KWSSIP
Karachi Water & Sewerage Services Improvement Project

Environmental & Social Management Plan

Replacement and Rehabilitation of Old Pipri Main (OPM)

FINAL REPORT
NOVEMBER 2023

Karachi Water & Sewerage Services

Improvement Project [KWSSIP]

Environmental & Social Management Plan - Replacement and Rehabilitation of Old Pipri Main (OPM)

November 2023

Project Implementation Unit (PIU)
Karachi Water & Sewerage Services Improvement Project (KWSSIP)

Sponsored by:
- Asian Infrastructure Investment Bank (AIIB) / World Bank (WB)
- Karachi Water & Sewerage Corporation, Government of Sindh

Environmental & Social Management Plan - Replacement and Rehabilitation of Old Pipri Main (OPM)

November 2023

Disclaimer

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List of Acronyms

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
AOI	Area of Influence
CHSMP	Community Health and Safety Management Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
CMP	Camp Management Plan
CSC	Construction Supervision Consultant
CSR	Corporate Social Responsibility
DIA	Direct Impact Area
ECP	Environmental and Social codes of Practices
ECS	Environmental and Social Cell
EHS	Environment, Health and Safety
EHSG	Environmental, Health and Safety Guidelines
EHS&S	Environmental, Health, Safety and Sustainability
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EPRP	Emergency Preparedness and Response Plan
ESA	Environment and Social Assessment
ESC	Environment and Social Compliance
ESF	Environmental and Social Framework
ESMP	Environmental & Social Management Plan
FGD	Focus Group Discussion
GAP	Gender Action Plan
GBV	Gender Based Violence
GIIP	Good International Industry Practice
GRM	Grievance Redress Mechanism
GOS	Government of Sindh
HIV/AIDS	Human Immunodeficiency Virus / Acquired immunodeficiency syndrome
HSEQ	Health, Safety, Environment and Quality
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IPC	Instruction of Payment Certificate
ILO	International Labour Organizations
ISO	International Standards Organization
JHA	Job Hazzard Analysis
KWSC	Karachi Water & Sewerage Corporation
KWSSIP	Karachi Water & Sewerage Services Improvement Project
LMP	Labour Management Plan
MGD	Million Gallon Per Day
MMP	MM Pakistan (Pvt.) Ltd.
MS	Mild Steel
MSDS	Material Safety Data Sheet
MSIP	Management Safety and Implementation Plans
NCR	Non Compliance Report
NCS	National Conservation Strategy
NHA	National Highway Authority

NRW	Non-Revenue Water
OHS	Occupational Health and Safety
OP	Operational Policies
OPM	Old Pipri Main
PAPs	Project Affected Persons
PIU	Project Implementation Unit
PM_{10}	Particulate Matter 10 Micron
$PM_{2.5}$	Particulate Matter 2.5 Micron
PRCC	Pre-stressed Reinforced Concrete Pipes
ROW	Right of Way
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SEPA	Sindh Environmental Protection Agency
SEQS	Sindh Environmental Quality Standards, 2016
SH	Sexual Harassment
SMF	Social Management Framework
SO_2	Sulfur dioxide
SOPs	Series of Projects
SSESMP	Site Specific Environmental and Social Management Plan
TCU	True Colour Units
TMP	Traffic Management Plan
ToR	Terms of Reference
TP	Treatment Plant
UC	Union Council
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WMP	Waste Management Plan

Executive Summary

1. The First Karachi Water and Sewerage Services Improvement Project (KWSSIP-1), funded by the World Bank (WB) and Asian Infrastructure Investment Bank (AIIB), is a crucial initiative by the Government of Sindh (GoS) through the Karachi Water and Sewerage Corporation (KWSC) to improve and enhance water and sewerage services in Karachi. This project addresses critical infrastructure needs to ensure uninterrupted services for residents, businesses and industries and in turn protect the city from unforeseen disruptions. Under the KWSSIP, the Emergency works, falling under Series of Projects (SOP 1), Component 2, are strategic investments aimed at safeguarding the city's most critical water supply and sewerage services.
2. The project involves replacing a deteriorated 4.5-kilometer section of the PRCC Old Pipri Main (OPM) pipeline, stretching from the Pipri Reservoir to FAW Motors along the National Highway. This aging section, in service for over six decades, has reached the end of its usable lifespan. Instead of replacing the entire pipeline, which would be costly and unnecessary due to the satisfactory condition of downstream sections, the project will focus on installing a new 72-inch Mild Steel (MS) pipeline for a 4.5km section. This replacement aims to address the current significant water wastage at the joints and improve the efficiency of the water distribution system. At the remaining section of OPM that is from FAW Motors to Future Pump house, internal and external sealing of joints will be performed. Currently, this section carries approximately 70 Million Gallons per Day (MGD) of water, with an estimated annual water loss of 7 MGD, equivalent to approximately 766.5 Million PKR. The investment for the proposed replacement and repair is expected to yield a quick payback period of 3 to 4 years, emphasizing Karachi Water and Sewerage Corporation (KWSC) commitment to ensuring reliable water supply infrastructure for the city's residents.
3. The project area, located in District Malir and Korangi, benefits from a designated 60-foot Right of Way (RoW), which provides the required space for construction activities including trench excavation, pipe stacking, machinery movement, and the temporary piling of excavated material. The availability of the required RoW ensures that construction can proceed efficiently and in compliance with local regulations.
4. The construction plan includes various phases such as demolition, excavation, pipeline assembly, and rigorous quality checks. The estimated construction timeline is 12 months.
5. The proposed project falls into Sindh Environmental protection Agency’s (SEPA) Schedule II, Category H, and has been classified as Category 'B' based on World Bank Operational Policies. An Environmental and Social Management Plan (ESMP) study, equivalent to an IEE, has been conducted to address potential impacts. The project is expected to have limited and site-specific impacts, mitigated through measures. SEPA approval for the IEE typically takes about 45 days. In essence, the project complies with environmental laws and regulations, with an ESMP in place to address concerns and seek necessary approvals.
6. Project location map and its main components are presented in **Figure ES-1**.

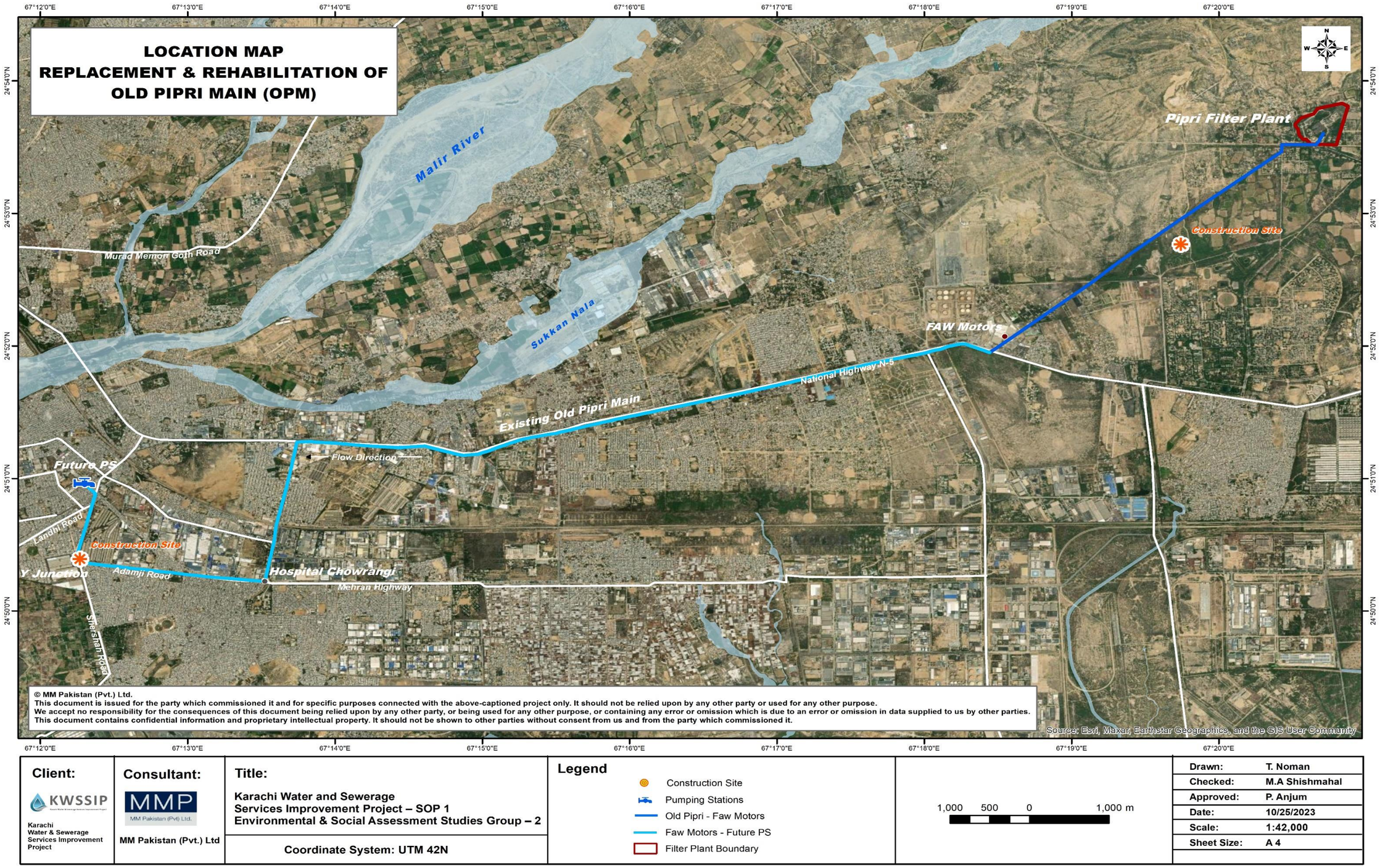


Figure ES-01: Project Location Map

7. The Project's Area of Influence (AoI), includes both the Direct Impact Area (DIA) and Indirect Impact Area (IIA). DIA consisting main trenching / construction / machinery movement spaces, with an IIA extending 200 meters (100 meters on both sides).
8. Air, noise, and water quality monitoring were conducted in the project area at one location. The monitoring point was chosen to be close to both the project intervention areas and nearby residential settlements. Sampling was carried out in KWSC Colony – Pipri Filtration Plant located few meters away from the pipeline, for a 24-hour period, following the SEQS (Sindh Environmental Quality Standards) for ambient air and noise. PM2.5 values were found to exceed the standards, likely due to vehicular emissions and poor road conditions. Given the already high levels of air pollutants, the project will implement stringent air pollution control measures to prevent worsening the existing baseline conditions. The observed noise values were slightly higher than the limits, primarily due to frequent public movement. To avoid exacerbating the already elevated noise levels, the project will enforce strict noise control measures.
9. Water analysis results revealed bacterial contamination in the water sample, although all other parameters were within SEQS and WHO limits. It is suspected that the overhead tank may not have been cleaned and disinfected for an extended period, which could explain the presence of bacterial contamination in the sampled water.
10. There is natural vegetation in the project's Area of Influence (AoI), however no trees will need to be cut during the construction work.
11. The socio-economic assessment within the project's Area of Interest (AoI) indicated the challenges, including poverty, limited access to basic amenities, etc. Housing conditions vary, and educational infrastructure requires improvement. While transportation options exist, they need enhancement, and issues persist in access to clean water and sanitation. Positive feedback from respondents indicates support for the project.
12. Women are primarily engaged in household activities, with limited participation in income-generating roles and low education levels. Decision-making power tends to rest with male family members. Although sexual harassment is uncommon, domestic violence is a concern. Local women have identified key issues, including potential construction-related mobility restrictions, healthcare and education needs, access to safe drinking water, and addressing unemployment among educated women. A gender-sensitive approach in project planning is essential for women's well-being and empowerment.
13. To address these challenges, the Environmental and Social Management Plan (ESMP) proposes binding the Contractor to provide 60% of employment opportunities to local residents, prioritize local hiring in a Recruitment Policy, and implement a Worker's Code of Conduct to prevent harassment. The ESMP also suggests incorporating clauses in the Contract to promote Corporate Social Responsibility (CSR) activities, supporting educational initiatives, skill development, vocational training, and income-generation programs tailored for women, all aimed at enhancing their economic and social status. These measures underscore a commitment to improving the socio-economic well-being of the local community.
14. The following critical actions will be performed to ensure the successful execution of the project:

- **Secure Necessary Permits and Clearances:** The project will prioritize obtaining permits, NOCs, and clearances from relevant government agencies, such as the Sindh Environmental

Protection Agency (SEPA) and District Municipal Corporations (DMCs) Malir and Korangi. This proactive approach will prevent work stoppages and project delays.

- **Qualified E&S Personnel:** To effectively implement the Environmental and Social Management Plan (ESMP), the presence of qualified environmental and social (E&S) personnel within the Project Implementation Unit (PIU), Construction Supervision Consultant (CSC), and Contractor teams will be ensured. Rigorous personnel recruitment processes, including specific qualification and experience criteria, will be incorporated into contractor selection.
- **Effective Traffic Management:** Recognizing the potential impact of construction-related traffic on major roadways, a Traffic Management Plan (TMP) will be collaboratively developed with relevant authorities. This plan will be instrumental in minimizing traffic-related disruptions and congestion.
- **Appropriate Worker Camp Locations:** The careful selection of suitable locations for worker camps is paramount to prevent strain on local infrastructure and potential issues like Gender-Based Violence and unsanitary conditions. Campsite locations have been proposed with these considerations.
- **Community Awareness:** The project will prioritize engaging with the local community, regularly distributing informative materials, and providing updates on project developments. These efforts will ensure that the community remains well-informed about the project's objectives and potential impacts, as well as avenues for addressing grievances.
- **Comprehensive ESMP Training:** To equip Contractors, workers, and management staff with essential skills, comprehensive ESMP implementation training will be conducted before the start of the construction and periodically during the construction phase. This training will cover diverse aspects, including environmental, social, safety, and legal requirements with hands-on training on the implementation of all required mitigation measures in the ESMP
- **Effective ESHS Plans Implementation:** To ensure the seamless execution of vital plans, including the Site Specific Environmental and Social Management Plan (SSESMP) including, Occupational Health and Safety Management Plan (OHSMP), Community Health and Safety Management Plan (CHSMP), qualified and experienced EHSS professionals will be recruited.
- **Implementing OHS protocols:** Stringent Occupational Health and Safety (OHS) measures will be strictly enforced, covering planning, compliance, training, emergency response, and worker well-being to ensure a safe working environment throughout the project.
- **Controlling Dust Emissions**: Set of mitigation measures will be implemented to protect sensitive receptors and minimize dust-related nuisances. These include regular water sprinkling, dust level monitoring, prompt site restoration, removal of excavated material, speed limits for construction vehicles, driver training, bilingual signboards, rapid complaint resolution through the project's GRM, avoiding densely populated areas, and employing good construction practices to minimize dust emissions effectively.
- **Controlling Noise**: To mitigate high noise levels during construction, measures such as using electric-powered equipment, restricting noisy work at night, and maintaining equipment will be implemented. Additionally, on-site grievance redress mechanisms will address noise-related complaints and ensure compliance with noise reduction standards.

- **Managing Waste**: The Contractor will develop a waste management plan to minimize and properly dispose of various waste streams during construction. This includes designated storage areas, engagement of licensed waste contractors, and reusing excavated material for backfilling. Proper handling and disposal of hazardous / non-hazardous waste will be ensured.
- **Community Safety:** The Contractor will create a Community Health and Safety Plan to mitigate construction-related risks, including dust, noise, and accidents. This plan involves proper barricading, removal of excavated material, and safety measures at excavation sites. It also includes trained operators, speed limits, and measures to reduce dust and noise. Safe pedestrian walkways with signage will be provided, and community awareness about construction risks will be increased.
- **Managing GBV/SEA/SH Incidents:** To mitigate potential health risks, social challenges, and GBV/SEA/SH incidents associated with labor influx, the Contractor will prioritize employing locals and provide training on respectful interaction with communities. Construction camps will be established at designated areas, and a Code of Conduct will be enforced for all site personnel. Training programs will cover SEA/SH prevention, and awareness will be raised among both workers and community members. Security measures, including fencing and security personnel, will be implemented, and alcohol, drugs, and weapons will be prohibited on-site. The project will follow guidelines and plans for labor influx and gender action.
- **Construction Traffic Management:** To manage construction traffic and ensure public safety, the Contractor will develop and implement a Traffic Management Plan, which will be approved by the relevant authorities. Key spots will have barricades, signs, markings, flags, lights, and trained flagmen. An emergency response plan for traffic accidents and a compensation system for community-related accidents will also be in place.
- **Operational Phase OHS Management:** Occupational Health & Safety Management System will be established. Workers will receive training and the necessary protective equipment to avoid exposure to hazardous conditions.

15. The Environmental and Social Management Plan (ESMP) for the project addresses the management of identified environmental and social impacts and risks and includes mitigation, enhancement measures, and monitoring. Contractors' qualifications will ensure familiarity with local and WB E&S requirements, with a preference for International Organization for Standardization (ISO)-certified contractors. Past E&S performance will be a crucial criterion for contractor selection. Bidding documents will incorporate various conditions, including performance security, ESHS compliance, recruitment policies, CSR activities, community development, and more. Sub-contractors must meet ESHS requirements and demonstrate relevant experience. Mitigation and control measures, including Environmental and Social Codes of Practices (ECPs), are provided in the ESMP to manage impacts. The total indicative cost of ESMP implementation is estimated to be about **PKR 36.058 million**.
16. Project’s Grievance Redress Mechanism (GRM) aims to address concerns and complaints throughout the project. The GRM includes a three-tiered structure: community level, sub-project level, and PIU level, with a separate component for Gender-Based Violence (GBV) grievances. Detailed records of complaints will be maintained in a Complaint Register, and complainants will be informed about the actions taken to address their concerns. Moreover, the robustness of the project’s GRM will be assessed by the PIU’s ESC and Third-Party Monitoring.

17. The replacement of the Pipri to FAW Motors OPM Section and repair of joints in its remaining section will have a predominantly positive impact. The project is expected to enhance the city's water supply situation by reducing water losses from leakage points in the main supply system. The construction phase will not lead to any adverse impacts on livelihoods, in fact employment opportunities for 119 people will be generated throughout the project construction stage. Moreover, no requirement for land acquisition is there, as there is sufficient Right of Way (RoW) available for the project's construction activities.

1 Introduction

The First Karachi Water and Sewerage Services Improvement Project (KWSSIP-1), funded by World Bank (WB) and Asian Infrastructure Investment Bank (AIIB), is an initiative of Government of Sindh (GoS) through Karachi Water and Sewerage Corporation (KWSC) to improve water and sewerage services in Karachi.

Under the project, KWSC is undertaking a number of Emergency works, falling within the framework of Series of Projects (SOP 1), Component 2, as part of the comprehensive Karachi Water and Sewerage Services Improvement Project (KWSSIP).

Replacement and Rehabilitation of Old Pipri Main (OPM) Project is also an essential part of emergency works. Under the project, rehabilitation and replacement works on one of the main bulk water supply line of KWSC known as the Old Pipri Main (OPM) will be carried out. This critical pipeline spans approximately 18.5 kilometers and is a crucial part of Karachi's water supply infrastructure. Originating from the Pipri Filtration Plant in Bin Qasim Town, District Malir, it boasts an impressive 72-inch diameter, providing water to the eastern part of the city. As it extends, the diameter gradually reduces: from 72 inches to 66 inches, then to 60 inches, followed by 54 inches, and finally terminates at 48 inches. The initial 4.5-kilometer section of the OPM, stretching from the Pipri Filtration Plant to FAW Motors on the National Highway, has significantly deteriorated, posing risks to the water supply system. To address these issues, the proposal suggests replacing the deteriorated 4.5-kilometer section with a more robust Mild Steel (MS) pipeline. Additionally, the remaining 14 km section is experiencing joint leakages, therefore for the remaining section from FAW Motors to Future Pump House (District Korangi), internal and external sealing of joints will be performed.

By upgrading this vulnerable section of the OPM, the project not only ensures the continued availability of clean and safe water to the residents but also contributes to the long-term sustainability of Karachi's water supply infrastructure. This endeavor underscores a commitment to responsible infrastructure management and the well-being of the community it serves.

Environmental and Social Management Plan (ESMP)

This Environmental and Social Management Plan (ESMP) has been developed for Replacement and Rehabilitation of Old Pipri Main (OPM) This instrument adheres to the guidelines established by the World Bank’s Operational Policies and has been prepared within the overarching framework of KWSSIP’s Environmental Management Framework (EMF) and Social Management Framework (SMF). The ESMP addresses potential environmental and social impacts that may occur throughout the project's lifecycle, covering design, construction, and operation and de-commissioning phases.

It is crucial to emphasize that the ESMP is a dynamic document. It will evolve and updated in parallel with the project's progress. Any adjustments or refinements to the project's design, as well as modifications to technical specifications made before the implementation phase, will prompt corresponding updates to the ESMP.

1.1 Karachi Water and Sewerage Services Improvement Project (KWSSIP)

In order to address the water supply and sewerage issues in Karachi, KWSSIP has been initiated as a phased program and agreed on a financing approach through SOPs with four overlapping phases. Following SOPs have been conceived under KWSSIP:

- SOP-1 (KWSSIP-1): Focuses on reforms, maintenance and rehabilitation
- SOP-2 (KWSSIP-2): To scale-up work done under the SOP-1
- SOP-3: Will focus on increasing water production and to ensure the additional wastewater created can be treated
- SOP-4: Will focus on improving services in informal settlements based on experience gained under the previous projects

1.2 First Series of Project (SOP-1) or KWSSIP-1

The SOP-1 (or KWSSIP-1) involves scaling-up infrastructure rehabilitation and expansion, complemented by capacity building to raise operational performance and improvements to the enabling environment. KWSSIP-1 has the following components:

- Component 1 is related to the capacity building and reform measures to improve the utility performance, including more reliable and energy efficient services.
- Component 2 undertakes selected infrastructure, aimed at improving the water and sewerage services in Karachi, while also increasing the city's resilience to water shortages, floods, and saltwater intrusion.
- Component 3 deals with project management and associated studies.

1.3 Project Design

The selection, design, and implementation of infrastructure subprojects in Component-2 are aligned with the approved Project Risk Reducing Procedure (PRRP) for KWSSIP-I that outlines the process for AED Screening for all sub-projects under KWSSIP-I. . This project is part of the Emergency Works of KWSSIP under Series of Projects (SOP-I) and has been categorised as 'No AED' after consultation and field verification with the PIU ESS Team and AED Cell under the Commissioner's Office, Karachi. The project involves replacing a 4.5 km section of the Old Pipri Main with a Seventy Two (72") inches MS pipeline from Pipri Reservoir to FAW Motors on N5 and repair of joints at the remaining 14 km section. Further project details are provided later in the document.

1.4 Requirement to Conduct IEE / ESMP Study

The Sindh Environmental Protection Act - 2014 is the core environmental law for the proposed project, and Sindh Environmental Protection Agency (SEPA) is the concerned authority with respect to environmental approvals. Under Section 17 of the Act, it is mandatory for the proponents of the projects to execute the Initial Environmental Examination (IEE) and/ or Environmental Impact Assessment (EIA), where warranted, and get the approval from SEPA prior to commencement of any project works. The categorization of the proposed Replacement and Repair of Old Pipri Main (OPM) Project falls under the following category defined by the SEPA:

Schedule II – Projects Requiring an IEE

Category H – Water Supply and Filtration Plants

Considering the scope of project's construction activities, prevailing conditions of project area and the Environmental & Social Screening, the proposed project has been classified as Category 'B' based on the WB Operational Policies (OPs), for which preparation of an ESMP is required. Therefore, an ESMP study (equivalent to an IEE for fulfilling SEPA requirements) has been conducted for the proposed project. The project may cause site specific and low intensity impacts, whereas the implementation of mitigation measures will further reduce the magnitude of these impacts. This ESMP will also be submitted as an IEE to SEPA by KWSSIP for SEPA approval. SEPA review process takes approximately forty five (45) days for granting approval of the IEE.

Besides this ESMP, Labour Management Procedures (LMP) and GRM procedures have been established under SOP 1. The LMP provides guidance on how to ensure effective worker management in line with local and WB policies for the project to promote sound worker management relationships and enhance the development benefits of a project by treating workers in the project fairly while also providing them with safe and healthy working conditions.

