than 90% of inhabitants engaged in agriculture and 70% in livestock are likely to be highly affected by natural disasters there. With agriculture making up 23% of the source of livelihood for Gilgit's inhabitants, the economy of the city is at a significant risk of being adversely affected by natural disasters.

Source: Information is taken from the Land use map for Gilgit developed by the GDA

Exhibit 2.8: Natural Disasters in Gilgit District[47]

Type of Disaster	Occurrence	Gilgit District Risk		
		High	Medium	Low
Earthquake:	No	■		
Landslide/Rock Fall/Mudflow:	Yes	■		
Glacial Movement/Avalanche:	Yes	■		
Flash Flood/Riverine Flood:	Yes	■		
Glacial Lake Outburst Flood (GLOF)	No		■	
Snow Storm:	Yes		■	
Wind Storm:	Yes			■
Lightening:	Yes		■	
Drought:	Yes		■	
Epidemic:	Yes		■	
Road Accident:	Yes		■	
Wild Fire:	No			■
Ethnic and Sectarian Violence:	Yes	■		

4.10 Baseline Environmental Quality

4.10.1 Ambient Air Quality:

Due to its mountainous surroundings, relatively small population, and absence of major industries, **Gilgit city** generally enjoys good air quality. However, environmental stress is increasing in the urban core, especially in densely populated neighborhoods like Jutial, Majini Muhalla, and Konodas. The main sources of air pollution include vehicular traffic—particularly unregulated public transport—diesel generators used during frequent power outages, and the seasonal burning of firewood and coal for heating. These contribute to elevated levels of fine particulate matter (PM2.5 and PM10), although overall concentrations still meet national environmental standards most of the year. The air quality monitoring for Ambient air is carried out by certified Laboratory. Results of the monitoring are attached as Annexure-III of this report.

Pollutant	Average Level (µg/m³ or ppm)	PEQS Limit (24hr)
PM10	110 µg/m³	150 µg/m³
PM2.5	58 µg/m³	35 µg/m³
NOx	24 µg/m³	80 µg/m³

SOx	14 µg/m³	120 µg/m³
CO	1.2 ppm	5 ppm

4.10.2 Ambient Noise Level:

Noise pollution in Gilgit city is moderate overall but increasingly problematic in commercial and transport-heavy areas. Areas around the **Gilgit bus terminal**, the main **bazaar**, and **construction zones** frequently experience noise levels above desirable thresholds. The principal contributors to urban noise include diesel generators during power outages, honking traffic, and heavy construction machinery such as road rollers and dumpers during infrastructure development. While mountainous surroundings naturally dampen ambient noise in peripheral zones, the urban core is gradually seeing the noise environment worsen, especially during the tourist season and school hours. Noise level monitoring is also carried as baseline survey by certified laboratory. The monitoring results are attached as Annexure-III.

4.10.3 Water Quality:

Gilgit city's water supply is mainly sourced from glacial melt channeled through canals and pipelines from tributaries of the **Gilgit River** and nearby springs. While upstream sources are relatively clean, the quality of water in downstream supply points often degrades due to poor waste disposal, sewage leakages, and livestock intrusion into water channels. Informal settlements in Konodas and other fringe areas face challenges related to the accessibility and purity of drinking water. Municipal water treatment is limited, increasing the community's reliance on household-level filtration or boiling. The water sampling for ground water was also conducted. Results of water analysis are attached as Annexure-III.

CHAPTER-5

4. PUBLIC CONSULTATION

PUBLIC CONSULTATION

5.1 GENERAL

This section describes the process and outcomes of the consultations carried out with various groups of stakeholders as part of the environmental and social assessment. It includes a brief discussion on the concerns expressed by the stakeholders during the consultation meetings and responses provided in order to address the concerns through necessary mitigation measures.

The specific objectives of the consultation were:

i. obtaining local and indigenous knowledge about the environment and people living in the project area;

ii. interaction with the project affected population and other stakeholders for the collection of primary and secondary data on environment and people; and

iii. engaging stakeholders for maximization of the project benefits.

The disclosure of the enhancement project in advance and subsequent consultation with stakeholders has advantages in the environmental assessment and mitigation of impacts. Public consultation can also provide a conduit for the improvement of the project implementation to better serve the stakeholders.

Information disclosure through public consultation was carried out. Short brief of project activities was developed and shared with stakeholders.

The Health Care Commission (GB) will prepare brochures related to the project containing basic information of the project, construction activities, traffic diversion routes, time of construction etc. for awareness of the general public.

The environmental assessment process under the GB Environmental Protection Act 2014 only requires the disclosure to the public after the statutory IEE / EIA has been accepted by the EPA, to be in strict adherence to the rules.

This public consultation process was carried out by the Grand Square Consultancy (GSCON) on May 19-21. Mainly key informants were consulted for these meetings which were carried out in an open and frank atmosphere conducive to appreciation of the basic elements of the project and dissemination of information on beneficial and adverse impacts and mitigation for adverse impacts.

The methodology of individual consultation was used for public consultation. Total 46 men and women participated in the individual consultation out of 46 participants 33 (72%) were men and 13 (28%) were women. Information on positive and negative aspects associated with the constructional and operational stage and proper mitigation of adverse impacts were shared at these consultations. Questionnaire used for conducting Surveys is attached as **Annexure-IV**.

5.2 PROPONENTS' ENVIRONMENT MANAGEMENT TEAM

As stated in earlier sections, the following project is in its planning phase. Once the project comes in its construction phase, a team with representatives from key management functions will be developed to assess issues, aspects, opportunities and existing manufacturing process w.r.t environment. Therefore, it is too early to substantiate the stated inscription.

5.3 THE RESPONSIBLE AUTHORITY

Proponent is responsible for the environmental impacts of this project and has taken commitment to implement the mitigation measures proposed in the Environmental Management Plan with subsequent review and approval conditions. Proponent ensured to use all practicable means consistent with other essential considerations to protect and preserve environmental quality.

5.4 OTHER DEPARTMENT & AGENCIES

As part of environmental assessment, detailed meetings were held with the institutional stakeholders in the form of one-to-one meetings i.e. DHQ Gilgit and District Health Office.

5.5 ENVIRONMENTAL PRACTITIONERS & EXPERTS

The Environmental Experts has been informed with briefing on project interventions including its benefits. All of consulted experts asked questions to get information about different components of project. About 6 experts were consulted and their recommendations have been mentioned below;

The Environmental Experts have been informed with briefing on project interventions including its benefits. All of the consulted experts asked questions to get information about different components of the project. About 6 experts were consulted and their recommendations have been mentioned below.

1. **Dr. Waseem** Associate Professor UOG
2. **Adeel Pervaiz** Sr. Manager Landfill LWMC
3. **Dr. Fariha Arooj.** Assistant Professor UVAS
4. **Dr. Mehwish Mumtaz** Assistant Professor PU
5. **Dr. Abdul Qadir Senior** Associate Professor PU
6. **Dr. Asim Mehmood** Environmental Consultant

Comments of environmental professions are given in Table 5-1.

Table 4-1 Environmental Experts and their recommendations

Environmental Experts			
1.	Associate Professor UOG	Dr. M. Waseem	- No construction, preliminary or otherwise relating to the project shall be started until and unless the Environmental Approval has been issued by EPA.
2.	Sr. Manager Landfill LWMC	Adeel Pervaiz	- The environmental reports must be available for better understanding to comment.
3.	Assis. Prof UVAS	Dr. Fariha Arooj	- All mitigation measures must be ensured by the proponent while development of this project.
4.	Assistant Professor PU	Dr. Mehwish Mumtaz	- A commendable initiative to enhance healthcare infrastructure in the area. It is recommended to strictly follow environmental compliance guidelines to ensure the hospital construction is completed efficiently and within the scheduled timeline.
5.	Senior Associate Professor PU	Dr. Abdul Qadir	- Solid waste generated during the hospital construction should be managed properly on a daily basis. Where feasible, non-hazardous construction waste can be utilized for landfilling in accordance with environmental

			guidelines.
6.	Environmental Consultant	Dr. Asim Mehmood	- The big problem that we faced during construction is the lack of skilled workers. They not only delay the work but sometimes are also responsible for destroying the work so hire a skillful person to complete the work without any obstacle.
7.	Wildlife Management Officer at GB	Muhammad Jaffar	- Establishment of medical and nursing college Minawar Gilgit has no negative impact on wildlife biodiversity of the surroundings. The wildlife species like Markhor exist above the population of Minawar area. This office has no objection on the proposed object.
8.	Section Officer, Health Department Gb	Ghulam Muhammad	- There is death of such health facilities in GB. GB is far area; establishment of the hospital will be a good addition regarding the delivery of health care services to the mases

5.6 AFFECTED & WIDER COMMUNITY

Stakeholders are considered to be individuals or organizations which have an interest in the proposed project or knowledge that will provide insight into issues or affect decision making related to the proposed project. On the basis of interest and role criteria there are two types of stakeholders for the proposed project as described below.

Primary Stakeholders: The primary stakeholders are primarily the Project Affected Persons (PAPs) and general public including women residing in the project area - for example, people living in the project area particularly those affected by the footprint of proposed project Construction of Hospital. These are the people who are directly exposed to the project's impacts.

Secondary Stakeholders: The secondary stakeholders are typically the general public including women residing around the COI. These also include institutional stakeholders – for instance, related government departments/agencies, local government, and organizations that may not be directly affected by the project; however, they may influence the project and its design. They include project proponent, execution agency, other concerned departments that may have a role during various phases of the project, regulatory agencies such as EPA, other relevant departments such as Forest and Wildlife, non-governmental organizations (NGOs), the broader interested communities including academia and journalists, and general public.

Consultation with Project Affected People: As part of the present environmental and social assessment, detailed consultations were carried out through personal meetings with the communities, including women in the project area. Separate meetings were held with the institutional stakeholders. All data of group discussion, individual discussion was

recorded. Further, public consultation was carried out with individuals from project areas who have direct impacts of the project and fall under project affected people. Total 46 participants including 33 (72%) men and 13 (28%) women were consulted in these individual consultations. Details of stakeholder consultations are given in **Table 5.-**2. Pictorial evidence of the consultation is given as **Figure 5-2**.

Issues, Concerns and Findings of the Focal Group Discussion: The people living in the vicinity of the project area had some concerns related to the Healthcare Facilities. The existing Healthcare Facilities are not sufficient to cater the needs of in terms of Healthcare.

- People said that there should be a proper handling of hazardous waste at the Hospital.
- The burning of waste in an open area should be avoided.
- Disposal of solid waste shall be done in a scientific manner and no dumping on open spaces and roads shall be allowed .
- Preference regarding provision of jobs shall be given to local community
- Special care shall be taken at school time and prayer time.
- Use of low noise producing machinery shall be ensured.
- Residents in the site's vicinity were assured that the Construction of Hospital is proposed for the sole purpose of providing enough Healthcare Facilities to the residents of Bhimber so they can fulfil their needs.

Results of the public consultation are given below as Table 5-2.

Table 4-2 Results of Stakeholder Consultation

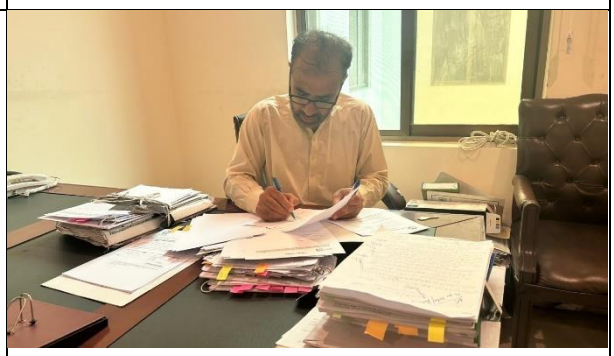
Sr.#	Date	Location/ Venue/ Address	Specifics of Participant	Feedback/ Concerns	Consultancy's Reply
Public Consultation					
1.	19-04-2025	Pari Banglah, Gilgit	Mr. Usman [Carpenter]	I am glad to hear about the new hospital project.	.
2.	19-04-2025	Pari Banglah, Gilgit	Mr. M Irfan {Teacher]	We are excited and hopeful this project will improve health care access and quality.	
3.	19-04-2025	Minawar Village, Gilgit	Mr. Afzal [Restaurant Owner]	This project will create employment opportunities for local residents.	
4.	19-04-2025	Minawar Village, Gilgit	Mr. Wajahat Ullah [Driver]	Healthcare facility is a basic need for us and we hope Govt of GB will construct this hospital soon.	
5.	19-04-2025	Minawar Village, Gilgit	Mr. Peerzada [Govt Service]	Happy to know about the health facility in hometown Minawar, Thankful to local Govt GB.	
6.	19-04-2025	Minawar Village, Gilgit	Mr. Imran Ullah [Govt Service]	This project will helpful for new generation to get quality education and health care.	
7.	19-04-2025	Minawar Village, Gilgit	Mr.Sami Ulah [Farmer]	Satisfied with the project as it is a positive sign for the area.	
8.	19-04-2025	Pari Banglah, Gilgit	Mr. Sana Ullah [Transporter]	More people will come to this area so there's a chance of traffic problems in the area.	Consultancy will make sure to minimize the traffic related concerns of locals and will also work on better traffic plans.
9.	19-04-2025	Pari Banglah, Gilgit	Mr. Shakar Ullah Baig [Business Owner]	This project will defiantly give best quality education in the area, will helpful for all community.	
10.	19-04-2025	Pari Banglah, Gilgit	Mr. M Ibrahim [Shopkeeper]	It is a good idea to enhance the local Hospitals.	
11.	19-04-2025	Pari Banglah, Gilgit	Zahoor Azam [Business Owner]	It is the need of time. Must be well equipped and encourages all the health care facilities. Separate sewerage systems must be designed.	Consultant will make sure that hospital provides the best health facilities and as the concern of sewerage system it will be handled properly.

12.	19-04-2025	Pari Banglah, Gilgit	Mr. Sher Khan [Retired Officer]	It will be very helpful for the local people, as the area doesn't have any facilitative hospital. So it's a good initiative, Appreciative.	
13.	19-04-2025	Pari Banglah, Gilgit	Mr. Yardad Khan [Govt Service]	I have no issue regarding this project. Construction work should not be a hindrance in our daily lives.	Consultancy will make sure to manage the construction work effectively to prevent interfering with the locals working hours.
14.	19-04-2025	Minawar Village, Gilgit	Mr. Rizwan [Retired Army Officer]	No objection. It is requested to handle the construction materials properly and work skilfully.	Consultancy will ensure that all construction regulations are followed.
15.	19-04-2025	Pari Banglah, Gilgit	Zaheer Ahmad [Dealer]	No objection, the following project will be helpful to provide better health facilities.	
16.	19-04-2025	Pari Banglah, Gilgit	Mr. Karim Ullah [Business Owner]	We are happy for this project our children will get education near their living places.	
17.	19-04-2025	Jalalabad, Gilgit	Mr. Ghani Shah [Shopkeeper]	No issue, it's a good initiative for local residents.	
18.	19-04-2025	Jalalabad, Gilgit	Mr. Ali Raza [Pharmacist]	No objection and satisfied with this project.	
19.	19-04-2025	Jalalabad, Gilgit	Mr. Taj [Labour]	We are experiencing a lack of health facilities in the area so it is a good project.	
20.	19-04-2025	Barmas, Gilgit	Mr. Nasir Ali [Shop Owner]	This was the absolute necessity of the area.	
21.	19-04-2025	Barmas, Gilgit	Mr. M Abbas [Butcher Shop]	It seems a good initiative to enhance the health facility of the area.	
22.	19-04-2025	Barmas, Gilgit.	Ms.Naseem Bibi [Housewife]	Concerned about dust and noise during construction	Consultancy will ensure about less dust and noise during construction.
23.	19-04-2025	Jalalabad, Gilgit.	Mr.Muhammad Ashraf [Teacher]	Strongly supports the project for better healthcare access.	

24.	19-04-2025	Jalalabad, Gilgit	Mr. Zahid [Shopkeeper]	We are grateful to see such a project in Gilgit.	
25.	19-04-2025	Jalalabad, Gilgit	Dr. Farooq Ahmed [Doctor]	Recommends strong waste management and hygiene systems.	Consultancy ensures that detailed hospital waste management plan is part of the EMP.
26.	19-04-2025	Jalalabad, Gilgit	Ms.Shamim Akhtar [Redt Nurse]	Suggested tree plantation and green areas around the hospital.	Green belt development is planned in the layout.
27.	19-04-2025	Jutial, Gilgit	Mr. Irfan Ali [Student]	Construction of the hospital will create jobs for skilled labor.	
28.	19-04-2025	Konodas, Gilgit	Mr.Abdul Ghafoor [Auto Driver]	Support project. Anticipates more passengers due to hospital visits.	
29.	19-04-2025	Jutial, Gilgit	Ms.Shazia Kausar [NGO Worker]	Stressed importance of women and child health services. .	Maternity and pediatric care units are included in the plan.
30.	19-04-2025	Jutial, Gilgit	Mr. M. Afzal Umar [Security guard]	Suggested employment of locals for security and admin work.	
31.	19-04-2025	Jutial, Gilgit	Ms.Fatima Khalid [Tailor]	This will improve health awareness among students and families.	Water demand will be managed, and alternate arrangements will be in place.
32.	19-04-2025	Jutial, Gilgit	Mr. Sajjad Anwar [Businessman]	Supports development but wants clarity on parking areas.	Consultancy ensures that Sufficient on-site parking is included in the proposed design.
33.	19-04-2025	Sakwar, Gilgit	Mr.Bilal Ahmed [Journalist]	Suggested better emergency access routes.	Consultancy ensures that emergency routes are part of the updated site circulation plan.
34.	19-04-2025	Sakwar, Gilgit.	Ms. Saira Bano [HouseWife]	Welcome project. Requested training opportunities for local health workers.	Local capacity building will be recommended as part of social uplift efforts.

35.	19-04-2025	Sakwar, Gilgit	Mr. Naeem Iqbal [Electrician]	A hospital nearby will help during accidents on the highway.	
36.	19-04-2025	Sakwar, Gilgit	Ms.Aiesha Ali [School Teacher]	Asked for noise barriers near the school boundary.	Consultancy will make sure to avoid noise near School Timings.
37.	19-04-2025	Barmas, Gilgit	Mam Javeria [Housewife]	Asked for disability access to all hospital sections.	Universal design with ramps is part of the plan. |
38.	19-04-2025	Barmas, Gilgit	Mr. Rehan Khan [Labour]	No objection and satisfied with the implementation of this project.	
39.	19-04-2025	Barmas, Gilgit	Mr. Rahat [Teacher]	Requested awareness campaigns for the community during and after the project.	
40.	19-04-2025	Konodas, Gilgit	Mam Dua [Teacher]	I have no issue,It is a great initiative for the area.	
41.	19-04-2025	Konodas, Gilgit	Mr. M. Aslam [Fruit Shop]	Happy to see the development of a 200 bed Hospital in our Area.	
42.	19-04-2025	Konodas, Gilgit	Mr. Rauf Raja [Labour]	I have no issue regarding this project. This project will be helpful for local communities.	
43.	19-04-2025	Jalalabad, Gilgit	Mam Hafsa [Student]	This project is a blessing for low-income families.	
44.	19-04-2025	Jalalabad, Gilgit	Mr. M Awais [IT Expert]	No issue regarding this project. It is requested that the construction must be properly monitored to prevent any disruption.	Consultancy will make sure that construction work is handled skillfully.
45.	19-04-2025	Konodas, Gilgit	Mam. Sania [Housewife]	Satisfied with the implementation of this project.	
46.	19-04-2025	Sakwar, Gilgit	Mam Tabeer [Housewife]	We welcome this development; it's long overdue.	
47.	19-04-2025	Barmas, Gilgit	Mr. Aziz ur Rehman [Labour]	It seems like a good project; such projects should be implemented. Preference should be given to the local workforce under this project.	

Pictorial evidence of stakeholder consultation is given below as Figure—2

	
Consultancy team in consultation with stakeholders at Village Hospital, Gilgit	Consultancy team in consultation with stakeholders at Village Hospital, Gilgit
	
Consultancy team in consultation with stakeholders	Consultancy team in consultation with Locals, Gilgit
	
Consultancy team in consultation with stakeholders, Gilgit	Consultancy team in consultation with stakeholders, Gilgit

	
Consultancy team in consultation with stakeholders, Gilgit	Consultancy team in consultation with stakeholders, Gilgit
	
Consultancy team in consultation with stakeholders at Shop, Gilgit	Consultancy team in consultation with stakeholders at Shop, Gilgit

CHAPTER-6

5. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

6.0 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 GENERAL

This chapter identifies the beneficial as well as the potentially significant adverse environmental and social impacts during design/pre-construction, construction and operation phases of the proposed project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A project impact evaluation matrix has been developed to evaluate the potential impacts of the proposed Project. Potential impacts arising from design, construction and operational phases of Hospital have been identified and assessed on the basis of field data, secondary data, expert opinion and examining previous similar projects in Pakistan. These include effects on physical, biological and socio-economic environments. Impacts associated with design, construction, operation phases of project components like main building, wastewater treatment plant, incinerator, waste management have been detailed in the section. A brief qualitative description of each aspect and the affected environment in both RoW and the project's COI is presented below.

6.2 METHODOLOGY FOR IMPACT IDENTIFICATION

The methodology for assessing the risk level associated with each potential impact is presented below.

Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described like this:

Risk = Likelihood × Consequence

Likelihood Scale

Likelihood	Definition	Scale
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied.	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventive measures are not applied	3
Unlikely	May occur once or twice during the activity if preventive measures are not applied	2
Rare	Unlikely to occur during the project	1

Consequence Scale

Consequence	Definition	Score

Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding Communities	5
Major	The action will cause major adverse damage on the environment or surrounding communities	3
Moderate	No or minimal adverse environmental or social impacts	2
Minor	No or minimal adverse environmental or social impacts	1

Risk Score Table

Likelihood	Consequence				
		Catastrophic	Major	Moderate	Minor
	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1

Total Risk: Significant: 15-25

Medium: 6-10

Low 1-5

Any 'Medium' to 'Significant' risk requires an environmental management measure to manage the potential environmental risk. Judgment will be required concerning the application of an environmental management measure to mitigate low risk situations.

6.3 IMPACT CHARACTERIZATION

Subsequent to the impact screening, various characteristics of the potential impacts including project siting (dense, heavy with development activities), environmentally sensitive areas (Cultural heritage site, protected area, wet land etc), temporal extent (temporary, permanent), and significance of impacts were determined. There are some potential adverse environmental and social impacts on the local environment. The proposed Project is divided into three (03) stages i.e.

- Pre-construction / Planning and Design Stage,
- Construction Stage and
- Operation and Maintenance (O&M) Stage.

The Pre-Construction Stage includes all stages before the construction Stage (i.e. site investigation work i.e. topographical, seismic studies etc.); Construction Stage includes all stages from mobilization of Contractor to the completion of Project; and Operation Stage starts after the Construction Stage which includes the inspection and repair works.

Adverse impacts envisaged at these three (03) stages of the proposed water supply project along with their proposed remedial or mitigation measures are given in the following section.

6.4 DESIGN/PRE CONSTRUCTION PHASE

Impact Screening Matrix

The 'activity wise' screening of potential impacts during the design/pre-construction phase is provided in **Table 6-1** below.