1.5 Objective of ESMP

The objectives of preparing this study are to:

- Facilitate PIU of KWSSIP in ensuring environmental and social sustainability of the project;
- Establish a baseline of existing social and environmental conditions prior to project initiation by collecting secondary and primary data/information on physical, biological and socio-economic environment of the project area;
- Identify potentially significant environmental and social impacts (both positive and negative) during all stages of the project;
- Avoid, minimize, and suggest mitigation and compensation measures for significant adverse impacts;
- Conduct, record and report public consultation and participation with major stakeholders; and
- Provide Environmental and Social Management Plan (ESMP) for all stages of the project as a tool for the implementation of the suggested measures, along with monitoring and evaluation mechanism with adequate resources including capacity building of implementing agencies.

1.6 ESMP Study Area - Area of Influence (AoI)

As discussed earlier, the proposed project is falling under Category 'B' in view of its associated environmental and social impacts, which means that the project impacts are not envisaged to go beyond the project boundaries. The area of influence (AoI) covers the areas likely to be directly or indirectly impacted by the Project, i.e. Direct Impact Area (DIA) and Indirect Impact Area (IIA). DIA includes the core project construction sites where direct impacts of construction activities are envisaged such as cutting of trees. IIA includes areas adjacent to the core project construction sites

that may experience impacts (e.g. nuisance associated with traffic congestion, community safety, dust or noise etc.) during construction or operation phases of the Project.

Table 1-1 defines the Areas of Influence (AoI) covering both Direct Impact Area (DIA) and Indirect Impact Area (IIA) which have been considered for the assessment of impacts. The extent of the IIA has been determined by the reach of impacts such as noise and air pollution etc. **Figure 1-1** describes the AoI in the form of maps.

Table 1-1: Project Area of Influence

S. No.	Project Components / Sites	Direct Impact Area (DIA)	Indirect Impact Area (IIA)
1-	Laying / Installation / Joints Repair of OPM	Main construction / trenching / pipeline laying / excavation areas, spaces for the movement of machinery / dumper trucks, space for temporarily stocking pipes and excavated material nearby excavated areas.	200 m (100 m from the center line on both sides)
2-	Construction Campsites	Main site area	100 m radius

Figure 1-1: Project Area of Influence (Study Area)

1.7 ESMP Study Approach and Methodology

The following approach and methodology was employed for the preparation of the ESMP:

1.7.1 Study Approach

The study was conducted in accordance with World Bank operational policies (OP 4.01, OP 4.11, OP 4.12 and OP 4.20), as well as SEPA guidelines. It utilized both primary and secondary data. Primary data was collected through fieldwork, including information on existing conditions, environmental sampling and analysis for air, water, and noise, assessments of environmental sensitive receptors, ecological surveys, and social surveys covering demographic characteristics, income dependency, quality of life, occupation, and social amenities. Secondary data was gathered by reviewing relevant literature and previous reports. The study also involved discussions with stakeholders, including government officials and community representatives, with the aim of understanding people's perceptions of the project and its environmental and social impacts.

1.7.2 Review of Project's Design Documents and Desk Research for Secondary Data Analysis

Information was collected from the PIU KWSSIP and Technical Consultants about the proposed project activities. This included a review of design documents and feasibility reports to assess the potential environmental and social impacts of construction. Additionally, literature review was conducted to gather existing environmental and social baseline data for the project area. Secondary data sources were used to analyse climate, rainfall, temperatures, geology, soils, flora and fauna profiles, critical habitats, archaeological sites, and the socio-economic conditions in the project area.

1.7.3 Reconnaissance Surveys, Delineation of the Area of Influence (AoI) and Environmental & Social Screening

Reconnaissance surveys were carried out to assess the existing environmental and social conditions in the project area that may potentially be affected by the proposed project. AoI has been decided by the consultant's team based upon the assessment on possible reach of impacts and consultants past similar field experience. Screening has been performed to determine the significance of impacts, the type of assessment to be carried out and the appropriate ESA instrument for the project.

1.7.4 Review of Legislation and Guidelines

National legislation, international agreements, environmental guidelines both of SEPA and WB, and best industry practices have been reviewed to set environmental standards that PIU KWSSIP as the executing agency will adhere to during implementation of the project.

1.7.5 Primary Data Collection (Baseline Surveys)

Field data gathering took place in the Area of Influence (AoI) between December 2021 and April 2022. The environmental survey collected data on water and air quality, noise, traffic, land use, and the presence of historical/cultural/archaeological sites. Ecological surveys recorded information about plant and animal species. Unidentified plants were identified using "PLANTNET" software. Fauna data was gathered through random sampling and observations. Socio-economic data was mainly obtained

through focus group discussions with community members, covering aspects like households, education, health, income, gender-related issues, businesses, social organizations, and political patterns in the project area.

1.7.6 Stakeholder Consultations

Stakeholder consultations were conducted with all key parties, with a focus on local communities in the project's Area of Influence (AoI) and government or local government bodies, in accordance with World Bank Operational Policies (WB OPs). These consultations included scoping sessions with local residents, representatives from the Education Department, local NGOs, the Public Health Engineering Department, and the management at the Pipri Filtration Plant. The process involved sharing information about the project with stakeholders to inform them about its development and to gather their responses and recommendations. Additionally, a stakeholder engagement workshop was organized to disseminate project information and receive feedback from key institutional stakeholders.

1.7.7 Impacts Identification and Assessment

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

1.7.8 Recommendations for Mitigation Measures

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

1.7.9 Preparation of Environmental and Social Management Plan (ESMP)

The ESMP includes controls to minimize the identified impacts and a monitoring program to monitor effects of mitigation measures implemented and residual impacts, if any, during implementation. The ESMP has identified roles and responsibilities of all concerned parties during the implementation of the project.

1.8 Document Structure

Chapter 2: Discusses the legal provisions related to environmental protection relevant to the project's planning and operational activities. It introduces the World Bank's Environmental, Health, and Safety Guidelines (EHSG) and compares them with national guidelines.

Chapter 3: Presents technical details of the project based on the feasibility report, including project overview, site descriptions, required resources, waste generation, and the project's implementation schedule.

Chapter 4: Covers baseline environmental and social conditions in the Area of Influence (AoI), including climatic conditions, the physical environment (land, air, water, noise, waste, and traffic), as well as ecological and social aspects.

Chapter 5: Assesses potential environmental and social impacts and risks of the project using the World Bank's mitigation hierarchy and outlines mitigation measures.

Chapter 6: Analyzes project alternatives considered during the design phase and provides a comparison between the project and a no-project scenario.

Chapter 7: Presents the Environmental and Social Management Plan (ESMP) for effective project implementation, management of impacts, and outlines the environmental monitoring plan and institutional arrangements.

Chapter 8: Describes the Grievance Redressal Mechanism to address grievances of workers, communities, and stakeholders.

Chapter 9: Discusses the process of information disclosure and stakeholder consultations, including feedback and concerns regarding environmental and social impacts and risks.

Chapter 10: Offers the conclusion of the Environmental and Social Management Plan (ESMP) study.

2 Legal and Institutional Framework

2.1 General

This Chapter summarizes the national, provincial, the World Bank and international environmental and social legislations, regulations, standards, and treaties relevant to this project. The footprint of the Project is located in the administrative boundaries of Sindh, therefore the rules, regulations and standards applicable in Sindh are applicable to this project. World Bank's Environmental Health and Safety - EHS Guidelines (EHSGs) will also be followed to make the project implementation in compliance with these guidelines.

2.2 Applicable National and Provincial Policies

Pakistan has in place a comprehensive constitutional, policy framework for the protection of the environment and people. This section is structured around the constitutional foundation and legislative hierarchy. An overview of relevant national policies is presented here. The full list of relevant policies is provided in **Table 2-1**.

Table 2-1: Applicable National and Provincial Policies and Guidelines

National Policies (Year of implementation)	Relevance / Applicability
National Conservation Strategy (NCS), 1992	The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core area relevant in the context of the proposed project development is the conservation of water.
National Climate Change Policy, 2012	The policy commits for responding appropriately for mitigation and adaptation to climate change through tools of environmental assessment, environmental management and environmental enhancement. The present ESMP has been prepared in consistence with this policy.
1st Sindh Labour Policy, 2018	This policy aims at decent working conditions following the international Labor standards and asks for improvement in health and safety of workers and timely payment of wages. This policy requires the stakeholders in developing strategies, plans and programs for the protection and promotion of the rights and benefits of working community without jeopardizing the genuine concerns of the employers, through any project /activity in the Sindh province and as such adherence will be required
Sindh Drinking Water Policy, 2017	The policy is aimed to provide safely managed drinking water whose supply is adequate, well maintained and sustainable. The

National Policies (Year of implementation)	Relevance / Applicability
	proposed project will also be a contribution towards fulfilment of this policy.
National Water Policy, 2002	Objectives of this policy include, efficient management and conservation of existing water resources, optimal development of potential water resources and improved flood control and protective measures. The policy requires municipal entities to treat effluents and hazardous discharge before disposal into water bodies. This project has considered the goals of this policy in terms of water conservation and restricting its loss.
Guidelines for Public Consultation, 1997	Public involvement can lead to a better and more acceptable decision for project implementation; hence, the project has considered these guidelines for completing this ESMP.

2.3 Relevant Applicable Sections of Provincial Environmental Law

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

Table 2-2: Key Sections of Sindh Environment Protection Act for Project

Environmental Legislation	SEPA 2014	Relevance with Project
Prohibition of Certain Discharges or Emissions: No person shall discharge or emit, or allow the discharge or emission of, any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards (SEQS).	Section 11 of Act	Applicable The project is required to show the compliance of provincial standards related with pollutants emission during construction stage.
Regulation of motor vehicles: No person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of subsection (g) of sub-section (1) of section 6.	Section 15 of Act	Applicable The project is required to show the compliance of provincial standards related with Motor Vehicles.
IEE and EIA: No proponent of a project shall commence construction or operation unless he has filed with the EPA an Initial Environmental Examination (IEE) or an Environmental Impact Assessment	Section 17 of Act	Applicable The project is required to submit an IEE and obtain environmental approval before commencement

Environmental Legislation	SEPA 2014	Relevance with Project
(EIA), and has obtained from the Agency approval in respect thereof.		of work from Sindh EPA .
Environmental Monitoring: For purposes of sub-section (1), the Agency may require the person in charge of a project to furnish such information as it may specify pertaining to the environmental impact of the project, including quantitative and qualitative analysis of - (a) discharge of effluents, wastes, emissions of air pollutants, noise and any other matter or action that may be found offensive under section 14 from the project on daily, weekly, monthly or annual basis; (b) ambient quality of the air, water, noise and soil before, during and after construction and during operation of the project. (3) On review of the data collected by it and information provided, the Agency may issue such directions to the person in charge as it may consider necessary to ensure compliance with the conditions of the approval.	Section 19 of Act	Applicable The project proponent (KWSSIP / KWSC) shall submit various environmental monitoring reports as per SEPA directives.
Penalties: Whoever contravenes or fails to comply with the provisions of sections 11, 17, 18 and 21 or any order issued there under shall be punishable with a fine which may extend to five million rupees, to the damage caused to environment and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues: Penalties. Provided that if the contravention of the provisions of section 11 also constitutes a contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2).	Section 22 of Act	Applicable The project proponent (KWSSIP / KWSC) shall ensure compliance of all regulatory requirements in relation to the project.

2.4 Review of the National and Provincial Environmental and Social Regulations

The applicable Environmental and Social (E&S) legislations and regulations are briefly described in **Table 2-3**.

Table 2-3: Applicable Provincial Acts

Provincial Acts (Year of implementation)	Relevance / Applicability

Provincial Acts (Year of implementation)	Relevance / Applicability
Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021	Sindh EPA has introduced Environmental Assessment Regulations, 2021, applicable to the proposed intervention for IEE/EIA review and General Environment Approval. The current ESMP will be submitted to SEPA as an Initial Environmental Examination (IEE) as the project falls under Schedule II for Water Supply and Filtration Plants
Sindh Environmental Quality Standards (SEQS) 2016	The relevant SEQS cover municipal effluents, gaseous emissions, vehicle exhaust, ambient air quality, drinking water quality, and noise, applicable during construction as part of the ESMP.
Antiquity Act (1975) and the Sindh Cultural Heritage (Preservation) Act, 1994	The project falls under the jurisdiction of the Antiquities & Archaeology Act, and the Office of the Director General must be notified if any archaeological resource is discovered during construction, though no such findings are currently known.
Sindh Wildlife Protection, Preservation, Conservation and Management Act, 2020	The Act mandates measures for wildlife protection in Sindh, allowing the project to operate on a "no harm" principle, and is pertinent due to the potential encounter with faunal species outlined in Section 4.2.4 during construction.
Pakistan Labor laws	Labor rights in Pakistan, outlined in Article 11 and 17 of the constitution, along with specific laws, apply to the project, making compliance essential. The LMP of the project covers the requirements as well.
Factories Act, 1934 and The Sindh Factories (Second Amendment) Act, 2021	This Act covers safety, welfare, health, work-related hazards, and rest facilities, applicable to the project, with compliance reflected in the project's LMP.
The Sindh Occupational Safety and Health Act, 2017	This Law ensures a safe working environment, catering to workers' physiological and psychological needs, applicable to the project. The contractor will prepare an OHS plan, aligning with the World Bank's OHS guidelines (attached as annexure), covering all aspects of this law.
The Sindh Bonded Labor System (Abolition) Act, 2015	The Bonded Labor System (Abolition) Act, mandating the elimination of forced labor, is compulsory for the project, with its aspects incorporated into the LMP.
Sindh Minimum Wages Act, 2015 (Sindh Act No. VIII of 2016)	The latest amendment of the Act regulates minimum wages and allowances for workers in Sindh, and compliance with the Act, including its amendments, is obligatory for the project, with these aspects already integrated into the project's LMP.
Sindh Workers Compensation Act, 2015	The act mandates compensation for injury or death by accident, making compliance obligatory for employers
Fatal Accidents Act 1855	This is an Act to provide compensation to families for loss occasioned by the death of a person caused by actionable wrong.

Provincial Acts (Year of implementation)	Relevance / Applicability
	For community related accidents, this law shall be applicable.
The Sindh Prohibition of Employment of Children Act, 2017	The Act, prohibiting employment of children under 14, is applicable to the project, and compliance is mandatory for contractors and sub-contractors, as detailed in the project's LMP.
The Protection Against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act, 2010, aiming to prevent sexual harassment, applies to this project, covering women at PIU-CSC and contractors, with its inclusion in both the project's LMP and GRM.
The Sindh Local Government (Amendment) Act, 2021	The LGA grants provincial governments authority over land use, conservation, pollution control, and public health. Local councils, under the act, can restrict pollution-causing activities, and the project must adhere to LGA provisions regarding air, water, and land pollution during construction.

2.5 Applicability of Stringent Environmental Quality Standards

According to the WB guidelines, when host country requirements differ from the levels and measures presented in the EHSGs, the Bank will require the proponent to achieve or implement whichever is more stringent. In this regard, the comparison and applicability of relevant local and international environmental quality standards is discussed as follows:

2.5.1. Comparison and Applicability of SEQS vs WHO / WBG Standards on Drinking Water Quality

Comparison of local and international water quality standards is provided as **Table 2-4**. The more stringent of the two will be followed during the construction stage (drinking water quality for labor and workers) and during the operational stage while assessing the quality of treated water from the pump houses equipped with intermittent chlorination system under the project. The stringent of the two are highlighted with green, while the similar values are highlighted with yellow and these highlighted values are applicable at the project.

Table 2-4: Comparison of Local and International Drinking Water Quality Standards

Parameter	Unit	SEPA	WHO / WBG
Bacterial			
E-Coli	numbers/ml	Must not be detectable inany 100 ml sample	Must not be detectable inany 100 ml sample
Total Coliform	numbers/ml	Must not be detectable inany 100 ml sample	Must not be detectable inany 100 ml sample
Physical			
Color	TCU	≤ 15 TCU	≤ 15 TCU
Taste	No objectionable / Acceptable	None	None
Odor	No objectionable / Acceptable	None	None
Turbidity	NTU	< 5 NTU	< 5 NTU
Total Hardness	mg/l	< 500 mg/l	-

Parameter	Unit	SEPA	WHO / WBG
TDS	mg/l	< 1000	< 1000
pH		6.5-8.5	-
Chemical			
Aluminum	mg/l	≤0.2	0.2
Antimony	mg/l	≤0.005	0.02
Arsenic	mg/l	≤0.05	0.01
Barium	mg/l	0.7	0.7
Boron	mg/l	0.3	0.3
Cadmium	mg/l	0.01	0.003
Chloride	mg/l	<250	250
Chromium	mg/l	≤0.05	0.05
Copper	mg/l	2	2
Cyanide	mg/l	≤0.05	0.07
Fluoride	mg/l	<1.5	1.5
Lead	mg/l	≤0.05	0.01
Manganese	mg/l	≤0.5	0.5
Mercury	mg/l	≤0.001	0.001
Nickel	mg/l	≤0.02	0.02
Nitrate	mg/l	≤0.50	50
Nitrite	mg/l	≤3	3
Selenium	mg/l	0.01	0.01
Residual Chlorine	mg/l	0.2-0.5 at consumer end	-
Zinc	mg/l	5.0	3

2.5.2. Comparison and Applicability of SEQS vs WHO / WBG Standards on Air Quality

Comparison of local and international air quality standards is provided as **Table 2-5**. The more stringent of the two shall be followed during the project construction and implementation. The stringent of the two are highlighted with green, which are applicable at the project.

Table 2-5: Comparison of Local and International Air Quality Standards

Pollutants	SEPA		WHO / WBG	
	Avg. Time	Standard	Avg. Time	Standard
SO_2	24 hrs	120 ug/m^3	24 hr 10 min	40 ug/m^3 500 ug/m^3
CO	8 hrs 1 hr	5 mg/m^3 10 mg/m^3	8 hrs	4 ug/m^3
NO_2	24 hrs	80 ug/m^3	24 hr	25 ug/m^3
O_3	1 hr	130 ug/m^3	-	-
SPM	24 hrs	120 ug/m^3	-	-
PM_{10}	24 hrs	150 ug/m^3	24 hr	45 ug/m^3
$PM_{2.5}$	24 hrs	75 ug/m^3	24 hr	15 ug/m^3

2.5.3. Comparison and Applicability of SEQS vs WHO / WBG Standards on Noise

Comparison of local and international noise standards is provided as **Table 2-6**. The more stringent of the two shall be followed during the project construction and implementation. The stringent of the two are highlighted with green, while the similar values are highlighted with yellow and these highlighted values are applicable at the project.

Table 2-6: Comparison of Local and International Noise Standards

Category of Area/Zone	Limit in dB(A) Leq			
	SEPA		WHO/WBG	
	Day Time	Night Time	Day Time	Night Time
Residential area (A)	55	45	55	45
Commercial area (B)	65	55	70	70
Industrial area (C)	75	65	70	70
Silence zone (D)	50	45	55	45

2.6 International Treaties and Conventions

The relevant international treaties and conventions to the project to which Pakistan is a party are as follows:

2.6.1. ILO's Fundamental Conventions – Ratified by Pakistan

The following ILO's fundamental convention shall be applicable.

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

2.7 Applicable World Bank Policies

2.7.1. World Bank Operational Policies

The World Bank operational policies applicable to the project and its compliance mechanism, are summarized in the description below in **Table 2-7**.

Table 2-7: Relevant World Bank Operational Policies

S. No.	World Bank Operational Policies	Brief Coverage	Relevance to project
1.	Environmental Assessment (OP 4.01)	Under this OP, the World Bank requires environmental assessment (EA) of projects proposed for Bank's financing to improve decision making through appropriate analysis of actions and of their likely environmental impacts.	The current ESMP has been prepared in the light of OP 4.01.
2.	Physical Cultural Resources (OP 4.11)	This policy seeks to assist in the preservation of cultural property. The Bank normally will assist only those projects that are sited or designed so as to prevent any damage to physical cultural resources.	There is very little chance that during the construction of proposed project, sites of cultural, archaeological, historical, or religious significance might be encountered. However, in case of discovery of any such sites or artefacts during implementation, a Chance Finds Procedures has been developed for this project, and it will be followed.
3.	Involuntary Resettlement (OP 4.12)	This Policy seeks to avoid involuntary resettlement where feasible, or to minimize, exploring all viable alternative project designs. Where resettlement avoidance is not feasible, resettlement should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable displaced persons to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs. Projects should assist displaced persons to improve or, at least, restore livelihoods to pre-displacement levels or to levels prevailing prior to the beginning of project implementation or whichever is higher.	If the proposed activities cause economic displacement due to restricted access during execution of the project. The Project Affected Persons (PAPs) shall be compensated under OP 4.12. However no PAPs have been reported in the AoI of the project
4.	Gender policy	The objective of the Bank's gender and	Following this

S. No.	World Bank Operational Policies	Brief Coverage	Relevance to project
	(OP 4.20)	development policy is to assist associate countries to curtail poverty and improve economic growth, human well-being, and development effectiveness by addressing the gender disparities and inequalities that are barriers to development, and by assisting member countries in formulating and implementing their gender and development goals, and the Bank occasionally assesses the gender dimensions of development.	operational policy, gender discrimination will be avoided at the project and suitable opportunities to both male and female will be provided where applicable.
5.	Access to information (BP 17.50)	The World Bank's Policy on Disclosure of Information is to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience. The Bank has broadened the scope of information about its activities that it makes publicly available. The Bank has established the Info-Shop at headquarters, plus regional Public Information Centres (PICs), to serve individuals seeking to obtain Bank information. In addition, Country Offices are encouraged to establish modest PIC services for their country clientele. This policy is triggered for proposed projects categorized as A and B. The developer consults project affected groups and local NGOs: a) during scoping and before TORs are prepared; b) when the draft EA is available; and c) throughout project implementation as necessary. The developer provides relevant information in a timely manner prior to consultation and in a form and language accessible to the groups being consulted.	This operational policy is applicable as to disclose all the relevant information about the project to the local community to avoid any unnecessary conflicts at construction site.

2.7.2. Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx

This guidance note provides guidance on identifying, assessing and managing the risks of adverse social and environmental impacts associated with the temporary influx of labor resulting from Bank supported projects. The guidance note contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the project's area of influence.

2.7.3. Environmental, Health & Safety (EHS) Guidelines

In addition to operational policies (OP), the WBG has also established its EHS guidelines for all the interventions that are financed by the group. These EHS Guidelines are technical reference

documents with general and sector-specific examples of Good International Industry Practice (GIIP). Following EHS guidelines are relevant to the proposed project during the construction and operation phase:

General EHS Guidelines: Issues associated with the construction and operation of maintenance facilities are addressed in the General EHS Guidelines with other key element like environment and occupational health and safety (OHS) at workplace as well as for community.

EHS Guidelines for Construction Materials Extraction: Issues associated with sourcing of construction materials are presented in the EHS Guidelines for Construction Materials Extraction.

EHS Guidelines for Water and Sanitation (2007): These guidelines provide guidance on managing various EHS issues which may occur during the construction and operational phases of water and sanitation projects.

2.8 Responsible Institutions for Planning, Policies and Regulations

2.8.1 Overview

The project will be implemented and operated by KWSSIP / KWSC with the involvement of relevant government departments and agencies, where these hold responsibilities relevant to the Project and / or represent key stakeholder interests.

2.8.2 Statutory Organizations

A summary of the key E&S regulatory institutions and their relationship with the project is provided in **Table 2-8**.

Table 2-8: Roles of Statutory Organizations

Organization	Functions / Role
Sindh Environmental Protection Agency (SEPA)	◆ Regulating the environmental issues. ◆ Reviewing and checking environmental assessment report prepared as per the legal requirements. ◆ Environmental approvals of the Project. ◆ Ensuring the implementation of government policies, during the project implementation. ◆ Ensuring compliance and reviewing the performance of Environmental Management Plans (EMP) implementation.
Labour & Human Resources Department, Sindh	◆ Guaranteeing the rights of the workers including the right to organize, collective bargaining, participation in the affairs of the implementing agency, health & safety, minimum wages, compensation etc.
Employees' Old Age Benefit Institute	◆ Making sure that workers are benefitted after retirement from the collected / raised funds and ensuring that all project workers are properly registered with the EOBI by their employers.

3 Project Description

3.1 Project Background

The Old Pipri Main (OPM), spanning 18.5 kilometers, originates from the Pipri Reservoir in UC Pipri, Bin Qasim Town, District Malir, and concludes its route at the Future Pump House in UC Landhi, Landhi Town, District Korangi. It begins as a 72-inch pipeline, progressively reducing to 66 inches, then 60 inches, further down to 54 inches, and finally reaches 48 inches at its endpoint, the Future Pump House.

Descending from the Pipri Reservoir, it crosses the National Highway (N-5) near FAW Motors, continuing along the Highway until the Manzil Pump. At this point, it turns left into the Landhi Industrial Area, merging at Hospital Chowrangi on Mehran Highway with two other water mains: the New Pipri Main (NPM) and the Haleji conduit. It then follows the Mehran Highway to the Y-point. Approximately 3 kilometers along Mehran Highway, the Old Pipri Main takes a right turn from the Y-Junction and concludes its path at the Future Pump House, approximately 800 meters from the Y-point. This 48-inch diameter OPM also supplies a 33-inch diameter water main running along the road known as 8000 Road, before joining the Haleji Conduit at the Future Pump House.

The Old Pipri Main pipeline has been in service for approximately 65 years. This pipeline currently conveys approximately 70 MGD (Million Gallons per Day) water, and it is estimated that about 7 MGD of water is lost through the leaking joints. The economic value of this lost water is approximately 766.5 Million PKR per annum.

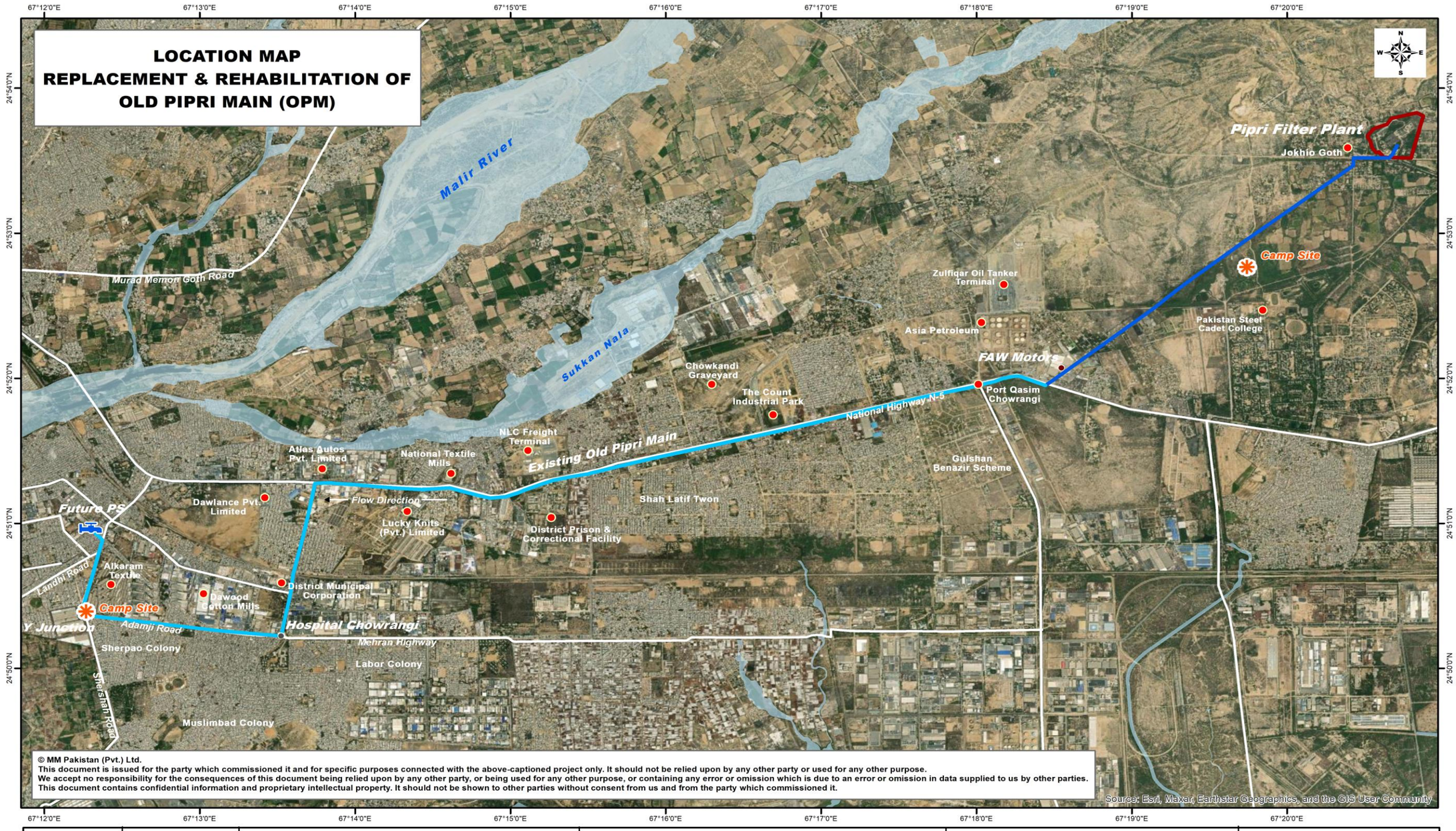
Integrity tests were conducted on the PRCC pipes of the Old Pipri Main (OPM) during feasibility study to evaluate their structural integrity following instances of bursts or major leakages. Results of the testing indicated that these pipes possess sufficient structural strength for continued service over many more years. However, the primary concern lies not in their structural stability but in joint leakage. Notably, the initial 4.5-kilometer section from the reservoir to the National Highway exhibits comparatively poor condition, necessitating replacement with an MS pipeline. Conversely, the remaining OPM pipes are in satisfactory condition. In essence, while the structural tests affirm the longevity of the pipes, the observed discrepancies in condition highlight the influence of soil variations and water leakages on the pipes' state. This assessment forms the basis for targeted replacement and maintenance strategies in specific sections of the OPM and NPM. Therefore, a complete replacement of the entire PRCC Old Pipri Main (OPM) has been deemed impractical. The chosen approach focuses on replacing the badly leaking and worn-out 4.5-kilometer section of the OPM, while at the remaining 14 km section, internal and external sealing of joints will be performed. This replacement / repair is essential to halt the significant water wastage occurring at the joints in this part of the pipeline.

The investment in the replacement and repair of the OPM is expected to yield returns in a relatively short timeframe, with a payback period estimated to be between 3 to 4 years.

3.2 Location and Right of Way (RoW)

The project area is located in District Malir and Korangi. 60 feet RoW for the 4.5 km OPM section and adequate space for joint repairs is available in the remaining section within which all the construction works (trench excavation, pipe stacking, machinery movement, temporary piling of excavated material etc.) will be performed.

Location map for this project component as well as proposed campsite location is shown in **Figure 3-1**.



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Client: KWSSIP — Karachi Water & Sewerage Services Improvement Project	**Consultant:** MMP (MM Pakistan (Pvt) Ltd.) — MM Pakistan (Pvt.) Ltd	**Title:** Karachi Water and Sewerage Services Improvement Project – SOP 1 Environmental & Social Assessment Studies Group – 2 **Coordinate System: UTM 42N**	**Legend** Construction Site Pumping Stations Old Pipri - Faw Motors Faw Motors - Future PS Filter Plant Boundary	1,000 500 0 1,000 m	Drawn: T. Noman Checked: M.A Shishmahal Approved: P. Anjum Date: 10/25/2023 Scale: 1:42,000 Sheet Size: A 4

Figure 3-1: Project Location Map – Replacement and Rehabilitation of Old Pipri Main (OPM) and Proposed Campsite Locations

3.3 Construction Steps

The project entails replacing a 4.5-kilometer section of the Old Pipri Main (OPM) with a new 72-inch Mild Steel (MS) pipeline. This replacement area is stretching from the Pipri Reservoir to the FAW Motors site located along the N5 highway. At the remaining 14 km section of OPM that is from FAW Motors to Future Pump house, internal and external sealing of faulty joints out of the total 2800 nos. joints will be performed. Breakdown of the technical steps to be adopted are as follows:

A- Replacement of 4.5 km Pipri to FAW Motors Section

a) Demolition and Removal:

The existing underground Pre-stressed RCC pipeline will be removed.

b) Debris Collection:

The debris resulting from the dismantling of the PRCC pipeline will be collected. As a common practice, the pipes are typically transported to the KWSC workshop, which also function as a small pipe factory. The dismantled material is then repurposed for the manufacturing of new pipes in the workshop. Any remaining material can be disposed of through approved vendors.

c) Excavation:

Trenches will be excavated along the pipeline route to accommodate the installation of the new 72-inch MS pipeline.

d) Pipeline Delivery:

The segments of the 72-inch MS pipeline, along with associated fittings and materials, will be delivered to the construction site.

e) Pipeline Assembly:

The MS pipeline sections will be assembled, aligned, and welded together to form a continuous pipeline.

f) Support Structures Installation:

Support structures, such as hangers and anchors, will be installed to securely hold the pipeline in place.

g) Valve Placement:

Control valves and isolation valves will be positioned at specified intervals along the pipeline route to manage water flow effectively.

h) Pressure Testing and Leak Detection:

Rigorous pressure testing and thorough leak detection will be carried out to verify the integrity of the pipeline and ensure it meets stringent quality standards.

i) Backfilling:

The trenches will be backfilled using suitable materials to cover and secure the newly installed pipeline.

j) Site Restoration:

The construction site will undergo comprehensive restoration to return it to its original condition.

k) Commissioning and Testing:

The new pipeline will be methodically commissioned, with flow rates and pressure adjusted to optimize its performance.

B- Repair of Joints from FAW Motors to Future Pump house Section

Following are the steps for external joint sealing.

- Excavation at the pipe joint up to 3 ft below the bottom of the pipe to allow access to the complete pipe joint.
- Dewatering of subsoil water and the water oozing out from the pipe joint.
- Removal of old joint sealing material.
- Plugging of the active leaking area from outside with the help of hydraulic cement.
- Sandblasting of the joint area to remove any previous coating, laitance and contaminants that may affect the bonding of new waterproofing material with the substrate, adversely.
- After sandblasting the joint surface will be thoroughly washed with high pres-ssure waterjet to remove the dust and loose particles.
- Cleaning of the washed joint surface using high pressure air.
- Water proofing of the joint by using highly elastic thermoplastic joint tape with recommended Epoxy, as per the manufacturer's specifications and recommendations. This highly flexible tape is impermeable to water, resistant to frost, UV and aging. It can resist negative and positive pressure up to 5 bars. This waterproofing will ensure no entrance of water from outside to inside or vice versa.
- Backfilling with granular material up to the center level of the pipe and with the selected excavated material in the remaining depth ensuring proper compaction/ consolidation.

Following are the steps to be followed for external joint sealing:

Those PRCC pipes joints which can't be repaired or sealed externally due to unavailability of required excavation area or encroachment of pipeline route, the joints are sealed / repaired internally. Following are the steps for internal joint sealing.

- A mild steel (MS) inspection key or entry will be made on every 1000 feet distance to enter inside the PRCC pipe for internal joint repairing / sealing. Mild steel (MS) plate of 10mm thickness, 04 feet wide will be rolled according to outer diameter of PRCC pipe (54 inch or 48 inch) and will be cut in two halves. These two halves will be jointed around PRCC pipe through fasteners. In upper

half, a 600mm dia hole will be made. A Mild steel (MS) 600mm dia pipe of 12mm thickness & 300mm long with flange on one end, will be welded there. A blind flange will be fitted with 600mm dia pipe flange through fasten- ers. The 12 mm thick rubber packing will used between PRCC pipe & rolled MS plate for sealing purpose.

- Removal of old joint sealing material.
- Plugging of the active leaking area from inside with the help of hydraulic cement.
- Sandblasting of the joint area to remove any previous coating, laitance and contaminants that may affect the bonding of new waterproofing material with the substrate, adversely.
- After sandblasting the joint surface will be thoroughly washed with high pressure waterjet to remove the dust and loose particles.
- Cleaning of the washed joint surface using high pressure air.
- Water proofing of the joint by using highly elastic thermoplastic joint tape with recommended Epoxy, as per the manufacturer's specifications and recommendations. This highly flexible tape is impermeable to water, resistant to frost, UV and aging. It can resist negative and positive pressure up to 5 bars. This waterproofing will ensure no entrance of water from outside to inside or vice versa.

3.4 Construction Details

a) Construction Equipment Requirement

1. Excavators - 05 Nos.
2. Crane - 05 Nos.
3. Generator for Camp and Site for Welding purpose - 07 Nos.
4. Submersible Pumps with Generators - 20 Nos.
5. Welding Plant – 06 Nos.
6. Dumpers -0 3 Nos.
7. Loaders - 03 Nos.

b) Source and Quantities of Construction Material

MS Pipes will be procured from the two pipe factories located near Nooriabad and Kotri. Bedding material and aggregates required for concreting of chambers may be brought from the quarries along M-9 Motorway.

c) Estimated Quantities of Excavated Material / Surplus Material

It is estimated that approximately 103,000 cubic feet of excavated material will be generated which will be reused in backfilling and other related works. No significant material is required from the burrow area. Sand will be sourced from Jhimpir and the Super Highway quarry site, while crushed material will be obtained from the crushing plant on Hub River Road. The final decision regarding these sources will be made by the contractor, and specific details will be outlined in the CESMP.

d) Implementation Timeline

Construction period shall be 12 months

e) Manpower Requirement for Construction Phase

1. Project Manager / Engineer In-charge
2. Site Engineers - 3 Nos.
3. Supervisors - 6 Nos.
4. Submersible Pumps Operators & Generator Operators - 20 Nos.
5. Excavator Operators - 5 Nos.
6. Excavator Operators - Helpers - 5 Nos.
7. Crane Operators - 5 Nos.
8. Crane Operators Helpers - 5 Nos.
9. Generator Operators for the Welding Plants - 6 Nos.
10. Dumper & Loader Operators - 6 Nos.
11. Dumper & Loader Helpers - 6 Nos.
12. Mechanics - 3 Nos.
13. Helpers with Mechanic - 3 Nos.
14. Site Labor - 40 Nos.

f) Environmental, Health and Safety and Social Safeguard Staff

The following key personnel will be hired in the contractor's team for the implementation of the project's Environmental, Health & Safety and Social Safeguards requirements:

- 01 EHS Specialist
- 01 Social / Gender Specialist
- 03 First Aiders

Total = 119

3.5 Overall Resources and Waste Estimation

Water and electricity will be the key resources to be consumed by the workforce. The key waste streams are solid waste from the camp and wastewater. 103,000 cubic feet of excavated material will be the major waste material that shall be generated from the excavation and trenching activities, however it will be used in backfilling and related activities. The debris resulting from the dismantling of the PRCC pipeline will be collected. As a common practice, the pipes are typically transported to the KWSC workshop, which also function as a small pipe factory. The dismantled material is then repurposed for the manufacturing of new pipes in the workshop. Any remaining material can be disposed of through approved vendors.

Water for drinking purpose and construction works shall be arranged by the Contractor through bowsers. Electricity shall be required mainly for welding works and workers residing at the campsite. For electricity, the Contractor will use generators. For construction camp too, electricity will be managed by using small generators.

Table 3-1 provide an estimate of the quantities of resources which are likely to be consumed and waste which is likely to be produced.

Table 3-1: Estimate of Resources Consumption and Waste Production in Construction Phase

Resource	Unit	Per capita daily use / generation	Project daily use

Resource	Unit	Per capita daily use / generation	Project daily use
Water (Workers Use)	liters	50[1]	5,450
Water (Construction)	liters	-	21, 127
Electricity	kWh	5	545
Domestic Solid Waste	kg	0.44[2]	47.96
Wastewater	liters	45	2,610

1 “Water consumption in construction sites (Tropical Cities) – Research Paper - (https://www.researchgate.net/publication/297774249)” and “Previous Project Experiences”
2 Waste Generation Rate = 0.44kg/capita/day (Ref: Pakistan – Waste Management Report, 2020)

4 Description of the Environment

The location of project lies in the jurisdictions of District Malir and Korangi.

4.1 Physical Environment

4.1.1 Climate

According to the Koppen Climate Classification, the project area lies in Subtropical - Arid Climate Zone, with mild winters and hot summers. Due to the proximity to the coast line, the climate of the project area is influenced by sea breezes, which results in less warm evenings throughout the year. Humidity however, generally remains high. As shown in the wind rose diagram **Figure 4-1** below, winds for more than half the year, including the monsoons blow from south-west to west. The wind direction changes in winter to east and north-east. The hottest months are April to June whereas, December and January are relatively colder months of the year. During July and August, it remains cloudy with generally light to heavy rainfalls influenced by monsoon weather system.

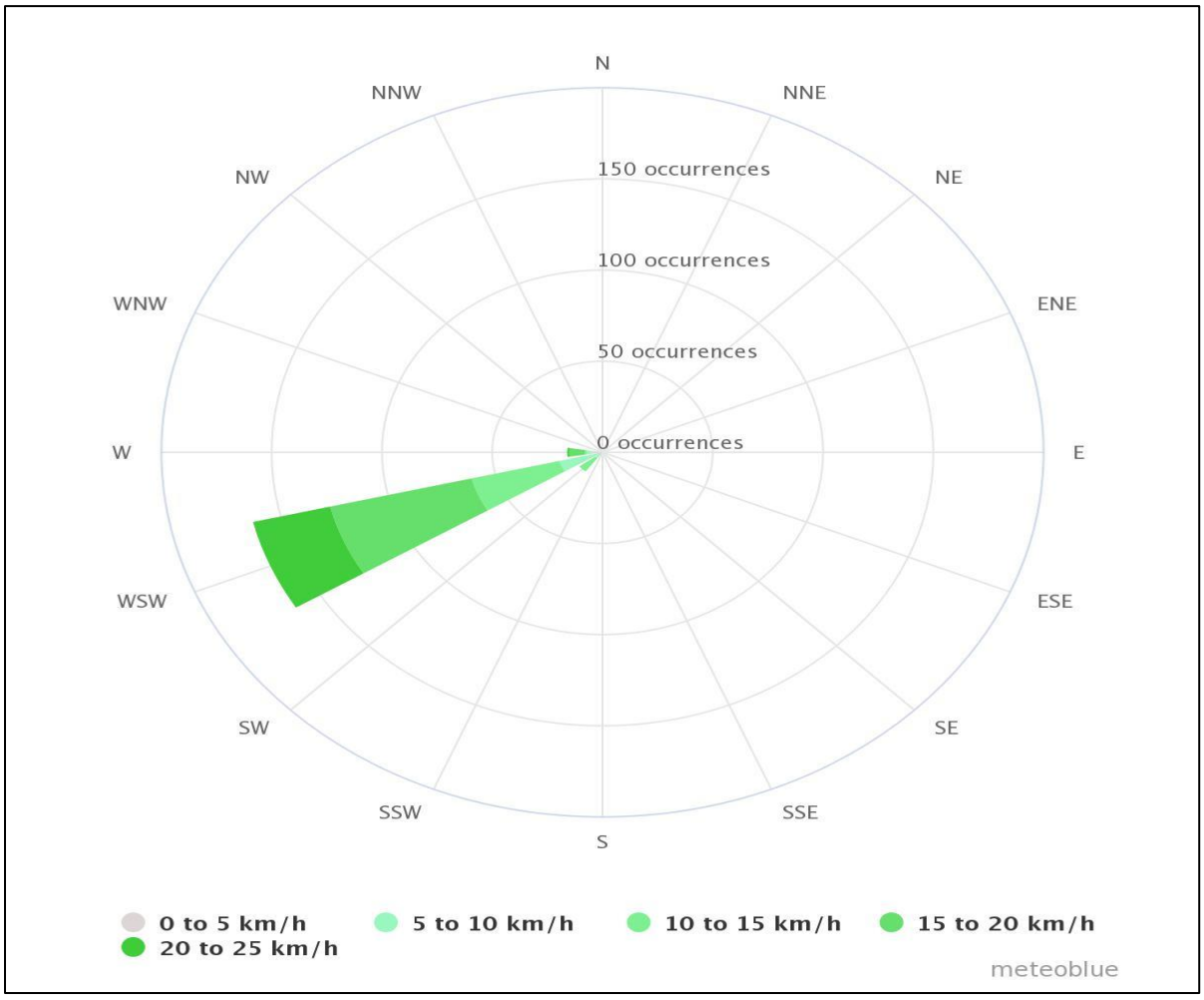


Figure 4-1: Wind Direction in the Project Area

4.1.2 High Temperatures and Heat Waves

Based on the maximum and minimum monthly average temperatures recorded between January 2012 to June 2022 at the weather station closest to the project area

The average maximum and minimum temperatures of the project area based upon the historic data are given in **Table 4-1**.

Table 4-1: Monthly Average Temperatures in the Project Area

Month	Maximum Average Temperatures (°C)	Minimum Average Temperatures (°C)
January	28.5	8.2
February	32.3	11.5
March	37.8	14.5
April	41.1	20.6
May	41.3	25.5
June	40.5	26.4
July	37.1	25.8
August	36.5	25.1
September	38.6	23.8
October	38.7	17.1
November	35.3	12.6
December	31.5	7.2
Source: PMD – Jinnah IAP (Jan 2012 to Jun 2022)		

Due to Climate change, last few years have witnessed a sharp rise in the heat waves occurrences in Karachi and its outskirts during May to September. During a heat wave, unusual period of hot, humid or dry conditions may prevail from three to five consecutive days during summer season. Most deadly heat wave in Karachi occurred between June 17-24, 2015, which took more than 1200 human lives. Pakistan Meteorological Department (PMD) issues an early warning in case a heat wave is expected to occur in the city.

Since heat wave may directly impact the health and performance of site workers and makes the workers susceptible to heat stroke, necessary mitigation measures shall be implemented during project implementation. Details of these mitigations are provided in **Chapter 5** of the report.

RainfallThe rainfall / temperature data for the last five years **(Table 4-2)** reveals notable annual variations in temperature and precipitation because of climate change. Of particular significance is the variability in annual precipitation, with 2018 experiencing a relatively low level of 3.56 mm, the precipitation surged substantially in the later years peaking at a notably higher 769.65 mm in 2022. Additionally, the number of days with rain ranged from 33 to 56 over these years. These variations underline the importance of considering local weather patterns and their potential implications for project activities. Since the project requires extensive excavation, due consideration will be given for the adoption of control measures at the excavation areas to restrict damage to the trenches and safeguarding community and worker's safety during rainfalls. Details of relevant mitigation measures are provided in **Chapter 5** of the report.

Table 4-2: Last Five Years Rainfall / Temperatures

Year	Average Annual Temperature (°C)	Annual Average Maximum Temperature (°C)	Annual Average Minimum Temperature (°C)	Annual Precipitation (mm)	Number of Days with Rain
2018	27.2	32.8	22.3	3.56	04
2019	26.9	31.9	22.6	463.81	56
2020	27.4	32.3	23.2	427.77	42
2021	27.6	32.8	23.4	473.45	33
2022	27.4	32.9	23.0	769.65	49

4.1.3 Soil

According to the geotechnical investigations, the soils of the project area generally consist of consolidated to unconsolidated gravels embedded in matrix of silt, sand and clay. The consistency and depth vary according to the topographical features. The drilling logs and classification test results show that the sub-surface geology is not much variable both in the lateral and vertical direction. Various test results show that the existing sub-surface material is suitable for filling purpose. Gravels are mostly embedded in the subsurface soils. Generally, the particle size distribution curves show that the site is underlain by sandy and clayey soils.

4.1.4 Land use

The land use along the route of the Old Pipri Main reflects the changing landscape of the area from rural to urban. As the pipeline travels through the Landhi Industrial Area, the land use is predominantly industrial. However, there are also scattered residential neighborhoods and open spaces along the route.

The land use pattern is also influenced by the presence of transportation infrastructure, such as the National Highway (N-5) and Mehran Highway. These major roads have spurred the development of commercial establishments and residential areas along their corridors.

Overall, the land use along the route of the Old Pipri Main is a mix of agricultural, industrial, residential, commercial, and open space. The land use pattern reflects the changing landscape of the area from rural to urban.

Residential settlements are located in the vicinity of Pipri Filtration Plant with predominantly being the KWSC Colony. Other residential areas are mainly concentrated in the southern part of the alignment around Future Colony, Landhi Town. Barren lands are dominated by sparse vegetation. Dominant industrial installations are located mainly in the middle part of the OPM as well as in proximity to the last section of the alignment. These areas are characterized by a mix of factories, warehouses, and power plants etc. Physical conditions of the project alignment are shown in **Figure 4-2** and land-use in **Figure 4-3** below.