Table 5-1 'Activity Wise' screening of possible Impacts during Design/Pre - Construction phase

Sr. No.	Potential Issue	Likelihood (Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	Residual Impact (Short term, Long Term)
1	Improper designing of distribution Hospital Building and its allied components	3/ Likely	2/ Moderate	6/ Medium	Low / Long Term
2	Lack of integration of EIA/EMP requirements into Construction bid documents	3/ Likely	2/ Moderate	6/ Medium	Low/ Shirt Term
3	Contractor's Environmental Safeguards Capacity	3/ Likely	2/ Moderate	6/ Medium	Low/ Shirt Term
4	Material Haul Routes/ Traffic Issues	3/ Likely	2/ Moderate	6/ Medium	Low/ Shirt Term
5	Identification of Locations for Labor Camps and ancillary facilities	3/ Likely	2/ Moderate	6/ Medium	Medium/ Short Term
6	Cutting of Trees	2/Unlikely	2/ Moderate	4/ Low	Low Residual Impact
7	Land acquisition and resettlement impacts	2/Unlikely	2/ Moderate	4/ Low	Low Residual Impact
8	Seismic Impacts	2/Unlikely	2/ Moderate	4/ Low	Low Residual Impact
9	Impacts due to existing utilities	3/Likely	2/ Moderate	6/ Medium	Low Residual Impact

Critical Risk Level Medium Risk Level

Significant Risk Level Low Risk Level

6.5 ADVERSE IMPACTS DURING PLANNING AND DESIGN PHASE

Potential adverse impacts during the planning and design stage of the Project are given below:

6.5.1 Improper Designing of Hospital Building and its Allied Components

Impacts

If location of the hospital is not carefully selected considering topography, geology and catchment of watershed results in degradation of building, reduce wastewater flow or

increased chances of structure settlement due to weak geological conditions/weak bearing capacity of soil.

The incinerator shall be positioned in a way that its emission shall not have direct impacts on the patients and nearby community. If not designed properly this will cause continuous nuisance to the hospital staff, patients, visitors and nearby community.

Mitigation Measures

The following mitigation measures will be implemented:

Factors such as site capacity, accessibility, acceptability, stability, environmental sensitivity, land use, socio-economic receptors and climate hazards have been studied and site has been selected accordingly.

Residual Impact

Provided the proposed mitigation measures are implemented, no significant adverse residual environmental effects are likely to occur. However, in case improper designing of building or its allied components, the residual impact will be long term in nature.

6.5.2 Lack of Integration of EIA/EMP Requirements into Construction Bid Documents

Impacts

The bidding documents must reflect the requirement to select a qualified and experienced Contractor from the perspective of ensuring implementation of required safeguards during project development.

Mitigation Measures

It is advised, is the best interest of project, an environmental team shall be constituted to manage the environmental issues of project. This team may include representatives from Ministry of National Health Service, Regulation and Coordination, representative from relevant Health Care Commission and member from relevant health department. This Environmental team of proposed project will be assigned the task to check that design and bid documents are responsive to key environmental, social and safety considerations, and that the proposed method of work reflects the boundaries defined in the EMP. The bid documents must include the EMP and its implementation cost must be reflected in the BOQ.

EIA/EMP implementation and monitoring requirements must be part of bidding documents and necessary contractual binding must be agreed by project contractors before award of contract.

Project contractors shall have qualified and experienced environmental staff to plan, arrange, implement, monitor and report EIA/EMP requirements.

Residual Impact

Upon integration of EMP requirements into construction contract agreement, and upon implementation of EMP in true letter and spirit, the residual environmental effects are expected to be low in magnitude, intermittent and short term.

6.5.3 Contractor's Environmental Safeguards Capacity

Impacts

Lack of contractor's environmental safeguard capacity or selection of environment non-responsive contractors may result in failure of EMP implementation and may be a source of number of non-compliances.

The responsibility of Environmental Team is to review and finalize the bidding documents relating to environmental issues.

Contractors that do not possess the required capacity for safeguards management must not be pre-qualified and selected.

Mitigation Measures

Environmental team shall review the contractor capacity with respect to safeguard management and contracts shall be awarded accordingly.

The Contractor will be required to define an Occupational and Environmental Health and Safety procedure for all work, including work camp operation, management of cement dust, and use of Personal Safety Equipment. These procedures shall be developed and approved by the Environmental team in collaboration with the focal agencies prior to the commencement any physical works on ground.

Environmental team shall ensure the project contractors are selected on merit and necessary funds has been allocated in the contract documents for EMP implementation and monitoring.

Residual Impact

Provided the proposed mitigated measures are implemented, no significant adverse residual environmental effects are likely to occur.

6.5.4 Relocation of Utilities

Utility services such as sewerage lines and telephone lines lying along the project alignment may need to be relocated temporarily or permanently to prevent damage to them.

Mitigation Measures

- Detailed filed surveys will be conducted to assess any sub-surface utilities that might be present under the proposed project alignment within the right of way of the project, shall be relocated prior to the commencement of the work.
- Based on the utilities that are identified during the detailed surveys, a relocation plan of those utilities will be developed by the respective line agencies in close coordination.
- In case any utilities can be allowed to remain in place and avoidance of their damage

is possible, the contractor will need to be aware of the location of these services so that disruptions are not caused. In such scenario, the responsibility for any repair of damaged services will lie with the contractor.

Residual Impact

Provided the proposed mitigated measures are implemented, the magnitude and extent of the environmental effects will be low. Therefore, no significant adverse residual environmental effects are likely to occur.

6.5.5 Identification of Locations for Labor Camps and ancillary facilities

Impacts

The proposed project will be completed in approximately 2 years (24 months) a considerable amount of work force will be engaged. As a result, worker camps will need to be developed and ancillary facilities will need to be provided such as electricity, washrooms for labor with suitable effluent and sewage disposal facilities as well as water for their everyday use for drinking and bathing etc.

Mitigation measures

In order to prevent a nuisance, specific locations shall be designated for development of the labor camps. All necessary facilities and amenities shall be provided in these camps such as resting area, drinking water, electricity, supply of water.

Solid and liquid effluent waste disposal facilities shall also be designed to cater waste of administration/office building etc.

The use of proper planning while identifying locations for the labor camps will ensure there is minimal disturbance to all key receptors and the traffic is not disrupted by labor camps being set up roadside next to the construction sites.

Residual Impact

No residual effects are expected.

6.5.6 Development of Traffic Management Plan

Impacts

In particular, the construction of hospital could result in heavy congestion due to the movement of construction heavy machinery and equipment with significant delays for traffic apart from posing a significant risk for vehicles.

Mitigation Measures

A comprehensive traffic management plan shall be developed by the contractor and approved by the Executing Agency or the Project Management Unit that will contain the traffic diversion onto alternate routes and management of traffic flows to minimize the congestion and the possibility of accidents. This plan shall be dependent to the EMP and will be implemented by the contractor.

Residual Impacts

After implementing the traffic management plan, the residual impacts will be low.

6.5.7 Land Acquisition and Resettlement Impacts

Impacts

The proposed project involves the distribution of the water supply network. This water distribution network or pipes will be laid within the existing network of water pipes, so no land acquisition is involved in this proposed project.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

No residual impacts so it will remain low.

6.5.8 Topography

Potential Impacts

The project area has plain topography. Land acquisition will be involved for the proposed project. A minor physical change in the topography of the project area is expected. This adverse impact is low in nature.

Mitigation Measures

Mitigation measures will involve adoption of best engineering design measures keeping in view of the aesthetics of the project area and provision of green areas for the landscape in design. The proposed design has tried to minimize these impacts.

Residual Impact

No residual effects from this component of the project are anticipated as no significant topographical change is anticipated.

6.5.9 Seismicity

Potential Impact

In Building Code of Pakistan (Seismic Provisions, 2007), the whole region of Pakistan is classified into five main Seismic Hazard zones i.e., i) Zone-1, ii) Zone-2A, iii) Zone-2B, iv) Zone-3, v) Zone-4 based on the peak horizontal ground acceleration and its ultimate tendency to damages during seismic events. The proposed Project Area falls in the seismic zone classified as "Zone-2B" with g-value 0.16 to 0.24, and is considered as Moderate Hazard seismicity zone.

No change (+/-) in the impact of seismology risk of the area is expected during the project construction phase as none of the project activities is expected to be of such a powerful extent to influence the tectonic risk. This adverse impact is medium in nature.

Mitigation Measures

The proposed structure should be designed and constructed keeping in consideration high intensity earthquakes. For seismic hazard analysis, updated structural and seismic evaluations should be conducted by the design engineer/consultant. Moreover, geo-technical investigations must be conducted prior to construction phase.

Residual Impacts

Upon implementation of mitigation measures suggested above, no significant residual impact is anticipated.

6.5.10 Flora

Potential Impacts

During the pre-construction phase, activities such as installation of construction camps, mobility of construction staff may damage the local vegetation/trees. As the heavy machinery and camps will be moved and installed, which require significant space due to which available vegetation is expected to be removed. This impact is site-specific, reversible, possible, and medium significant and needs to be encountered prior to the start of construction stage.

Mitigation Measures

- The camps, mobility of machinery should be proper planned and well designed to avoid any loss to local green cover;
- It is recommended to establish the construction camps where no or minimum vegetation exists.
- The location of construction camp should be selected so, as to have limited environmental impact during construction phase and to reduce the cost and land requirement.
- Compensation to the forest department for all type of plants (saplings, sub-mature, mature trees and other green assets) will be paid by the proponent as desired by the Forest Department and as per law of land.

Residual Impacts

Given the type of vegetation involved, and the presence of type of land adjacent to the project site, the residual impacts on vegetation are considered low

6.5.11 Fauna

Potential Impact

As movement and installations of machinery and vehicles will take place so, noise and habitat loss is expected. The routes of the available wildlife and other habitats may be affected due to camps set-up and machinery movements and installations. This impact is site-specific, temporary, irreversible, and possible and low significant.

Mitigation Measures

- The standard measures must be adopted to minimize noise due to machinery movements and installations;
- Wildlife movements and routes must be considered during activities and should be avoided to their maximum level;
- The alternate routes and points are recommended to avoid any damage to locally available fauna;
- The camps shall be properly fenced and gated to check the entry of animals in search of eatable goods; and
- Similarly, wastes of the camps shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them.
- Fruit trees along with other broad leaved trees must be considered for plantation to balance the local ecosystem.
- Proper waste management plan may be considered mandatory to safeguard the local environment.

Residual Impacts

Provided the proposed mitigated measures are implemented, no significant adverse residual environmental effects on species/ fauna are anticipated as no significant adverse impacts on fauna are envisaged.

6.6 ADVERSE IMPACTS DURING CONSTRUCTION PHASE

6.6.1 Impact Screening Matrix

The screening of potential impacts during the construction phase is provided in **Table 6-2** below.

Table 6-2 Screening of Possible Impacts during Construction Phase

Sr. No.	Potential Issue	Likelihood (Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	Residual Impact (Short term, Long term)
1	Construction of Hospital Building and its Allied components	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
2	Site Accessibility	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term

3	Degradation of air quality due to construction works	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
4	Injuries to workers from lack of necessary training and/or not using PPEs etc.	3/ Likely	3/ Moderate	9/ Medium	Low/ Short term
5	High noise/ Vibration levels from Construction activities	5/ Likely	2/ Moderate	10/ Medium	Low/ Short term
6	Wastewater and Solid Waste Generation	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
7	Air Emissions	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
8	Disposal of Solid Waste / Spoil/ Demolition Waste	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
9	Social and Cultural Conflicts	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
10	Communicable diseases incl. COVID-19	2/ Likely	3/ Moderate	6/ Medium	Low/ Short term
11	Vegetation and Wildlife Loss (Flora & Fauna)	2/ Likely	3/ Moderate	6/ Medium	No residual Impact
12	GHG Emission	3/ Likely	2/ Moderate	6/ Medium	No Residual Impact
13	Construction Camps	3/ Likely	2/ Moderate	6/ Medium	No residual Impact
14	Site Restorations	2/ Likely	10/ Moderate	10/ Medium	Low/ Short term

Critical Risk Level

Significant Risk Level

Medium Risk Level

Low Risk Level

6.6.2 Environmental Impacts and Mitigation during Construction of Hospital Building and Allied Components

Following impacts are envisaged during the construction phase of proposed project. These impact will be mitigated accordingly to minimize the impacts of said project and make it sustainable.

6.6.2.1 Change in land use

As mentioned above the proposed project site is situated in area where no worth mentioning activity with special reference to environment is involved hence no significant adverse impact will happen. The adjacent land value will be increased by this project.

Mitigation

Not required.

6.6.2.2 Impacts on Topography

Civil work will be done for the construction of building so there will not bring major changes in the existing topography of the project site. The changes due to the civil work will be of localized nature. There will be no significant changes off-site the project area.

Mitigation

- The contractor will be required to impart proper training to their workforce in the storage and handling of obnoxious materials, like furnace oil, diesel, petrol and chemicals etc. that can potentially cause soil contamination.
- Soil contamination by asphalt and other obnoxious material will be minimized by placing all containers in caissons or dumped into pits lined with impervious liners to avoid contamination of soils/ groundwater from leachates.
- Proper drainage facility should be provided to avoid the water accumulation which will minimize the soil contamination.
- Solid waste generated during construction should be properly treated and safely disposed of only at demarcated waste disposal sites.
- Plantation needs to take place at the project site so that soil becomes stabilized.

6.6.2.3 Impacts on Soils

The overall geology and soil quality of the project site is not expected to be adversely impacted due to the execution of the proposed project during the construction period. The contamination of soil can take place at concrete mixing areas if the activities are carried out in unmanaged way.

Mitigation

Vigorous plantation needs to take place at the project site so that soil becomes stabilized.

6.6.2.4 Impacts on Surface and Groundwater

The ground water is well protected by existing geological conditions in the site area. No appreciable impacts on the ground water quality are expected. The ground water used for the project activity will be taken by using submersible electric water pumps. As mentioned above very small level civil work will be undertaken so the surface and ground water quality will not be disturbed to much extent.

Excessive runoff, especially in rainy days, due to different activities to be carried out during construction phase can result in the increase of Total Dissolved Solids **(TDS)** and Total Suspended Solids **(TSS)** in small water channels. Similarly, untreated sewage can result in high value of Chemical Oxygen Demand **(COD)** and Biochemical Oxygen Demand **(BOD)** of surface water.

Mitigation

- The workers will be provided with washrooms and toilets at site.
- Proper sanitary system will be developed on temporary bases.
- Wastewater effluent from construction site, washing-yards should be passed through the treatment process to remove primary contaminants before discharging it into natural streams.

6.6.2.5 Impacts on Air Quality

Due to the construction activities like excavation, clearing, leveling, compaction, material transportation, earthling/ grounding etc. dust will be generated which will ultimately increase the Particulate Matter (PM) value in the area. Gaseous emissions from the heavy machinery, generators and vehicles will also come out and this will affect the quality of ambient air. This may also pose health risk to the construction workers and residents who suffer from respiratory ailments.

Mitigation

Framework for air quality management has been developed as given as Annexure-V of this report. Main features of the air quality management are given below.

- Periodic environmental monitoring and testing of emissions from vehicles should be carried out in order to keep the concentration of various pollutants including CO, Noise & Smoke within the PEQS limiting value.
- Periodic sprinkling of water on windblown stockpiles of construction material and unpaved sidewalks.
- Ambient gaseous monitoring for various pollutants like CO, NO_2, SO_2, PM_{10} etc. should also be carried out periodically.
- Periodic maintenance of the machinery will be carried out to reduce the concentration of emissions.
- Haul-trucks carrying earth, sand, aggregate etc. will be kept covered with tarpaulin to help contain construction materials and being transported within the body of each carrier between the sites.

- Tyres of the vehicles and heavy machinery will be washed and the waste water produced as a result of this activity will be reused after due treatment. This will reduce concentration of PM in the ambient air.

6.6.2.6 Water Consumption

It is hard to estimate the total water requirements during construction phase of the project. However, calculations are made on the basis of past experience and data analysis from similar project. Estimated water requirement during construction phase is 3000 to 3200 gallon per day. This water requirement will be fulfilled by installation of tube well at the site. The same tub well will serve the project during its operation phase.

Mitigation

Recharge zone shall be created to recharge of ground water. These recharge zone shall never be concreted. However, the must be maintained to make the area neat and tidy.

6.6.2.7 Waste Generation

During the construction of project waste will be generated such as debris waste including clay, sand, crush, stones, paper, plastic, wood pieces, iron and steel as scarp, wires, rags, ropes etc., sewage and solid wastes. Garbage will also be produced by workers which, if will not be properly disposed of, will cause unsanitary and unhygienic conditions on and around the project site. Resulting impacts could vary from unsightly littering of the site, fly and vermin infestations.

Mitigation

- Most of construction waste will be utilized on site to fill excavated sites or recycled; remaining of it will be properly disposed off/ landfilled.
- Providing adequate waste baskets and dumpsters is essential to keep the site clean and pest free.
- Arrangements should be made for regular garbage collection from the proposed project site.
- All the putrescible material will be segregated from other waste and will be disposed of accordingly.
- Septic tanks will be constructed for the treatment of sewage waste from construction camps and other construction activities.

6.6.2.8 Construction Debris

Each phase of the development will produce solid waste, the disposal of which, if not managed properly could have negative impacts on the site and surrounding area.

- A site waste management plan should be made the responsibility of the project contractor to provide for the designation of appropriate waste storage area on the site and a schedule for the timely collection and removal of construction debris to an approved dump site.

- Only small quality of the waste will be produced as no major excavation is involved in the project.

6.6.2.9 Occupational Safety and Health Workers

Potential Impact

Occupational Health and Safety (H&S) related impacts will arise during construction stage activities including clearing of earth, levelling, compaction, foundations, finishing and testing & commissioning. In nutshell, occupational health and safety issues associated with the construction of proposed project will primarily include physical hazards; chemical hazards; and noise.

Noise: Construction and maintenance personnel may be potentially exposed to high levels of noise from heavy equipment operation and from working in proximity to vehicular traffic. As most of these noise sources cannot be prevented, control measures should include the use of personal hearing protection by exposed personnel and implementation of work rotation programs to reduce cumulative exposure.

In addition, disasters such as earthquakes and fires may occur. Lack of Emergency Response Plan (ERP) or an inefficient response plan may lead to an accident or critical injury. Considering these consequences, this impact can be categorized as direct, moderate, site-specific, medium term, temporary, medium probability and irreversible.

Mitigation Measures

Framework for Occupational Health and Safety Management plan has been developed to handle any health and safety issue of workers and community. Framework Occupational Health and Safety plan is attached as **Annexure-VI**. Mitigation Measures to prevent and control physical hazards include:

Moving Equipment and Traffic Safety

Establishment of work zones to separate workers on foot from traffic and equipment by:

- Routing of traffic to alternative roads when possible;
- Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g. traffic cones and barrels) to delineate the work zone;
- Regulation of traffic flow by warning lights, avoiding the use of flaggers if possible;
- Reduction of maximum vehicle speeds in work zones; and
- Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles; and safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space (while controlling glare so as not to blind workers and passing motorists).
- Provide appropriate PPE in conjunction with training, use, and maintenance of the PPE.

- Furthermore, the noise reduction options that should be considered which include:
- Selecting equipment with lower sound power levels;
- Installing suitable mufflers on engine exhausts and compressor components;
- Installing vibration isolation for mechanical equipment;
- Providing noise protection PPEs (ear plugs/ear muffs) to the construction workers;
- Re-locating noise sources to less sensitive areas to take advantage of distance and shielding;
- Developing a mechanism to record and respond to complaints; and
- Regular monitoring of noise levels at active sites or near noise producing equipment/machinery and compare it to the available occupational noise standards.

Monitoring of OHS Activities:

During the construction phase of proposed project, occupational health and safety monitoring programs of the contractor (s) should verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health, and safety hazards at the construction site and camps, and the implementation of prevention and control strategies. The occupational health and safety monitoring program should include:

- Regular inspection and testing of all safety features and hazard control measures focusing on engineering and personal protective features, work procedures, places of work, installations, equipment, and tools used;
- Surveillance of the working environment: The contractors should document compliance using an appropriate combination of portable and stationary sampling and monitoring instruments. Monitoring and analyses should be conducted according to internationally recognized methods and standards. Monitoring methodology, locations, frequencies, and parameters should be established individually for each project following a review of the hazards;
- Continuous and efficient surveillance of worker's health during the entire construction phase by the nominated officials of contractors; and
- Training: Training activities for employees (construction contractor & supervision consultant staff) and visitors should be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises, including fire drills, should be documented adequately. Service providers and contractors should be contractually required to submit to the employer adequate training documentation before start of their assignment.
- Contractor(s) shall prepare a comprehensive OHS Plan including work method statements for all hot works to avoid incidents during construction stage.

Residual Impacts

Upon implementation of the proposed mitigation measures suggested above, and also upon implementation of the Occupation Health and Safety Plan (Attached as Annexures), low residual impacts are anticipated.

6.6.2.10 Community Health and Safety

Potential Impact

Community health and safety issues during the construction of proposed project may include dust, noise, and vibration from construction vehicle transit, and communicable disease associated with the influx of temporary construction labor. Significant community health and safety issues associated with the projects may also include:

- Pedestrian safety;
- Traffic safety; and
- Emergency preparedness.

Further, the laying of water supply pipelines, in particular, will require the digging of trenches for laying these lines will pose a risk of community members falling into these trenches. The construction areas located near the, settlements may cause accident for the people moving near to these areas. Considering these consequences, this impact can be categorized as direct, moderate, site-specific, medium term, temporary, medium probability and irreversible.

Mitigation Measures

The World Bank/IFC EHS Guidelines, 2007, defines community health and safety in terms that guarantee as-built infrastructure conforms to acceptable standards (structural safety, flood and fire risk), water supply sources are of suitable potable quality, emergency response planning is in place for built environments, traffic safety provisions are enforced alongside transport hazard assessment and mitigation, and disease prevention measures are taken. The Contractor will prepare the site specific community health and safety plan in compliance with relevant sections of the IFC General Environmental Health and Safety Guidelines (WB/IFC 2007), Pakistan Labor Laws,;

- The Contractor will clearly barricade work areas to prevent access by the public, while ensuring passage by providing safe pathways for pedestrians around construction zones;
- The Contractor will exclude parking, waiting vehicles and vendors from areas adjacent to the work by means of clearly marked barricades and posted signage;
- The Contractor will remove excavated earth, spoil, rubble, cut vegetation and refuse whether generated by the project or discarded by third parties from areas within the construction zone, where it has potential to interfere with the public or generate dust;
- The Contractor will provide temporary lighting to facilitate construction during night time;
- The Contractor will remove hazardous conditions on construction sites that cannot be controlled effectively with site access restrictions and will barricade any excavations and materials placed near the public place (if applicable);
- Hard Barricades will be provided at the excavation deeper than 1.5 meter as per "NZS 3845:1999 Road safety barrier systems";

- The Contractor will promptly reinstate any services and reinstall any physical facilities that are cut, disconnected or damaged during construction, and maintain or provide temporary services that are interrupted by construction. The Supervisory Consultant will inspect and certify the adequacy of all reinstated services and facilities;
- Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas especially near the settlements;
- An Emergency Preparedness and Response Plan (EPRP) in coordination with the local emergency responders to provide timely first aid response in the event of accidents and hazardous materials response in the event of spills;
- Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites;
- Timely public notification on planned construction works;
- Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity and social links;
- Any environmental condition that is disagreeable to the public and causes an avoidable nuisance can be addressed with additional provisions over and above those described above, as determined necessary by the supervisory consultant.
- These requirements will be incorporated into the bidding specification and contract documents, and will be binding on the contractor, at risk of penalty for noncompliance, as charges to be recovered from contractor for unsafe act or condition.