Figure 4-2: Physical Conditions of the Project Alignment

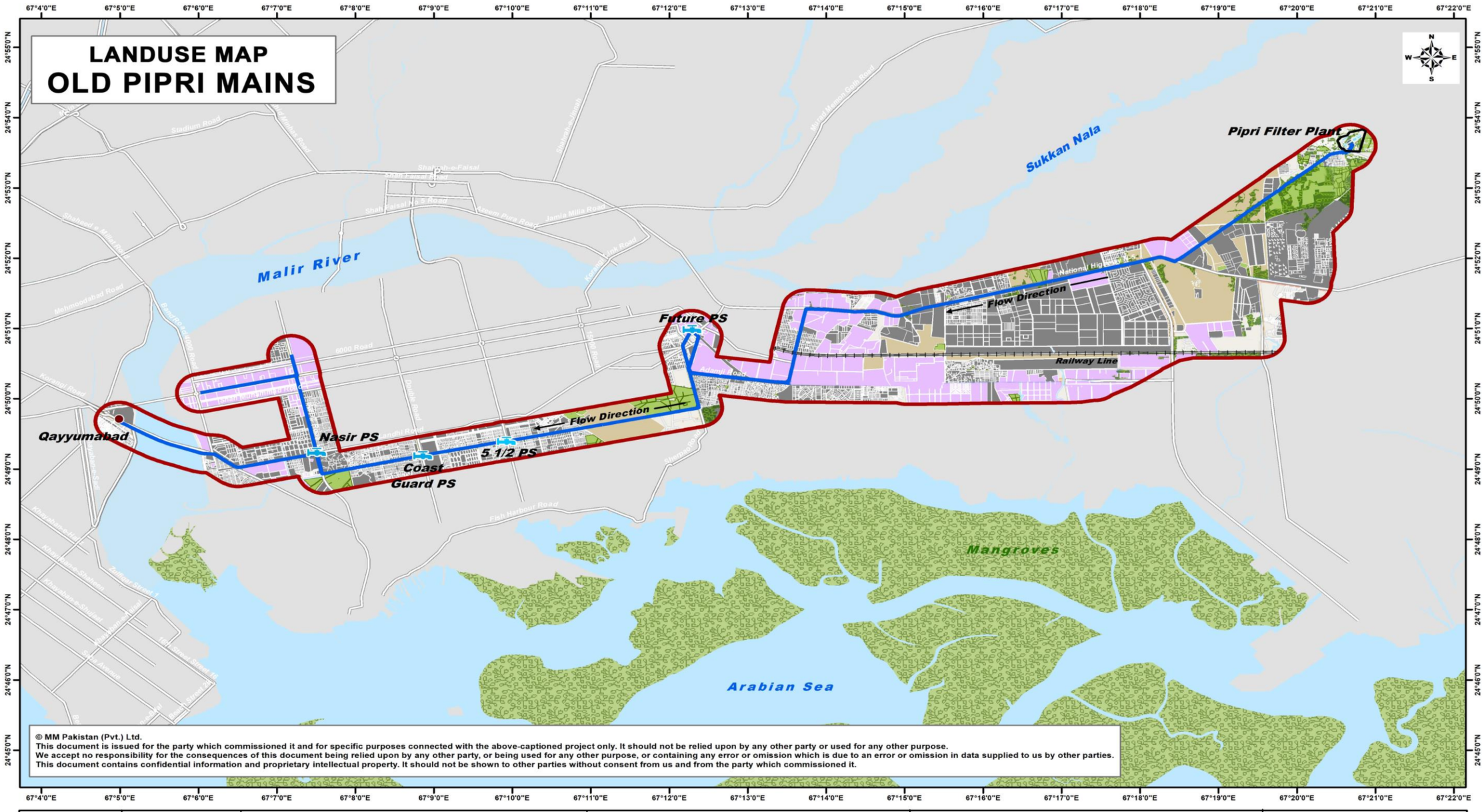


Figure 4-3: Land use Map of the Project Alignment

4.1.5 Potential Sensitive Receptors in the Project Area

To safeguard these sensitive receptors from potential disturbances arising from construction activities, comprehensive noise and dust control measures will be implemented. These measures will include but are not limited to the use of barriers, scheduling construction activities during less disruptive hours, and regular watering to suppress dust where necessary. Additionally, continuous monitoring and adherence to established environmental guidelines will be upheld to ensure the protection and well-being of the nearby communities, institutions / instalments.

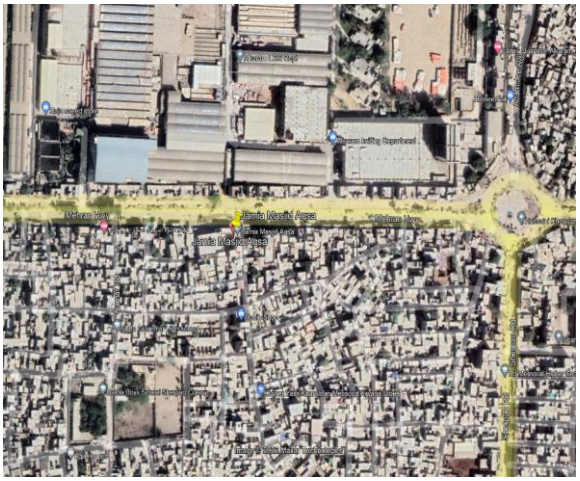
i. Al Rahman Masjid – N5

ii. FAST National University – N5

iii. Khyber Hospital – Landhi

iv. Shumaila School – Landhi

v. Jamia Masjid Aqsa



Distances of these sensitive receptors from the main line are as follows:

S. No.	Sensitive Receptor Name	Distance from Centre Line (m)	Northing	Easting
1.	Al Rahman Masjid – N5	23	24°51'59.49"N	67°18'11.39"E
2.	FAST National University – N5	35	24°51'24.67"N	67°15'52.77"E
3.	Khyber Hospital – Landhi	15	24°50'50.74"N	67°13'38.51"E
4.	Shumaila School – Landhi	20	24°50'44.82"N	67°13'37.10"E
5.	Jamia Masjid Aqsa	37	24°50'18.76"N	67°12'36.15"E

Maps showing the identified sensitive receptors in proximity to the OPM alignment is attached as **Figure 4-4** below:

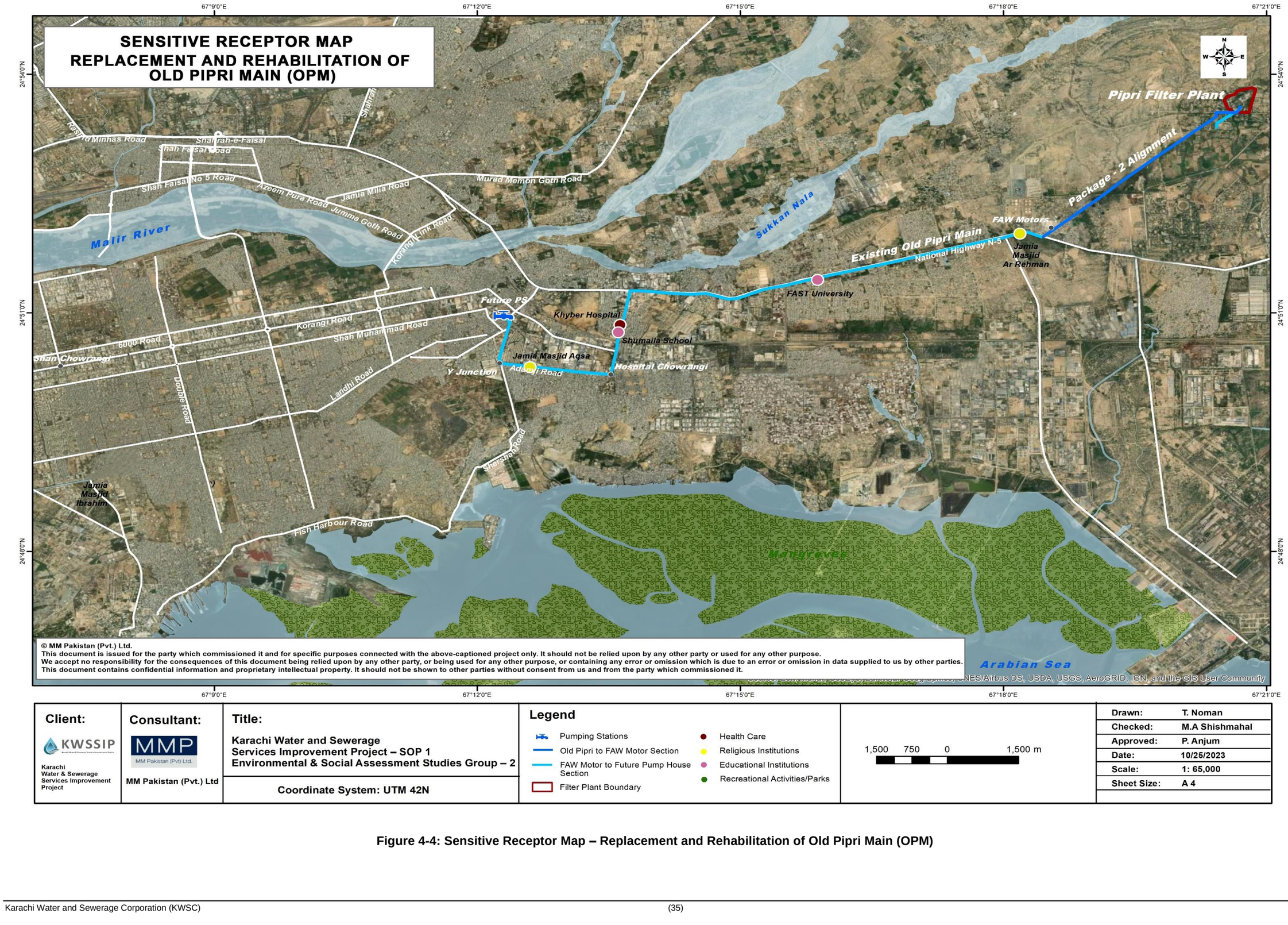


Figure 4-4: Sensitive Receptor Map – Replacement and Rehabilitation of Old Pipri Main (OPM)

4.1.6 Air, Noise, Water Quality Monitoring

Air, Noise and Water Quality monitoring was carried out in the project area at one location. Monitoring points were selected with the objective that they are located in proximity to the project intervention areas as well as to the nearby residential settlements. Since the replacement of pipe is of 4.5 km only, therefore only one location is selected for environmental monitoring. The joints will be repaired along the alignment which will not pose significant damage to the environment.

Details of monitoring location are provided in **Table 4-3** below:

Table 4-3: Details of Air, Noise and Water Quality Monitoring Locations

Location	Latitude	Longitude
KWSC Colony – Pipri Filtration Plant	24.8920° N	67.3450° E

4.1.7 Air Quality

Sampling was performed for a 24 hour period following the SEQS for ambient air. **Table 4-4** shows the observed average concentrations for ambient air quality parameters, such as, particulate matter (PM10 and PM2.5), carbon monoxide (CO), oxides of nitrogen as NO, total suspended particles (TSP), sulfur dioxide (SO_2) and compares these with the SEQS and WHO / WB Standards.

Table 4-4: Ambient Air Quality Level

S. No.	Measuring Parameter	Unit	SEQs / WBG Limit 2	Monitoring Results
1	Oxides of Nitrogen as NO	(µg/ m^3)	40	40
2	Sulfur Dioxide (SO2)	(µg/ m^3)	40	Nil
3	Carbon Monoxide (CO)	(mg/m^3)	4 (for 8 hrs)	Nil
4	Total Suspended Particulate (TSP)	(µg/m^3)	500 µg/m^3	169.00
5	Particulate Matter (PM2.5)	(µg/m^3)	15	18.95
6	Particulate Matter (PM10)	(µg/m^3)	45	17.40
7	Ozone (O3)	(µg/m^3)	130	20
8	Lead (Pb)	(µg/m^3)	1.5	0.01

PM2.5 values were found to be exceeding the standards and the probable reason is likely to be vehicular emission and poor road conditions. As the air pollutant levels are already high, the project will implement strict air pollution control measures to ensure that it does not aggravate the prevailing baseline conditions.

4.1.8 Noise

Baseline noise monitoring for the project was undertaken at one monitoring location for a 24 hour period. The observed values were found to be slightly higher than the limits mainly due to frequent movement of public. As the most of the observed noise levels are already towards the higher side, the project will implement strict noise control measures to ensure that it does not aggravate the prevailing baseline conditions.

Table 4-5 shows the observed day and night time results.

Table 4-5: Noise Monitoring

Monitoring Location	Time	Category	Measured Values	SEQS	WHO / WBG
KWSC Colony – Pipri Filtration Plant	Day	Residential	55.9	55	55
	Night		48.5	45	45

4.1.9 Water Quality

The water sample has been collected from tap, with overhead tank of KWSC Colony – Pipri as source of water. The testing was performed as per APHA methods. Results of the monitoring are given in **Table 4-6**. The results showed presence of bacterial contamination in the water sample, whereas all other parameters were found within the SEQS / WHO limits. It is anticipated that the overhead tank may not be cleaned and disinfected since long, which could be the major cause for the presence of bacterial contaminations in the sampled water.

Table 4-6: Water Quality Results

S. No	Measuring Parameters	Unit	Testing Method	SEQs Limits	WHO / WBG	Monitoring Results
1	Colour	TCU	Pt-Co	< 15 TCU	< 15 TCU	2
2	Taste	Taste	Sensory Evolution	Objection / Non-Objection	Objection / Non-Objection	Non Objection
3	Odour	Odour	Sensory Evolution	Objection / Non-Objection	Objection / Non-Objection	Non Objection
4	Turbidity	NTU	APHA-2130	< 5 NTU	< 5 NTU	1.06
5	Total Hardness as CaCO3	mg/l	APHA-2340	< 500	-	155.73
6	Total Dissolved Solids (TDS)	mg/l	APHA-2450C	< 1000	< 1000	319
7	pH @ 25°C	pH	ASTM-1293	6.5 - 8.5	-	7.56
8	Aluminium (AL)	mg/l	ASTM D-857	<0.2	0.2	0.11
9	Antimony (Sb)	mg/l	APHA 3111 Sb	<0.005	0.02	ND
10	Arsenic (Ar)	mg/l	Merck Kit Method	< 0.05	0.01	ND
11	Barium (Ba)	mg/l	APHA-D3651	0.7	0.7	0.17
12	Boron (B)	mg/l	APHA 4500-B	0.3	0.3	0.096
13	Cadmium (Cd)	mg/l	ASTM D-3557	0.01	0.003	ND
14	Chloride (Cl^-)	mg/l	APHA 4500-Cl^-	< 250	250	69
15	Chromium (Cr)	mg/l	APHA 3500-CrB	< 0.05	0.05	ND
16	Copper (Cu)	mg/l	Test Kit Method	2	2	0.812
17	Cyanide (Cn)	mg/l	APHA 4500 CN	<0.05	0.07	ND
18	Fluoride (F)	mg/l	APHA 4500 F^-	< 1.5	1.5	0.25
19	Lead (Pb)	mg/l	APHA 3500 Pb B	< 0.05	0.01	ND
20	Manganese (Mn)	mg/l	APHA 3500 MnB	< 0.5	0.5	ND
21	Mercury (Hg)	mg/l	Test Kit Method	< 0.001	0.001	ND
22	Nickel (Ni)	mg/l	APHA 3500 Ni	< 0.02	0.02	0.01
23	Nitrate (NO3)	mg/l	Test Kit Method	< 0.50	50	0.435

S. No	Measuring Parameters	Unit	Testing Method	SEQs Limits	WHO / WBG	Monitoring Results
24	Nitrite (NO2)	mg/l	Test Kit Method	< 3	3	ND
25	Selenium (Se)	mg/l	APHA 3500 Se	0.01	0.01	ND
26	Residual Chlorine	mg/l	Test Kit Method	0.2 - 1.5	-	0.152
27	Zinc (ZN)	mg/l	APHA 3500 Zn	5	3	1.05
28	Faecal Coliforms	Count / ml	APHA 922 B	0 Per 100 ml	0 Per 100 ml	42
29	E Coli	Count / ml	Total Viable Count	0 Per 100 ml	0 Per 100 ml	18
30	Total Bacterial Count	Count / ml	APHA 922 B	0 Per 100 ml	0 Per 100 ml	67
31	Pesticides	mg / l	Kit Method	0.001	-	Nil

4.2 Ecological Environment

4.2.1 Flora

The status of the flora and fauna of the study area was determined through field assessments carried out between 06 to 09 February 2022. The survey indicates that there are some specimen of 36 tree species found along the project route. Only one of these species (*Guaiaum officinale* – Lignum) is of major ecological significance per IUCN. Total 24 Lignum trees exist along the route. Specific mitigations to save these trees from any harm are provided in the subsequent sections. Other natural vegetation that exists in the project's AoI includes 41 species of herbs, 27 shrub species and 9 species of grasses. Detailed list is given in **Annexure 4-1**. No trees will need to be cut for the construction work. Various grass species, primarily phragmites as listed in the following table, will be cleared from areas above the OPM where water leakage is occurring. It's worth noting that these grasses are commonly found in the natural environment, and their removal will not harm the environment.

4.2.2 Fauna

The data on the fauna was gathered through random sampling and observations along the alignments, visual encounters, incidental observations and indirect methods such as recording pug marks in the Direct Impact Area (DIA). For birds, the surveys were conducted using line transect method. Birds were identified in the field and confirmed through consulting the handbook for bird identification (Grimmett *et al.*, 2008). The conservation status of faunal species was assessed as per IUCN Red List of Endangered species. A total of 07 mammal, 03 reptile and 21 bird species have been recorded / reported during the field visits in the AoI. All recorded species are common in nature. These may be encountered during clearance and excavation, and may get disturbed due to construction activities. No significant impacts are expected on recorded faunal species as these can naturally disperse easily from one habitat to the other during construction activities.

Details on the recorded / reported fauna is provided in **Annexure 4-2.**

4.2.3 Critical Habitats

No critical habitats have been found within the AoI of the proposed project interventions.

4.3 Social and Socioeconomic Aspects

This section presents the socioeconomic baseline based on data collected through several rounds of public consultation and a household socioeconomic survey conducted for the ESMP. There are seven communities located in the project's AoI. This include KWSC Colony - Pipri Filtration Plant, Tatal Jokhiyo village, Razaq Abad (Haji Natho Khan Village), Hassan Panhwahar Goth, Zafar Town, Future Colony and Mohammad Nagar.

The socioeconomic baseline for the project area has been meticulously established by leveraging both primary and secondary data sources. Additionally, this baseline was further reinforced through a sample-based survey conducted using the socio-economic questionnaire (refer to **Annexure 4-3**), with 61 respondents (34 males and 27 females), as outlined in **Error! Reference source not found.**. Given the absence of specific data on actual households for each locality, random reconnaissance surveys are conducted in each settlement, engaging five to ten residents to estimate average household sizes in each settlement. Sample sizes for each settlement are calculated based on information provided by consulted residents. During these surveys, primary data is collected from the communities through formal and informal consultations. It is noteworthy that a significant portion of the population lives in close-knit and extended families, primarily due to factors such as poverty and strong family bonds.

Table 4-7: Sample Distribution

S. No	Community	District	Sample Size
1.	KWSB Colony, Pipri Filtration Plant	Malir	7
2.	Tatal Jokheyo Goth	Malir	8
3.	Razaq Abad (Haji Natho Goth)	Malir	8
4.	Hassan Panhwahar Goth	Malir	8
5.	Zafar Town	Korangi	10
6.	Future PS Locality	Korangi	8
7.	Mohammad Nagar Locality	Korangi	12
Total			**61**

4.3.1 Administrative Setup

The project area of the proposed project falls in Malir and Korangi Districts.

4.3.2 Population

At the surveyed settlements, most of the population lives in close and joint families, mainly because of low income as well as poverty in some settlements, close family relations etc. The detail pertaining to total household and population of these settlements is provided in **Table 4-**.

Table 4-8: Population and Households in the AoI

S. No	Community	District	Population	Household	Sample Size
1.	KWSB Colony, Pipri Filtration Plant	Malir	1400	200	7
2.	Tatal Jokheyo Goth	Malir	4800	600	8
3.	Near Razaq Abad (Haji Natho) Goth	Malir	1600	200	8
4.	Hassan Panhwahar Goth	Malir	5600	700	8
5.	Zafar Town	Korangi	12600	1260	10
6.	Future PS Locality	Korangi	8000	1000	8
7.	Mohammad Nagar Locality	Korangi	5000	404	12
Total					**61**

4.3.3 Economic Conditions and Poverty

Along the AoI except few lower middle to middle-class communities, most of the settlements are poverty stricken. Most of the residents are working class, working as labor, daily wages worker, running small shops and rickshaw drivers etc. Many of them don't have the same degree of access to the basic necessities of life, such as healthcare facilities, drinking water, and roads, as people living in the urban areas do. Lack of proper and affordable healthcare facilities in these settlements makes the women of these communities vulnerable.

4.3.4 Infrastructure and Services

The survey findings indicated valuable insights into the availability of essential amenities and services in the project area. While the data highlights widespread access to electricity, the reliability and consistency of the supply need to be examined. Water supply access is at a significant majority, yet a portion of the population still faces challenges in accessing clean and safe drinking water. The absence of piped water supply and the reliance on tanker water require attention. Sanitation and environmental health are not in good shape, whereas further extension of sewerage infrastructure to a number households is needed. Healthcare facilities are available to a vast majority of the surveyed population, but equitable access for all residents remains a priority. The provision of schools to nearly all respondents aligns with the government's responsibility to provide basic education. Finally, the availability of a graveyard reflects the community's readiness for essential end-of-life services. Overall, the survey findings suggest that the project area has access to essential amenities and services, however, there are gaps that need to be addressed to ensure equitable access and improve the overall living conditions for all residents.

4.3.5 Language and Religion

In the Project's AoI, Urdu, Sindhi and Pushto were found to be the dominant languages. Majority population in the project area is Muslim, with Hindus and Christians as minorities.

4.3.6 Quality of Health Facilities

Government as well as Private Hospitals / Clinics health facilities are available in the AoI. The quality of services was found to be variable from area to area as reported by the respondents. Overall, the private medical facilities were reported to be better however expensive, while the facilities at Government owned hospitals / clinics were generally reported to be reasonable.

4.3.7 Quality of Educational Facilities

The quality of educational facilities at private institutions was reported to be better as compared to government owned facilities. Majority of the respondents were however found satisfied with the quality of education at government schools as well.

Gender Aspects and Consultation with Women

Besides male members, consultations were conducted with 27 female members of the communities in the project area during the study. A participatory and consultative approach was employed for information gathering and data collection. Challenges for women's participation in development include a lack of suitable capacity, skills, and experience, as well as limited opportunities and time to work in these sectors. Female participants were initially briefed about the project objectives and interventions before sharing their views. Women's primary concerns were generally related to the hardships they are currently facing. Details of the consultation have been added in Section 9.

5 Assessment of Potential Environment and Social Impacts and Risks

Potential impacts arising from design, construction and operation phase of the project have been identified and assessed on the basis of field data, secondary data, experts' opinion and examining previous similar projects in Pakistan. These impacts include effects on physical, biological and socio-economic environments. Impacts associated with design, construction, operational phases have been detailed in this Chapter.

5.1 Methodology for Screening of Impacts

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
(Adapted from: EPA Victoria, 2004. Site EMP Kit- Guidance Notes		

Consequence Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding communities. 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. Occurrence may result in work being halted and a fine.	3
Moderate	The action will cause limited adverse impacts on the environment or surrounding communities, work is unlikely to be halted, fines unlikely.	2
Minor	No or minimal adverse environmental or social impacts no likelihood of being fined.	1
(Adapted from: Environmental Management for Construction Handbook-Safeguards Unit Central & West Asia Department-Asian Development Bank - ADB)		

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**			

5.2 Pre-Construction Phase

Screening of potential impacts during the pre-construction phase is provided in **Table 5-1** below:

Table 5-1: Screening of Possible Impacts during Pre- Construction Phase

S. No.	Potential Issue	Likelihood(Certain, Likely, Unlikely, Rare)	Consequence(Catastrophic, Major, Moderate, Minor)	Risk Level (Significant ,Medium, Low)	ResidualImpact (Short term, Long term)
1.	Permits, NOCs, Clearances	Likely	Moderate	Medium	Short Term
2.	Lack of appropriate E&S personnel with CSC, and Contractors	Likely	Moderate	Medium	Long Term
3.	Inappropriate Planning for Traffic Management	Likely	Major	Medium	Short Term
4.	Improper location of worker camp leading to environmental and social issues	Likely	Major	Medium	Short Term
5.	Material Selection	Likely	Moderate	Medium	Long Term

Critical Risk Level

Significant Risk Level

Medium Risk Level

Low Risk Level

5.2.1 Permits, NOCs, Clearances Impacts

a) Impacts

Without necessary permissions from relevant Government Agencies, the project cannot be implemented. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances may result work stoppage. Permissions and clearance will be required mainly from the Sindh Environmental Protection Agency (SEPA). National Highway Authority (NHA), Traffic Police and District Administrations – Malir / Korangi will need to informed about the initiation of construction activities.

a) Mitigation Measures

Necessary consents, permits and clearances will be obtained before the start of civil works. SEPA approval will be issued after the submission of this IEE to SEPA by PIU.