Residual Impacts

- Upon implementation of the proposed mitigation measures suggested above, and also upon implementation of the proposed Health and Safety Plan, no residual impacts are anticipated.

6.6.2.11 Impacts on Flora & Fauna

The establishment of the proposed project will not affect the fauna & flora of the area. Furthermore, no such agricultural fields and trees are present in the proximity of the project site. It is worth mentioning that proposed project does not involve cutting of any kind of trees. Furthermore, parks with vigorous flowering/ nonflowering & ornamental plants are integral component of proposed project.

Mitigation

As the project site is present in semi-urban area hence there is no wild fauna or flora present in and around the project site. So there will be no impact on the fauna and flora of the project area. However, following mitigation measures will be adopted to restore the environment as much as possible.

- Impact mitigation calls for protecting and restoring as much of the original condition on the development site as possible.

- In an effort to preserve the natural aesthetics and environment, naturally occurring plants such as those used primarily by the birds for food and shelter should be planted for their survival. This would ensure that primarily native plants are used in the landscape plan/ parks thus minimizing the use of imported species and eliminating the introduction of potentially invasive species.
- Using bird feeder may encourage the displaced avifauna to remain in or return to the general vicinity, thus maintaining the existing biodiversity.
- The project contractor should be subject to punitive penalties for removal or damage of ecologically valuable trees designated for protection or relocation (if any).

6.6.2.12 Transportation of Construction Materials

Transportation of heavy machinery implies heavy traffic on the roads leading to the site with possible impacts to the surrounding area (dust, spillage, emissions and noise). Use of uncovered vehicles for transportation of construction materials can lead to inadvertent dispersal of materials during heavy rains or high winds during dry periods. This could have a negative impact on the residents of the surrounding.

Mitigation

- Arrangements should be made with contractors to ensure that the vehicles used for transporting materials and machinery to the site are appropriately sealed and covered to minimize dust.
- The construction activity will go on for a short period of time and there will be no worth mentioned impacts from this activity on the project area.
- Dust producing materials such as sand or cement should be stockpiled in low enclosures and covered, away from drainage areas where they could easily be washed away during rainfall.

6.6.2.13 Impact on Traffic

During the construction of the project, movement of heavy trucks and machinery will have only a minor impact on the traffic of main Road as it is a vide road specially designed for this kind of heavy traffic. However, the location of proposed project near the populated are need proper traffic management.

Mitigation

Framework for traffic management has be prepared and given as **Annexure-VII** of the EIA report. mitigation measures are required as this activity will be for a short period of time and the carrying capacity of Road is fair enough to accommodate this traffic for that much time period.

6.6.2.14 Employment Generation

During construction stage of the proposed project, about 150-200 workers / laborers will be engaged. This will be positive change.

Mitigation

Not required

6.6.2.15 Site Accessibility during Construction

Potential Impact

The proposed project can be approached through various roads. The construction material, equipment and machinery will be arrived at proposed workshop area and construction camps sites. From the camp, the material, equipment and machinery will be transferred to work site by multiple routes.

Mitigation Measures

The accessibility of road for local population will be ensured by implementation of Traffic Management Plan. The framework for Traffic Management Plan is given as **Annexure-VII** of this EIA report.

- The approach roads should be selected to avoid any soil degradation and erosion impacts;
- Special care should be taken for known sensitive area to ensure that all interested parties are aware of the type and location of working. Measures should be taken where necessary to protect such areas physically; and
- Mitigations for the loss of trees and crops, soil erosion, soil contamination, air and noise pollution, waste generation, and loss of agricultural land provided in below sections will be adopted.

Residual Impacts

Provided the proposed mitigative measures are implemented, the environmental impacts will have low magnitude and will be reversible. Therefore, no significant adverse residual effects are expected.

6.6.2.16 Resource Conservation

Potential Impact

During the construction, overburden on local resources is possible if construction facilities such as workers camp and construction camp built near rural areas and can create problems for local communities.

Mitigation:

Framework for Resource Conservation Plan has been developed for the proposed project and attached as **Annexure-VIII**.

Residual Impact

Provided the proposed mitigative measures are implemented as suggested, the environmental impacts will have low magnitude on resource conservation. Therefore, low residual impacts due to the project are anticipated.

6.6.2.17 Construction Camps/Camp Sites

Potential Impact

Approximately one (01) construction camp is proposed to be established during construction period for the subject project. Due to the proposed camp site, loss of vegetation and dissatisfaction of rehabilitation measures during and after completion of construction phase may occur. This may include waste, soil pollution, groundwater pollution, dust, etc. However, the impact will be medium adverse in nature. For these impacts, mitigation measures have been developed to minimize the likelihood, extent or duration of their occurrence and any associated adverse effects. **Below given** table summarizes potential impacts and proposed mitigation measures associated with construction camps.

Summary of Workers Camp Impacts & Mitigation Measures

Potential Impact	Proposed Avoidance and Mitigation Measures
Environmental	
● Temporary habitat loss or disturbance ● Temporary visual intrusion ● Noise emissions at a single location ● Waste generation ● Discharge of sanitary effluents and rainwater run-off to nearby water bodies	● Reinstate any temporary facilities to pre-existing conditions in ecologically sensitive areas. ● Implement landscaping plan for all facilities in areas where high landscape value and visual vulnerability to the proposed activities warrants site-specific landscape restoration measures. ● Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary. ● Provide adequate warnings of impeding works to all potential receptors within a 1 km corridor surrounding the ROW via public notices and local news.
Social	
● Worker camp site: consultation surrounding potential construction camp sites revealed concerns regarding the location of proposed sites for Worker Camps.	● State land will be a first preference for worker camp location, followed by land where there is a willing lessee. ● Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values. ● Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. This will include, in appropriate languages:

Potential Impact	Proposed Avoidance and Mitigation Measures
	● A briefing on camp rules ● A community relations orientation to increase awareness about the local area, cultural sensitivities and the project Code of Conduct ● Awareness-raising on health considerations, including sexually transmitted diseases (STDs). ● The construction contractor is required to develop a Construction Camp Management Plan to address: a. Discipline; b. Community liaison; c. Ethnic tensions and; d. Communicable diseases. ● A Code of Conduct and Camp Rules will be required within the Construction Camp Management Plan, which provides policies and a disciplinary framework with respect to worker behavior.
Camp Location	
●The final location will be determined by the construction contractors and agreed with the WASA or its PMU.	●The construction contractor will be required to assess the environmental/social sensitivity of any additional or alternative sites prior to their approval for adoption.

Some additional mitigation measures should include:

- The contractor(s) should provide plan to the Proponent for removal & rehabilitation of site upon completion;
- Photographical and botanical inventory of vegetation before clearing the site; and
- Compensatory plantation to be scheduled when construction works near end.

Residual Impacts

The residual impacts are envisaged to be low after implementation of suggested preventive and mitigatory measures.

6.6.2.18 Green House Gas (GHG) Abatement

Potential Impact

The main sources of greenhouse gases (CO2, CH4, NOx etc.) during the construction activities of the proposed project will include both mobile and stationary sources. The mobile source will be the construction and transportation vehicles while the stationary

source will be the backup generator for electricity. Emission of greenhouse gases cause global warming and other climatic changes on regional and global scale. This impact is can be categorized as high to low adverse in nature.

Mitigation Measures

- Regular motioning of the vehicles for engine efficiency;
- Avoid idling of construction vehicles;
- Alternative energy resources shall be considered where possible; and
- The Contractor shall ensure the compliance with NEQS.

Residual Impacts

After implementation of suggested mitigation measures the residual impact will be low.

6.6.2.19 Emergency Response Plan

Potential Impact

The construction of the proposed project may encounter emergencies. In addition, disasters such as earthquakes and fires may occur. Lack of Emergency Response Plan (ERP) or an inefficient response plan may lead to an accident or critical injury. This impact is medium adverse in nature.

Mitigation Measures

Emergency Response Plan has been developed to manage all potential and actual emergency situations during construction phase. The same is attached as **Annexure-IX** of the report.

Residual Impact

Successful implementation of mitigation measures suggested here and in Emergency Response Plan (attached as Annexure) will keep the residual impact to low.

6.6.3 Natural and Man-Made Disasters

Potential Impact

Natural disasters (earthquakes) and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. The workers shall be trained and facilitated to cope with such disasters. This impact is medium adverse in nature.

Mitigation Measures

Mitigation measures include the following:

- An ERP for earthquakes and manmade disasters should be developed by the contractor. The ERP should be implemented in close consultation with the RESCUE 1122 Services and other concerned departments;
- Training of the contractor and employees regarding the emergency procedures and plans should be regularly conducted;
- Emergency numbers should be clearly posted at all disposal stations; and

- Minor incidents and near misses should be reported, and preventive measures should be formulated accordingly.

Residual Impact

The mitigation measures suggested above will keep the risk of natural disasters to low category.

6.6.4 Social and Cultural Conflicts

Potential Impact

During the construction phase of the proposed project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local resources. Furthermore, difference in cultural values may also cause discomfort to local residents. This impact is negative, local, low, short-term and probable.

Mitigation Measures

- Local labor especially from nearby communities should be given preference for the construction works;
- Careful planning and training of work force to minimize disturbance to the local people;
- Public notification through print or electronic media during the entire construction phase to avoid any inconvenience in accessibility to the locals; and
- Adequate training especially for the transitive workforce of the station (involved both in the construction process and in the commissioning) to regard the customs of the area so that the locals do not feel insecure.

Residual Impacts

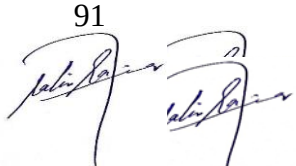
Implementation of mitigation measures will reduce the risk of conflicts in society and will results into short term and low residual impacts.

6.6.5 Communicable Diseases

Potential Impact

The laborers in the Contractor Camp, truck drivers and like personnel who interact with each other have the potential for the spread of HIV/AIDS if the incidence exists. Majority of the people living in the surrounding of the Project, and potential Labor are not aware of the source, mode of communication or consequences of HIV/AIDS. Although their religious and cultural value system, to a large extent excludes the outbreak or rapid communication of HIV/AIDS, yet its occurrence in such a situation cannot be precluded. It is necessary that awareness and preventive campaigns are run from time to time in the Labor camps and the field offices of the Project to prevent the communicable diseases like Cholera, Typhoid and Tuberculosis.

Mitigation Measures



The Contractor shall:

- Arrange to run an active campaign, in the labour camp, to make people aware of the
  cause, mode of transmission and consequences of HIV/AIDS;
- Strengthen the existing local health & medical services for the benefit of labour as well as the surrounding villages;
- Ensure cleanliness and hygienic conditions at the labour camp by ensuring proper drainage and suitable disposal of solid waste. Inoculation against Cholera will be arranged at intervals recommended by the Health Department;
- Locating a labour camp at least away from the villages (local settlement), and
- Keep all the camps, offices, material depots, machinery yards and work sites open for the inspection of health and safety measures and related documents.

Residual Impacts

Successful implementation of suggested mitigation measures in above section will reduces the chances of spread of communicable diseases among workers and nearby community. Therefore, the impact will be low.

6.6.5.1 Site restorations

Potential Impacts

After completion of construction activity, the project facilities will be restored as close to its original condition as possible. One of the important tool is the photographic record of project facilities e.g., campsite(s) prior to set-up will be taken and will be compared after site restoration.

Unattended construction waste and excavated material along the RoW of transmission and water supply mains will be source of bad aesthitcs within city. Before closure of typical construction day area need to be cleared from all type of waste and construction material.

Mitigation measures

- Demobilization of all equipment and machinery;
- Disposal of any waste material remaining at the time of completion of the operation;
- Backfilling of all excavation followed by compactions;
- Dismantling and removal of fence or barriers surrounding the campsite area;
- General restoration of the site area including landscaping and restoration of drainage where required.
- Environmental Team through Contractor will ensure that restoration of construction works at water transmission and supply mains will be carried out by contractors.
- PMU will ensure periodic monitoring of such restorations.
- Contractors will develop site restoration protocols and will submit to Environmental Team for review and approval.

- Construction site restoration protocols will be part of bidding documents and constructions contracts.
- Construction contractor will add restorations costs into BOQs.

Residual Impacts

The proposed site will be restored near to its original conditions and the residual impacts will be low.

6.7 IMPACTS DURING OPERATIONAL PHASE

The potential impacts from operation of the water supply system in KSS are provided as **Table 6-3** below.

Table 6-3 Screening of Possible Impacts during Operation Phase

Sr. No.	Potential Issue	Likelihood (Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	Residual Impact (Short term, Long term)
1.	Hazardous / Infectious Waste	4/ Likely	4/ Moderate	16/ Medium	Low/ Short term
2.	Non Hazardous solid waste	3/ Likely	2/ Moderate	6 / Medium	Low / Long term
3.	Traffic Impacts	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
4.	Degradation of air quality due to operation of Incinerator	3/ Likely	4/ Moderate	12/ Medium	Low/ Short term
5.	Accidental release of gases	2/ Likely	3/ Moderate	6/ Medium	Low/ Short term
6.	Wastewater Generation	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
7.	Social and Cultural Conflicts	3/ Likely	2/ Moderate	6/ Medium	Low/ Short term
8.	Communicable diseases	3/ Likely	12/ Moderate	12/ Medium	Low/ Short term
9.	GHG Emission	3/ Likely	2/ Moderate	6/ Medium	No Residual Impact

10.	Improved Health care system	Positive Impact	Long Term Positive Impacts
11.	Cost saving of local community after heaving advance health facility from Government	Positive Impact	Long Term Positive Impacts

Critical Risk Level

Significant Risk Level

Medium Risk Level

Low Risk Level

Positive Impacts

6.7.1 Hazardous / Infectious waste Generation

Potential Impacts

During regular operation of hospital, hazardous and infectious waste will be produced from different department of the hospital, specially from Operation Rooms / Theaters. This waste can cause serious adverse impacts on the health of hospital staff, patients and nearby community, if not managed properly. Approximate quantity of infectious waste will be 80 to 100 kg per day.

Mitigation Measures

Waste management checklist / plan has been developed and attached as Annexure-II of the EIA report. Successful implementation of this checklist will enable the management of hospital to easily manage waste.

Incinerator of 50kg/hr is proposed in the design of hospital as part and parcel of this project. This captive incinerator will help to manage all the quantity of infectious waste. The specification of incinerator will meet the national and international standards to control emissions. Dual chamber incinerator will be installed with temperature control system in 1st chamber at 600-650 ^{0} C while temperature of 2nd chamber will be 850-900 ^{0} C. This high temperature will ensure the complete burning of all waste material and control emission of dioxins and furans as well. Following are the key points of this management system

- Installation of bins with color coding for different type of waste.
- At source segregation of infection / hazardous waste in separate bins. Medical waste chart is given below to identify the right bin for different kind of waste.

- Collection of waste by certified and trained staff only.
- Use of Personal Protective Equipment by staff is mandatory including, safety gloves, safety mask, safety apron, safety glasses, safety shoes etc.
- Regular supervision of waste collection process

Residual Impact

The implementation of suggested mitigation measures will reduce impacts on the environment and the residual impacts will be low.

6.7.2 Wastewater Generation

Potential Impacts

Wastewater will be produced from different activities of hospital including kitchens, toilets, washing of OT/OR, washing of floor etc. The wastewater will have infectious properties due to inclusion of blood from washing of infected hand by doctors after operations, droplets of blood with washings of floor and washing of bed infected sheets. Direct discharge of this infected wastewater may become source of diseases in the local area.

Mitigation measures

Wastewater Treatment plant of about 50 m^3 per day will be installed for treatment of wastewater. This treated waste water will be reused for watering the plants and lawns. The same water will also be used for sprinkling on unpaved area. Remaining quantity of wastewater will be discharged into drain passing outside the proposed hospital. The treatment standards are designed to meet NEQS permissible limits.

Residual impact

The residual impact will be negligible, if wastewater treatment plant is operated according to right procedure.

6.7.3 Air Emission due to operations of Incinerator

Potential Impacts

Air quality deterioration can take place by improper storage of the waste. Similarly, incineration of waste can also pollute the air. The combustion of any substance will generate by-product emissions that could be released to the air. Waste burning processes generate wastes, which contain particulates, sulphur and nitrogen oxides, volatile organic compounds, dioxins/furans and acidic gases. The Particulates also includes heavy metals present in the waste. Primary attention needs to be focused on gaseous emissions of particulates less than 10 microns in size, dioxins/furans, sulfur dioxide and nitrogen oxides due to associated health concerns and other environmental damage caused by these pollutants.

Incinerator air emissions can have a major impact on the local and regional air quality if not controlled properly. The pollutants can seriously impair human health and damage vegetation and other materials.

Of particular concern are dioxins which are produced by burning of the plastic and polyethylene products. The dioxins are carcinogenic and can affect the facility staff carrying out the waste burning and nearby communities. Open burning of the waste particularly if it contains plastics/ polyethylene will be avoided since it produces dioxins in addition to other toxic gases.

Mitigation measures

Special care must be taken during storage of waste to ensure that waste will not contaminate the air quality. If waste is incinerated, then it will be ensured that i) properly trained staff operate the incinerators according to standard operating procedures; ii) appropriately high (more than 1200°C) temperature is achieved in the incinerator to avoid dioxin discharge; iv) the flue gases are properly treated (e.g. with the help of wet scrubbers) before their release to the atmosphere; and v) there is no leakage of gases from the first chamber of the incinerator to avoid any release of dioxins before they can be destroyed in the second chamber.

Besides, following mitigation measures will be adhered to protect air quality from stack emissions:

- To limit these emissions, the incinerator should be properly operated and carefully maintained. The temperature in the primary chamber should he around 600-800°C and in the secondary chamber 900- 1200°C.
- To protect human health, agriculture, and native wildlife and vegetation, design higher stacks to reduce ground level concentrations.
- In order to meet environmental standards, modern pollution control equipment such as wet scrubbers in specific to proposed project is designed to remove emissions.

- Gaseous and particulate air emissions can be controlled with Wet Scrubber. This method is extremely effective in controlling emissions of metals and organic compounds that could also attach to fine particulates.
- Exhaust gas from an incinerator will be forced through a wet scrubber to remove toxic gases. Scrubbers are used primarily to control acid gases, but they also remove some heavy metals. Wet scrubbers use a moving alkaline liquid solution to neutralize acids.
- Primary Pollutants emitted from a major incinerator facility should be monitored on a continuous basis.
- Some potentially hazardous materials such as gaseous HCI, SOx, and dioxins resulting from chlorine and sulfur containing materials in the waste are difficult to capture and remove, even when using sophisticated gas-cleaning plant. The pre-sorting of waste and the removal of as much as possible of the materials, which lead to these hazardous contaminants, will therefore help to minimize harmful emissions to atmosphere.
- It has been found that a strong correlation exists between combustion temperature, residence time and dioxin emission. The California air resources board recommends minimum temperatures of 98.22 ± 87.77°C with a minimum residence time of 1 second. The design of Incinerator must operate under the conditions as per specifications to minimize the production of dioxins.
- Production of CO and HC are directly related to the combustion efficiency therefore the optimum conditions must he ensured to prevent their production. The reasons could be incomplete burning of waste, due to fuel rich burning (overloading of the furnace) and insufficient temperature caused by high moisture content of waste.
- Regular and thorough cleaning of the incinerator, including ash removal is absolutely essential for efficient operation. An accumulation of ash/ unburnt material/ incombustible matter will cause excessive temperatures to be generated and should therefore be avoided. The incinerator should be cleaned and all ash removed regularly. Free passage of air is essential for combustion as well as for the cooling process. Therefore, the removal of deposits from within as well as underneath the combustion chamber is critical.
- Hospitals can reduce the need to burn medical waste by reducing the amount of waste they produce. Much of the waste burned in medical waste incinerators can be recycled and remade into new items instead. Recycling keeps these items from being burned, reducing air pollution and saving natural resources at the same time. Hospitals can take other steps to reduce the amount of trash they produce. Reducing the amount of trash produced by hospitals will reduce the amount of trash that needs to be burned.
- Using non-toxic materials as alternatives will reduce much of the toxic materials from incinerator emissions. Alternatives to commonly used medical items containing dioxin and mercury does exist. For example, hospitals can use

thermometers that contain no mercury and non-PVC plastic items that contain no dioxin or chlorine.

- Chlorinated plastics shall not be incinerated and the wastes incinerated shall not be chemically treated with any chlorinated disinfectant.
- Good combustion practices can control emissions by ensuring that the temperature in the combustion chamber and the time the Waste remains in the combustion chamber are kept at optimal levels. Major variations in these or other incineration operations could lead to a limited but significant belch of contaminated air emissions.
- Stack emissions must be monitored under maximum capacity of incinerator once in three months through laboratory approved by EPA and record of such analysis shall be maintained. For dioxins and furans, monitoring shall be done once in a year

Residual Impacts

The residual impacts of the incinerator operation will be negligible if suggested measures are adopted.

6.7.4 Employment Generation

Impact

During the regular operational stage of the proposed project approximately 200 to 300 employees of all categories will be employed. This will be a major positive impact.

Mitigation

Not required

6.7.5 Solid Waste Generation

During the regular operation of the proposed project no process solid waste will be produced, only kitchen waste/ Municipal Solid Waste will be produced. Approximate quantity of municipal solid waste, during operation will be 5kg per day.

Mitigation

Municipal solid waste will be disposed off in an environment-friendly manner. The garbage collection system is embedded in the designing of hospital building. After complete development the waste generated will be managed by private contractor.

6.7.6 Impact of flora and fauns

Impact

The proposed project, if not managed will damage the vegetation by doing wrong parking of visitors in lawns and green belts. Further, due to operations of the hospital local species of animals may also migrate.

Mitigation

The project management is committed to its responsibility for better environment on the project site of which tree plantation is an essential part. Parks with intensive tree plantation, plantation along road sides, grassy plots and lawns are intrinsic component of proposed building. Native species of trees will be planted to enhance greenery of area.

As the proposed project site is located in already populated area, no wildlife species are present in the project area. Hence, negligible impact on the fauna of local area.

6.7.7 Emergency Response

Safety is the major area that require proper attention based upon potential impacts of activities by unforeseen circumstances. There is always a chance of fire at any kind of premises/ buildings. If the fire-fighting arrangements may not arrange this will be a major negative impact.

Mitigation

The following mitigation measures will be adopted during the regular operational stage of the proposed project:

- Emergency Exits
- Smoke Detectors
- Fire Extinguishers (DCP 05 cylinders, AFFF 03 cylinders,CO2 02 cylinders, DCP 02 Trolleys)
- Emergency Signs
- Floor Marking
- First Aid Boxes (02)
- Firefighting Kit

6.7.8 Waste Storage Yard (WSY)

WSY is one of crucial component to be considered because of its associated environmental impacts of significant importance. The collected waste has to be properly stored before final disposal by incineration. Segregation of the waste will also be done at this stage. WSY must be located away from residential area, food storage/ preparation facilities at convenient access of waste carrying wheel barrows/ trolleys from authorized staff at all the times. This must be properly covered and secured to keep animals and birds etc. away from the site. Waste Storage Yard will help to prevent scavenging/ scattering of waste and protection from sun & rain.

The project site will be available with waste storage yard for temporary waste storage. This facility could create impacts of major significance if not properly handled and supervised.

Mitigation

The storage facility requires following measures to be adopted for safe and healthy working conditions without affecting personnel's health & environment:

- Medical waste should be incinerated on the day it is received, if not possible, the medical waste (yellow bag) won't be stored for more than 24 hrs.
- The storage area must be marked as hazardous storage facility
- The workers must wear personal protective equipment like gas mask, gloves, overall and safety shoes before entering the storage area
- Ensuring the housekeeping of area around the storage tanks and especially inside the facility

6.7.9 Noise and Vibration

Main noise source of the proposed project is motor power machinery noises generated by incinerator as well as airborne noises of waste transport vehicles on the surrounding environment.

Mitigation

As for main equipment in proposed project, soundproof and noise reducing measures will be adopted. At the same time, limit value and requirement on noise of equipment will also be brought forward to manufacturers. Central noise-isolation control room with double soundproof door and window which will be closed as much as possible when conditions allow, will be set up in workshop with loud noise. Greening will be done at plant as well as at WSY area. Large amount of trees, which selected in accordance with local condition, will be planted around main plant building so as to realize the aim of dustproof, noise reduction and environment beautification.

Besides, place where workers are exposed to excessive noise provide ear protection to maintain noise levels below 85 dB. Ear protections include Molded and pliable earplugs, cup-type protectors and helmets. Such devices may provide noise reductions ranging from 5 to 35 dB.

6.7.10 Health and Safety of Workers

The project activities will impose certain negative impacts on health and safety of the workers engaged in waste management services including collection, transportation, storage and incineration. However, mitigation measures will be required to minimize/ eliminate health and safety related negative impacts of the project.

Mitigation

Implementation of the following measures will ensure health and safety of the workers:

- Ensure that the workers/ laborers engaged for provisions of waste management services are trained in safety procedures for all relevant aspects of collection, transportation, storage and incineration of waste;
- Proponent of the Project will make regular checks to ensure that the workers are following safety working procedures/ safety measures.
- Formal Environment Occupational Health and Safety Management System Manual will be developed by Proponent and ensure its compliance.

- Workers who will be engaged in incineration process, must be adhered to the following:
    - Wear safety shoes with non-skid soles
    - Wear long-sleeve shirts and protect hands with protective gloves
    - Wear appropriate eye protection; consult a safety supervisor or a supplier
    - Arrange for periodic inspection of incinerator structure integrity, to detect any cracking, etc.
    - Wear respiratory protection (Gas Mask) during maintenance or other work in which dust and noxious gases may be released into the atmosphere

6.6 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

Besides the concrete measures to be adopted as described above, the quality of environment will further be enhanced through the running of project in complete accordance with the 5RS Principles- Reduce, Reuse, Recycle, Refurbish and Retrofit.

- The project will provide health care facilities to local community.
- Access to advance health care facilities will help in saving lives of people.
- Financial Budget of people will be managed by reducing medical expenditure in private hospitals.
- The sale of food and other services to immigrant workers during the construction phase of the project will lead to some direct incomes as a form of project impact.
- The communities may be presented in form of temporary employment, when engaged to assist surveyors. Also, experts involved in feasibility studies and other pre-project consultations may lead to some level of purchases of items from petty traders and farmers during their presence in the communities.
- Some form of temporary employment would be generated for community members during the construction phase by the project directly.
- However, completion of the project will enhance the employment possibilities of inhabitants.
- Plantation of native plants and landscaping of the area will add beautification in the area
- Scientific disposal of hazardous / infectious waste will promote sustainability in the area.
- Recycling and reuse of treated wastewater will help to conserve precious water resource.

CHAPTER-7

6. ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

7.0 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.1 INSTITUTIONAL CAPACITY

7.1.1 Environmental Committee and its Responsibilities

During the construction phase, the overall responsibility for the implementation and monitoring of the EMP rests with the Environmental Committee (including Project Director, representative from Ministry of Health National Service, Regulation and Coordination and relevant Health Care Commission), will overall supervise the project activities by using the Construction Supervision Consultant (CSC) and implementation of the proposed mitigation will be monitored.

During the operation phase, the overall responsibility for the implementation and monitoring of the EMP rests with Medical Superintendent of the hospital along with director Administration. The specific roles and responsibilities for environmental management and monitoring are provided in **Table 7-1** below.

The environmental management plan will require involvement of the various organizations for its implementation during construction and operation phases of the project i.e.:

The Environmental Committee (EC) will:

- Coordinate activities with all stakeholders, review consultants, proposals, and provide overall guidance during various stages of project preparation;
- Have competent staff to manage contractors and ensure implementation of recommended mitigation measures
- Manage and ensure effective implementation of the gender action plan;
- Ensure submission of all IEE/EIA requirements as per law by responsible entities; and
- Monitoring of activities of the entire project.

The Construction Supervision Consultant, if hired will be responsible for the following items:

- Incorporates into the project design the environmental protection and mitigation measures identified in the EMP for the design stage;
- Hire competent staff to implement the ensure implementation of mitigation measures suggested in the EMP.
- Assists EC to ensure that all environmental requirements and mitigation measures from the IEE/EIA and EMP are incorporated in the bidding and contracts documents.
- Prior to construction, reviews the updated Site-Specific Environmental Management Plans (SSEMPs) prepared by the contractor.

- Undertakes environmental management capacity building activities for relevant project focal staff including staff from contractors

The GB EPA will have the following responsibilities with regards to this project:

- Provides regulatory compliance works for the project.
- Reviews and approves environmental assessment report of the proposed project submitted by EC.
- Issues environmental clearance certification for the Project based on their mandate and regulations.
- Undertakes monitoring of the project's environmental performance based on their mandate.

The project contractor will be responsible for following items:

- Implementation of, or adherence to, all provisions of the IEE/EIA and EMP;
- Preparation of site specific EMPs (SSEMPs) as required. SSEMPs will be prepared by Contractor's Environment Specialist, site in charge, HSE staff and project technical team before their mobilization and it will be submitted to Engineer of construction supervision consultant/PMU for review and approval. Site specific EMP template for guidance of contractors is provided as **Annexure-X**.
- Contractor's environmental performance will rest with the person holding the highest management position within the contractor's organization. Reporting to their management, the contractor's site managers will be responsible for the effective implementation of the EMP.
- The Contractor will be required to have qualified Environmental Specialists in their team to ensure all mitigation measures are implemented during the different development phases of the project.

Table 6-1 Environmental Management Plan

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
Design/Pre-Construction Phase	1.1	Improper design of Hospital Building and its Allied Components	Factors such as site capacity, accessibility, acceptability, stability, environmental sensitivity, land use, socio-economic receptors and climate hazards have been studied and site has been selected accordingly. Water supply network design shall facilitate uninterrupted water supply through gravity system without technical constraints.	Design Consultant	Environmental Committee (EC)	Before Construction (BC): during detailed designing of the project
	1.2	Lack of integration of IEE/EMP requirements into Construction bid documents	The Environmental Committee (EC) will be assigned the task to check that design and bid documents are responsive to key environmental, social and safety considerations, and that the proposed method of work reflects the boundaries defined in the EMP. The bid documents must include the EMP and its implementation cost must be reflected in the BOQ. IEE/EMP implementation and monitoring requirements must be part of bidding documents and necessary contractual binding must be agreed by project contractors before award of contract. Project contractors shall have qualified and experienced environmental staff to plan,	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project

			arrange, implement, monitor and report IEE/EMP requirements.			
	1.3	Contractor's Environmental Safeguards Capacity	PMU shall review the contractor capacity with respect to safeguard management and contracts shall be awarded accordingly. The Contractor will be required to define an Occupational and Environmental Health and Safety procedure for all work, including work camp operation, management of cement dust, and use of Personal Safety Equipment. These procedures shall be developed and approved by the PMU in collaboration with the focal agencies prior to the commencement of any physical works on ground. PMU shall ensure the project contractors are selected on merit and necessary funds have been allocated in the contract documents for EMP implementation and monitoring.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project
	1.4	Relocation of Utilities	Detailed field surveys will be conducted to assess any subsurface utilities that might be present under the proposed project alignment within the right of way of the project, shall be relocated prior to the commencement of the work. Based on the utilities that are identified during the detailed surveys, a relocation plan of those utilities will be developed by the respective line agencies in close coordination.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project

			In case any utilities can be allowed to remain in place and avoid their damage if possible, the contractor will need to be aware of the location of these services so that disruptions are not caused. In such a scenario, the responsibility for any repair of damaged services will lie with the contractor.			
	1.5	Identification of Locations for Labor Camps and ancillary facilities	In order to prevent a nuisance, specific locations shall be designated for development of the labor camps. All necessary facilities and amenities shall be provided in these camps such as resting area, drinking water, electricity, supply of water. Solid and liquid effluent waste disposal facilities shall also be designed to cater waste of administration/office building etc. The use of proper planning while identifying locations for the labor camps will ensure there is minimal disturbance to all key receptors and the traffic is not disrupted by labor camps being set up roadside next to the construction sites.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project
	1.6	Development of Traffic Management Plan	A comprehensive traffic management plan shall be developed by the contractor and approved by the Executing Agency or the Project Management Unit that will contain the traffic diversion onto alternate routes and management of traffic flows to minimize the congestion and the possibility	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project

			of accidents. This plan shall be dependent on the EMP and will be implemented by the contractor.			
	1.7	Land Acquisition and Resettlement Impacts	No mitigation measures are required.	-	-	-
	1.8	Topography	Mitigation measures will involve adoption of best engineering design measures keeping in view of the aesthetics of the project area and provision of green areas for the landscape in design. The proposed design has tried to minimize these impacts.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project
	1.9	Seismicity	The proposed structure should be designed and constructed keeping in consideration high intensity earthquakes. For seismic hazard analysis, updated structural and seismic evaluations should be conducted by the design engineer/consultant. Moreover, geo-technical investigations must be conducted prior to the construction phase.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project
	1.10	Flora	The camps, mobility of machinery should be proper planned and well designed to avoid any loss to local green cover; It is recommended to establish the construction camps where no or minimum vegetation exists. The location of the construction camp should be selected so as to have limited environmental impact during the construction phase and to reduce the cost and land requirement.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project

			Compensation to the forest department for all types of plants (saplings, sub-mature, mature trees and other green assets) will be paid by the proponent as desired by the Punjab Forest Department and as per law of land.			
	1.11	Fauna	The standard measures must be adopted to minimize noise due to machinery movements and installations; Wildlife movements and routes must be considered during activities and should be avoided to their maximum level; The alternate routes and points are recommended to avoid any damage to locally available fauna; The camps shall be properly fenced and gated to check the entry of animals in search of edible goods; and Similarly, wastes of the camps shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them. Fruit trees along with other broad leaves must be considered for plantation to balance the local ecosystem. Proper waste management plan may be considered mandatory to safeguard the local environment.	Design Consultant	Environmental Committee (EC)	BC: during detailed designing of the project
Construction Phase	2.1	Change in land use	Not Required	Construction Contractor	Environmental Committee (EC) and	During Construction at Active

					Construction Supervision Consultant	Construction Site
	2.2	Impacts on Topography	The contractor will be required to impart proper training to their workforce in the storage and handling of obnoxious materials, like furnace oil, diesel, petrol and chemicals etc. that can potentially cause soil contamination. Soil contamination by asphalt and other obnoxious material will be minimized by placing all containers in caissons or dumped into pits lined with impervious liners to avoid contamination of soils/ groundwater from leachates. Proper drainage facility should be provided to avoid the water accumulation which will minimize the soil contamination. Solid waste generated during construction should be properly treated and safely disposed of only at demarcated waste disposal sites. Plantation needs to take place at the project site so that soil becomes stabilized.	Construction Contractor	EC and CSC	During Construction (DC) at Active Construction Site
	2.3	Impacts on Soils	Vigorous plantation needs to take place at the project site so that soil becomes stabilized.	Construction Contractor	EC and CSC	DC at Active Construction Site
	2.4	Impacts on Surface and Groundwater	The workers will be provided with washrooms and toilets at site.	Construction Contractor	EC and CSC	During Construction at Active

			Proper sanitary system will be developed on temporary bases. Wastewater effluent from construction site, washing-yards should be passed through the treatment process to remove primary contaminants before discharging it into natural streams.			Construction Site
	2.5	Impacts on Air Quality	Framework for air quality management has been developed as given as Annexure-V of this report. Main features of the air quality management are given below. Periodic environmental monitoring and testing of emissions from vehicles should be carried out in order to keep the concentration of various pollutants including CO, Noise & Smoke within the PEQS limiting value. Periodic sprinkling of water on windblown stockpiles of construction material and unpaved sidewalks. Ambient gaseous monitoring for various pollutants like CO, NO2, SO2, PM10 etc. should also be carried out periodically. Periodic maintenance of the machinery will be carried out to reduce the concentration of emissions. Haul-trucks carrying earth, sand, aggregate etc. will be kept covered with tarpaulin to help contain construction materials and being transported within the body of each carrier between the sites.	Construction Contractor	EC and CSC	During Construction

			Tyres of the vehicles and heavy machinery will be washed and the waste water produced as a result of this activity will be reused after due treatment. This will reduce concentration of PM in the ambient air.			
	2.6	Water Consumption	Recharge zone shall be created to recharge of ground water. These recharge zone shall never be concreted. However, the must be maintained to make the area neat and tidy.	Construction Contractor	EC and CSC	During Construction
	2.7	Waste Generation	Most of construction waste will be utilized on site to fill excavated sites or recycled; remaining of it will be properly disposed off/ landfilled. Providing adequate waste baskets and dumpsters is essential to keep the site clean and pest free. Arrangements should be made for regular garbage collection from the proposed project site. All the putrescible material will be segregated from other waste and will be disposed of accordingly. Septic tanks will be constructed for the treatment of sewage waste from construction camps and other construction activities.	Construction Contractor	EC and CSC	During Construction at Active Construction Site

	2.8	Construction Debris	Each phase of the development will produce solid waste, the disposal of which, if not managed properly could have negative impacts on the site and surrounding area. A site waste management plan should be made the responsibility of the project contractor to provide for the designation of appropriate waste storage area on the site and a schedule for the timely collection and removal of construction debris to an approved dump site. Only small quality of the waste will be produced as no major excavation is involved in the project.	Construction Contractor	CSC, PMU	During Construction at Active Construction Site
	2.9	Occupational Safety and Health Workers	Framework for Occupational Health and Safety Management plan has been developed to handle any health and safety issue of workers and community. Framework Occupational Health and Safety plan is attached as Annexure-VI. Mitigation Measures to prevent and control physical hazards include: Moving Equipment and Traffic Safety Establishment of work zones to separate workers on foot from traffic and equipment by: Routing of traffic to alternative roads when possible; Where worker exposure to traffic cannot be completely eliminated, use of protective	Construction Contractor	CSC, PMU	During Construction at Active Construction Site

			barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g. traffic cones and barrels) to delineate the work zone; Regulation of traffic flow by warning lights, avoiding the use of flaggers if possible; Reduction of maximum vehicle speeds in work zones; and Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles; and safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space (while controlling glare so as not to blind workers and passing motorists). Provide appropriate PPE in conjunction with training, use, and maintenance of the PPE. Furthermore, the noise reduction options that should be considered which include: Selecting equipment with lower sound power levels; Installing suitable mufflers on engine exhausts and compressor components; Installing vibration isolation for mechanical equipment;			

			Providing noise protection PPEs (ear plugs/ear muffs) to the construction workers; Re-locating noise sources to less sensitive areas to take advantage of distance and shielding; Developing a mechanism to record and respond to complaints; and Regular monitoring of noise levels at active sites or near noise producing equipment/machinery and compare it to the available occupational noise standards. Monitoring of OHS Activities: During the construction phase of proposed project, occupational health and safety monitoring programs of the contractor (s) should verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health, and safety hazards at the construction site and camps, and the implementation of prevention and control strategies. The occupational health and safety monitoring program should include: Regular inspection and testing of all safety features and hazard control measures focusing on engineering and personal protective features, work procedures, places of work, installations, equipment, and tools used;			

			Surveillance of the working environment: The contractors should document compliance using an appropriate combination of portable and stationary sampling and monitoring instruments. Monitoring and analyses should be conducted according to internationally recognized methods and standards. Monitoring methodology, locations, frequencies, and parameters should be established individually for each project following a review of the hazards; Continuous and efficient surveillance of worker's health during the entire construction phase by the nominated officials of contractors; and Training: Training activities for employees (construction contractor & supervision consultant staff) and visitors should be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises, including fire drills, should be documented adequately. Service providers and contractors should be contractually required to submit to the employer adequate training documentation before start of their assignment. Contractor(s) shall prepare a comprehensive OHS Plan including work method statements for all hot works to avoid incidents during construction stage.			
	2.10	Community Health and	The World Bank/IFC EHS Guidelines, 2007, defines community health and safety	Construction	CSC, PMU	During

		Safety	in terms that guarantee as-built infrastructure conforms to acceptable standards (structural safety, flood and fire risk), water supply sources are of suitable potable quality, emergency response planning is in place for built environments, traffic safety provisions are enforced alongside transport hazard assessment and mitigation, and disease prevention measures are taken. The Contractor will prepare the site specific community health and safety plan in compliance with relevant sections of the IFC General Environmental Health and Safety Guidelines (WB/IFC 2007), Pakistan Labor Laws,; The Contractor will clearly barricade work areas to prevent access by the public, while ensuring passage by providing safe pathways for pedestrians around construction zones; The Contractor will exclude parking, waiting vehicles and vendors from areas adjacent to the work by means of clearly marked barricades and posted signage; The Contractor will remove excavated earth, spoil, rubble, cut vegetation and refuse whether generated by the project or discarded by third parties from areas within the construction zone, where it has potential to interfere with the public or generate dust; The Contractor will provide temporary lighting to facilitate construction during	Contractor		Construction

			night time; The Contractor will remove hazardous conditions on construction sites that cannot be controlled effectively with site access restrictions and will barricade any excavations and materials placed near the public place (if applicable); Hard Barricades will be provided at the excavation deeper than 1.5 meter as per "NZS 3845:1999 Road safety barrier systems"; The Contractor will promptly reinstate any services and reinstall any physical facilities that are cut, disconnected or damaged during construction, and maintain or provide temporary services that are interrupted by construction. The Supervisory Consultant will inspect and certify the adequacy of all reinstated services and facilities; Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas especially near the settlements; An Emergency Preparedness and Response Plan (EPRP) in coordination with the local emergency responders to provide timely first aid response in the event of accidents and hazardous materials response in the event of spills; Instruct foremen to strictly enforce the keeping out of non-working persons,			

			particularly children, off work sites; Timely public notification on planned construction works; Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity and social links; Any environmental condition that is disagreeable to the public and causes an avoidable nuisance can be addressed with additional provisions over and above those described above, as determined necessary by the supervisory consultant. These requirements will be incorporated into the bidding specification and contract documents, and will be binding on the contractor, at risk of penalty for noncompliance, as charges to be recovered from contractor for unsafe act or condition.			
	2.11	Impacts on Flora & Fauna	As the project site is present in semi-urban area hence there is no wild fauna or flora present in and around the project site. So there will be no impact on the fauna and flora of the project area. However, following mitigation measures will be adopted to restore the environment as much as possible. Impact mitigation calls for protecting and restoring as much of the original condition on the development site as possible. In an effort to preserve the natural	Construction Contractor	CSC, PMU	During Construction

			aesthetics and environment, naturally occurring plants such as those used primarily by the birds for food and shelter should be planted for their survival. This would ensure that primarily native plants are used in the landscape plan/ parks thus minimizing the use of imported species and eliminating the introduction of potentially invasive species. Using bird feeder may encourage the displaced avifauna to remain in or return to the general vicinity, thus maintaining the existing biodiversity. The project contractor should be subject to punitive penalties for removal or damage of ecologically valuable trees designated for protection or relocation (if any).			
	2.12	Transportation of Construction Materials	Arrangements should be made with contractors to ensure that the vehicles used for transporting materials and machinery to the site are appropriately sealed and covered to minimize dust. The construction activity will go on for a short period of time and there will be no worth mentioned impacts from this activity on the project area. Dust producing materials such as sand or cement should be stockpiled in low enclosures and covered, away from drainage areas where they could easily be washed away during rainfall.	Construction Contractor	CSC, PMU	During Construction

	2.13	Impact on Traffic	Framework for traffic management has be prepared and given as Annexure-VII of the EIA report. mitigation measures are required as this activity will be for a short period of time and the carrying capacity of Road is fair enough to accommodate this traffic for that much time period.	Construction Contractor	CSC, PMU	During Construction at Active Construction Site
	2.14	Employment Generation	Not required	Construction Contractor	CSC, PMU	During Construction
	2.15	Site Accessibility during Construction	The accessibility of road for local population will be ensured by implementation of Traffic Management Plan. The framework for Traffic Management Plan is given as Annexure-VII of this EIA report. The approach roads should be selected to avoid any soil degradation and erosion impacts; Special care should be taken for known sensitive area to ensure that all interested parties are aware of the type and location of working. Measures should be taken where necessary to protect such areas physically; and Mitigations for the loss of trees and crops, soil erosion, soil contamination, air and noise pollution, waste generation, and loss of agricultural land provided in below sections will be adopted.	Construction Contractor	CSC, PMU	During Construction
	2.16	Resource Conservation	Framework for Resource Conservation Plan has been developed for the proposed	Construction Contractor	CSC, PMU	During Construction

			project and attached as Annexure-VIII.			
	2.17	Construction Camps/Camp Sites	Reinstate any temporary facilities to pre-existing conditions in ecologically sensitive areas. Implement landscaping plan for all facilities in areas where high landscape value and visual vulnerability to the proposed activities warrants site-specific landscape restoration measures. Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary. Provide adequate warnings of impeding works to all potential receptors within a 1 km corridor surrounding the ROW via public notices and local news. State land will be a first preference for worker camp location, followed by land where there is a willing lessee. Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values. Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. This will include, in appropriate languages: A briefing on camp rules A community relations orientation to	Construction Contractor	CSC, PMU	During Construction at Active Construction Site

			increase awareness about the local area, cultural sensitivities and the project Code of Conduct Awareness-raising on health considerations, including sexually transmitted diseases (STDs). The construction contractor is required to develop a Construction Camp Management Plan to address: Discipline; Community liaison; Ethnic tensions and; Communicable diseases. A Code of Conduct and Camp Rules will be required within the Construction Camp Management Plan, which provides policies and a disciplinary framework with respect to worker behavior. The construction contractor will be required to assess the environmental/social sensitivity of any additional or alternative sites prior to their approval for adoption. The contractor(s) should provide plan to the Proponent for removal & rehabilitation of site upon completion; Photographical and botanical inventory of vegetation before clearing the site; and Compensatory plantation to be scheduled when construction works near end.			