NHA will be informed about the initiation of construction activities near N5 Highway before the start of works. Additionally, Traffic Police and DMC Malir/Korangi will be duly informed before the initiation of works. This proactive communication will be aimed to facilitate necessary traffic management arrangements.

5.2.2 Lack of Appropriate Environment and Social Personnel with PIU, CSC and Contractors

a) Impacts

Lack of E&S personnel's environmental safeguard capacity or selection of environment non-responsive contractors may result in failure of ESMP implementation and may be a source of non-compliances. Inadequate resources will lead to major impacts and risk in the physical, biological and social environment and eventual harms to environment and non-compliances with ESMP requirements.

b) Mitigation Measures

Mitigation measures include:

1. PIU shall recruit qualified CSC and Contractors who are able to implement the Project's Environmental, Social, Health and Safety requirements as per the desired standards.
2. Education, qualification and experience requirements of personnel (**Section 7.8.2**) will be included in the bidding documents.
3. Contractors with poor environmental, health, and safety management will not be hired.
4. Contractor's qualifications as stated in this ESMP to be included as the pre-qualification criteria in the short-listing process.
5. The conditions of the ESMP will be correctly reflected in the contractor's bidding documents and the supervision consultant's Terms of Reference (TOR).
6. Necessary funds to be allocated in the Contract documents for ESMP implementation and monitoring. Indicative costs of ESMP Implementation are provided in **Section 7.13** of this report.
7. Guidelines for Contractor's selection are provided in **Section 7.1** to **7.3**.

8. Guidelines for the preparation of necessary Environmental Social Health and Safety (ESHS) plans are provided in **Annexure 7-2**.

5.2.3 Inappropriate Planning for Traffic Management

a) Impacts

The construction traffic will need to utilize N5 National Highway. This may cause nuisance to the general traffic.

b) Mitigation Measures

1. / CSC and / Contractors in collaboration with National Highways and Motorway Police – Pipri Section will devise a Traffic Management Plan (TMP), which will be reviewed and approved up by PIU KWSSIP, to minimize the expected disruption at the identified sections. Guidelines for the preparation of traffic management plan are provided in **Annexure 7-2**.
2. Works will not commence until the PIU obtains necessary permissions from relevant authorities such as National Highway Authority (NHA) and District Administration – Malir.
3. PIU will accord approval of TMP before initiation of construction activities and no temporary or permanent works will be initiated before the plan is approved by the PIU.

5.2.4 Improper Location of Worker Camp leading to Environmental and Social Issues

a) Impacts

The duration of the construction activity for the project is expected to be 12 months and approximately 119 skilled / unskilled workers will be engaged. Influx of these workers could affect project areas negatively in terms of:

1. Disturbance to privacy of nearby communities.
2. Community exposure to Labour Influx; Gender Based Violence, Sexual Exploitation and Abuse (SEA) / Sexual Harassment (SH)
3. Improper Sewage and Waste Disposal
4. The influx of workers may bring communicable diseases to the project area.

b) Mitigation Measures

1. Campsite location is proposed in this ESMP **(See Figure 3-1)** after consulting with the Technical Consultants and keeping in view the suitable distance from the nearby settlements. Worker camp shall be developed at the identified campsite location and ancillary facilities shall 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.
2. The Contractor in collaboration with the PIU / CSC will establish strict protocols for interaction with local communities.
3. Contractors have to follow whereas PIU shall ensure the adherence to the labor standards including Provincial Labor Laws and ILO Standards for work hours, worker's payments & compensations.

4. Contractor shall prepare a Workers Camp Management Plan (CMP) and ensure its effective implementation. Guidelines for the preparation of such plans are provided in **Annexure 7-2**.
5. Labour Management Procedures (LMP) (SOP 1) will be implemented by the Contractor in letter and spirit.
6. Other necessary measures will include:

- Contractor will develop a Code of Conduct (COC) for all site personnel. All site personnel will sign this CoC and abide by it.
- Contractor will ensure that project staff will receive training on the prevention of Sexual Exploitation Abuse, SEA / SH.
- Construction crew will avoid entering settlements.
- Provision related to SEA/SH/GBV will be incorporated in the bidding document,
- The Contractor will raise awareness of the risks among community members and local health authorities and inform them about available grievance mechanisms.
- The routes / places used by the women will be avoided as far as possible. If unavoidable, alternate routes will be identified for the communities.
- Contractor will conduct induction training or workshops to introduce the basics of health and hygiene and the necessary preventive measures against diseases.
- Necessary medical screening of all workers & staff and submission of proof of vaccination (COVID-19) prior to any employment will be ensured.
- Establishment of the committee on the protection against harassment at workplace at the consultant and contractor level.
- Workers will be provided with trainings on the Worker's GRM so that they know their rights and responsibilities.
- Availability of complaint box shall be ensured at all work sites as well as GRM banner, complaint register and GRM focal points at the site level.

5.2.5 Material Selection

a) Impacts

Inadequate consideration of corrosion resistance and climate change impacts (high temperatures and extreme rainfall events) with respect to material selection during the design phase may lead to premature material degradation.

b) Mitigation Measures

- Conduct a thorough corrosion risk assessment based on environmental conditions and selection of appropriate pipe material as MS pipe is chosen to replace old pipe of PRCC so that it can withstand heavy rainfall. (Comparison of different pipes against different factors including corrosion has been done at feasibility stage)
- Selection of impermeable material for joint sealing to resist water and ageing.

5.3 Construction Phase

Screening of potential impacts during the construction phase of the project are provided in **Table 5-2** below:

Table 5-2: Screening of Possible Impacts during Construction Phase

S. No.	Potential Issue	Likelihood(Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic,Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	ResidualImpact (Short term, Longterm)
1.	Inadequate Implementation of ESMP, OHS, CHS and Other Specific Plans.	Likely	Major	Significant	Short Term
2.	Occupational Health & Safety and Emergency Preparedness & Response	Likely	Major	Significant	Short term
3.	Communicable Diseases - COVID- 19 and Camp Management	Likely	Major	Medium	Short term
4.	Employment of Child Labor	Unlikely	Major	Moderate	Long Term
5.	Employment Generation	Overall Positive			
6.	Dust Emissions	Likely	Major	Significant	Short term
7.	High Noise Levels from Construction Activities	Likely	Moderate	Medium	Short term
8.	Solid Waste Management -Generation of Excavated Material, Kitchen Waste, Hazardous Waste	Likely	Major	Significant	Short term
9.	Untreated Disposal of Effluent from Worker Camp	Likely	Moderate	Medium	Short term
10.	Climate Change	Likely	Moderate	Medium	Short Term
11.	Soil Contamination	Likely	Moderate	Medium	Short term
12.	Improper Site Restoration	Likely	Major	Medium	Short term
13.	Community Health & Safety	Likely	Major	Significant	Short term
14.	Labor Influx / SEA – SH – GBV Incidents	Likely	Moderate	Medium	Short term
15.	Construction Traffic Management and Safety	Likely	Moderate	Medium	Short term

S. No.	Potential Issue	Likelihood(Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic,Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	ResidualImpact (Short term, Longterm)
16.	Vegetation Loss and Disturbance to Fauna	Likely	Moderate	Medium	Short term
17.	Stakeholders Concerns and Engagement	Unlikely	Moderate	Low	No residual Impact

Critical Risk Level

Significant Risk Level

Medium Risk Level

Low Risk Level

5.3.1 Inadequate implementation of ESMP, OHSMP, CHSMP and Other Plans

a) Impacts

Inadequate implementation of ESMP and associated plans will result in major concerns in the form of community grievances, environmental / social impacts and risking the health and safety of the workforce.

b) Mitigation Measures

1. The CSC and Contractor will recruit qualified and experienced Environment, Health, Safety, Social and Gender Staff in line with the requirements mentioned in **Section 7.8.2**.
2. Contractor to define Environmental, Social, Gender, Occupational & Community Health and Safety procedures for all works in method statements, and shall prepare and implement Site Specific Environmental Social Management Plan (SSESMP), OHS Plan, CHS Plan and other required plans based on the ESMP guideline. These procedures and plans shall be approved by the PIU and CSC before the Contractor commences any physical works on ground.
3. PIU - KWSSIP shall review the Contractor's capacity with respect to safeguard management. Contractors not possessing the required capacity for E&S safeguards management will not be pre-qualified.

5.3.2 Occupational Health & Safety and Emergency Preparedness & Response

a) Impacts

1. Occupational Health and Safety risks related to the project shall mainly be associated with the project's construction phase as the workers will be exposed to a number of physical hazards such as accidents related to the use of heavy equipment and cranes, falling of objects, trip and fall accidents near deep excavations, heat stress / heat stroke occurrences during extreme hot weather, fires at construction sites, increased levels of dust and noise at sites, confined spaces inside MS pipes and hazards related to welding works such as; Electrical hazards, Heat related risks, Fire related risks, Asphyxiation risks, Fumes / respiratory risks and Gas use and storage risks etc.
2. In case, if the working hours are not regulated properly, the risk of accidents could increase due to the higher probability of fatigue.
3. Communicable diseases such as COVID-19 may be introduced due to the migration of workers associated with the project.

b) Mitigation Measures

1. The OHS plan would include OHS Policy Statement, OHS Organization, SOPs for all works, Hazard Identification and Risk Management, requirement of conducting Job Hazard Analysis and preparing Method Statements containing OHS aspects, OHS training requirements, incident recording and reporting protocols, and the OHS plan needs to be approved by the supervision consultant before start of construction.
2. The Health & Safety Framework (**Attached as Annexure 5-1)** by the World Bank will be followed by the PIU-KWSSIP and the Contractor's will prepare OHS plan accordingly.

3. Specific safety measures to be implemented for preventing workers from confined space and heat stroke hazards include the following:
   a. Gas Monitoring and Ventilation: Before entry, thorough gas monitoring will be conducted to detect hazardous gases or low oxygen levels. Proper ventilation systems will be set up to ensure a safe atmosphere inside the confined space.
   b. Proper Training and Equipment: All workers involved will receive confined space training to understand the risks and will be equipped with safety gear such as harnesses, lifelines, gas detectors, and communication devices.
   c. Permit System and Procedures: A permit-to-work system designed for confined spaces will be in place. Clear procedures for entry, work, and exit, including rescue protocols, will be established. Trained personnel will monitor confined space entry throughout the operation.
   d. Testing and Isolation: The pipeline section will be isolated, depressurized, drained, and thoroughly cleaned before entry. Testing for residual gases, liquids, or solids will be conducted to ensure a safe environment. Lockout/tagout procedures will prevent accidental equipment activation.
   e. Emergency Response Plan: A comprehensive emergency response plan specific to confined spaces will be developed. The team will be equipped with rescue gear and trained in confined space rescue procedures. Regular mock rescue drills will be conducted to ensure readiness.
4. Specific mitigation guidelines for dealing with various hazards associated with the proposed construction activities as well as guidelines for the preparation of OHS Plan are provided under **Annexure 7-2**.
5. Established occupational health and safety protocols on COVID19 (**Annexure 7-2 Section 4**) will be followed
6. Contractor shall prepare an Emergency Preparedness and Response Plan (EPRP) following **Annexure 7-2** as part of the OHS Plan to contain larger emergencies.
7. PIU will work with the national / provincial emergency response services to ensure any external emergency response arrangements (Fire, Ambulance, Epidemic Control etc.), if the resources available with the Contractor are not sufficient to contain any such emergencies.
8. At every workplace, a readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital.
9. At every workplace and construction camp, proper equipment and paramedical staff will be provided.
10. The Contractor will maintain site safety and install hard barricading, flexible green net, signboards, temporary safety and traffic diversions throughout the construction period and provide personal protective equipment (PPE) to all the workers working at the construction sites.
11. Zero tolerance to loss of life policy shall be developed and implemented by the Contractor.
12. Contractor will ensure organization of Health and Safety trainings for all site personnel throughout the construction period.
13. In case accident in the form of injury or fatality affects any workers, they or their legal heirs will be compensated by following Sindh Workers Compensation Act, 2015.

14. Specific mitigation guidelines for dealing with various hazards such as Confined Space works, Heat Stroke etc. associated with the proposed construction activities are provided in **Annexure 7-2**.

5.3.3 Communicable Diseases - COVID- 19 and Camp Management

a) Impacts

1. Communicable diseases such as COVID-19 may be introduced due to the immigration of workers associated with the project.
2. Inappropriate camp management may lead to discomfort among workers.

b) Mitigation Measures

The Contractor shall ensure the following measures:

3. Implementation of health and safety protocols on COVID19 (**Annexure 7-2 Section 4**).
4. Awareness among workers will be created on proper sanitation and hygiene practices;
5. Good housekeeping practices will be maintained at camp and project sites;
6. Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water;
7. Arrangements will be made to treat the affected workers on time to control the movement of vectors diseases;
8. Implementation of Camp Management Plan and Labor Management Procedures (LMP).
9. Use of non-wood fuel for cooking;
10. Contractor shall implement ECP 10: Construction Camp Management,
11. Cleaning staff shall be appointed for maintaining cleanliness at Campsites.

5.3.4 Employment of Child Labor

a) Impacts

Major impacts of child labor include psychological, physical damage to the child being employed, deprivation of education and chances of sexual exploitation.

b) Mitigation Measures

1. The Contractor shall have its employment policy in accordance with relevant acts, guidelines and labor policies i.e. The Sindh Prohibition of Employment of Children Act, 2017;
2. No child having age below 18 shall be allowed to be employed in any construction work by the – construction contractors, sub-contractors and any service providers.
3. Contractor will ensure that all persons at site are adults and have their government issued identity card with them.

5.3.5 Employment Generation

Primarily a positive impact, the project will create significant temporary employment for construction workers, maintenance, support, administrative, security and project management staff. Majority of

project staff are expected to be recruited locally. It is expected that around 119 employment opportunities shall be created during the construction period.

5.3.6 Dust Emissions

a) Impacts

1. Local air quality shall be affected by dust and vehicular emissions due to the movement of construction vehicles, sand blasters, generators and welding machines.
2. The impacts of dust emissions shall mostly be limited to the work areas.

b) Mitigation Measures

1. Immediate removal of excavated material will be ensured to avoid its emission and runoff.
2. Water sprinkling at the unpaved sections of access road.
3. Regular watering of construction areas and the use of dust suppressants, like chemical agents or natural materials, will be employed to minimize airborne dust.
4. Regular maintenance and tuning of construction vehicles and equipment will be scheduled to minimize emissions. Encouraging the use of low-emission or electric vehicles wherever feasible will also be prioritized.
5. Limiting the use of high-emission equipment like sand blasters, generators, and welding machines to necessary periods will reduce their overall emissions. Ensuring proper maintenance and efficient functioning will also be emphasized.
6. Where possible, utilizing electric or battery-operated equipment in place of fuel-powered machinery will be considered to reduce emissions and noise pollution.
7. Physical barriers or windbreaks will be set up around construction sites to contain dust and prevent its spread. Buffer zones between the construction area and nearby residences or sensitive environments will also be established.
8. Limiting speeds of construction vehicles in the project area.
9. Regular trainings of the drivers to ensure implementation of speed limits.
10. Fuel-efficient / well-maintained construction machinery shall be employed to minimize exhaust emissions.
11. Vehicles transporting soil, sand and other construction materials shall be covered with tarpaulin.
12. Earliest resolution of any dust related public complaints registered through Project's Grievance Redress Mechanism.

5.3.7 High Noise Levels from Construction Activities

a) Impacts

1. Construction activities will involve use of construction equipment and machinery i.e. excavators, cranes, power generators, loaders, sand blasters, welders and dumper trucks etc. which may generate high noise levels at the project sites and can have effects on the people nearby the project sites. However, these increased noise levels will prevail only for a short duration during the construction phase.

b) Mitigation Measures

1. Quieter machinery will be chosen to minimize noise. Additionally, workers will use noise-reducing tools where available.
2. Simple barriers such as walls or fences will be installed around work areas to reduce noise spreading to nearby residences.
3. Noisy activities will be scheduled during times less likely to disturb residents. Workers will avoid early mornings or late evenings for loud tasks.
4. Regular maintenance checks will ensure machinery operates smoothly and quietly.
5. Workers will receive training on noise reduction techniques. They will be encouraged to use quieter tools and equipment and to maintain safe distances from noisy machinery.
6. Workers will be provided with appropriate PPE, such as earmuffs or earplugs, to protect their hearing from prolonged exposure to loud noise.
7. Residents will be informed in advance about noisy construction activities and expected durations.
8. Construction areas near residences will be minimized, concentrating louder tasks away from housing.
9. Basic monitoring will be conducted to ensure noise levels stay within acceptable limits.
10. Strict adherence to noise level regulations and local standards will be maintained during construction to protect both workers and residents.
11. Blowing of horns by construction machinery and vehicles will be strictly prohibited.
12. The operation of heavy equipment will be restricted to daylight hours as far as possible and noisy works will be avoided / minimized during the night time.
13. Noise from vehicles and power generators will be minimized by use of proper silencers and mufflers.
14. All the equipment and machinery used during construction phase will be well maintained and in compliance with SEQS.
15. Earliest resolution of any noise related public complaints registered through Project's Grievance Redress Mechanism.

5.3.8 Solid Waste Management - Generation of Excavated Material, Domestic Waste, Hazardous Waste

a) Impacts

During construction phase the major waste streams will include Excavated Material from trenching / excavation, old damaged PRCC pipes and Domestic Waste from construction camp, Hazardous Waste including used oil filters, used oils from workshop and small quantities of Medical Waste resulting from first aid treatments. Old PRCC pipes in the form of debris will also be removed.

b) Mitigation Measures

1. A waste management plan will be developed by the Contractor prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal.
2. There will be designated Fuel storage areas.

3. Licensed and SEPA approved waste contractors will be engaged to dispose-off all waste materials that cannot be recycled or reused.
4. The debris from the PRCC pipeline will be carefully collected and can be sold to third-party vendors. Additionally, it is a standard practice to send the pipe debris to the KWSC workshop, which doubles as a small pipe factory. Here, the pipes are dismantled further, and the salvageable materials are utilized in the production of new small pipes. This alternative will also be explored as part of the recycling or reuse process for the pipe waste
5. All excavated material will be utilized for backfilling and related construction activities.
6. Domestic waste from the camp will be disposed to the nearest SSWMB waste disposal bin.

5.3.9 Untreated Disposal of Effluent from Worker Camp

a) Impacts

1. The project's construction camp will be a source for the generation of domestic effluent from the toilets, washrooms and the kitchen area.

b) Mitigation Measures

1. The Contractor will ensure that no untreated effluent is released. A closed sewage treatment scheme including soak pits and septic tanks will be constructed to treat the effluent from the construction/labor camp.
2. Soak pits will be built in absorbent soil and shall be located 300 m away from any nearby water well, boring or hand pump.
3. It shall be ensured that the soak pits remain covered all the time and measures are taken to prevent entry of rainwater into them.
4. In case the septic tank gets filled with sludge, it shall be emptied through vacuum truck and after getting approval from KWSC, the removed effluent will be transferred to the approved municipal drain.

5.3.10 Climate Change

a) Impacts

There are chances that the open trenches may get flooded during the rainy season. Flooding and heat waves can hamper the construction activity. Furthermore, rise in temperature will affect the health and efficiency of the workers. Workers may face heat strokes.

b) Mitigation Measures

- The construction methodology should be adopted to withstand extreme weather conditions.
    - Hydration: Workers will be encouraged to drink cool water regularly, even before feeling thirsty. Electrolyte-rich beverages may also be provided to replenish lost minerals.
    - Shade and Rest Breaks: Scheduled breaks will be provided in shaded or cooler areas, allowing workers time to rest and cool down during peak heat hours.

- Appropriate Clothing: Workers will be provided with loose-fitting, lightweight clothing that covers the skin for protection yet allows ventilation. Wide-brimmed hats may also be provided for additional protection from direct sun exposure.
- Education and Training: Comprehensive training sessions will be conducted to educate workers on heat-related illness symptoms and the importance of recognizing signs of heat exhaustion or heat stroke.
- Work Scheduling: Tasks requiring physical exertion will be scheduled during cooler periods of the day whenever feasible. Work hours will be adjusted to minimize prolonged exposure to extreme heat, particularly during heatwaves or high-temperature periods.•;

5.3.11 Soil Contamination

c) Impacts

During the construction phase, spills of fuel, lubricants and chemicals can take place while transferring from one container to another or during refueling. Spills could also occur during maintenance of equipment and vehicles or through leakages from static equipment, vehicles and power generators. Depending on the quantity of spill, the soil can get contaminated.

d) Mitigation Measures

1. The Contractor will ensure that all the construction vehicles, equipment and power generators are properly maintained and there are no leakages from their engines and mechanical / moving parts.
2. It will be ensured that trays are provided and used during refueling, maintenance of construction vehicles / equipment and under the parked vehicles and equipment if there are any leakages.
3. Fuels, lubricants and chemicals will be stored in covered bounded areas, underlain with impervious lining. Static Power Generators will also be placed at impervious floors bunded with parapet walls.

5.3.12 Improper Site Restoration

a) Impacts

In case the temporary sites such as Campsites are not restored in appropriate manner, the area will not regain its value and function and the sites could lead to nuisance to the public and users due to damaged site conditions, debris, dismantled material, spoils, excess construction materials, oil spills etc.

b) Mitigation Measures

The Contractor will have a full and rigorous program for closing up and removing temporary facilities as well as for cleaning up and/or restoring the sites occupied on temporary basis. The facilities to be used in the construction stage that will be dismantled are the camp and workshops. Site restoration will involve the following:

1. Dismantling and full removal of worksite facilities and camp, including contractor offices, staff and workers' accommodation, machinery yard, warehouses, store rooms, maintenance shops,

drinking water utilities, vehicle parking areas, temporary materials stockpiling enclosures, sewage network and toilets etc.

2. Ground cleaning will be done by removing all the affected topsoil and handing it over to authorized waste handlers.
3. Addition of topsoil where necessary.

5.3.13 Community Health & Safety

a) Impacts

General public may become susceptible to following health and safety risks during construction activities:

- Unprotected trenches and excavations could pose a significant hazard to the communities.
- Other nuisance that the communities could face include emissions of dust and higher noise levels due to the movement of construction vehicles.

b) Mitigation Measures

1. Contractor will prepare Community Health and Safety Plan based on construction methods, site specific hazards and framework presented in **Annexure 5-1.**
2. All the trenches and excavations will be protected with barriers especially at locations nearby communities.
3. Warning signs will be installed at all the prominent locations especially in those areas where residential / commercial settlements are in proximity.
4. Excavated material shall not be piled next to the trenches and excavations and removed from the site on frequent basis.
5. Adequate lighting will be installed at excavated areas and trenches to keep them well-lit and prominent during night.
6. Contractor will ensure setting up of its machinery on the roads for construction works in such way that it will not hinder the public traffic to the maximum possible extent and will not compromise the public safety.
7. Contractor shall ensure that all the vehicle drivers and equipment operators have valid licenses and proven competency to safely operate vehicles and equipment in public areas.
8. Excavators and dumper trucks will be provided with trained banksmen / marshaller to supervise safe movement during excavation activities.
9. Vehicular speeds shall be kept at minimum during movement.
10. Following measures shall be adopted for minimizing the nuisance caused by dust and noise to the public:

- Use of noise suppression on equipment;
- Water sprinkling for dust suppression;
- Carrying out major work activities having potential of higher noise generation in day time only.

5.3.14 Labor Influx / SEA – SH – GBV Incidents

a) Impacts

1. Influx of workers at project sites may pose a threat of communicable diseases, most common are HIV/AIDs (Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (AIDS), COVID- 19, tuberculosis, pulmonary infections, typhoid, cholera and dysentery, malaria, rabies and other skin disease, hepatitis A, B and C, in case of not complying with adequate control measures.
2. The influx of labor, seeking construction jobs can be associated with a series of social challenges such as crime, illegal drug abuse etc.
3. Many of the skilled labor employed from outside the project area may cause some antipathy among the local people and outsiders.

b) Mitigation Measures

1. The contractor will employ more locals in skilled, semi-skilled, and unskilled work. ;
2. The contractor will proactively manage the potential impacts from labor influx and potential cultural conflicts between local communities and workers, which include following:

- Construction camp will be built at the designated areas;
- Inclusion of COC obligations and the applicable legislation in the contracts of all employees and workers with the provision of sanctions and penalties in case of violations;

3. Contractor shall ensure that project staff will receive training on the prevention of Sexual Exploitation Abuse (SEA), Gender Based Violence (GBV) / Sexual Harassment (SH).
4. Construction crew will avoid entering settlements.
5. The Contractor shall raise awareness of the risks among community members and local health authorities and inform them about available grievance mechanisms.
6. The routes/places used by the women will be avoided as far as possible. If unavoidable, alternate routes will be identified for the communities.
7. Any violation of the COC will lead to strict punishment including termination of employment;
8. The use of drugs and alcohol will not be allowed at the work/construction site;
9. Carrying weapons into the workplace premises will be prohibited;
10. Site security arrangements will be ensured in line with Security Management Guidelines for Contractors are attached as **Annexure 5-3**.
11. Appropriate fencing, security check points, gates and security guards will be provided at the construction sites to record entry and exit of workers, staff and visitors;
12. The Contractor will ensure that good relations are maintained with local communities.