	2.18	Green House Gas (GHG) Abatement	Regular motioning of the vehicles for engine efficiency; Avoid idling of construction vehicles; Alternative energy resources shall be considered where possible; and The Contractor shall ensure the compliance with NEQS.	Construction Contractor	CSC, PMU	During Construction
	2.19	Emergency Response Plan	Emergency Response Plan has been developed to manage all potential and actual emergency situations during construction phase. The same is attached as Annexure-IX of the report.	Construction Contractor	CSC, PMU	During Construction at Active Construction Site/ Camps
	2.20	Natural and Man-Made Disasters	An ERP for earthquakes and manmade disasters should be developed by the contractor. The ERP should be implemented in close consultation with the RESCUE 1122 Services and other concerned departments; Training of the contractor and employees regarding the emergency procedures and plans should be regularly conducted; Emergency numbers should be clearly posted at all disposal stations; and Minor incidents and near misses should be reported, and preventive measures should be formulated accordingly.	Construction Contractor	CSC, PMU	During Construction at Active Construction Site/ Camps
	2.21	Social and Cultural Conflicts	Local labor especially from nearby communities should be given preference for the construction works; Careful planning and training of work	Construction Contractor	CSC, PMU	During Construction at Active Construction

			force to minimize disturbance to the local people; Public notification through print or electronic media during the entire construction phase to avoid any inconvenience in accessibility to the locals; and Adequate training especially for the transitive workforce of the station (involved both in the construction process and in the commissioning) to regard the customs of the area so that the locals do not feel insecure.			Site/ Camps
	2.22	Communicable Diseases	Arrange to run an active campaign, in the labour camp, to make people aware of the cause, mode of transmission and consequences of HIV/AIDS; Strengthen the existing local health & medical services for the benefit of labour as well as the surrounding villages; Ensure cleanliness and hygienic conditions at the labour camp by ensuring proper drainage and suitable disposal of solid waste. Inoculation against Cholera will be arranged at intervals recommended by the Health Department; Locating a labour camp at least away from the villages (local settlement), and Keep all the camps, offices, material depots, machinery yards and work sites open for the inspection of health and safety	Construction Contractor	CSC, PMU	During Construction/ Prior to Operations

			measures and related documents.			
Operational Phase	3.1	Hazardous/ Infectious Waste Generation	Successful implementation of this checklist will enable the management of hospital to easily manage waste. Incinerator of 50kg/hr is proposed in the design of the hospital as part and parcel of this project. This captive incinerator will help to manage all the quantities of infectious waste. The specification of the incinerator will meet the national and international standards to control emissions. Dual chamber incinerator will be installed with a temperature control system in the 1st chamber at 600-650 ^{0} C while the temperature of the 2nd chamber will be 850-900 ^{0} C. This high temperature will ensure the complete burning of all waste material and control emission of dioxins and furans as well. Installation of bins with color coding for different type of waste. • At source segregation of infection / hazardous waste in separate bins. Medical waste chart is given below to identify the right bin for different kind of waste. • Collection of waste by certified and trained staff only. • Use of Personal Protective Equipment by staff is mandatory including, safety gloves, safety mask, safety apron,	WASA, Rawalpindi	Env. Expert/ EPAs	During Operations

			safety glasses, safety shoes etc. • Regular supervision of waste collection process			
	3.2	Wastewater Generation	Wastewater Treatment plant of about 50 m^3 per day will be installed for treatment of wastewater. This treated waste water will be reused for watering the plants and lawns. The same water will also be used for sprinkling on unpaved area. Remaining quantity of wastewater will be discharged into drain passing outside the proposed hospital. The treatment standards are designed to meet NEQS permissible limits.			
	3.3	Air Emission due to operations of Incinerator	Special care must be taken during storage of waste to ensure that waste will not contaminate the air quality. If waste is incinerated, then it will be ensured that i) properly trained staff operate the incinerators according to standard operating procedures; ii) appropriately high (more than 1200°C) temperature is achieved in the incinerator to avoid dioxin discharge; iv) the flue gases are properly treated (e.g. with the help of wet scrubbers) before their release to the atmosphere; and v) there is no leakage of gases from the first chamber of the incinerator to avoid any release of dioxins before they can be destroyed in the second chamber.			

			Besides, following mitigation measures will be adhered to protect air quality from stack emissions: • To limit these emissions, the incinerator should be properly operated and carefully maintained. The temperature in the primary chamber should he around 600-800°C and in the secondary chamber 900- 1200°C. • To protect human health, agriculture, and native wildlife and vegetation, design higher stacks to reduce ground level concentrations. • In order to meet environmental standards, modern pollution control equipment such as wet scrubbers in specific to proposed project is designed to remove emissions. • Gaseous and particulate air emissions can be controlled with Wet Scrubber. This method is extremely effective in controlling emissions of metals and organic compounds that could also attach to fine particulates. • Exhaust gas from an incinerator will be forced through a wet scrubber to remove toxic gases. Scrubbers are used primarily to control acid gases, but they also remove some heavy metals. Wet scrubbers use a moving alkaline			

			liquid solution to neutralize acids. • Primary Pollutants emitted from a major incinerator facility should be monitored on a continuous basis. • Some potentially hazardous materials such as gaseous HCI, SOx, and dioxins resulting from chlorine and sulfur containing materials in the waste are difficult to capture and remove, even when using sophisticated gas-cleaning plant. The pre-sorting of waste and the removal of as much as possible of the materials, which lead to these hazardous contaminants, will therefore help to minimize harmful emissions to atmosphere. • It has been found that a strong correlation exists between combustion temperature, residence time and dioxin emission. The California air resources board recommends minimum temperatures of 98.22 ± 87.77°C with a minimum residence time of 1 second. The design of Incinerator must operate under the conditions as per specifications to minimize the production of dioxins. • Production of CO and HC are directly related to the combustion efficiency therefore the optimum conditions must he ensured to prevent their production.			

			The reasons could be incomplete burning of waste, due to fuel rich burning (overloading of the furnace) and insufficient temperature caused by high moisture content of waste. • Regular and thorough cleaning of the incinerator, including ash removal is absolutely essential for efficient operation. An accumulation of ash/ unburnt material/ incombustible matter will cause excessive temperatures to be generated and should therefore be avoided. The incinerator should be cleaned and all ash removed regularly. Free passage of air is essential for combustion as well as for the cooling process. Therefore, the removal of deposits from within as well as underneath the combustion chamber is critical. • Hospitals can reduce the need to burn medical waste by reducing the amount of waste they produce. Much of the waste burned in medical waste incinerators can be recycled and remade into new items instead. Recycling keeps these items from being burned, reducing air pollution and saving natural resources at the same time. Hospitals can take other steps to reduce the amount of trash they produce. Reducing the amount of trash produced by hospitals will reduce			

			the amount of trash that needs to be burned. • Using non-toxic materials as alternatives will reduce much of the toxic materials from incinerator emissions. Alternatives to commonly used medical items containing dioxin and mercury does exist. For example, hospitals can use thermometers that contain no mercury and non-PVC plastic items that contain no dioxin or chlorine. • Chlorinated plastics shall not be incinerated and the wastes incinerated shall not be chemically treated with any chlorinated disinfectant. • Good combustion practices can control emissions by ensuring that the temperature in the combustion chamber and the time the Waste remains in the combustion chamber are kept at optimal levels. Major variations in these or other incineration operations could lead to a limited but significant belch of contaminated air emissions. • Stack emissions must be monitored under maximum capacity of incinerator once in three months through laboratory approved by EPA and record of such analysis shall be			

			maintained. For dioxins and furans, monitoring shall be done once in a year			
	3.4	Employment Generation	No mitigation required.			
	3.5	Solid Waste Generation	Municipal solid waste will be disposed off in an environment-friendly manner. The garbage collection system is embedded in the designing of hospital building. After complete development the waste generated will be managed by private contractor.			
	3.6	Impact on flora and fauna	The project management is committed to its responsibility for better environment on the project site of which tree plantation is an essential part. Parks with intensive tree plantation, plantation along road sides, grassy plots and lawns are intrinsic component of proposed building. Native species of trees will be planted to enhance greenery of area. As the proposed project site is located in already populated area, no wildlife species are present in the project area. Hence, negligible impact on the fauna of local area.			
	3.7	Emergency Response	The following mitigation measures will be			

			adopted during the regular operational stage of the proposed project: • Emergency Exits • Smoke Detectors • Fire Extinguishers (DCP 05 cylinders, AFFF 03 cylinders,CO2 02 cylinders, DCP 02 Trolleys) • Emergency Signs • Floor Marking • First Aid Boxes (02) • Firefighting Kit			
	3.8	Waste Storage Yard (WSY)	The storage facility requires following measures to be adopted for safe and healthy working conditions without affecting personnel's health & environment: • Medical waste should be incinerated on the day it is received, if not possible, the medical waste (yellow bag) won't be stored for more than 24 hrs. • The storage area must be marked as			

			hazardous storage facility • The workers must wear personal protective equipment like gas mask, gloves, overall and safety shoes before entering the storage area • Ensuring the housekeeping of area around the storage tanks and especially inside the facility			
	3.9	Noise and Vibration	As for main equipment in proposed project, soundproof and noise reducing measures will be adopted. At the same time, limit value and requirement on noise of equipment will also be brought forward to manufacturers. Central noise-isolation control room with double soundproof door and window which will be closed as much as possible when conditions allow, will be set up in workshop with loud noise. Greening will be done at plant as well as at WSY area. Large amount of trees, which selected in accordance with local condition, will be planted around main plant building so as to realize the aim of dustproof, noise reduction and environment beautification. Besides, place where workers are exposed to excessive noise provide ear protection to maintain noise levels below 85 dB. Ear protections include Molded and pliable earplugs, cup-type protectors and helmets.			

			Such devices may provide noise reductions ranging from 5 to 35 dB.			

	3.10	Health and Safety of Workers	• Ensure that the workers/ laborers engaged for provisions of waste management services are trained in safety procedures for all relevant aspects of collection, transportation, storage and incineration of waste;
			• Proponent of the Project will make regular checks to ensure that the workers are following safety working procedures/ safety measures.
			• Formal Environment Occupational Health and Safety Management System Manual will be developed by Proponent and ensure its compliance.
			• Workers who will be engaged in incineration process, must be adhered to the following:
			  • Wear safety shoes with non-skid soles
			  • Wear long-sleeve shirts and protect hands with protective gloves
			  • Wear appropriate eye protection; consult a safety supervisor or a			

			supplier • Arrange for periodic inspection of incinerator structure integrity, to detect any cracking, etc. • Wear respiratory protection (Gas Mask) during maintenance or other work in which dust and noxious gases may be released into the atmosphere			

7.2 TRAINING SCHEDULES

Capacity building and training programs are necessary for the project staff in order to control the negative impacts resulting from the project construction and during its operation phase. They will also require trainings on monitoring and inspecting of such a project for environmental impacts and for implementation of mitigation measures.

The details of capacity building and training program are presented in the **Table 7-2**.

Table 6-2 Capacity Development and Training Programme

Provided by	Organized by	Contents	Target Audience	Venue	Duration
Pre-construction Phase PMC offering specialized services in environmental management and monitoring	EC & CSC	• Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan • Group exercise and participatory workshop to measure effectiveness of program	Contractor staff	--	One day long training seminar including group exercise/workshop
Construction Phase PMC offering specialized services in social management and monitoring	EC & CSC	• Short seminar on Environmental risks associated with construction phase. • Development of Environmental • Performance Indicators • Occupational Health and Safety (OHS) issues • Group exercise and participatory workshop to measure effectiveness of program	Contractor staff	---	One day long training seminar including group exercise/workshop

Operation Phase 3rd party trainer	EC & CSC	Short seminars on Environmental risks associated with operation phase. Development of Environmental Performance Indicators/ Occupational Health and Safety (OHS) issues	O&M contractor	EC & CSC	One day long training seminar including group exercise/workshop

7.3 ENVIRONMENTAL MANAGEMENT

The EIA has identified potential impacts that are likely to arise during proposed project of Hospital in detail, both negative and positive impacts at each stage of the project. To minimize the adverse impacts, EIA has recommended mitigation measures in the Environmental Management Plan (EMP). The proposed mitigation measures have been based on the understanding of the sensitivity and behavior of environmental receptors in the project area, legislative controls that apply to the project and a review of good industry practices for projects of similar nature. For residual impacts (impacts remaining after applying the recommended mitigation measures) and for impacts in which there can be a level of uncertainty in prediction at the EIA stage, monitoring measures have been recommended to ascertain these impacts during the course of the project activities.

The Environmental Management Plan (EMP) is developed to eliminate and/or mitigate the impacts envisaged at the design, construction and operation stages.

The detailed EMP provided in this document as **Table 7-1** ensures that proposed project has no detrimental effect on the surrounding environment. The Plan shall act as a guideline for incorporating environmental measures to be carried out by the contractors engaged for the proposed project. It shall also be used for other parties concerned for mitigating possible impacts associated with each project and will form part of the contract documents to be considered alongside the specifications. This Plan shall act as the Environmental Management and Monitoring Plan during the construction and operation phase of the project and will allow for prompt implementation of effective corrective measures.

The EMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to outline standardized good practice to be adopted for all project works. The EMP has been prepared with the objectives of:

- Defining the roles and responsibilities of the project proponent for the implementation of EMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project;
- Outlining mitigation measures required for avoiding or minimizing potential negative impacts assessed by environmental study;
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the study;
- Defining the requirements for communication, documentation, training, monitoring, management and implementation of the mitigation measures.

7.4 IMPACTS & MITIGATION MEASURES

The EMP provides comprehensive mitigation and management measures for the following phases of the project:

- the pre-construction/design,
- construction and

- operation phases

A monitoring plan for the pre-construction/design, construction and operation phases of the project, indicating environmental parameters, mitigation measures of the negative environmental impacts, responsible authority and frequency is provided below as **Table 7.3**, **Table 7.4** and **Table 7.5** below.

During the procurement/pre-construction period, the monitoring activities will focus on (i) checking the contractor's bidding documents particularly to ensure that all necessary environmental requirements have been included; and (ii) checking that the contract documents' references to environmental mitigation measures requirements have been incorporated as part of contractor's assignment and making sure that any advance works are carried out in good time.

During the construction period, the monitoring activities will focus on ensuring that any required environmental mitigation measures are implemented to address possible impacts.

7.5 Environmental Monitoring Program

It will be in the fitness of the things to operate this project under the Environmental Management Plan. Regular monitoring of all the significant environmental issues is essential to check the compliance status of EMP. The main objective of the monitoring will be;

- To verify the results of the environmental study with respects to the proposed project.
- To estimate the trends of concentrated values of the issues, which have been identified as critical and then planning the mitigating measures.
- To assess the efficiency of pollution control mechanism.

To ensure that any additional parameters, other than those identified in the EIA report, do not turn critical after the commissioning of proposed project.

A monitoring plan for the pre-construction/design, construction and operation phases of the project, indicating environmental parameters, mitigation measures of the negative environmental impacts, responsible authority and frequency is provided below as **Table 7.3**, **Table 7.4** and **Table 7.5**. In general, the construction impacts will be manageable, and no insurmountable impacts are predicted, provided that the EMP is implemented to its full extent as required in the Contract documents. However, experience suggests that some Contractors may not be familiar with this approach or may be reluctant to carry out some measures. For the proposed project, in order that the Contractor is fully aware of the implications of the EMP and to ensure compliance, environmental measures must be costed separately in the tender documentation and listed as BOQ items, and that payment milestones must be linked to environmental performance, Vis a Vis the carrying out of the EMP.

Table 6-3 'Pre-Construction' Environmental Monitoring Plan for Baseline Development

Parameter to be measured	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibility
Ambient Air Quality	To establish baseline air quality levels	CO,NO_2 & PM_{10} (particulate matter smaller than 10 microns) concentration at receptor level	1-hr and 24-hr concentration levels	At least two random receptor locations (especially one in Federal Area and One in Punjab) in the project area, both upwind and downwind	Once	Design Consultant
Ambient Noise	To establish baseline noise levels	Ambient noise level near receptors in project area	A-weighted noise levels 24 hours, readings taken at 15 s intervals over 15 min. every hour, and then averaged	At three random receptor locations in the project area	Once	Design Consultant
Wastewater Quality in vicinity of project area	To establish wastewater quality in project area	Wastewater quality in project area	Water samples for comparison against NEQS parameters	At two locations within the project area	Once	Design Consultant

Table 6-4 Construction Phase Monitoring Requirements

Project Activity and Potential Impact	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibility
Noise Disturbance due to noise from construction activity	To determine the effectiveness of noise abatement measures on sound pressure levels	Ambient noise level at different locations in project area	A-weighted noise levels 24 hours, readings taken at 15 s intervals over 15 min. every hour at 15 m from receptors, and then averaged	At three random receptor locations in project area	Quarterly basis on a typical working day	EC & CSC
Air Quality Dust emissions from construction vehicles and equipment	To determine the effectiveness of dust control program on dust at receptor level	CO,NO_2 & PM_{10} (particulate matter smaller than 10 microns) concentration at receptor level	1-hr and 24-hr concentration levels	At three random receptor locations in project area	Quarterly basis on a typical working day	EC & CSC
		Visible dust	Visual observation of size of dust clouds, their dispersion and the direction of dispersion	Construction site	Once daily during peak construction period	EC & CSC
Wastewater Quality	To determine the effectiveness of mitigation measures	As per WHO/NEQS	Water samples for comparison against NEQS parameters	upstream and downstream locations of nullahs	Quarterly basis on a typical working day	EC & CSC

Safety precautions by Safety workers	To prevent accidents for workers and general public	Number of near miss events and accidents taking place	Visual inspections	Construction site	Once Daily	EC & CSC
Soil Contamination	To prevent contamination of soil from oil and toxic chemical spills and leakages	Incidents of oil and toxic chemical spills	Visual inspections	At construction site and at vehicle and machinery refueling & maintenance areas	Once a month	EC & CSC
Solid Waste & Effluent disposal Insufficient procedures for waste collection, storage, transportation and disposal	To check the availability of waste management system and implementation	Inspection of solid and liquid effluent generation, collection, segregation, storage, recycling and disposal will be undertaken at all work sites in project area	Visual inspections	At work sites in project area	Once daily	Contractor's Environmental officer, CSC

Table 6-5 Operation Phase Environmental Monitoring Plan

Parameter to be measured	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibility
Waste Water Quality	To determine the effectiveness of mitigation measures	As per WHO/NEQS	Water samples for comparison against NEQS parameters	upstream and downstream locations of nullahs	Bi-annual basis on a typical working day	Health Department
Water Quality	To assess whether provided portable water is within limits of NEQS.	As per NEQS	Water samples for comparison against NEQS parameters	At storage tanks and few samples will be taken from users taps	Bi-annual	Health Department
Air Emission monitoring of Incinerator and Generator	To assess the compliance As per NEQS of emission levels with NEQS	As per NEQS	Air Emission monitoring against NEQS parameters	Incinerator and Generator	Quarterly	Health Department

7.6 ENVIRONMENTAL BUDGET

The **Table 7-6** below provides cost estimates for 'Pre-Construction phase' monitoring while **Table 7-7** and **Table 7-8** provides cost estimates for 'Construction phase' and 'Operation phase' monitoring of key environmental parameters.

The costs training and capacity development is provided as **Table 7-9** below.

Table 6-6 Cost Estimates for 'Pre-Construction Phase' Environmental Monitoring

Monitoring Component	Parameters	Quantity	Amount PKR	Details
Wastewater Quality	NEQS	1	35,000	6 readings @ PKR 30,000 per sample
Air Quality*	CO, NO_2, SO_2, O_3 PM_{10}	1	75,000	3 readings @ PKR 70,000 per sample
Noise Levels**	dB(A)	1	15,000	3 readings @ PKR 30,000 per reading
Groundwater Quality	PEQS /NEQS	2 (Once only at 2 locations)	35,000	2 readings @ PKR 30,000 per sample
		Total (PKR)	**160,000.0**	

Table 6-7 Annual Cost Estimates for 'Construction Phase' Environmental Monitoring

Monitoring Component	Parameters	Quantity	Unit Rate PKR	Total
Wastewater Quality	PEQS / NEQS / WHO	4	35000	140,000
Air Quality	CO, NO_2, PM_{10}	12 (Quarterly basis at 3 locations)	75000	300,000
Noise Levels	dB(A)	4	15000	60,000
Air Emissions for construction machinery (Generators and	Flue gases and noise levels	4	35000	140,000

Vehicles)				
		Total (PKR)	**640,000**	

Table 6-8 Annual Cost Estimates for 'Operation Phase' Environmental Monitoring

Monitoring Component	Parameters	Quantity	Amount PKR	Details
Water Quality	NEQS	4	35000	140,000
Air quality (ambient air)	NEQS	4	75000	300,000
Air Emissions	NEQS	4	35000	140,000
Noise Levels	NEQS	4	15000	60,000
Total (PKR)			**640,000**	

Table 6-9 Cost of Capacity Development and Training Programme for Project Contractor(s)

Provided by	Organized by	Contents	No. of training events	Duration	Cost (PKR)
Pre-construction Phase Monitoring Consultants / Organizations offering specialized services in environmental management and monitoring	EC & CSC	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan	Two seminars for Contractor management staff and project staff	1 day	100,000/Training
Construction Phase Monitoring Consultants / Organizations offering specialized services in environmental management and monitoring	EC & CSC	Short seminars on Environmental risks associated with construction phase. Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues	Two seminars for Contractor management staff and project staff dealing in environment and social issues	1 day	100,000/Training
Operation Phase 3rd party trainer	EC & CSC	Short seminars on Environmental risks associated with operation phase. Development of Environmental Performance Indicators Occupational Health and	Bi-annual seminars	1-2 Day	600,000/Year

		Safety (OHS) issues			
Total			**800,000 (PKR 0.8 million)**		

CHAPTER-8

7. RECOMMENDATIONS & CONCLUSIONS

8.0 GRIEVANCE REDRESSAL MECHANISM

8.1General

The national and international guidelines require establishment of a local grievance redress mechanism to receive and facilitate resolution of the Displaced/Affected Persons concerns and grievances regarding the project's social and environment performance. The measures have been identified to mitigate any potential environmental and social impacts to be caused due to implementation of proposed project.

However, in spite of best efforts, there is chance that the individuals / households affected by the project or other stakeholders are dissatisfied with measures adopted to address adverse social impacts of the project. To address, such situation an effective Grievance Redress Mechanism (GRM) has been established to ensure timely and successful implementation of the project. It will also provide a public forum to the aggrieved to raise their objections and the GRM will address such issues adequately. It will receive, evaluate and facilitate the resolution of displaced persons' concerns, complaints and grievances about the social and environmental performance at the level of the project.

The GRM will aim to investigate charges of irregularities and complaints receive from any displaced persons and provide a time-bound early, transparent and fair resolution to voice and resolve social and environmental concerns link to the project.

The executing agency, along with local beneficiary department shall make the public aware of the GRM through public awareness campaigns. The name of contact person(s) and his/her phone number will serve as a hotline for complaints and shall be publicized through the media and placed on notice boards outside their offices, construction camps of contractors, and at accessible and visible locations in the project area. The project information brochure will include information on the GRM and shall be widely disseminated throughout the project area. Grievances can be filed in writing, via web-based provision or by phone with any member of the PMU.