5.3.15 Construction Traffic Management and Safety

a) Impacts

Movement of construction traffic could cause temporary nuisance to public in the vicinity of project construction area.

b) Mitigation Measures

The Contractor shall implement the following measures for effectively managing the construction traffic and public safety:

- Traffic Management Plan shall be prepared as per the guidance provided under **Annexure 7-2** before taking up any construction work and shall be implemented after getting approved from the PIU / CSC.
- Barricades, signs, markings, flags, lights and flagmen shall be deployed at key spots.
- The flagmen shall be trained for traffic management and equipped with red and green flags and lights.
- Emergency response plan will be prepared for any traffic accident during construction following **Annexure 7-2**.
- In case of community related accident, compensation shall be paid in accordance with Fatal Accidents Act 1855.

5.3.16 Vegetation Loss and Disturbance to Fauna

a) Impacts

1. Total 24 Lignum trees exist along the route. No trees will need to be cut for the construction work. Various grass species, primarily phragmites as listed in the following table, will be cleared from areas above the OPM where water leakage is occurring. It's worth noting that these grasses are commonly found in the natural environment, and their removal will not harm the environment.
2. Specific further mitigations to save Lignum trees from any harm along the route are as follows:
    a. Protective Barriers: Erecting physical barriers around the trees will establish a safety zone, preventing accidental damage from construction equipment or vehicular movement.
    b. Designated Exclusion Zones: Clearly demarcate exclusion zones with prominent signage to ensure workers and machinery maintain a safe distance from the trees, minimizing the risk of impact or damage.
    c. Regular Monitoring: Assigning dedicated personnel for routine inspections throughout the construction phase will enable early detection of any signs of stress or damage, allowing for immediate intervention if required.
    d. Educational Awareness: Conducting training sessions for project workers and contractors will raise awareness about the trees' significance and outline specific procedures to avoid any harm.
    e. Specialized Care: Employing arborists or tree care experts to assess the trees' health before and after construction will enable tailored care measures such as pruning, watering, or protective coatings if needed.
3. No tree cutting will be required for project activities. General vegetation such as grasses may need to be cleared. These grasses are commonly found in the natural environment, and their removal will not harm the environment.
4. Faunal species as detailed under **Section 4.2.2** may be encountered during clearance of vegetation and earth excavation, and may get disturbed due to construction activities, however,

no significant impacts are expected on recorded faunal species as these can be naturally dispersed easily from one habitat to the other during construction activities.

b) Mitigation Measures

1. For trees, all precautions shall be taken to protect them from any damage from construction activities.
2. While clearing vegetation and excavation it shall be ensured that no wildlife get injured or killed.
3. Construction work that may generate high noise levels shall be avoided during night time as far as possible to prevent local birds and fauna from disturbance;
4. Workers shall be provided with adequate knowledge regarding protection of flora and fauna, and relevant government regulations.

5.3.17 Stakeholders Concerns and Engagement

a) Impacts

The identified stakeholders may have different types of stakes associated with various aspects of the project depending on their professions, affiliations and involvements. All the institutional stakeholders including SEPA and utilities will be consulted.

b) Mitigation Measures

1. PIU, CSC and Contractor to ensure public consultations and participation of stakeholders including men. women and vulnerable groups from surrounding communities and key institutional stakeholders throughout the project lifecycle. This would ensure that concerns about the impacts of the project are addressed at the right time.
2. Stakeholder engagement to be carried out in a meaningful and inclusive way, providing access to remedy.
3. Periodic environmental monitoring reports will be submitted to SEPA as per the requirement of approved IEE.

5.4 Operational Phase Impacts

5.4.1 OHS Risks Associated with Maintenance & Repair

a) Impacts

Deterioration wear & tear would be caused with the passage of time that requires regular maintenance. Workers dealing with the maintenance activities during the operational phase may face health and safety risks if proper safety measures are not followed.

b) Mitigation Measures

Regular repair and maintenance especially during monsoon to address wear and tear issues will be required by the KW&SC staff.

Workers will be provided with PPEs during routine maintenance activities. Trainings will be conducted for the work practices and use of equipment.

6 Analysis of Alternatives

6.1 No Project Alternatives

If 'no project' option is triggered, it will result in loss of all positive impacts that project will pose on Karachi city; such as leakage free bulk water supply and improved water supply infrastructure.

Furthermore, project implementation will also create job opportunities during construction and operational phases, thereby improving the socioeconomic condition of the local people and help in improving their quality of life. Thus, the 'no project' option is not a viable option.

6.2 Site / Location Alternatives

No site / location alternatives have been proposed by the Technical Consultants as the project mainly involves replacement of existing bulk water supply within the KWSC RoW. •

6.3 Pipe Laying Method Selection

Trenchless Technology is being used worldwide for rehabilitation of old MS waterlines & RCC sewer as well as for laying of new lines. Cured-in-Place Pipe (CIPP) technology is being used for rehabilitation of MS water lines up to a diameter of 800 mm by insertion of a liner in the host pipes, with resin. This technology is also being extensively used for RCC sewers, in the developed countries. However, no evidence of using this technology for rehabilitation of PRCC waterlines has been found. In Pakistan CIPP technology has not been introduced as yet.

Water mains in Karachi are laid with a usual cover of two meters as most of the trunk mains perform under gravitational flow. The basic requirement of using Micro- tunnelling technology is that the overburden soil shouldn't be less than thrice the size of the pipe, that too if the soil conditions are favourable. The feasibility of using micro tunnelling for laying large diameter water trunk mains at shallow depth has been ruled out by the Technical Consultants subject expert after having thorough discussions with leading local firms dealing in trench less technology.

6.4 Selection of Suitable Pipe Material for Large Diameter Water Mains

Currently three types of pipes material are in common use for large diameter pressurised water mains.

- Spirally welded Mild Steel pipes
- HDPE pipes
- GRP pipes

Spirally welded pipes with internal CC (Concrete Channel) protective lining and external coating have been extensively used in Karachi for Bulk Water Transmission system including the rising mains. There is no issue in availability of local skilled staff to install and maintain MS pipes. MS Pipes up to 10ft diameter can be manufactured in Karachi. HDPE pipes can be manufactured up to 1600 mm outer diameter in Pakistan. Capex of HDPE pipe is lesser than MS pipe, however, its fittings are imported and are highly expensive. In view of the fact that the waterlines in Karachi are quite often

punctured for taking illegal connections and its difficult repairing techniques HDPE pipe is not recommended for large size water trunk mains in Karachi. Use of GRP pipes for water mains is not recommended keeping in view the skills required for its laying and its disadvantages with respect to its repair and local conditions in Karachi where puncturing of water mains for water theft is a serious issue. MS pipe with internal CC lining and outer protective coating has been proposed

7 Environmental and Social Management Plan

This chapter describes how the identified impacts and risks (refer to **Chapters 5**) will be managed, with mitigation and enhancement measures as well as monitoring. Mitigation and enhancement measures are collated and expanded upon in the Environmental and Social Management Plan (ESMP). The ESMP is organized by management plans, institutional setup, capacity building and training, and presents key monitoring and performance indicators.

The following sections present management measures and monitoring requirements for the impacts and risks.

7.1 Contractors Qualification

It will be ensured that all contractors procured under the Project be compliant with International Standards Organization (ISO) 9001 Quality Management, ISO 14001 Environmental Management and ISO45001 Occupational Health and Safety Management. These will be done by PIU-KWSSIP imposing the requirements of ISO certifications during prequalification or technical evaluation of contractors. In addition, all subcontractors under the major contractors will also be subject to ISO 14001 and ISO45001 audit provisions by the main Contractor during the course of the project.

The ESMP of the Project along with the ECPs and occupational hazards and risks will be included in the contractors' bid documents. The technical specifications of the bid documents will clearly state that contractor will need to comply with the mitigation and control measures provided in the ESMP, ECPs, OHS Plan, World Bank Group (WBG) EHS General Guidelines, WBG/WHO Air, Water, Noise Standards and SEQS.

7.2 Inclusion of ESHS Conditions in the Bidding Documents

In order to make Contractors fully aware and responsible for ensuring ESHS compliance, following conditions in particular and all other relevant conditions in line with 'WB – Procurement of Works & User's Guide – Updated January 2017, shall be made part of the bidding documents:

1. The Contractor will obtain (at its cost) an Environmental, Social, Safety and Health (ESHS) Performance Security for compliance with the Contractor's ESHS obligations.
2. The Contractor will be required to declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, or social, or health or safety requirements or safeguard or related to sexual exploitation and abuse and gender-based violence in the past five years.
3. The Contractor will submit comprehensive and concise Environmental, Social, Health and Safety Management Strategies and Implementation Plans (ESHS-MSIP) which includes but not limited to; Mobilization strategy, Strategy for obtaining consents/permits, Traffic management plan, Water resource protection plan, Bio-diversity protection plan and a Strategy for marking and respecting work site boundaries etc.

4. The Contractor will be required to ensure compliance of 'Code of Conduct' that should be signed by each Contractor's employee / workers. The issues to be addressed in the Code of Conduct shall include the following:
    - Compliance with applicable laws, rules, and regulations of the jurisdiction
    - Compliance with applicable health and safety requirements (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)
    - The use of illegal substances
    - Non-Discrimination (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction)
    - Interactions with community members (for example to convey an attitude of respect and non-discrimination)
    - Sexual harassment (for example to prohibit use of language or behaviour, in particular towards women or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
    - Violence or exploitation (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading or exploitative behaviour)
    - Protection of children (including prohibitions against abuse, defilement, or otherwise unacceptable behaviour with children, limiting interactions with children, and ensuring their safety in project areas)
    - Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
    - Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favours, are not provided to any person with whom there is a financial, family, or personal connection)
    - Respecting reasonable work instructions (including regarding environmental and social norms)
    - Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
    - Duty to report violations of this Code
    - Non retaliation against workers who report violations of the Code, if that report is made in good faith.
5. Payments to contractors will be linked to environmental, health and safety performance, measured by completion of the prescribed environmental and social mitigation measures in the SSESMP and control measures described in the OHS and CHS plans.
6. In addition, for any non-compliance causing damages or material harm to the natural environment, workers, public or private property or resources, the Contractor will be required to either remediate / rectify or compensate for any such damages in a timeframe specified by and agreed with the engineer (CSC).

7. For repeated non-compliance the Contractor will be penalized. The penalty of non- compliance of the requirements of the SSESMP and OHS / CHS Plan will be deducted in the Instruction of Payment Certificate (IPC). The penalty will be imposed after all contractual instruments are applied and a Non-compliance Report (NCR) is issued by the Engineer. PIU shall determine the amount of penalties in consultation with the CSC Contract Management Specialist and shall include the penalties costs in the Bidding and Contract Documents.

7.3 Criteria for the Selection of Sub-Contractors

The Contractor shall ensure that following criteria is followed for the selection of any sub-contractor, to make sure their ability of implementing ESHS requirements:

- WB OPs Requirements apply to main Contractor and hired Sub-contractors.
- Sub-contractor needs 5 years of ESHS management experience.
- Sub-contractor must provide:
- Company information and structure.
- List of manpower with CVs of key personnel.
- List of plant and machinery with manufacturing years.
- Support agencies, facilities, and resources.
- Details of similar projects in the last 5 years.
- Project planning and execution methodology.
- Current commitments and projects of similar magnitude.
- Experience in similar projects.
- EHS policy, safety manual, and statistics for 2 years.
- Quality assurance and control practices.
- Financial performance documents for the last 5 years.
- Documents supporting HSEQ performance.
- Employee insurance and medical evaluation policy.
- Sub-contractor performance management and monitoring.
- Safety and security evaluation policy.
- Copies of ISO 9001, 14001, OHSAS 18001, or other certifications

7.4 Various Mitigation and Control Measures

The ESMP includes different types of mitigation and control measures and guidelines for managing environmental, health, safety and social impacts and risks in the form of:

(i) General and non-site-specific measures in the form of Environmental and Social Codes of Practices (ECPs) presented in **Annexure 7-1** to address general construction matters identified in **Chapter 5**.

(ii) Specific mitigation measures as presented in **Chapter 5**;

(iii) Guidelines for making project and site-specific plans as **Annexure 7-2**.

7.5 Environmental and Social Code of Practices for Construction

The environmental and social codes of practice (ECPs) are generic, non-site-specific guidelines for the construction phase. The ECPs consist of environmental and social management guidelines and OHS practices to be followed by the contractors for sustainable management of all environmental, social, health and safety issues. The ECPs are listed below and details are presented in **Annexure 7-1**.

- ECP 1: Waste Management
- ECP 2: Fuels and Hazardous Goods Management
- ECP 3: Water Resources Management
- ECP 4: Drainage Management
- ECP 5: Air Quality Management
- ECP 6: Noise and Vibration Management
- ECP 7: Protection of Flora
- ECP 8: Protection of Fauna
- ECP 9: Road Transport and Road Traffic Management
- ECP 10: Construction Camp Management
- ECP 11: Worker Health and Safety

7.6 Site Specific Environmental and Social Management Plan

The Contractor will prepare a– Site Specific Environment and Social Management Plan (SSESMP) demonstrating the manner in which they will comply with the requirements of Site-Specific Management Plans, ECPs and the mitigation measures proposed in this ESMP Report. The SSESMP will be submitted before the start of any construction activities and be approved by the Engineer. The SSESMP will form the part of the contract documents and will be used as monitoring tool for compliance. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing penalty on the contractor.

7.7 Occupational Health and Safety Plan

The Contractor will also prepare an occupational health and safety plan for managing the identified hazards and control measures. The OHS shall comply with World Bank General Environmental Health and Safety Guidelines, WB Health & Safety Framework South Asia Region (SAR); Sindh Occupational Safety and Health Act, 2017, Sindh Labour Acts, ILO Code of Practices 1992 and Good International Industry Practices (GIIP) . Review and update of the OHS plan will be done;

- When there is a change in the scope of construction methodology/technique based on site condition,

- Following significant OHS hazard or a major accident, and
- At the end of the Project (to allow for improvements in subsequent projects).

7.7.1 Job Hazard Analysis

Job Hazard Analysis (JHA) is essential for identifying and mitigating construction hazards. It focuses on worker-task-tool-environment relationships and aims to preemptively address hazards. The hierarchy of control (elimination, substitution, engineering, administrative, and PPE) should be applied to minimize risks. JHA is a crucial part of Contractor's health and safety management, especially for high-risk jobs, those with potential for severe injuries, tasks prone to human errors, new/complex jobs, or those needing written instructions. It plays a key role in preventing worksite injuries and fatalities

7.7.2 EHS in Method Statement

The Contractor will incorporate an EHS (Environment, Health, and Safety) Chapter into each Method Statement. This section will be informed by the Job Hazard Analysis (JHA), the Occupational Health and Safety (OHS) Plan, and site-specific environmental considerations. The EHS portion will undergo review and approval by the EHS Specialists from the Engineer/Construction Supervision Consultant (CSC), alongside technical assessments by the engineering team of the CSC. Any revisions to the method statement will also require EHS Specialist review and approval.

7.7.3 Site Engineer’s EHS Oversight

EHS (Environment, Health, and Safety) will be a significant responsibility for site engineers. A training program overseen by the Construction Supervision Consultant (CSC) will be conducted by EHS specialists. The training will emphasize that engineers should:

Take on greater EHS responsibility as part of their daily work.

Review and approve site readiness according to design specifications, ensuring compliance with Method Statements and withholding funds for non-compliance.

Impose financial penalties on Contractors for EHS non-compliance.

Help workers understand and implement eco-friendly and safe practices to protect the environment and worker health and safety, reducing the risk of illnesses, injuries, and fatalities during construction

7.8 Institutional Arrangements

The institutional requirements for the Construction and O&M phases of the proposed project are provided in below sections:

7.8.1 Institutional Arrangements for Implementation of ESMP during Construction Phase

The institutional arrangement for the implementation of ESMP for the subproject is presented in **Figure 7-1**. The PIU-KWSSIP will be responsible for the compliance of environmental and social safeguard requirements of the KWSSIP.

The project activities will be monitored and managed by the PIU-KWSSIP. The Environmental and Social Cell (ESC) staffed by qualified environmental, social and gender specialists have already been established under PIU-KWSSIP. The Environmental & Social Cell (ESC) will be the custodian of the ESMP. ESC will submit progress reports for the implementation of the ESMP to WB and Sindh Environmental Protection Agency (SEPA) as per environmental approval/NOC conditions and requirements mentioned under **Section 7.12** for the KWSSIP.

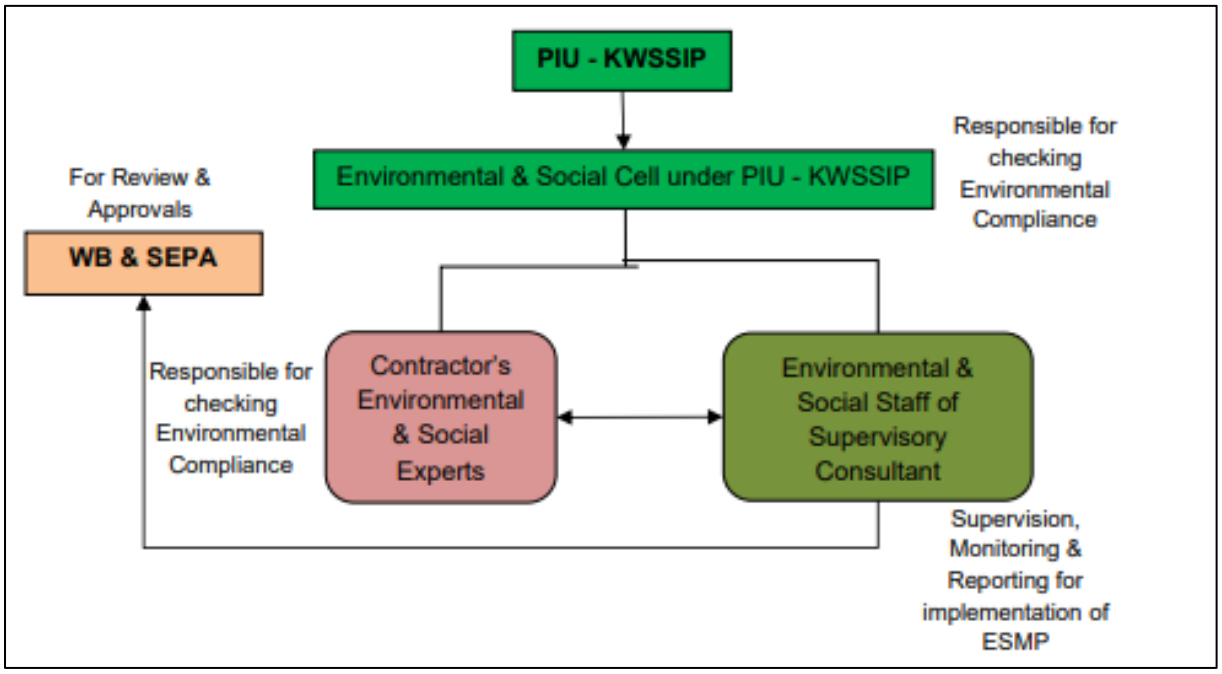


Figure 7-1: Organizational Setup for Implementation of ESMP at Construction Phase

7.8.2 Roles and Responsibilities

a) SEPA

In accordance with the Sindh Environmental Protection Act, 2014, SEPA holds the responsibility for approving Environmental Assessment reports. Additionally, Environmental monitoring reports, as mandated by SEPA, will be duly submitted for regulatory compliance.

b) PIU-KWSSIP

PIU-KWSSIP and ESC

The Project Director of PIU-KWSSIP is in-charge for the financial and technical matters related to KWSSIP project.

a) Environment and Social Cell (ESC)

An ESC has already been established in PIU, which consists of three specialists – one environment specialist, one social safeguard specialist and a gender specialist. The PIU will hire the services of independent environmental and social consultancy firm for Third Party Validation (TPV). The PIU responsibilities for monitoring the ESMMP will consist of:

Environmental Specialist

- Ensuring that the required environmental trainings are provided to the concerned PIU staff;
- To carrying out random visits to the construction sites to review the environmental performance of the Contractor;
- Review monitoring reports for the progress of environment and social management of the Project;
- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental and social monitoring reports;
- Maintaining interface with the other line departments/ stakeholders; and
- Reporting to the SEPA on status of ESMMP implementation.
- Make sure that all the contractual obligations related to the environmental and social compliance are met;
- Monitor the progress regarding implementation of environmental safeguards as provided in the ESMMP;
- Oversee the compliance of all the monitoring programs as given in ESMMP;
- Check randomly whether monitoring of the environmental aspects of the Project during construction and operational phases is being properly carried out;
- Document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports, and make follow-up on these actions to ensure progress toward the desired outcomes;
- Make sure that the Contractor implements the additional measures suggested by the monitoring and evaluation (M&E) Contractor; and
- Report the status of ESMMP compliance to Project Director, PIU-KWSSIP.

Social Development Specialist

- Ensure the required trainings on community engagement, community health and safety and other social safeguards compliance are imparted to the Project Management and Contractors work force
- Monitor the progress regarding implementation of social safeguards as provided in the ESMMP;
- Oversee the compliance of all the social monitoring programs as given in ESMMP;
- Review the progress monitoring reports for the social management of the Project;
- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental and social monitoring reports;
- Maintaining interface with the other line departments/ stakeholders;
- Ensure adequate site-level arrangements for GRM and dedicated and training work force for identifying, recording and monitoring complaints
- Monitor the complaints registration process under GRM and suggest corrective actions as necessary;
- Conduct periodic consultations with the primary stakeholders

Gender Specialist

- Resolve any GBV and SEA/SH related issues reported;
- Monitor the compliance of gender related measures;
- Oversee the gender issues reported through GRM.

c) Construction Supervision Consultants (CSC)

PIU will engage construction supervision consultants (CSC) for the proposed project The CSC will conduct day to day monitoring by conducting site visits/ inspections for ESMP implementation and prepare monthly monitoring reports for each site and submit to ESC. The ESC will review the report, discuss with the CSC and finalize the findings. In case of noncompliance from the contractors, the CSC will have the authority to halt the construction activities or impose penalties as per the contract conditions. The CSC will submit the final version of monitoring and evaluation reports to PIU as per periodic reporting mechanism (defined later in the document). PIU will submit these reports to WB for their review and further action. Also, these reports will be submitted to SEPA as per the frequency to be mentioned in the construction phase 'Environmental Approval' requirements. Roles and responsibilities of CSC will be:

- Review and approve the contractor's management plans;
- To oversee and supervise the performance of the Contractor to make sure that the Contractor(s) is complying with ESMP;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner;
- Maintain close coordination with the Contractor and ESC;
- Preparing training materials and implementing training programs;
- Ensure the implementation of the mitigation measures suggested in ESMP;
- To supervise and monitor environmental and social activities being performed at site and issue NCRs where non-compliance is reported;
- To organize periodic environmental and social training programs and workshops for the consultant's and contractor's staff;
- Periodic reporting as mentioned in ESMP; and
- Suggest any additional mitigation measures (if required).

E&S team of CSC of the proposed project will be based in Karachi and consist of the following personnel:

- Environmental Specialist (one specialist – M.Sc. in Environmental Engineering/ Environmental Sciences with 10 years of professional experience, worked on at least one implementation project SC)

- OHS Specialist (one specialist – M.Sc. in Environmental Engineering/ Sciences with OHS Certification,10 years of professional experience, worked on at least one implementation project as OHS - SC)
- OHS Inspector (Bachelors Degree in relevant Field) with OHS Certification, 5 years of professional experience, worked on at least one implementation project as OHS - SC)
- Social Safeguard Specialist (one specialist – Master's Degree in Sociology or related field with 10 years of professional experience, worked on at least one implementation project SC)
- Gender Specialist (one specialist – Masters in Sociology, Gender Study or equivalent with 10 years of professional experience, worked on at least one implementation project SC)

d) Construction Contractor

- Contractors must appoint qualified Environmental and Social Team members with experience of working in Karachi
- They will be responsible for implementing ESMP mitigation measures, with costs included in the project budget.
- Non-compliance results in payment deductions.