8.2 Scope of GRM

During different stages of project preparation and implementation, it is likely that Affected Persons (APs) having livelihood impacts and falling in COI in particular and local community residing in the vicinity of the project area and other stakeholders may have some grievances related to project actions and activities. To resolve all such issues, a Grievance Redress Mechanism (GRM) will be available to allow APs or the local community to appeal any disagreeable decision, practice, or activity arising from project implementation. APs and the general public will be informed of their rights and of the procedures for registering complaints and GRM verbally in the consultation held during Impact Assessment Survey (IAS). Consultations will be held with the APs to discuss livelihood impacts, measures for minimizing these impacts and Grievance Redress Mechanism (GRM) or Grievance Redressal Committee (GRC) to be in place specifically to redress complaints revolving around compensation related to livelihood disruption.

9.3 Functions of GRC Committee

The GRC or GRM will perform following functions:

- Ensure effective implementation of the Grievance Redressal Mechanism on the issues that fall under their jurisdiction;
- Ensure an easy access to GRM having provision to file grievances verbally or by phone, in writing or via web based provision including the option of submitting grievances anonymously;
- GRC will look into all referred grievances and effectively address and resolve them within 15 days from the receipt of the grievances, in a timely and impartial manner;
- The GRC will deal promptly with any issues relating to livelihood, utilities disturbance;
- The GRC will take decisions on the basis of consensus or majority of votes;
- When required, the GRC would seek the assistance of other persons and institutions;
- Speaking orders and decisions of the committee on the grievances shall be recorded and replied to aggrieved parties and persons with a copy kept as record;
- In case, aggrieved is not satisfied by the decision of the GRC, she/he can prefer an appeal within ten days of the receipt of decision, the GRC could refer the case to the appropriate forum after examining the appeal; and
- In the event that a grievance cannot be resolved by GRC, the affected person can seek alternative redress through the higher administrative authority or court of law or as appropriate.

9.4 Stage of GRM

The Project proponent (designated person from Ministry of National Health Services Regulations and Coordination) will be the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. The project proponent and his staff for environment and social safeguards will be designated as the key officers for grievance Redressal. Resolution of complaints will be completed within seven (7) working days. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, traffic police, etc.). Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included, unless anonymity is requested. A tracking number will be assigned for each grievance, including the following elements:

- Initial grievance sheet (including the description of the grievance), with an acknowledgement of receipt handed back to the complainant when the complaint is registered;
- Grievance monitoring sheet, mentioning actions taken (investigation, corrective measures);
- Closure sheet, one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off.

- The updated register of grievances and complaints will be available to the public at the contractor's office, construction sites and other key public offices in the project area. Should the grievance remain unresolved, it will be escalated to the second tier.

The proponent team will activate the second tier of GRM by referring the unresolved issue (with written documentation) to the team of Beneficiary department (local Health Department) who will pass unresolved complaints upward to the Grievance Redress Committee (GRC). The GRC will be established by Local Health Department before start of site works.

The GRC will consist of the following persons: (i) Project Director; (ii) representative of District government; (iii) representative of the affected person(s); (iv) representative of the local Deputy Commissioners office; and (v) representative of the EPA (for environmental-related grievances).

A hearing will be called with the GRC, if necessary, where the affected person can present his/her concerns/issues. The process will facilitate resolution through mediation. The local GRC will meet as necessary when there are grievances to be addressed. The local GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within fifteen (15) working days. The contractor will have observer status on the committee. If unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the Government's judicial or administrative remedies.

The functions of the local GRC are as follows: (i) resolve problems and provide support to affected persons arising from various environmental issues and including dust, noise, utilities, power and water supply, waste disposal, traffic interference and public safety as well as social issues and land acquisition (temporary or permanent); asset acquisition; and eligibility for entitlements, compensation and assistance; (ii) reconfirm grievances of displaced persons, categorize and prioritize them and aim to provide solutions within a month; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

The Health Department's officers will be responsible for processing and placing all papers before the GRC, maintaining a database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out.

In the event that a grievance cannot be resolved directly by the Proponent (first tier) or GRC (second tier), the affected person can seek alternative redressal through the district committees as appropriate. The monitoring reports of the EMP implementation will include the following aspects pertaining to progress on grievances: (i) Number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions,

remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending).

In order to provide greater clarity, the pictorial description of the GRM is provided in Figure 8-1 below.

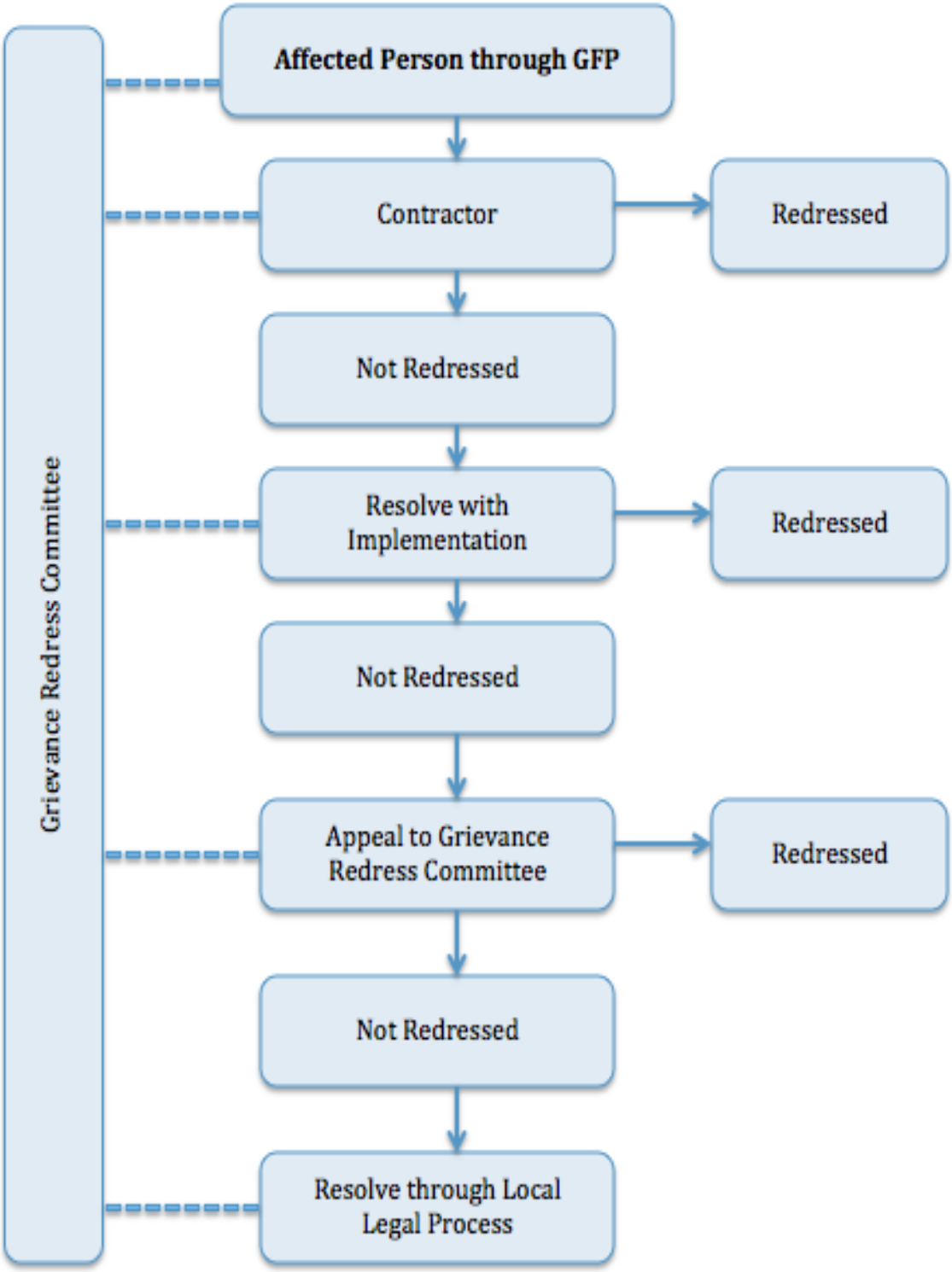


Figure-8-1 Grievance Redressal Mechanism

8. RECOMMENDATIONS AND CONCLUSIONS

9.1 RECOMMENDATIONS

Based on the findings of this Environmental Impact Assessment (EIA) Report and survey results, following recommendations have been formalized for smooth functioning of proposed project.

- The present Environmental Impact Assessment (EIA) Report cor Construction of 200 bed capacity hospital at **Gilgit GB** meets the administrative and legal framework of the GB EPA.
- As the project is in feasibility stage, the proponent shall obtain statutory clearances prior to award of contract and ensure conditions/requirements are incorporated in the project design and documents;
- Upon mobilization of the contractors, EC to provide a safeguards orientation as per EIA and project administration manual;
- Contractor to appoint environmental and social safeguards, responsible for environmental compliance, occupational health and safety and core Labour standards.
- Regular monitoring for leakage shall be carried out to avoid contamination of water supply
- Employment opportunities shall be given to local community as per plans discussed in the EIA report

9.2 CONCLUSION

The EIA Report for Construction of 200 Bed Hospital at Gilgit is made to fulfill the legal requirement of GB Environmental Protection Act, 2000 and the rules and regulations made thereunder.

The proposed project is of high significance considering the urgent need advance health facilities in the region.

Primary and secondary data has been collected and used to assess the environmental impacts of the project. This EIA report highlights the potential environmental impacts associated with the project and recommends mitigation measures accordingly. Any environmental impacts associated with the project need to be properly mitigated, through the existing institutional arrangements described in this report.

The majority of the environmental impacts are associated with the Design and Construction phase of the proposed project and majority of these impacts are short term and reversible.

Major impacts during construction phase will be related to excavations, building civil work, traffic congestion and community health and safety issues during construction phase.

The implementation of mitigation measures during construction period will be the responsibility of the Contractor. Therefore, the required environmental mitigation

measures will have to be clearly defined in the bidding and contract documents, and appropriately qualified environmental staff retained by the Construction Supervision Consultant (CSC) to supervise the implementation process. The EMP includes measures to minimize project impacts due to traffic, noise, air pollution, waste generation etc.

The EMP prepared for the proposed project under this EIA document is considered sufficient for issuance as part of the contracts to the successful bidder(s) and for subsequent use during the project works.

It should be mentioned that prior to the commencement of works, this EMP must be further updated by the Contractor into site specific EMPs (SSEMPs) for further review and approvals. In these SSEMPs, aspects such as a detailed traffic management plan, identification of locations for disposal of debris and spoil and any other details which shall become available later must be included for efficient implementation of all proposed mitigation measures and the subsequent monitoring of these measures.

NOC from concerned department for disposal of mucking material, spoil and municipal solid waste from worker camps will be taken. It will be responsibility of contractor.

Based on the above, this report concludes that there are no potential adverse environmental impacts from proposed project "Construction of Hospital of 200 Bed Capacity at Minawar Gilgit". Impacts of less significance can be mitigated to an acceptable level by adequate implementation of the mitigation measures identified and suggested in EMP, hence, no significant or unacceptable change in the baseline environmental conditions will occur. Similarly, the project will have a visible positive impact on the socio-economic conditions of the local residents in terms of 24/7 availability health care system.

Based on the findings of the EIA, the project is unlikely to cause any significant, irreversible or unprecedented environmental impacts. The potential impacts are localized, temporary in nature and can be addressed through proven mitigation measures. The project is strongly recommended for issuance of Environmental Approval from GB EPA.

9. LIST OF REFRENCES

10. List of References

The following documents, reports were consulted during the preparation of this report.

- Data & information provided by the Project Management of NVEC
- Data from project proponent.
- Project location/ layout maps etc.
- Guidelines for the preparation and review of Environmental Reports, GB Environmental Protection Agency Review of IEE / EIA Regulations 2014
- Hazardous Substances Rules, 2003, Pakistan Environment Protection Agency.
- Handbook of Environmental Impact Assessment Vol. 1 & 2, Edited by Judith Petts, Blackwell Publishing, Ist Indian Edition, 2005.
- GB Environmental Protection Act, 2014.
- Ahmed, M. and Suphachalasai, S. (2014). Assessing the Cost of Climate Change and Adaptation in South Asia. Manila: ADB
- Anjum, B. F. et al. (2005). Climate Change Perspective in Pakistan. Pakistan Journal of Meteorology. 2(2). pp. 11–21
- Asian Development Bank (2017a): Mainstreaming Climate Risk Management into Urban Infrastructure Investments through Urban Resilience Assessments (URAs), Peshawar City, Khyber Pakhtunkhwa, Pakistan (UCCRTF TA-8913 PAK).
- Quagliata, A., Ahearn, M., Boeker, E., Roof, C., Meister, L., & Singleton, H. (2018). Transit Noise and Vibration Impact Assessment Manual (No. FTA Report No. 0123).
- National Disaster Management Authority 2008: Seismic Zoning Map of Pakistan
- EIA for Priority Projects for Urban Development in Sialkot
- 2017 District census report of Rawalpindi. Census publication. Islamabad: Population Census Organization, Statistics Division, Government of Pakistan.
- Chaudhry, Q. Z. et al. (2009). Climate Change Indicators of Pakistan. Technical Report. No. 22. Islamabad: Pakistan Meteorological Department.
- IPCC (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

- Rehman, N., Adnan, M. and Ali, S. (2018) 'Assessment of CMIP5 climate models over South Asia and climate change projections over Pakistan under representative concentration pathways', Int. J. Global Warming, Vol. 16, No. 4, pp.381–415.

ANNEXURE-I

LAYOUT PLAN

ANNEXURE-II

HOSPITAL WASTE MANAGEMENT PLAN

Check list for Hazardous / Infectious Waste Management

1. **Types of Waste**
   - Non risk waste
   - Chemical Waste
   - Geno toxious Waste
   - Infectious Waste
   - Pathological Waste
   - Pharmaceutical Waste
   - Sharps
2. **Cost Estimated Table for risk waste**

	Containers	Waste Bags		Trolleys
Type		Yellow bags	Yellow box	
No.				
Estimated Cost				

Cost Estimated Table for non-risk waste

	Containers	Waste Bags		Trolleys
Type				
No.				
Estimated Cost				

3. **Time Table available for waste collection Y/N**
   Risk waste _____
   Non risk waste _____

4. **Number of staff for waste collection**
   Risk waste _____
   Non risk waste _____

5. **Procedure for management of waste requiring special treatment such as autoclave before final disposal**
   _____
   _____
   _____

6. **Contingency plan for the storage or disposal of risk waste in the event of**

   Maintenance **Y/N**

   Collection **Y/N**
   Incineration **Y/N**
7. **Training Programs** **Y/N**
8. **Emergency Procedures** **Y/N**
9. **Collection with Local Council** **Y/N**

10. **Waste Management Plan**

- Monitored **Y/N**
- Reviewed
- Revised
- Updated

Waste Segregation

1. Risk Waste Segregation

	Non Risk	Risk
Ward Bedside		

Lab		
Other room		

2. **Segregation of syringes, needles, plastic bottles, drips, infusion bags by making them non useable?**
3. **Container Bin**
   Metal/ Tough Plastic

   Paddle type/ swing lid

   Strong/ Yellow bag

I.	Removed when not more than ¾ full	**Y/N**
II.	Self- locking plastic sealing tags (no stapling)	**Y/N**
III.	Date	**Y/N**
IV.	Point of production	**Y/N**
V.	Quantity	**Y/N**
VI.	Description of waste	**Y/N**
VII.	Biohazard Symbol	**Y/N**
VIII.	Immediately replaced by new one	**Y/N**

4. **Sharps**
   - Metal/ high density plastic container Y/N
   - Yellow box Y/N
   - Marked Danger Contaminated Sharps Y/N
   - Closed when ¾ full Y/N
   - Incinerated Y/N

   If yes placed in yellow waste bag Y/N
5. **Pharmaceutical Waste**

   - Large quantity- returned to the suppliers Y/N
   - Small quantity- crushed & placed in yellow waste bags Y/N

6. **Chemical Waste**
   - Resistant container Y/N
   - Hg & Cd waste? Should not be incinerated
   - Specialized treatment facilities

7. Non-Risk Waste

- Non- risk waste container lined with a white plastic bag Y/N
- Non-risk waste container placed in all areas of the hospital and notices affixed to visitor to use them Y/N

WASTE COLLECTION

Sanitary staff-PPEs Y/N
- Waste collected in one day Y/N
- Labeled Y/N

Point of Production

- Immediately replaced by new one Y/N
- Proper cleaning before replacement Y/N

WASTE TRANSPORTATION

Trolley
Free of sharp edges Y/N
Easy to Load& unload & clean Y/N
Stable, 3 or 4 wheeled, high sides Y/N
Cleaning frequency Y/N
Yellow- bagged risk waste & white- bagged non-risk waste- collected on separate trolleys which shall be painted or marked in the corresponding colors Y/N
Short route
Y/N
All concerned staff members are properly trained in:

- Handling
  Y/N
- **Loading and unloading**
  Y/N
- Transportation Y/N
- Disposal of yellow bagged waste Y/N
- Fully aware of emergency procedures for dealing with accidents and spillages Y/N

- All vehicles carry adequate supply of plastic bags, protective clothing, cleaning tools and dis- infectants to clean and dis infects any spillage Y/N
- The transportation of waste is properly documented Y/N
- All vehicles are cleaned and disinfected after use. Y/N

WASTE STORAGE

- All separate central storage facility for yellow-bagged waste, displaying the biohazard symbol and clearly mentioned that the facility stores risk wastes Y/N
- The designated central storage facility Y/N
- Located within the hospital premises away from food storage of food preparation areas Y/N
- Large enough to contain all the risk waste produced by the hospital Y/N
- With spare capacity to cater for collection or incinerator breakdowns Y/N
- Easy to clean and disinfect, with an impermeable hard standing base Y/N
- Plentiful water supply Y/N
- Good drainage Y/N
- Lighting Y/N
- Ventilation Y/N
- Easy accessible to collection vehicles and authorized staff, but totally enclosed and secure from un-authorized access, and especially inaccessible to animals, insects and birds Y/N
- Yellow-bagged waste ONLY stored in the central storage facility Y/N
- No waste shall be refrigerated at the central storage facility for more than 24 hours

  Y/N
- Provided that if in an emergency infectious waste is required to be stored for more than 24 hours, it shall be refrigerated at a temperature of 3 C to 8 C

  Y/N
- Containers with chemical waste which are to be specialized treatment facilities are stored in a separate room or area.

  Y/N

WASTE DISPOSAL

- Effluent from the waste treatment methods periodically tested to verify that it confirms the NEQS?
    - Sharp containers which have not been placed in yellow bags for incinerator disposed by encapsulation or other method of disposal approved by the Federal Agency or Provincial Agency concerned
    - Non risk waste Y/N
    - Collection
    - HOW: _____ Y/N
    - Storage
      HOW: _____ Y/N
    - Transportation
      HOW: _____ Y/N
    - Disposal
      HOW: _____ Y/N

      All liquid infectious waste are discharged into the sewerage system after being properly treated and disinfected Y/N

WASTE MINIMIZATION AND REUSE

- To minimize hospital waste Y/N

a. Purchasing and stock controls, involving careful management of the ordering processes to avoid over –stocking , particularly regard to data-limited pharmaceutical and other products, and to accord preference to products involving low amounts of packaging Y/N

b. Waste recycling programs, involving return of un-used or waste chemicals in quantity to the supplier for reprocessing , return of pressurized gas cylinders to suppliers the refilling and reuse, sale of materials such as mercury, cadmium, nickel, and lead-acid to specialized recyclers, and transporters of high level radioactive waste to the original supplier Y/N

c. Waste reduction practices in all hospital departments Y/N

d. For reuse, separate collection, washing and sterilization, in accordance with approved procedures.
Y/N

ANNEXURE-III

LAB REPORT

ANNEXURE-IV

PERFORMA OF CONSULTATION

SOCIO-ECONOMIC BASELINE SURVEY OF THE PROJECT AREA

Name of Project _____

Name of Interviewer: _____ Date: _____

a) Settlement: _____ (b) Union Council: _____

c) Tehsil: _____ (d) District: _____

_____

_____

1. Name of Respondent _____

2. What is your father's name _____

3. What is your age

Age years 15 – 25 _____

25 – 35 _____

35 – 45 _____

Above 45 _____

4. Marital Status.

1. Married 2. Unmarried

5. What is your caste /ethnic group _____

6. What is your mother tongue? _____

7. What is your qualification?

1. Illeterate 2. Primary 3. Middle

4. Metric 5. Intermediate 6. Above Inter

8. What is your profession _____

9. Which of the following facilities are available in your house
   1. Electricity 2. Water Supply
   3. Gas 4. Telephone
   5. Sewerage

10. What are the sources of water for your domestic use
    1. Public Water Supply 2. Hand Pumps
    3. Channel 4. Any other

11. In your opinion, should this Project be implemented here
    1. Yes 2. No

    If yes, then reasons

    _____
    _____
    _____

    If no, then reasons

    _____
    _____
    _____

12. In your opinion, what will be possible impacts of the construction of this project area project?

During Construction_____

_____

_____

After Construction _____

_____

_____

13. What protective measures do you suggest to safeguard your interests

_____

_____

_____

14. Is there any health institution in this locality

1. Yes 2. No

If yes, then what is that _____

_____

15. Is there any educational institution in this locality
    1. Yes 2. No

If yes, then what is that _____

_____

16. Is there any historical /archeological monument in this locality
1. Yes 2. No

If yes, then what is that _____

_____

17. Is there any shrine /mosque /graveyard in this locality
1. Yes 2. No

If yes, then what is that?

Shrine _____

Mosque _____

Graveyard _____

ANNEXURE-V

AIR QUALITY MANAGEMENT PLAN

Dust Management Plan

General

This plan is prepared for the project "Augmentation of Surface Water Supply for Khayaban-e-Sir Syed from Khanpur Dam and Formation of DMAs". The purpose of this plan is to describe the measures that the project shall take to ensure that the risk of emissions from dust generated by site operations during construction are minimized and that best practice measures are implemented.

Dust emissions from construction can cause ill health effects to Contractor staff along with nuisance and annoyance to members of the local community. Dust will be controlled through:

- Elimination
- Reduction/Minimization
- Control

This dust management plan shall be implemented based on the measures already provided in the Environmental Management Plan (EMP) relating to controlling dust emissions.

Methodology

The following methodology will be undertaken for each project section:

Step 1 – Identify the dust generating activities

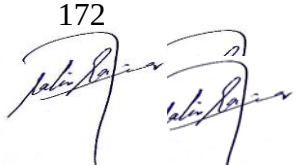
Construction activities that are likely to produce dust will be identified. The activities that will be taken into account are:

- Haulage Routes, Vehicles and /Concrete Batching Plant
- Roads, surfaces and public highways
- Excavations for lying of new conductance and replacement of distribution pipelines
- Static and mobile combustion plant emissions
- Materials Handling, Storage, Spillage and Disposal
- Storage of material
- Stockpiles
- Spillages
- Storage of Waste
- Site Preparation and Restoration after Completion
- Earthworks, excavation and digging
- Storage of spoil and topsoil
- Demolition
- Construction and Fabrication Processes

Step 2 – Identify Sensitive Receptors

Sensitive receptors have already been identified. The nature and location of the sensitive receptors will be taken into account when implementing control measures.

Step 3 Implement Best Practice Measures to Control



Based on the nature of the activity producing the dust, the likelihood of dust being produced and the possible consequence of dust based on the sensitive receptors, the most effective control measure will be identified and implemented.