Contractors must also:

- Follow contract provisions and COVID-19 SOPs.
- Ensure OHS measures and training.
- Address site-specific issues.
- Create site-specific ESMP for approval.

Contractor team requires:

- EHS Specialist (5 years' experience)
- Social Safeguard and Gender Specialist (5 years' experience)
- Three First Aiders (2 years' experience)

Required qualifications for above staff is as follows:

- EHS Specialist (one specialist) – B.Sc. in Environmental Engineering with OHS Certification with 5 years of professional experience in project implementation)
- Social Safeguard Specialist (one specialist) – Masters in Sociology with 05 years of professional experience in project implementation)
- First Aiders (three) – Valid certificate in first-aid and emergency medical treatment with 2 years of professional experience

7.9 Environmental and Social Management and Monitoring Plan (ESMMP)

The ESMMP includes mitigation, safety inspections, and audit plans, built on impact and risk assessments from Chapter 5. It addresses potential negative ESHS impacts and risks during pre-

construction and construction, offering prevention measures and assigning responsibilities for implementation and monitoring.

The E&S Mitigation Plans are provided as **Table 7-1**, **Table 7-2** and **Table 7-3**. Contractor will make sure that they present the implementation status of mitigation and preventive measures identified in these Tables in every monthly reports, with quantifiable information. Guidelines for the preparation of various project specific plans as required by the following tables are separately prepared and attached as **Annexure 7-2**.

Table 7-1: Environmental and Social Mitigation Plan for Pre-Construction Phase

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
Permits, NOCs, Clearances	Necessary consents, permits, and clearances to be obtained before the start of civil works. Permissions and clearances are required mainly from the government agencies including; Sindh Environmental Protection Agency (SEPA), National Highway Authority (NHA) and District Administration – Malir and Korangi.	Pre-Construction Phase	◆ Completion of ESMP Approval Process in line with Review of SEPA IEE/EIA Regulations 2021 ◆ Writing formal letters from PD-KWSSIP to the identified departments for taking necessary permits, consents and approvals.	◆ PIU, CSC and Contractor
Lack of appropriate E&S personnel with CSC and Contractors	◆ PIU to hire qualified CSC and Contractors able to implement the Project's Environmental, Social, Health and Safety requirements. ◆ Education, qualification and experience requirements of personnel (**Section 7.8.2**) shall be included in the bidding documents. ◆ Contractors with poor environmental, health, and safety management shall not be hired. ◆ Contractor's qualifications as stated in this ESMP will be included as the pre-qualification criteria in the short-listing process. ◆ Conditions of the ESMP will be correctly reflected in the contractor's bidding documents and the supervision consultant's	Pre-Construction Phase / Before Start of Construction Activities	◆ Bidding and Contract Documents ◆ ESMP, SSESMP, OHS / CHS and Other Plans	◆ CSC's Selection: PIU ◆ Contractor's Selection: PIU & CSC ◆ Preparation of Plans: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	TOR. ◆ Inclusion of ESMP in the bidding documents. ◆ Necessary funds will be allocated in the Contract documents for ESMP implementation and monitoring, as per indicative costs provided in **Section 7.13** of this report.			
Inappropriate Planning for Traffic Management	◆ Contractor shall conduct traffic impact assessments to plan traffic management to minimize disturbance of vehicular traffic and pedestrians. ◆ Access arrangements for vehicles accessing the project area will be formulated. ◆ PIU / CSC / Contractors in collaboration with Sindh Traffic Police will devise a Traffic Management Plan (TMP) as per the guidelines provided in **Annexure 7-2**. TMP will be approved by the PIU. ◆ Works shall not commence until the PIU obtains necessary permissions from relevant authorities such as Korangi and Malir DMCs. ◆ Implementation of: ◆ ECP 9: Road Transport and Road Traffic Management	Pre-Construction Phase / Before Start of Construction Activities	Preparation and Implementation of Traffic Management and Diversion Plan (TMDP), ECP 9: Road Transport and Road Traffic Management	◆ Preparation of TMDP: PIU / CSC / Contractor / Sindh Traffic Police ◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ESC
Improper Location of Worker Camp Leading	◆ The worker camps shall be developed at the identified campsite location, and ancillary	Pre-Construction Phase / Before Start of	Establishment of Campsites at proposed locations and	◆ Preparation and Implementation of

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
to Environmental and Social Issues	facilities 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, will be provided. ◆ The contractor, in collaboration with the PIU / CSC, will establish strict protocols for interaction with local communities. ◆ The contractor will ensure that workers adhere to labor standards, including Provincial Labor Laws and ILO Standards for work hours, worker's payments & compensations, while the PIU shall oversee their adherence. ◆ The contractor will prepare a Workers Camp Management Plan (CMP) and ensure its effective implementation. Guidelines for the preparation of these plans are provided in **Annexure 7-2**. ◆ Labor Management Procedures (LMP) will be implemented by the contractor in letter and spirit. ◆ Other necessary measures include the contractor developing a Code of Conduct (COC) for all site personnel. All site personnel will be required to sign this COC	Construction Activities	implementation of Labor Management Procedures (LMP); ECP 10: Construction Camp Management	LMP: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU SDS

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	and abide by it. ◆ The contractor will ensure that project staff receive training on the prevention of Sexual Exploitation, GBV / SH. ◆ The construction crew, under the direction of the contractor, will avoid entering settlements. ◆ Provisions related to SEA/SH/GBV will be incorporated in the bidding document by the contractor. ◆ The contractor will raise awareness of the risks among community members and local health authorities and inform them about available grievance mechanisms. ◆ The routes/places used by women will be avoided as far as possible by the contractor. If unavoidable, alternate routes will be identified for the communities. ◆ The contractor shall conduct induction training or workshops to introduce the basics of health and hygiene and the necessary preventive measures against diseases. ◆ The contractor will ensure necessary medical screening of all workers and staff and submission of proof of vaccination (COVID-19) prior to any employment.			

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	◆ Workers will be provided with trainings on the Worker's GRM by the contractor so that they know their rights and responsibilities. ◆ Availability of a complaint box shall be ensured at all work sites by the contractor. ◆ The implementation of ECP 10: Construction Camp Management will be the responsibility of the contractor.			
Material Selection	◆ Conduct a thorough corrosion risk assessment based on environmental conditions and selection of appropriate pipe material as MS pipe is chosen to replace old pipe of PRCC. ◆ Selection of impermeable material for joint sealing to resist water and ageing	Pre-Construction Phase / During Design	Selection of appropriate material during the design period	◆ Design Consultant and PIU

Table 7-2: Environmental and Social Mitigation Plan for Construction Phase

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
Inadequate Implementation of ESMP, OHS, CHS and Other Specific Plans.	◆ The CSC and Contractor will recruit qualified and experienced Environment, Health, Safety and Social Staff in line with the requirements mentioned in **Section 7.8.2**. ◆ Contractor to define Environmental, Social, Occupational & Community Health and Safety procedures for all works in method statements, and shall prepare and implement Site Specific Environmental Social Management Plan (SSESMP), OHS Plan, CHS Plan and other required plans based on the ESMP guideline. These procedures and plans shall be approved by the PIU and CSC before the Contractor commences any physical works on ground. ◆ PIU - KWSSIP shall review the Contractor's capacity with respect to safeguard management. Contractors not possessing the required capacity for E&S safeguards management will not be pre-qualified.	Throughout Construction Phase	ESMP, OHS, CHS and Other Specific Plans.	◆ Contractor's selection: PIU Procurement Specialist, Environment and Social Cell (ESC) and CSC ◆ Preparation / Implementation of plans: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ESC
Occupational Health & Safety / Emergency Preparedness and Response	◆ Contractor to prepare Occupational Health and Safety (OHS) Management Plan in accordance with proposed WB Health and Safety Plan **(Annexure 5-1)** ◆ Contractor shall prepare an emergency preparedness and response plan (EPRP) as part of	Throughout Construction Phase	Implementation of OHS Management Plan, Emergency Preparedness and Response Plan, ECP 11: Workers Health	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ESC

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	the OHS Plan to contain larger emergencies. (sample EPRP **Annexure – 7-2**) ◆ PIU will work with the national / provincial emergency response services to ensure any external emergency response arrangements (Fire, Ambulance, Epidemic Control etc.), if the resources available with the Contractor are not sufficient to contain any such emergencies. ◆ At every workplace, a readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital. ◆ At every workplace and construction camp, proper equipment and paramedical staff will be provided. ◆ The Contractor will maintain site safety and install hard barricading, flexible green net, signboards, temporary safety and traffic diversions throughout the construction period and provide personal protective equipment (PPE) to all the workers working at the construction sites. ◆ Zero tolerance to loss of life policy shall be developed and implemented by the Contractor. ◆ Contractor will ensure organization of Health and Safety trainings for all site personnel throughout the construction period.		and Safety	◆ Coordination with National / Provincial Emergency Response Services: PIU

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	◆ In case accident in the form of injury or fatality affects any workers, they or their legal heirs will be compensated by following Sindh Workers Compensation Act, 2015. ◆ Implement specific mitigation guidelines provided in **Annexure 7-2** Implementation of ECP 11: Workers Health and Safety			
Communicable Diseases - COVID- 19 and Camp Management	◆ Implementation of health and safety protocols on COVID19 i.e. Health & Safety of Building and Construction Workers - Issued by Ministry of National Health Services, Regulations and Coordination, GoP - April, 2020 (**Annexure 7-2 Section 4**). ◆ Awareness among workers will be created on proper sanitation and hygiene practices; ◆ Good housekeeping practices will be maintained at camp and project sites; ◆ Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water; ◆ Arrangements will be made to treat the affected workers on time to control the movement of vectors diseases; ◆ Implementation of Camp Management Plan and Labor Management Procedures (LMP). ◆ Use of non-wood fuel for cooking;	Throughout Construction Phase	Implementation of COVID19 Guidelines - Health & Safety of Building and Construction Workers, Workers Code of Conduct (CoC), CMP, LMP.	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ESC

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	◆ Contractor shall implement ECP 10: Construction Camp Management ◆ Cleaning staff shall be appointed for maintaining cleanliness at Campsites.			
Employment of Child Labor	◆ Implementation of Sindh Prohibition of Employment of Children Act, 2017; ◆ No child having age below 18 shall be allowed to be employed in any construction work by the – construction contractors, sub-contractors and any service providers. ◆ Contractor will ensure that all persons at site are adults and have their government issued identity card with them.	Throughout Construction Phase	Implementation of Sindh Prohibition of Employment of Children Act, 2017	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU SDS
Dust Emissions	◆ Immediate removal of excavated material will be ensured to avoid its emission and runoff. ◆ Water sprinkling at the unpaved sections of access road.. ◆ Limiting speeds of construction vehicles in the project area. ◆ Regular trainings of the drivers to ensure implementation of speed limits. ◆ Fuel-efficient / well-maintained construction machinery shall be employed to minimize exhaust emissions. ◆ Vehicles transporting soil, sand and other	Throughout Construction Phase	ESMP, ECP 1: Waste Management, ECP 2: Fuels and Hazardous Goods Management, ECP 5: Air Quality Management, ECP 9: Road Transport and Road Traffic Management	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ES

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	construction materials shall be covered with tarpaulin. ◆ Earliest resolution of any dust related public complaints registered through Project's Grievance Redress Mechanism. ◆ Implementation of: ◆ ECP 1: Waste Management ◆ ECP 2: Fuels and Hazardous Goods Management ◆ ECP 5: Air Quality Management ◆ ECP9: Road Transport and Road Traffic Management			
High Noise Levels from Construction Activities	◆ Blowing of horns by construction machinery and vehicles shall be strictly prohibited. ◆ The operation of heavy equipment shall be restricted to daylight hours as far as possible and noisy works shall be avoided / minimized during the night time. ◆ Noise from vehicles and power generators will be minimized by use of proper silencers and mufflers. ◆ All the equipment and machinery used during construction phase shall be well maintained and in compliance with SEQS. ◆ Earliest resolution of any noise related public complaints registered through Project's Grievance Redress Mechanism.	Throughout Construction Phase	ESMP, ECP 6: Noise and Vibration Management	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ES

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	◆ Implementation of ECP 6: Noise and Vibration Management			
Solid Waste Management - Generation of Excavated Material, Domestic Waste, Hazardous Waste	◆ A waste management plan will be developed by the Contractor prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility i.e. designated area with secondary containment. ◆ Fuel storage areas, hazardous material storage areas, and generators will have secondary containment in the form of concrete or brick masonry bunds. The volume of the containment area shall be equal to 120% of the total volume of fuel stored. ◆ Licensed and SEPA approved waste contractors will be engaged to dispose-off all hazardous and non-hazardous waste materials that cannot be recycled or reused. ◆ Domestic waste from the camp will be disposed to the nearest SSWMB waste disposal bin. ◆ Implementation of: ◆ -ECP 1: Waste Management ◆ -ECP 2: Fuels and Hazardous Goods Management	Throughout Construction Phase	Implementation of Waste Management Plan (WMP), ECP 1: Waste Management ECP 2: Fuels and Hazardous Goods Management	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ES
Untreated Disposal of Effluent from Worker	◆ The Contractor will establish a closed sewage treatment system, including soak pits and septic	Throughout Construction	Implementation of Waste Management	◆ Implementation:

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
Camp	tanks, to treat camp effluent, preventing untreated releases. ◆ Soak pits in absorbent soil, positioned at least 300 meters from water sources, will be maintained and protected from rainwater entry. ◆ When septic tanks are filled, the Contractor will arrange sludge removal via a vacuum truck, subject to approval from KWSC. ◆ Implementation of: ◆ ECP 1: Waste Management ◆ ECP 3: Water Resources Management ◆ ECP 10: Construction Camp Management	Phase	Plan (WMP), ECP 1: Waste Management ECP 3: Water Resources Management ECP 10: Construction Camp Management	Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ES
Climate Change	◆ Workers will be encouraged to drink cool water regularly, ◆ Scheduled breaks will be provided in shaded or cooler areas, ◆ Workers will be provided with loose-fitting, lightweight clothing that covers the skin for protection yet allows ventilation. ◆ Comprehensive training sessions will be conducted to educate workers on heat-related illness symptoms and the importance of recognizing signs of heat exhaustion or heat stroke. ◆ Work hours will be adjusted to minimize prolonged	Throughout Construction Phase	Implementation of OHS Management Plan, Emergency Preparedness and Response Plan, ECP 11: Workers Health and Safety	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ESC

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	exposure to extreme heat, particularly during heatwaves or high-temperature periods.•; ◆ Implement specific mitigation guidelines provided in **Annexure 7-2** Implementation of ECP 11: Workers Health and Safety			
Soil Contamination	◆ The Contractor will maintain all construction vehicles, equipment, and power generators to prevent engine and mechanical part leakages. ◆ Trays will be provided and used during refuelling, maintenance, and under parked vehicles and equipment to contain any potential leakages. ◆ Fuels, lubricants, and chemicals will be stored in covered, lined areas, and static power generators will be placed on impervious floors with parapet walls to prevent environmental contamination. ◆ Implementation of; ◆ ECP 2: Fuels and Hazardous Goods Management	Throughout Construction Phase	Implementation of Spill Prevention Plan, ECP 2: Fuels and Hazardous Goods Management	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ES
Improper Site Restoration	◆ The Contractor will be responsible for the dismantling and complete removal of worksite facilities and the camp, which includes contractor offices, staff and workers' accommodation, machinery yard, warehouses, store rooms, maintenance shops, drinking water utilities, vehicle parking areas, temporary materials stockpiling enclosures, sewage network, and toilets, among	End of Construction Phase	Implementation of Waste Management Plan (WMP)	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU Technical Team and ES

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	others. ◆ After dismantling, the ground will be cleaned by removing all affected topsoil, and this soil will be handed over to authorized waste handlers for proper disposal. ◆ Where necessary, topsoil will be added to the area to restore the ground.			
Community Health and Safety	◆ Contractor shall prepare Community Health and Safety Plan based on construction methods, site specific hazards and framework presented in **Annexure 5-1**. ◆ All the trenches and excavations will be protected with barriers ◆ Excavated material shall not be piled next to the trenches and excavations and removed from the site on frequent basis. ◆ Adequate lighting shall be installed at excavated areas and trenches to keep them well-lit and prominent during night. ◆ Contractor shall ensure setting up of its machinery on the roads for construction works in such way that it will not hinder the public traffic to the maximum possible extent and will not compromise the public safety. ◆ Contractor shall ensure that all the vehicle drivers and equipment operators have valid licenses and	Throughout Construction Phase	Implementation of Community Health and Safety Plan	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU SDS

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	proven competency to safely operate vehicles and equipment in public areas. ◆ Excavators and dumper trucks will be provided with trained banksmen / marshaller to supervise safe movement during excavation activities. ◆ Vehicular speeds shall be kept at minimum during movement. ◆ Following measures shall be adopted for minimizing the nuisance caused by dust and noise to the public: ◆ Use of noise suppression on equipment; ◆ Water sprinkling for dust suppression; ◆ Carrying out major work activities having potential of higher noise generation in day time only.			
Labor Influx / SEA – SH – GBV Incidents	The contractor will ensure the following: ◆ Hire more local people for skilled, semi-skilled, and unskilled work. ◆ Proactively manage the potential impacts of labor influx and potential cultural conflicts between local communities and workers. This includes: ◆ Building construction camps in designated areas. ◆ Including a code of conduct (COC) and applicable laws in the contracts of all employees and workers, with penalties for violations. ◆ Providing training on the prevention of sexual	Throughout Construction Phase	Workers Code of Conduct (CoC), Community Health and Safety Plan	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU SDS

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	exploitation and abuse (SEA) and sexual harassment (SH) to project staff. ◆ Preventing construction crews from entering settlements. ◆ Raising awareness of the risks among community members and local health authorities, and informing them about available grievance mechanisms. ◆ Avoiding the routes/places used by women as far as possible. If unavoidable, identifying alternate routes for the communities. ◆ Terminating the employment of any worker who violates the COC. ◆ Prohibiting the use of drugs and alcohol at the work/construction site. ◆ Prohibiting workers from carrying weapons into the workplace premises. ◆ Ensuring site security arrangements in line with the Security Management Guidelines for Contractors (attached as **Annexure 5-3**). ◆ Providing appropriate fencing, security checkpoints, gates, and security guards at construction sites to record the entry and exit of workers, staff, and visitors. ◆ Maintaining good relations with local communities.			
Construction Traffic	◆ Traffic Management Plan will be prepared as per	Throughout Construction	Implementation of	◆ Implementation:

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
Management and Safety	the guidance provided under **Annexure 7-2** before taking up any construction work and shall be implemented after getting approved from the PIU / CSC. ◆ Barricades, signs, markings, flags, lights and flagmen shall be deployed at key spots. ◆ The flagmen shall be trained for traffic management and equipped with red and green flags and lights. ◆ Emergency response plan shall be prepared for any traffic accident during construction. ◆ In case of community related accident, compensation shall be paid in accordance with Fatal Accidents Act 1855. ◆ Implementation of; ◆ ECP 9: Road Transport and Road Traffic Management	Phase	TMP, ECP 9: Road Transport and Road Traffic Management	Contractor ◆ Supervision: CSC ◆ Monitoring: PIU SDS
Vegetation Loss and Disturbance to Fauna	◆ All precautions will be taken to protect them from any damage from construction activities. ◆ The contractor will be required to compensate the cutting of any shrubs in the project's DIA through plantation of ornamental shrubs at the areas to be specified by the PIU at the time of project execution. ◆ While clearing vegetation and excavation it shall be ensured that no wildlife get injured or killed.	Throughout Construction Phase	ECP 7: Protection of Flora' ECP 8: Protection of Fauna	◆ Implementation: Contractor ◆ Supervision: CSC ◆ Monitoring: PIU ES Identification of Compensatory Plantation Sites: PIU ES

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility
	◆ Construction work that may generate high noise levels shall be avoided during night time as far as possible to prevent local birds and fauna from disturbance; ◆ Workers shall be provided with adequate knowledge regarding protection of flora and fauna, and relevant government regulations. ◆ Implementation of; ◆ ECP 7: Protection of Flora ◆ ECP 8: Protection of Fauna			
Stakeholders Concerns and Engagement	◆ **Chapter** Error! Reference source not found. provides detailed account of Stakeholders Engagement and Information Disclosure. ◆ PIU, CSC and Contractor to ensure public consultations and participation of stakeholders throughout the project lifecycle. This would ensure that concerns about the impacts of the project are addressed at the right time. ◆ Stakeholder engagement to be carried out in a meaningful and inclusive way, providing access to remedy.	Throughout Construction Phase	Preparation and Implementation of Project specific Stakeholder Engagement Plan	Preparation of Plan: CSC and Contractor Implementation: PIU, CSC and Contractor Supervision: CSC Monitoring: PIU SDS

Table 7-3: Environmental and Social Mitigation Plan for Operational Phase

Impacts and Risks	Details of mitigation / enhancement measure	Implementation timing	Implementation method	Responsibility

OHS Risks Associated with Maintenance & Repair	Workers will be provided with PPEs during routine maintenance activities. Trainings will be conducted for the work practices and use of equipment	During Maintenance Activities	WB General EHS Guidelines and GIIPs	KWSC OPM Operations In-charge

7.10 Monitoring Parameters and Monitoring Plan

The Monitoring Plan proposed for the Project's Pre-Construction and Construction Phases are presented in **Table 7-4** and **Table 7-5**. The monitoring will comprise surveillance to check whether the Contractor is implementing the ESMP requirements and meeting the provisions of the contract during pre-construction and construction phases of the project including the responsible agencies for implementation and supervision. Monitoring time and locations for some parameters may require adjustments by the CSC and PIU during project execution.

Table 7-4: Environmental and Social Monitoring Plan for Pre-Construction Phase

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
Ambient Air Quality	Contractor, CSC, PIU ES	◆ 24hr - CO, SO2, NO2, PM10, PM2.5al	01 Location – KWSC Colony - Pipri	Once	Before Initiation of Construction Activities	◆ To determine the baseline air quality for comparing it with construction phase results to determine the difference ◆ Devising right mitigation strategies
Noise Level	Contractor, CSC, PIU ES	◆ 24hr – Noise Levels	01 Location – KWSC Colony - Pipri	Once	Before Initiation of Construction Activities	◆ To determine the baseline noise levels for comparison with construction phase noise results to determine the difference ◆ Devising right mitigation strategies

Table 7-5: Environmental and Social Monitoring Plan for Construction Phase

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
Occupational Health and Safety	Contractor, CSC, PIU ESC	◆ Number of unsafe acts/incidents, near misses, first aid injuries, work- related illness, lost time incidents, fatalities ◆ Number of training sessions, attendance sheets, training material developed, toolbox talks, risk assessments ◆ PPEs use and violations ◆ Hot work permits records ◆ Equipment fixed with spark arrestors ◆ Presence of dedicated non-combustible zones is the areas surrounding the hot work areas	All Project Sites	Daily	Throughout Construction Phase	◆ To prevent workers from accidents ◆ Investigation reports, Corrective action plans, Increased training and Awareness creation.
Communicable Diseases / COVID19	Contractor, CSC, PIU ESC	◆ Number of COVID-19 tests ◆ Number of cases in workforce for: a. Neglected, Tropical and Vector Borne Diseases. b. Tuberculosis. c. Coronavirus infections. d. Dengue. e. Hepatitis.	All Project Sites	To be determined by PIU, CSC at the time of execution	Throughout Construction Phase	◆ To prevent spread of COVID19 and other communicable diseases. ◆ Investigation report, Corrective action plans, Consultation with health department and /or specialists.