Step 4 – Monitor effectiveness of control

Construction Supervision Staff (CSC) will have the responsibility to ensure that dust control measures are being implemented and are effective.

Step 5 – Record and report result of monitoring

All inspections, audits and results of monitoring will be recorded and kept as part of the site filing system.

Method Statements and Risk Assessments

The Contractor's Risk Assessments and Method Statements will be required to be approved by the CSC prior to commencing work and will be required to contain environmental aspects of the task, including dust control measures where required.

Where dust has been identified within the risk assessment as a significant issue, the method statement will be required to cover the following:

Methods and materials that will be used to ensure that dust generation is minimized.

The use of pre-fabricated materials where possible.

Optimum site layout:

Dust generating activities to be conducted away from sensitive receptors

Supply of water for damping down.

Good housekeeping and management

All employees will be briefed on the Risk Assessment and Method Statement before starting work.

Training

All Contractor staff will be required to attend training seminars as already mentioned in the EMP document. A site-specific induction will also be required before being allowed to work on site. These will include site-specific sensitive receptors and details regarding dust control measures to be taken.

Toolbox talks on air pollution and minimizing dust emissions will be provided on a regular basis to Contractor staff.

Identification of Dust Generating Sources and Control Methods

Haulage Routes, Vehicles and /Concrete Batching Plant	
Dust Source	**Dust Control Methods**
Major haul roads and traffic routes	Haul roads will be dampened down via a mobile bowser, as required.
Public Roads	Road sweeper will be used to clean public roads as required.
Site traffic management	Site traffic will be restricted to

	constructed access roads as far as possible. Site speed limit will be set at 10 mph as this will minimize the production of dust.
Road Cleaning	A mechanical road sweeper will be readily available and used.
Handling, Storage, Stockpiling and Spillage of Dusty materials	
Material handling operations	The number of times a material will have to be handled will be kept to a minimum to prevent double handling and ensure dusty materials are not handled unnecessarily.
Transport of fine dusty materials and aggregates.	Closed tankers will be used or sheeted vehicles.
Vehicle loading/unloading materials on to vehicles and conveyors.	Dusty materials will be dampened down Drop heights will be kept to a minimum and enclosed where possible.
Excavation for Lying new pipelines	
Excavation	Excavation will be carried out by applying green sheets on the edges, especially near Environmental Sensitive Receptors, already highlighted in the **EIA** report.
Handling of Mucking Material	Mucking material will be stored in bonded area to avoid spillage and generation of fugitive dust
Loading of material on dumpers	Mucking material will be damped down before loading on dumpers to reduce fugitive dust emission.
Storage of Materials	
Bulk cement, bentonite etc.	Bentonite will be delivered in tankers and stored in dedicated enclosed areas. Bulk cement will be transported through tractor trollies or trailers.
Fine dry materials	These will be protected from the weather and by storing in appropriate containers and indoors, where necessary.
Storage location	Material will be stored in dedicated lay-down areas.

Storage of Stockpiles	
Stockpile location	Stockpiles will be placed so as to minimize double handling and facilitate the site restoration.
Building stockpiles	Stockpiles, tips and mounds will not be stored at an angle greater than an angle of repose of the material.
Small and temporary stockpiles	Where possible, stockpiles will be placed under sheeting. Dusty material will be damped down. Wind barriers (protective fences) of a similar height to the stockpile will be erected, if required.
Site Preparation and Restoration	
Earthworks, excavation and digging	These activity areas will be kept damp where required and if possible, will be avoided during dry and windy periods.
Completed earthworks	Surfaces will be stabilized by re-vegetation as soon as possible, where applicable.
Construction and Fabrication Process	
Cutting, grinding, drilling, sawing, trimming, planning, sanding	These activities will be avoided wherever possible. Equipment and techniques that minimize dust will be implemented. Water will be used to minimize dust.
Cutting roadways, pavements, blocks	Water sprinkling to be used.
Angle grinders and disk cutters	Best practice measures will be used such as dust extraction.

Monitoring Arrangements

Monitoring will be conducted at sensitive receptor locations in the project area as provided in the EMP. Furthermore, at locations where PM levels are exceeding applicable guidelines, additional stringent measures will be implemented at the respective location(s) in the project area to ensure dust levels are controlled as far as possible.

Chance Find Procedure

Project may involve deep excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through Supervision Consultant to Directorate General (DG) of Archeological Department, Government of Pakistan to take further suitable action to preserve those antique or sensitive remains. Representative of the DG 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 representative and will be given to the DG. 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 should 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 provincial 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 Archeology Department is given below:

Archeology Department

19 Ataturk Ave, Shakar Parian,

Islamabad, Islamabad Capital Territory, Pakistan

ANNEXURE-VI

FRAMEWORK FOR OSH MANAGEMENT PLAN

Occupational Health and Safety Management Plan

It is required that all personnel working on the project attend the Health and Safety site induction briefing prior to commencing any work on the site.

The General Site Rules shall act as the main agenda and content of the induction briefing. Additionally, any information specific to the project shall be included in the induction. The induction briefing should be, as far as possible, two way communication with attendees invited to contribute, comment and ask questions regarding health and safety. Other rules are as follows:

- All attendees of the induction briefing will be recorded.
- High visibility jacket/vests, safety helmets and safety footwear (incorporating steel toe- caps and mid-sole) must be worn at all times.
- Safety goggles for protection during all cutting, grinding and drilling operations or where there is risk from impact, dust, chemicals or hot metal.
- Dust masks for protection from dust.
- Ear protection during all operations which produce noise above the level at which you need to raise your voice to be heard. Gloves during concreting work.
- On this site, formal permits must be in place before any of the following operations may be carried out: Permit to Excavate, Hot Work Permit & Confined Spaces Permit. (Where Applicable), thoroughly understand it and get permission from area supervisor (If required).
- Follow the messages and instructions displayed on HSE boards installed on site.
- Be aware of emergency muster (assembly) points and escape routes. In the event of an emergency do not panic, follow the site emergency response procedures.
- Report promptly all accidents to your supervisor and HSE officer at site. Immediately provide first aid for the injured and call for the medic.
- While working alone or in a confined space make sure that your nearby colleague and supervisor are well informed or use a banksman where appropriate.
- Ensure adequate lighting is in place for work on night shifts or for emergency response.
- All Scraps, waste materials and garbage must be disposed of in accordance with the construction waste management Strategy.
- Always clean your work site after completing the job or your shift.
- Maintain appropriate barricades as required.
- Never tamper with electric cables and appliances. Never insert direct cables into sockets, rather use proper plugs.
- Do not enter scaffold that is not tagged safe for access.

- Tools or materials must not be carried while climbing up or down scaffolding or ladders.
- Use pouches or ropes for this purpose.
- Do not smoke or produce naked flame in NO SMOKING area. Use of open fire is prohibited.
- Keep all gangways and aisles clear and clean at work sites.
- Vehicles must be driven at a safe speed, observing speed limits. Drivers must have a valid driving license for the class of vehicle they are operating.
- Vehicles shall only be parked in designated parking areas. Never travel in a vehicle unless in seating equipped with a seatbelt.

1. **Site HSE Roles and Responsibilities**

1.1 Project Manager (PM)

i. Develop and disseminate policies for occupational health and safety management systems and environmental management systems

ii. Provide resources for the management and implementation of occupational health and safety management systems and environmental management systems

iii. Responsible for ensuring the implementation of occupational health, safety and environmental policies

iv. Aware of the relevant maters of environment, health and safety.

v. Allocate Budget and Provide resources for the implementation of HSE Plan in its true spirit.

vi. Attend meetings regarding the Health Safety and Environment.

vii. Report Health Safety and Environment matters to the management of the company as required.

1.2 Construction Manager (CM)

- Responsibilities include, but not limited to:
- Well conversant with international & local, Health, Safety & Environmental rules, regulations and current legislation.
- Ensure that all senior site staff is also conversant with the relevant requirements of current legislations and EPC contractor HSE plan.
- Ensure that site personnel are assigned appropriate duties and responsibilities accordingly to assist in the effective implementation of this HSE Plan.
- Ensure no job is carried on without supervision.
- Approve work methods statements; ensure safety procedures are established and undertaken.

- Funds for essential HSE facilities, equipment and personnel are made available.
- His own personal behavior supports, strengthens and confirms the site's HSE management program.

1.3 Environmentalist/HSE Officer

i. Carry out safety inspection of Work Area, Work Method, Men, Machine & Material and other tools and tackles.

ii. Facilitate inclusion of safety elements into Work Method Statement.

iii. Highlight the requirements of safety through Tool-box/other meetings.

iv. Conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.

v. Advice & co-ordinate for implementation of HSE plan in its true spirits.

vi. Convene HSE meeting & minute the proceeding for circulation & follow-up action.

vii. Plan procurement of PPE & Safety devices and inspect their healthiness.

viii. Report to Project Manager (PM) and Resident Director EPC contractor on all matters pertaining to status of safety and promotional program at site level.

ix. Facilitate administration of First Aid

x. Facilitate screening of workmen and safety induction.

xi. Conduct fire and other emergency Drills and facilitate emergency preparedness

xii. Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.

xiii. Recommend to Site In charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.

xiv. To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.

xv. Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.

xvi. Ensuring that all injuries, accidents, incidents/near misses and hazards are positively and timely reported.

xvii. Assisting Engineers/Area Supervisors in accident/incident investigations, where required Attending and positively contributing in the HSE Committee Meetings.

1.4 Workers

- Use the proper tools and equipment when operating. According to the requirement of operation and different hazard sources using the PPE and protective clothing provided by company, such as, helmets, safety harness, goggles, safety vest, and other personal protective equipment
- Maintain the tool and keep the tool clean after job completion.
- Report to the site supervisor or on-site project manager for the equipment damage and hidden danger.
- Develop personal safety awareness - including workers themselves and others, especially new employees and young people.
- Avoid unnecessary risk generation.
- For known sources of danger, remind new employees to stay away from these hazards.
- It will strictly be forbidden to play in the construction area or to damage the public utilities.
- Provide advice on how to eliminate hazards.

1.5 Sub-Contractor HSE Management

i. Sub-contractor's employees shall immediately correct all unsafe conditions & acts as directed by Contractor Direct supervision. Unsafe acts by any personnel may be grounds for immediate removal and permanent banning from the project site.

ii. Only properly trained employees shall be authorized by sub-contractor to operate equipment, machinery, vehicles & tools.

iii. All Sub-contractors are required to follow safe work practices, and meet the requirements clearly identified in field HSE PLAN.

iv. The Sub-contractor shall erect & maintain safeguards for the protection of workers, any other sub-contractors & the public and eliminate or mitigate HSE hazards created by or otherwise resulting from performance of the work.

2 Communication and HSE Meetings

2.1 HSE Targets and Goals

Pursuant to the Policy Statement, the following HSE Targets and Goals are identified in order to create a positive approach to health, safety, and protection of the environment during all activities of the project; this will be achieved by employing competent and motivated staff:

i. To avoid all personal injuries during the execution of the Project,

ii. To ensure that all personnel employed on the Project are competent to carry out their designated tasks safely.

iii. To create positive health, safety and environment attitudes and perceptions at all levels of the Project organization, and to raise health safety and environmental awareness in general.

iv. To implement a training program that supports the achievement of personnel competency in relation to Health, Safety, and the Environment.

v. To complete the Project without incurring any significant property damage to permanent equipment, or temporary facilities.

vi. To complete the Project with minimum avoidable impact upon the surrounding environment.

vii. To implement a hierarchy of communication forums that ensure that HSE concerns can be raised and addressed at all levels of the organization. To continually monitor and improve HSE performance.

2.2 HSE Score Board

Environmentalist/HSE Officer will arrange a HSE score board and display at the key location of the project site facilities. Information on the HSE Score Board will be updated on daily basis.

2.3 HSE Awareness Sign Boards

HSE awareness signboards shall be displayed at key locations around the site to create and maintain awareness and ownership of HSE issues.

2.4 Internal Site HSE Committee Meeting

Internal HSE Committee Meetings chaired by the Site Manager/Construction Manager, will be held monthly with all Area Supervisors and nominated Engineers, Supervisors and support staff. HSE committee meetings will allow communication of HSE performance and corrective actions. All-important HSE matters of the site as well as the non-compliance reported in the current month will be discussed in these meetings.

1.3 Performance Monitoring

1.3.1 Performance Review in Site HSE Committee Meetings

Performance reviews shall be held on monthly basis in the Internal Site HSE Committee Meetings. The objective of the review is to gather information from

monitoring, inspection and site working activities and to assess the effectiveness of the implementation of HSE procedures on site. The key performance indicators are:

a. Compliance with Health, Safety and Environment standards
b. Identification of areas not addressed in the HSE Plan
c. Achievement of specified HSE objectives
d. HSE statistics, root cause and trend analysis of the statistics

1.3.2 HSE Inspections of Equipment and Tools

a. The Site Manager will ensure that no Civil, Electrical or Mechanical equipment will go to the working area without HSE inspection.

b. Environmentalist/HSE Officer will co-ordinate with Equipment and Plant Department for the inspection of all Civil, Electrical and Mechanical equipment or the inspection of Civil, Electrical and mechanical equipment,

c. If during inspection, any equipment is found sub-standard, Manager Site HSE is authorized to reject this equipment and inform the Site Manager.

1.4 Incident / Accident Reporting and Investigation

1.4.1 Objective

The objective of incident reporting, investigation & analysis is to identify the cause(s) of an incident to allow for preparation of recommendations, to avoid recurrence of such incident(s) in future.

1.4.2 Incident Reporting and Investigation

Any work-related incident, accident, injury, illness, exposure, or property loss must be reported to your supervisor, the SS, and within 1 hour. Motor vehicle accidents must also be reported. A report must be filed for the following circumstances:

a) Accident, injury, illness, or exposure of an employee;
b) Injury of a subcontractor;
c) Damage, loss, or theft of property; and/or
d) Any motor vehicle accident regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.
e) HSE Officer shall brief the Management about the lost time injury/fatal cases and serious incidents/near-misses.
f) Project Manager and Construction Manager will review the incident report and comments on the recommendations of the Site HSE Staff. They will then assign corrective actions accordingly.
g) Occupational accidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the accident and modifying future work activities to eliminate the hazard.

h) All employees have the obligation and right to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to make such a report, it may be made orally to your supervisor or other member or management, or you may submit your concern in writing, either signed or anonymously.

i) The Site HSE Staff shall carry out a follow up of the recommendations/corrective actions from time to time where he identifies ongoing non-compliance he shall inform the Project Manager Construction Manager.

1.5 Orientation, Site HSE Induction and Other Training Activities

1.5.1 Initial HSE Orientation Program

Each and every person will undergo a HSE orientation program. On completion of orientation he will be issued an Organizational Identity card. Contractor Site HSE Staff shall perform the initial orientation based on but not limited to the following:

- Explaining Organizational HSE Policy and Standards.
- General HSE rules and regulations for working in a Construction Site, Batching plant, Excavation Area, Mechanical and Electrical work including use of Personal Protective Equipment, incident reporting, getting first aid, emergency response, (HSE inspection, housekeeping, etc.
- Hazards at construction site, works, offices, or any miscellaneous work.
- Specific hazards like height, open excavations, electrical, fire, Fumes (including spray painting) and vehicle safety etc.
- Environmental hazard.

1.5.2 Daily Tool Box Talk by Supervisors/HSE Officer

HSE tool Box talk shall be conducted by Supervisor/HSE Officer for specific work groups prior to the start of work. The tool box is a forum for two- way communication between management and the employees. Tool box talk is focused on a specific job. The agenda shall consist of the following:

- Details of the jobs being intended for immediate execution.
- The relevant hazards and risks involved in executing the job and their control and mitigating measures.
- Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
- Recent non-compliances observed.
- Appreciation of good work done by any person.
- Feedback from employees

- Any doubt clearing session at the end.
- Record of Tool box talk shall be maintained as per format attached.
- Incidents, which may occur in the site/works, shall also be discussed in "tool box talks".
- Daily tool box talk record format is attached as Annex. "A".

1.5.3 HSE Training During Project Execution

HSE training shall be arranged by contractor as per the need of the project execution and recommendation of HSE committee of site.

1.5.3.1 Site-Specific Training

Prior to working at this site, an initial site-specific training session or briefing shall be conducted prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities;
- Content and implementation of the HASP;
- Description of assigned tasks/scope of work;
- Site hazards and controls;
- Site-specific hazardous procedures (e.g., lining activities, etc.);
- Coordination of Site activities;
- Training requirements;
- PPE requirements;
- Emergency information, including local emergency response team phone numbers,
- route to nearest hospital, accident reporting procedures, evacuation routes and procedures, location of assembly points, and emergency response procedures;
- Instruction in the completion of required inspections and forms; and
- Location of safety equipment (e.g., portable eyewash, first aid kit, fire extinguishers, etc.).
- The various components of the project HASP will be presented followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the Site until they have completed the Site-specific training session.

1.5.3.2 Safety Meeting/Health and Safety Plan Review

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All Site personnel will attend these safety meetings, which may be contracted personnel, subcontractor personnel, or personnel from contractors. The safety meetings will cover specific health and safety issues, Site activities, changes in Site conditions, and a review of topics covered in the Site-specific pre-entry briefing.

1.5.3.3 Management Employees Training Program

- The management employees training program will be conducted during the project to ensure that all management employees are trained.
- An HSE specialist from contractor head office shall conduct the meetings, during his visit to site.

The duration of this course would be half day.

Annexure Sub-A

HSE TOOL BOX TALK RECORD	Quality Records Forms	
		Doc. Version 1

Project Title: AUGMENTATION OF WATER SUPPLY SYSTEM IN KHYABAN-E-SIR SYYAD FROM KHANPUR DAM & CREATION OF DMAS, DISTRICT RAWALPINDI

Project Section:

Topic: _____ **Date** _____

SR. NO.	NAME OF WORKER / STAFF	CRAFT	AREA	CONTRACTOR	REMARKS

Delivered By				**SITE HSE OFFICER**	

ANNEXURE-VII

TRAFFIC MANAGEMENT

1. Objectives of TMP

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.** However, operating policy for TMP for the construction of the proposed project along various types of roads is shown in Figures 2 to 7.

Figure 1: Policy Steps for the TMP

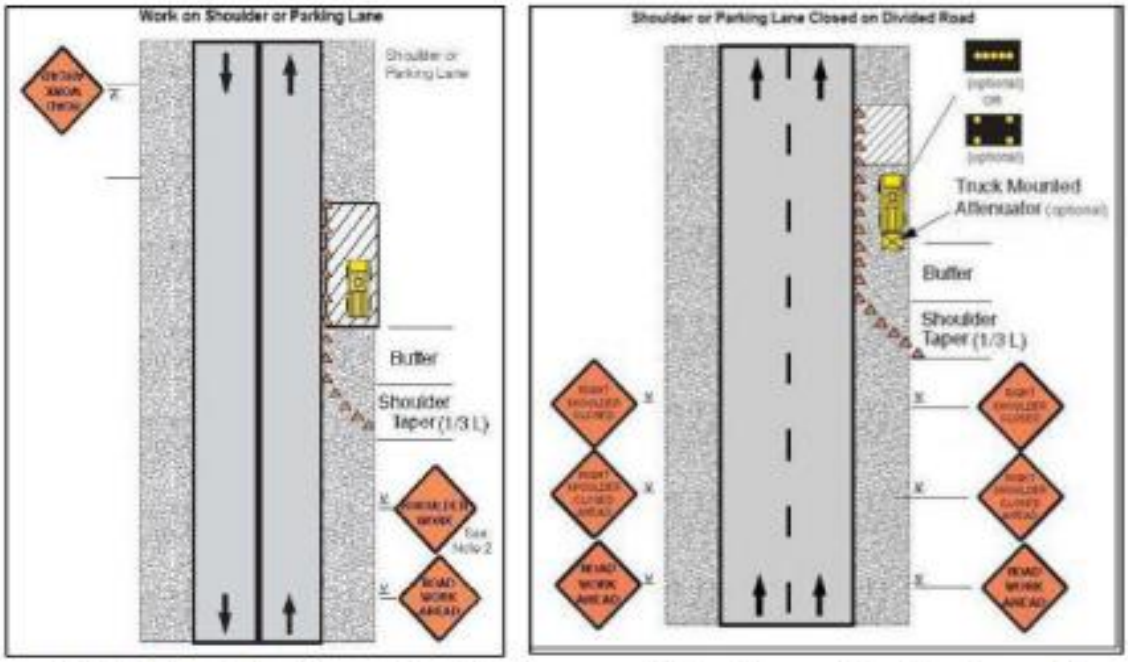


Figure 2: Work on Shoulder and Parking Lane and Shoulder and Parking Lane Closed Divided Road

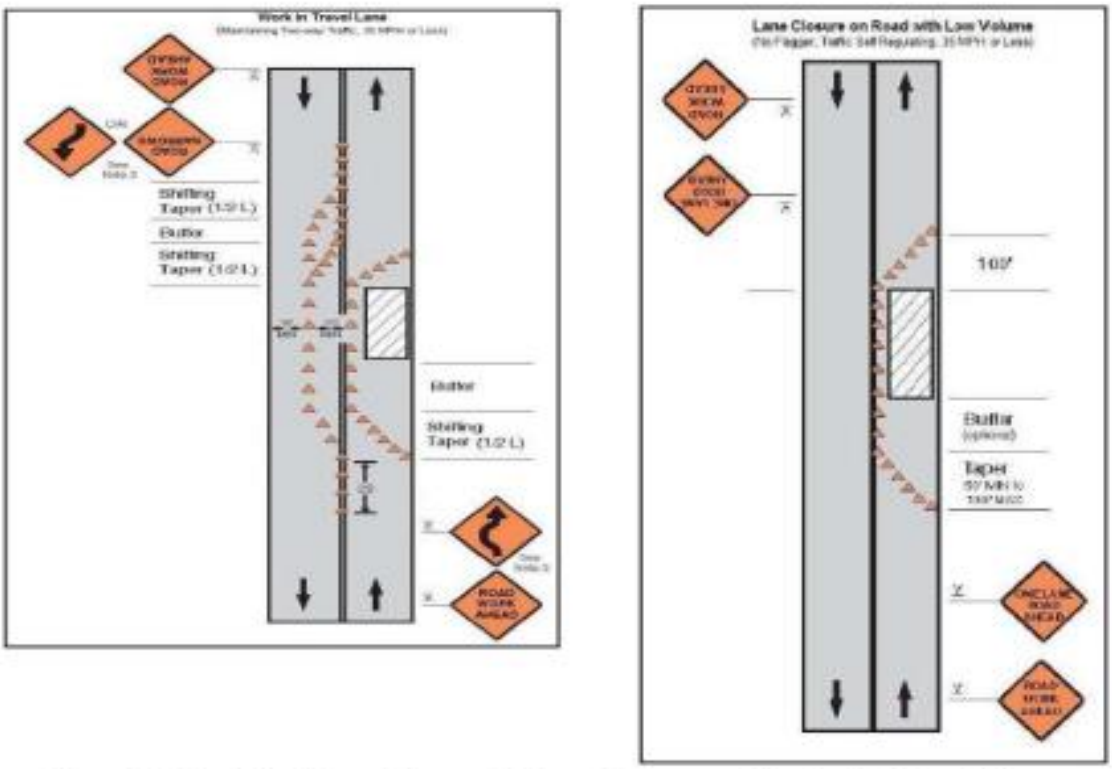


Figure 3: Work in Travel lane and Lane Closure on Road with Low Volume

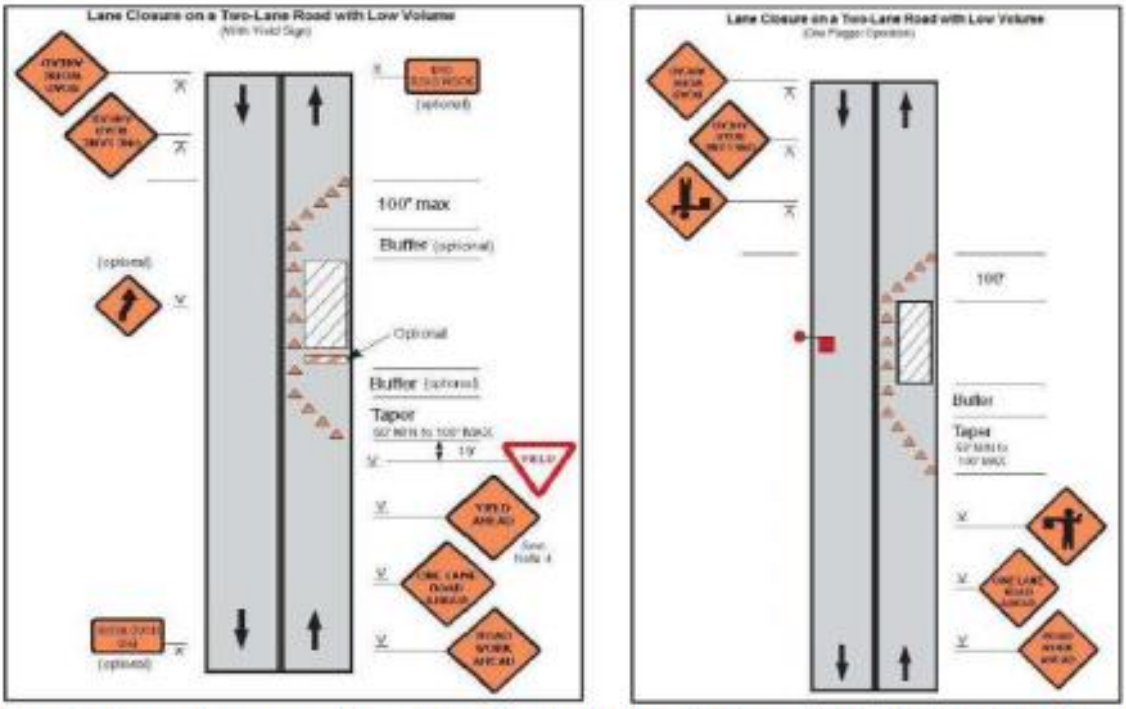


Figure 4: Lane closure on a Two-Line Road with Low Volume (with yield sign) and Lane Closure on a Two-Line Road with Low Volume (one flagger operation)

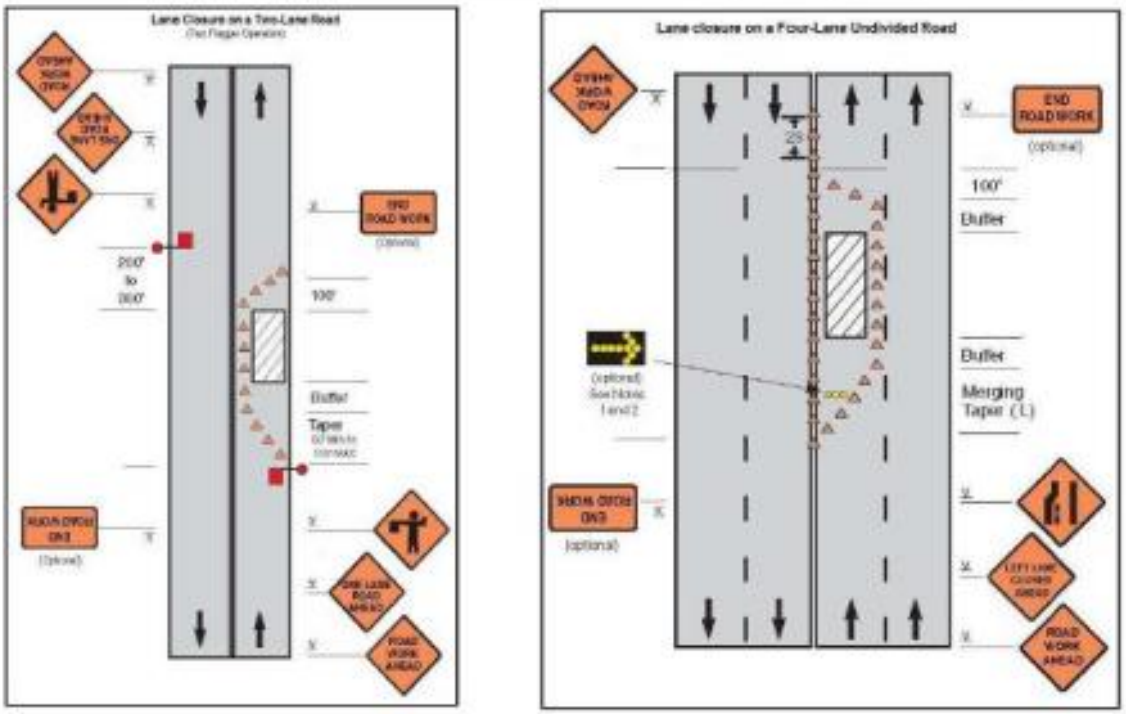


Figure 5: Lane Closure on a Two Lane Road (two flagger operation) and Lane Closure on a Four Lane Undivided Road

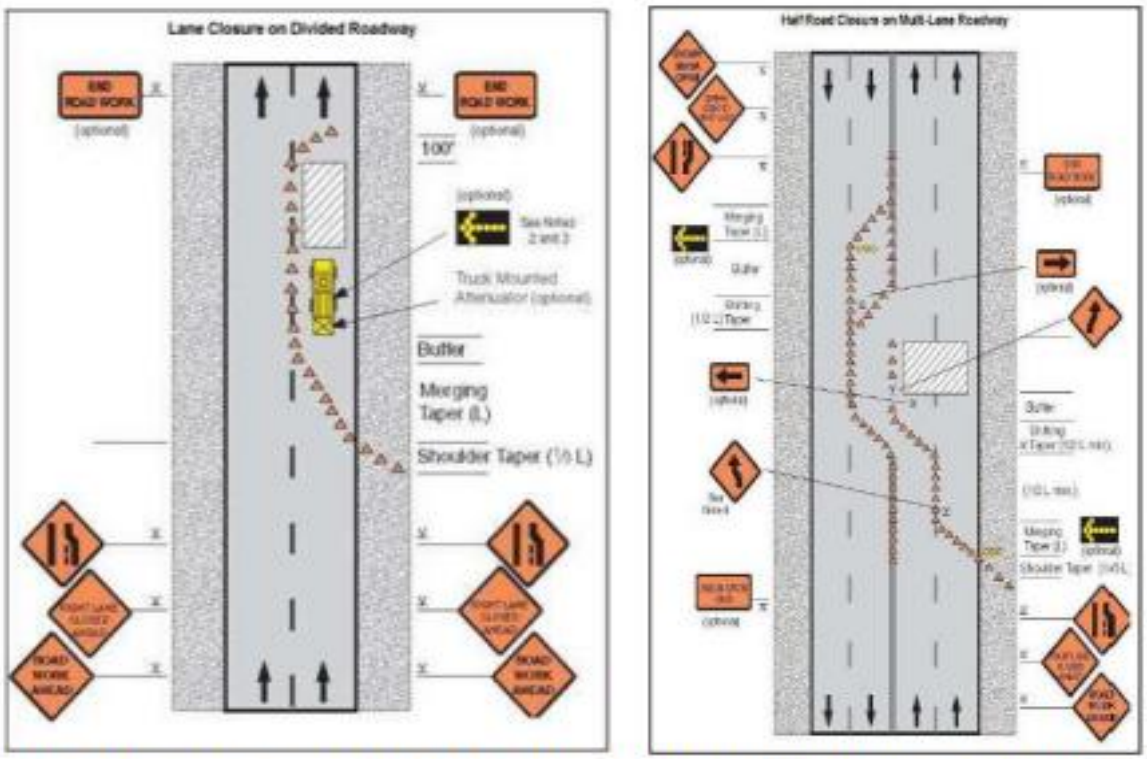


Figure 6: Lane Closure on Divided Roadway and Half Road Closure on Multi-Lane Roadway

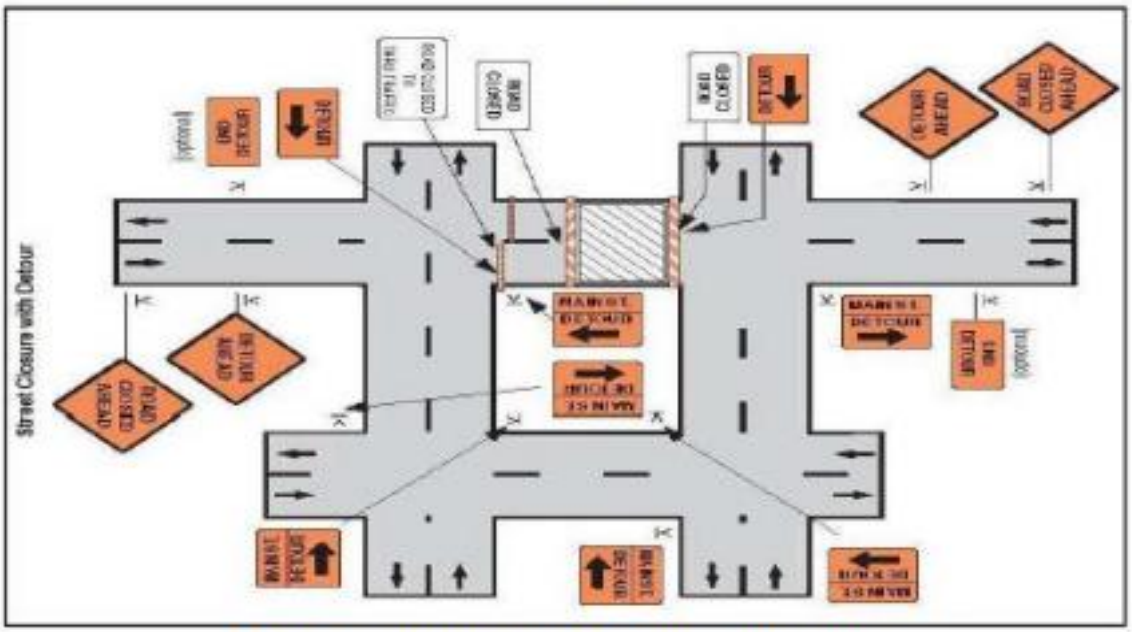


Figure 7: Street and Road Closure with Detour

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 Traffic Police 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;
- 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. There are additional grounds for travel delays in the area, as most of the streets and roads in the proposed project sites lack sufficient capacity to accommodate additional traffic from diverted traffic, as a result of street and road closure to accommodate the construction activities.

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 above 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 city level meeting with the elected representatives.

The Project Management Unit (PMU) comprising staff members of WASA, 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.

Therefore, these campaigns will be conducted in schools and community centers. 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 PIU, and 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. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal the roads are narrow but carry 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").

Figures 2 to 7 illustrates a typical set-up for installing traffic control devices at the construction sites of the area, depending on the location of work on the road way, and road geometrics:

- Work on shoulder or parking lane;
- Shoulder or parking lane closed on divided road;
- Work in travel lane;
- Lane closure on road with low volume;
- Lane closure on a two-line road with low volume (with yield sign);
- Lane closure on a two-line road with low volume (one flagger operation);
- Lane closure on a two lane road (two flagger operation);
- Lane closure on a four lane undivided road;
- Lane closure on divided roadway;
- Half road closure on multi-lane roadway; and
- Street closure with detour.

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 centimeter 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.

ANNEXURE-VIII

RESOURCE CONSERVATION

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 Resource Conservation Plan is intended to make an effort towards achieving sustainable development. The objective of the resource 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 the activities during different stages of the project; and
- An inspector shall be assigned responsibility to oversee the ongoing activities to check the compliance of the planned strategies.

4. EXECUTION OF THE PLAN

The planned strategies shall be implemented to conserve the natural resources including but not limited to the following:

Material

- Material supplied shall be in conformance with the estimated quantities and excess material shall be returned to the supplier;
- Material wastage shall be avoided by using best management practices;
- Waste produced during the project execution shall be disposed of safely to the designated disposal sites through approved contractors; and

- Reuse of the materials shall be appreciated.

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 fuel consumption;
- Switch off idle equipment and vehicles to avoid wastage of fuel;
- Minimize warm up time, unnecessary acceleration and deceleration of the construction equipment and 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 day light; and
- Alternate energy sources shall be considered for electricity generations during construction and operation to conserve fossil fuel as it is non-renewable resource.

Water

- Avoid using potable water for sprinkling, curing and washing of equipment and vehicles.
- Surface water or treated effluent can be used instead;
- Wastage of water should be controlled through providing proper valves and through controlling pressure of the water;
- Unnecessary equipment washings should be avoided;
- Awareness amongst workers shall be raised to conserve water and immediately report for any leaks detected; and
- Ensure protection of canal water from contamination resulting from construction activities.

Pollution

- Emissions shall be reduced and controlled as far as possible and direct discharges to air shall be avoided by strictly adhering to the mitigation measures outlined in EIA report;
- Waste water shall not be discharged directly into the canal and must be managed as per the recommendations presented in EIA report; and
- Construction waste, and municipal solid waste shall not be dumped and burnt openly, and shall be handled according to the preventative measure given in EIA report.

5. CHECKING AND CORRECTIVE ACTIONS

The R-WASA shall bind the construction contractor through contract agreement to comply with the strategies outlined in the Resource Conservation Plan. The Environmental Committee shall also appoint an Inspector who shall monitor the daily onsite activities and shall report any issues and concerns raised in relation to Resource

Conservation Plan. The inspector shall recommend adequate corrective actions to mitigate the issues raised.

ANNEXURE-IX

EMERGENCY RESPONSE PLAN

Emergency Response Plan

Contractors are committed and obliged to protecting the community, workers, public and concerned company's property and the surrounding environment; in the emergency situations. These situations shall be handled through the implementation of an Emergency Preparedness and Response Plan (EPRP). The construction contractors shall meet with the local emergency service institutions and law enforcement agencies i.e. Fire and rescue 1122, Police, to review and discuss the construction process, including unique construction equipment(s), the overall construction process, and schedule/phasing. This plan will be

communicated to all the concerned and personnel who will be responsible for managing the emergency situations, and those who will be effected by the emergencies.

1.1 Purpose

The purpose of the emergency response plan is to identify the actual and potential hazards and their risks, organize responsibilities, identify the resources and plan to utilize them in order to control and minimize impacts of risks in an efficient way. This plan is applicable to all construction processes and sites, machinery/ equipment and materials. It includes preparation to respond in the event of fires, incidents/ accidents involving personnel injuries, property damages etc., hazardous materials emissions, explosions, and natural disasters i.e. flood, earthquake etc. This plan also includes preparation to respond in the event of riots, arsons, terrorist attacks etc.

1.2 Objectives

The objectives of this plan are;

i. To develop, maintain, implement, check and improve procedures and practices which will ensure efficient utilization of available resources; in order to protect workers and staff from impacts of hazard's risks.
ii. To minimize impacts of emergencies and unplanned happenings.
iii. The plan includes preparedness and response mechanisms.

1.3 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 may require coordinated response.

i. Construction Accident
ii. Road & Traffic Accident
iii. Hazardous material spills
iv. Structure collapse or failure
v. Trauma or serious illness
vi. Sabotage
vii. Fire
viii. Environmental Pollution
ix. Loss of person
x. Community Accident

1.4 Types of Emergencies

Following is a list of the hazards and emergency situations, which need planning and proper handling to minimize their risks.

- Fire
- Road Traffic Accidents,
- Materials/ effluents spills i.e. asphalt, POL, etc.
- Natural disasters i.e. torrential rains, floods, earthquakes
- Occupational accidents i.e. fall, electrocutions, cave-ins
- Arsons, vandals
- Terrorist attacks, etc.

1.5 Responsibilities

1.5.1 Alerting

The following procedures will be prescribed for internal reporting of emergencies:

i. The Emergency Response Coordinator (ERC) will awaken on-site personnel, including visitors, of the nature of the emergency.
ii. The ERC will activate and deploy the concerned ERTs, and notify and inform the project person in-charge, emergency medical assistance/ Rescue 1122, fire department, Police etc., whoever and whenever needed.
iii. Concerned Project Manager (PM) or whosoever is in-charge of the project shall only be authorized to speak on contractors' behalf to outside agencies (police, fire department, medical services, Media etc.) during an emergency situation.
iv. The ERC will identify any need for security measures at the Project Area during any emergency and will notify the concerned project or security person in-charge.

ANNEXURE-X

SITE SPECIFIC EMP FRAMEWORK

GUIDE FOR DEVELOPMENT OF SSEMP

- **Step 1: Define Boundaries**
- **Step 2: Identify Sensitive Receptors**
- **Step 3: Specify construction activities**
- **Step 4: Conduct Risk Assessment**
- **Step 5: Assign Environment Management measures**
- **Step 6: Prepare Site Plans**
- **Step 7: Prepare Environment Work Plans (if required)**
- **Step 8: Monitoring**

Step 1: The project area needs to be clearly defined.

Step 2: The mapping of sensitive receptors has already been conducted and needs to be presented clearly in a map.

Step 3: The tentative construction activities to be conducted are as follows:

- Site Surveying and Vegetation (Trees and plants) Clearance
- Establishment of Work Camp and access roads
- Dismantling of existing structures including Utilities
- Preparation of ground for Landscaping

Step 4: The Risk Assessment matrix template is provided in the table below.

Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described like this:

Risk = Likelihood × Consequence

Likelihood Scale

Likelihood	Definition	Scale
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventative measures are not applied	3
Unlikely	May occur once or twice during the activity if preventative measures are not applied	2
Rare	Unlikely to occur during the project	1

Consequence Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding community e.g. extreme loss of soil and water resources and quality from storm water runoff extreme pollution of soil and water resources including major contamination from hazardous materials widespread effects on ecosystems with deaths of fauna/flora widespread community impacts resulting in illness, injury or inconvenience loss or destruction of archaeological or historical sites Occurrence will almost certainly result in the work being halted and a significant fine.	5
Major	The action will cause major adverse damage on the environment or surrounding communities' e.g. major loss of soil and water resources and quality from storm water runoff major pollution of soil and water resources including contamination from hazardous materials significant effects on ecosystems with isolated deaths of non-vulnerable flora and fauna significant annoyance or nuisance to communities major damage to or movement required to archaeological or historical sites occurrence may result in work being halted and a fine	3
Moderate	No or minimal adverse environmental or social impacts e.g. No measurable or noticeable changes in storm water quality. Water quality remains within tolerable limits little noticeable effect on ecosystems no or isolated community complaints no or unlikely damage to archaeological or historical sites no likelihood of being fined	2
Minor	No or minimal adverse environmental or social impacts e.g. No measurable or noticeable changes in storm water quality. Water quality remains within tolerable limits little noticeable effect on ecosystems no or isolated community complaints no or unlikely damage to archaeological or historical sites no likelihood of being fined	1

Risk Score Table

		Consequence			
		Catastrophic	Major	Moderate	Minor
Likelihood	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1

Risk: Significant: 15-25

Medium: 6-10

Low 1-5

Any Medium to Significant risk requires an environmental management measure to manage the potential environmental risk. Judgment will be required concerning the application of an environmental management measure to mitigate low risk situations.

The higher the risk the more intensive the required mitigation measure will need to be; e.g. where site sedimentation is deemed to be low risk, then silt fences may be needed but as the risk increases, then sediment traps may be required. The selection of the appropriate mitigation measure will require judgment based on the level of risk and the specific site parameters.

Step 5: The Environmental Management measures are to be extracted from the **EIA/IEE** study for the project and should be added in the last column of the table below.

No.	Construction Activity	Hazards to Consider	Likelihood that the site or sensitive receptors will be affected?	Consequence of the site or sensitive receptors being affected?	Risk Score (consequence x likelihood)	Environmental Management Measures
i	Site Surveying & vegetation clearance	Damage to vegetation beyond project footprint				These can be taken from the EMP provided in the **EIA** report (If Risk Score is 6 or more)
		Erosion of exposed areas and sediment				
		Loss of topsoil				
		Dust generation				
		Noise				
ii	Establishment of Work Camp, Batching plant etc.	Soil deposited onto roads from tires				
		Stockpile erosion				
		Noise & Vibration				
		Traffic congestion				
		Fuel spills				

iii	Dismantling of and existing structures including Utilities	Noise and vibration				
		Dust generation				
		Community safety				
		Worker safety				
		Traffic Congestion				
iv	Preparation of Sub-Base	Noise and vibration				
		Dust generation				
		Traffic Congestion				
v	Camping	Noise and vibration				
		Dust generation				
		Traffic Congestion				
		Community safety				
		Labor safety (PPEs)				
vi	Landscaping	Dust generation				

		Sediment runoff				
		Failure of vegetation to take root				

Step 6: The Site plans are a critical part of the SSEMP and will need to be prepared, otherwise the UMDS will consider the document as incomplete.

The site plan will need to provide the following:

- Indication of North and scale
- Existing and planned supporting infrastructure (e.g. access roads, water supplies and electricity supplies)
- Location of planned work
- Contours
- Drainage systems
- Locations of sensitive receptors

Step 7 (if required)[1]: The completed SSEMP provides details of all the environmental management requirements for all stages of the construction process. For individual work teams who are responsible for only a small part of the overall construction works it can be confusing as to what is required for their particular work component. For example, the work team responsible for stripping soil for the construction areas are not going to be interested in the requirements for pouring concrete for footings and foundations. However, it is essential that the soil stripping team knows exactly what to clear and what to leave and where to put stockpiles of soil for later use.

In situations where different work activities are required at different times or at different locations, environmental work plans can be prepared. These are similar to the work method statements that are often produced for major construction projects.

Step 8: A detailed monitoring plan will be provided along with frequency and responsibilities to ensure all key environmental parameters are monitored to ensure compliance with both national and ADB requirements.

Template for SSEMP

- Introduction
- Project Overview
- Scope of SSEMP
- Objectives of SSEMP
- Map of Sensitive Receptors
- Construction Activities
- Activities
- Risk Assessment
- Risk Assessment Matrix & Mitigation Measures
- Site Plan(s)
- Environmental Monitoring Plan
- Instrumental Monitoring of Environmental Parameters by Contractor as per EMP
- In-house monitoring
- Third Party environmental monitoring

[1] ADB, Safeguards Unit for Central & West Asia Department, *Environmental Management for Construction Handbook*.

- Visual monitoring of Environmental Parameters by Contractor as per EMP
- Responsibilities
- Organizational Responsibilities and Communication
- Responsibility of EA
- Responsibility of Construction Supervision Consultant (CSC)
- Responsibility of Contractor
- Responsibility of EPA (Punjab and Federal)