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
		f. Measles. g. HIV/AIDS. ◆ Number of workers vaccinated ◆ Audit of provisions and equipment				
Worker Grievances	Contractor, CSC, PIU SDS	◆ Number and types of worker grievances ◆ Resolution timeframes ◆ Number and duration of worker protests	All Project Sites	Monthly	Throughout Construction Phase	◆ To protect workers from work stress ◆ Investigation reports, Corrective action plans, Compensation and/or redress.
Ambient Air Quality Monitoring	Contractor, CSC, PIU ES	◆ 24hr - CO, SO2, NO2, PM10, PM2.5, Dust Settling, Silica, wind speed / direction	01 Location – KWSC Colony - Pipri	Monthly	Throughout Construction Phase	◆ To determine the effectiveness of dust / air quality control measures at receptor level ◆ Investigation for finding the cause and corrective action / application of right mitigation measures
Noise Level	Contractor, CSC, PIU ES	◆ 24hr – Noise Levels	01 Location – KWSC Colony - Pipri	Monthly	Throughout Construction Phase	◆ To determine the effectiveness of noise abatement measures at receptor level and workers sound pressure levels ◆ Investigation for finding the cause and corrective action /

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
						application of right mitigation measures
Water Quality	Contractor, CSC, PIU ES	◆ WBG / WHO / SEQS Drinking Water Quality Parameters	02 Samples: Worker Camp, Office Sites and Kitchen / Mess Areas	Monthly	Throughout Construction Phase	◆ To check quality of water being supplied to workers / staff ◆ Arrangements for the provision of clean drinking water from alternate source
Waste Management	Contractor, CSC, PIU ES	◆ Inspection of solid waste generation, collection, storage, recycling and disposal ◆ Recording volumes of excavation and spoil generated, reused, sold, stockpiled by location ◆ Recording waste volumes by type (kitchen and domestic, medical, batteries, electrical equipment, tires, rags, paper, scrap metal wastes etc.) generated at various construction sites ◆ Recording the final disposal of each waste stream ◆ Calculating rate of waste reuse / recycling ◆ Recording storage, transport and disposal	All Project Sites, camp, focusing on areas where waste is stored / located	Fortnightly	Throughout Construction Phase	◆ To check implementation status and effectiveness of waste management system ◆ Identification of violations against the Waste Management Plan requirements, Corrective actions ◆ Identification of additional waste management measures if required, Revision of waste management plan if required.

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
		costs				
Soil Contamination	Contractor, CSC, PIU ES	◆ Visual Inspection ◆ Recording Incidents of oil, fuel and chemical spills	All work areas, machinery parking areas, generator installation sites and workshops	Weekly	Throughout Construction Phase	◆ To check implementation of Spill Prevention Plan ◆ Corrective actions, Identification of additional management measures if required
Effluent Disposal	Contractor, CSC, PIU ES	◆ Visual Inspection for checking any bypasses or leakages in effluent disposal arrangements at camp and office sites	All workers camp / office sites	Weekly	Throughout Construction Phase	◆ To check status and effectiveness of effluent disposal arrangements ◆ Corrective actions, Identification of additional management measures
Community Health and Safety / Construction Traffic Management and Safety / Access to Receptors	Contractor, CSC, PIU SDS	◆ Status of Barricading at Trenches and Excavations ◆ Status of provision of Pedestrian access ◆ Status of piling-up of excavated material and pipes along trenches ◆ Status of posting safety signage ◆ Status of traffic diversions ◆ Road safety incidents records ◆ Lighting arrangements	All Project Area	Bi-weekly	Throughout Construction Phase	◆ To protect general public from construction nuisance, hazards and accidents ◆ Corrective actions, Identification of additional management measures

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
		◆ Provision of safety equipment and materials at sites				
SEA/SH incidents	Contractor, CSC, PIU GS	◆ Status of worker's interaction with public, nearby communities. ◆ Investigation of any SEA/SH incidents reported / communicated by workers or registered by communities in GRM	All Campsites and Project Sites	Weekly	Throughout Construction Phase	◆ To protect public and communities from SEA/SH incidents. ◆ Penalizing the Culprit and taking strict disciplinary action by involving relevant Government agencies. ◆ Implement strict measures to restrict repetition of such incidents.
Stakeholder Engagement	Contractor, CSC, PIU SDS	◆ Number and types of engagements ◆ Topics raised during engagement ◆ Number and types of community grievances ◆ Closure duration of grievances ◆ Claimant satisfaction of process and results grievance mechanism	Stakeholders Identified in Project's SEP	Monthly	Throughout Construction Phase	◆ Minimizing stakeholders complains ◆ Investigation reports Increased engagement or more appropriate methods of consulting in line with community needs ◆ More engagement resources (staff, materials, etc.)
Public Grievances	Contractor, CSC, PIU SDS	◆ Numbers of grievances ◆ Types of grievances ◆ Number of grievances related to dust, noise,	Affected Communities	Monthly	Throughout Construction Phase	◆ Minimizing public complains ◆ Revise grievance management system

Item	Responsibility	Monitoring Parameters	Monitoring Locations	Monitoring Frequency	Monitoring Timing / Duration	Objective of Monitoring and Potential Response in Case of Exceedance
		traffic, restricted access, any abuses related to project workers. ◆ Number of grievances resolved. ◆ Appropriate close-out measures and actions to prevent recurrence ◆ Grievances closed out within timeframes				and capacity

ESC – Environment and Social Cell

SDS- Social Development Specialist

ES – Environmental Specialist

GS – Gender Specialist

7.11 ESMP Trainings

Training programs shall be implemented during the Project life cycle to ensure all staff receive the required training in both general and job-specific issues. Trainings shall be provided to all new recruits and continual refresher courses shall be organized for the existing staff. s. Additionally, the trainings would lead the staffs to be well aware about the roles of PIU, the CSC and the Contractors when it comes to environmental and social issues. Each organization will be responsible to provide training to their own staffs before the start of the Project and also during the execution of the Project. Training will cover all staff levels, including management, supervisory personnel as well as both skilled and unskilled workforces. Training program will consist of the following:

7.11.1 Pre-construction phase ESMP Implementation Training

CSC will organize training for PIU, CSC, and Contractor Management & Workers, and it will provide awareness on waste management, driving safety, defensive driving, standard operating procedures (SOPs) for construction works; community and occupational health and safety, core labor standards, code of conduct, avoidance of interaction with communities, outcomes of GBV/SEA/SH conducts, transmissible diseases, applicable E&S laws, sensitivity of the project area and key findings of the ESMP etc.

7.11.2 ESMP Implementation Training during Construction Phase

The training during the construction phase includes the following:

- Workers will be provided with weekly ESHS awareness sessions, daily toolbox talks, and induction training during worker appointments, covering topics including OHS/CHS protocols, avoidance/protocols of community interaction, etc.
- Drivers and operators would be regularly trained before and during field operations regarding road safety, defensive driving, waste disposal, cultural values, and social sensitivity.
- All site personnel would be educated about the proper use of personal protective equipment, camp operations and management, waste disposal, resource conservation, and housekeeping through regular weekly training.
- Workers will be provided with training on ESHS management related to site restoration works at the end of the construction phase.

7.11.3 Capacity Development Trainings

In addition to regular ESMP and H&S training, the Contractor will be required to organize capacity development training once before construction and monthly throughout the construction period for the key ESHS management staff, site supervisors, and project management personnel belonging to the Contractor, PIU, and CSC for sensitizing them on effective ESHS management, relevant WB ESS and GoS requirements on ESHS management. An adequate budget for capacity development training in the ESMP cost has been maintained. Indicative outline of training capacity building training program is as follows:

No.	Training Activity	Participants	Trainer	Mode of Training	Content	Schedule

No.	Training Activity	Participants	Trainer	Mode of Training	Content	Schedule
1.	Site Orientation and Induction	Contractor and Construction Supervision Consultant (CSC)	PIU KWSSIP	Presentation / Lecture	Awareness about site, working protocols	Once for everyone
2.	ESMP and Environment Code of Practices (ECPs)	Contractor	CSC and PIU KWSSIP	Presentation	Awareness and applicability of ESMP and ECPs	Bi-annually
3.	Emergency Response and Use of Fire Extinguishers	Contractor	CSC and PIU KWSSIP	Presentation	Potential natural and other hazard/emergencies and dealing with emergency and fire to minimize damage	Bi-annually
4.	Resettlement Related Issues and Grievance Redress	Contractor	CSC and PIU KWSSIP	Presentation	Awareness on WB ESS5 (Involuntary Resettlement)	Bi-annually
5.	Labor Management Procedures	Contractor	CSC and PIU KWSSIP	Presentation	Awareness on WB ESS2 (Labor and Working Conditions)	Bi-annually
6.	Gender Aspects including GBV	Contractor	CSC and PIU KWSSIP	Presentation	Awareness on GBV, gender equality, gender related issues and their redress; awareness regarding Gender Action Plan (GAP)	Bi-annually
7.	Stakeholder Engagement	Contractor	CSC and PIU KWSSIP	Presentation	Interaction with the Project Affected Peoples (PAPs) and Other Interested Parties, Awareness on WB ESS10 (Stakeholder Engagement)	Bi-annually
8.	Awareness workshop regarding COVID-19 and other vector borne diseases	Contractor	CSC and PIU KWSSIP	Presentation	Risk, prevention, and available treatment	Bi-annually
9.	First Aid and Cardiopulmonary resuscitation (CPR)	Contractor	CSC and PIU KWSSIP	Presentation	Onsite first aid procedures	Bi-annually

7.12 Reporting and Documentation

Contractor shall prepare monthly reports detailing the progress and efforts of Contractor on the implementation of Project's Environmental, Social, Health and Safety (ESHS) Safeguards Requirements included in the ESA and ESMP. The PIU - ESU with assistance from CSC and Contractors will also produce quarterly reports.

Contractor's Monthly ESHS Reports: The monthly reports shall provide detailed account of implementation status on the mitigation measures as suggested in the ESMP (**Table 7-1 to Table**

7-3) and updates on the outcome of the field inspections carried out by the Contractor ESHS Teams and status / results of ESHS Monitoring as required under Monitoring Plans (**Table 7-4 to Table 7-6**). Report shall also provide details on all the trainings conducted by the Contractor during the reporting month and details of complaints registered at Project's GRM and actions taken by the Contractor for resolution of complaints. In addition to the monthly reports, the Contractor will also submit weekly onsite monitoring reports based on daily monitoring activities / findings. Template to be followed by the Contractor for Monthly ESHS Report is attached as **Annexure 7-3**.

CSC's Monthly ESHS Reports: Based on the Contractor's Monthly Reports, the CSC in their Monthly Report shall validate the information provided in the Contractor's report, indicate the gaps, their own field observations and evaluation of Contractor's performance on implementing project's ESHS safeguards. CSC Monthly Reports shall also provide details on Corrective Action Plans (CAPs), agreed timelines for resolution of active ESHS issues, status of penalties imposed by the CSC on Contractor for continual non-compliances and way forward suggested by the CSC. The report shall also provide expert analysis on the adequacy of trainings organized by the Contractor, advise for the Contractor regarding realignment of training program and independent analysis on GRM activities.

PIU's Quarterly Progress Reports on Environment, Social, Health and Safety Management: The reports shall be prepared by the PIU with assistance from CSC and Contractors. The report shall provide detailed account of quarterly ESHS Safeguards implementation status, mitigation measures and preventive actions undertaken, environmental and social monitoring activities conducted, details of monitoring data collected, analysis of monitoring results particularly the non-compliances, recommended mitigation and corrective measures, GRM data, ESHS trainings conducted, and environmental and OHS regulatory violations observed. The monitoring reports will be submitted to the World Bank for review and approval and SEPA as well, if required under ESMP Approval Conditions.

Project's Environmental, Health and Safety Completion Report: At the end of construction, the PIU - ESU shall submit a Project Completion Report on ESHS Aspects which will summarize the overall environmental and social impacts / risks occurred during the project implementation, efforts and measures taken for mitigating or offsetting the impacts, constraints / limitations faced during execution for resolving any particular ESHS issues, overall ESHS performance of Contractor and CSC and lessons learnt.

7.13 ESMP Implementation Costs

Estimated cost estimates for Contractor's staffing, implementation of mitigation measures, preventive actions, and monitoring are presented in **Table 7-6**. Total cost of ESMP implementation is estimated at **PKR 36.058 million**.

Table 7-6: Estimated ESMP Implementation Cost

Item No.	Spec. Ref.	Description	Unit	Quantity	Unit Rate (PKR Millions)	Amount (PKR) (In Figures)
Pre-construction / Construction Phase Cost for ESMP Implementation (For 1+12 Months)						
Contractor Staffing Costs						
1.	**A**	EHS Specialist	01 person	13	250,000	3,250,000

Item No.	Spec. Ref.	Description	Unit	Quantity	Unit Rate (PKR Millions)	Amount (PKR) (In Figures)
			per Month			
2.		Social Safeguard / Gender Specialist	01 person per Month	13	250,000	3,250,000
3.		First Aider	03 persons per Month	13	100,000	3,900,000
					Sub Total A	10,400,000
Implementation Costs - Construction Stage (Mitigation Measures and Monitoring Cost)						
1	**B**	Ambient Air Quality Monitoring (24 hours specified in SEQS) - Pre Construction / Construction	01 samples per Month	13	80,000	1,040,000
2		Noise Quality (24 hours specified in SEQS) - Pre-Construction	01 sample per Month	13	50,000	650,000
3		Water samples collection and Laboratory analysis(SEQS parameters) - Construction Phase	02 samples per Month	12	60,000	1,440,000
4		Fixed cost at project sites (PPEs, In-house, fire safety equipment, septic tanks, installation of noise / safety barriers)	Month	12	500,000	6,000,000
5		Traffic Management Cost	Month	12	500,000	6,000,000
6		Capacity Development Trainings: Pre-Construction and Construction Phases	Days	7	178,500	1,250,000
7		Key Mitigation Measures: Water Sprinkling, Solid Waste Management, Spill Control, Site Restoration etc.	Month	12	500,000	6,000,000
					Sub Total B	**22,380,000**
					Total Amount Carried Forward to Main Summary (A+B)	**32,780,000**
					Escalation and Contingencies: 10%	**3,278,000**
					Total Amount Carried Forward including Contingencies	**36,058,000**

8 Grievance Redressal Mechanism

This Section outlines the policy and procedure for documenting, addressing, responding and employing methods to resolve project grievances and complaints that may be raised by the project affectees or community members arising from environmental and social performance, the engagement process, resettlement and/or unanticipated environmental or social impacts resulting from project activities that are performed and/or undertaken by PIU. The Section describes the scope and procedural steps and specifies roles and responsibilities of the parties involved in addressing the grievances.

8.1 Principles

A GRM is established to address any complaints or grievances arising during the implementation period of the projects. People of the project area may perceive risks to themselves or their property or their legal rights or have concerns about the possible adverse environmental and social impact that a project may have. Any concerns or grievances will be addressed quickly and transparently, and without retribution to the project affectees or community members or complainant.

The primary principle of GRM is that all complaints or grievances are resolved as quickly as possible in a fair and transparent manner.

8.2 Objectives

The objectives of the GRM are to:

- develop an organizational framework to address and resolve the grievances of individual(s) or community(s), fairly and equitably;
- provide enhanced level of satisfaction to the aggrieved;
- provide easy accessibility to the aggrieved/affected individual or community for immediate grievance redress;
- ensure that the targeted communities and individuals are treated fairly at all times;
- identify systemic flaws in the operational functions of the project and suggest corrective measures; and
- ensure sustainability of the project.

8.3 Type of Complaints

The major complaints that may arise during the execution of the proposed project at site include but not limited to:

- E&S issues (dust, noise, air pollution, social and cultural issues);
- Damage and blockage of public utilities;
- Traffic inconvenience;
- Gender based violence (GBV) and harassment;

- Resettlement issues including loss of livelihood; and
- Issues related to compensation of resettlement impacts.

8.4 Disclosure of GRM

The GRM shall be disclosed at PIU-KWSSIP, KWSC head office, and concerned project engineers, KWSSIP website as well as at sub-project sites.

8.5 Structure of Grievance Redress Mechanism

The project will establish a three-tier GRM comprising Community GRC, sub-project GRC; and PIU-GRC. These tiers are described below.

8.5.1 Community GRC (Tier-1)

The community-GRC will provide a platform for project affectees or community members to raise and discuss their concerns, resolve the E&S including resettlement issues at the community level and coordinate with project management to communicate these issues and concerns. Community-GRC will be established to maintain a close rapport and coordination with affected persons and community members throughout the project implementation. The social development specialist (SDS) of PIU with the assistance of SC will facilitate the establishment of community-GRC that is representative of the ethno-cultural and gender diversity within the community. The community-GRC will comprise the following six members with one as the committee convener:

- Three female members (from the project affectees or community members); and
- Three male members (from project affectees or community members).

The project E&S and engineering staff will coordinate with community-GRC to review and resolve the issue or concern related to resettlement planning or implementation as well as environmental and social concerns preferably within five (05) working days from receipt of the grievance. Any complaints that cannot be resolved at community-GRC will be forwarded to the next tier.

8.5.2 Sub-Project GRC (Tier-2)

KWSSIP will constitute a GRC headed by concerned Project Manager (PM) at each project site to resolve all grievances and complaints of the project affectees or community members received either directly or through the Tier-1. Sub-project GRC will comprise of the following members:

- Project Manager (PM), as head/convener of sub-project GRC;
- Environment, SDS and Gender specialists of PIU;
- E&S specialists of Supervision Consultant (SC)
- Resident Engineer of supervision consultant;
- A representative (E&S specialist) of contractor (if required); and
- A representative of local community.

Note: Representative from any other district government department may be called as and when required by the sub-project GRC. Environmental Specialists of PIU and SC will join sub-project GRC meeting related to environmental issues only.

Sub-project GRC will meet once a month and when the need arises. The sub-project GRC will review grievances involving all E&S issues including resettlement issues that may arise due to project implementation. Sub-project GRC will perform the following functions:

- Record, categorize and prioritize the grievances that need to be resolved by the committee and resolve them within ten (10) working days;
- Invite and hear aggrieved persons/parties to produce evidence of their claims and record their view point;
- Communicate its decisions and recommendations on all resolved issues to PIU and the aggrieved persons for smooth implementation;
- Forward the unresolved cases/ complaints to PIU-GRC within an appropriate time frame with reasons recorded and its recommendations;
- Develop an information dissemination system and acknowledge the aggrieved persons/parties about the development regarding their grievance;
- Maintain a complaint register accessible to the project affectees or community members with brief information about complaints and sub-project GRC decision with status report; and,
- Maintain complete record of all complaints received by the sub-project GRC with actions taken.

Any complaint that cannot be resolved by the sub-project GRC, will be forwarded to the next tier – the PIU-GRC.

8.5.3 PIU-GRC (Tier-3)

At the third tier, the PIU has already constituted a GRC (PIU-GRC). The PIU GRC will receive complaints either directly or through the Tier-2 GRC. The committee has the following composition:

- Project Director KWSSIP, (Chairman of PIU-GRC);
- SDS, Member
- Gender Specialist, Member;
- Concerned Project Manager – PIU, Member;
- SDS of SC, Member; and
- Representative of Civil Society.

Note: Representative from any other district government department may be called as and when required by the PIU-GRC. Environmental Specialists of PIU and SC will join PIU-GRC meeting related to environmental issues only.

The PIU-GRC through authorized representative, will acknowledge the complainant about his/her complaint, scrutinize the record, investigate the remedies available and request the complainant to

produce any record in favor of his/her claim. After thorough review and scrutiny of the available record on the complaint, field visit will be conducted to collect additional information, if required. Once the investigations are completed, the PIU-GRC will give decision within twenty (20) working days of receipt of the complaint. If the complainant is still dissatisfied with the decision, he/she can go to the court of law, if he/she wishes so.

Organization of the GRC is shown in **Figure 8.1**.

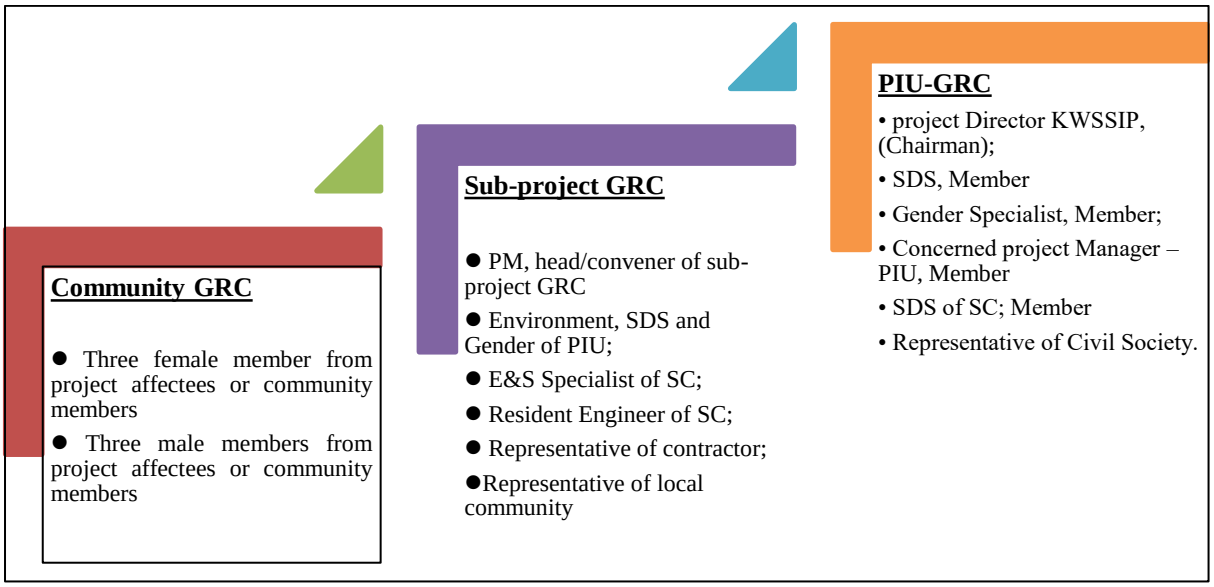


Figure 8.1: Organogram of GRC

Gender representation will be ensured by inducting a female member in all GRCs. The mechanism will ensure the access of project affectees or community members to a GRM that openly and transparently deals with the grievances and makes decision in consultation with all concerned that are consistent with the WB OPs requirements.

8.5.4 Gender Based Violence (GBV) Committee

Besides PIU-GRC, a GBV committee has also been established and notified within PIU consisting of the following members:

- Concerned Project Manager, Head/ Convener of GBV Committee;
- Gender Expert, KWSSIP, Secretary; and
- SDS KWSSIP, Member.

GBV Committee will address the gender related issues caused by the project activities during RP and project implementation.

8.6 Grievance Redress Procedure/ Mechanism

The intention of GRM is to resolve a complaint as quickly and at as low a level as possible to avoid a minor issue becoming a significant grievance. Irrespective of the stage of the process, a complainant

has the option to pursue the grievance through the court as is his/her legal right in accordance with law.

The GRCs will work at site, sub-project and PIU levels. The E&S and engineering staff of PIU, in coordination with site staff will inform the project affectees and community members about the GRCs and its mechanism through consultations and by posting at prominent places. The complaints received through any media will be screened by type and category. These complaints will be registered in Community Complaints Register (CCR), where the name and address of complainant, date, description of complaint and action taken will be recorded. The following procedure will be used to redress the grievances:

- First, complaint resolution will be attempted to be addressed at community-GRC through the involvement of the field E&S/engineering staff. The community-GRC shall give decision within five working days of receipt of the complaint. If unsettled, grievance can be lodged to the sub-project GRC by the complainant or by the GRC;
- Sub-project GRC will acknowledge the receipt within two working days of lodging of complaint. Initial review and consultation with the sub-project GRC will be conducted within five working days of receipt of complaint. If required, sub-project GRC will advise the E&S/engineering specialists to conduct field visits in consultation with the aggrieved persons/parties and local community and submit a fact-finding report. Preferably, the fact finding will be completed within eight working days from receipt of complaints. sub-project GRC shall give decision within 10 working days of receipt of the complaint. If unresolved, a grievance will be lodged to the (PIU-GRC) by the complainant or by the GRC; and
- The PIU-GRC shall give decision within 20 working days of receipt of the complaint. If the complainant is still not satisfied, he/she can pursue further by submitting the case to the appropriate court of law.

All E&S issues will be dealt according to the above GRM procedures. The GRCs will hear and clarify with the complainant (if required so) about the E&S issue and shall conclude and communicate their recommendations for further implementation in due course of time. Complainant will be kept informed during the process and the GRC decision will be communicated to him/her accordingly. In case of any delay, the complainant will be informed on the progress and process about his/her grievance. The GRC proceedings will be documented step by step and all records will be maintained and summarized in the project progress and internal monitoring reports.

8.6.1 Lodging of Complaint

The complainant(s) can lodge their grievances through a number of ways/channels including online, mail, phone, WhatsApp, e-mail and complaint box. Moreover, PIU has established an e-Portal for filing and tracking progress of the application online; the details are provided below.

- It is an electronic complaint lodging system (application) that will be accessible through a link on the PIU KWSSIP website;
- The focus of the e-portal is the quick complaint lodging for all types of primary stakeholders;

- Any project affectee or community member with internet access can lodge a complaint with option for anonymous complaints. Uploading of photos for better understanding of the problem will also be an option;
- Each complainant will get a unique Grievance Number to track their complaints through the e-portal;
- Each complaint will go through a quick resolution mechanism being managed by a dedicated team at the PIU. Each complainant will be contacted to ensure that his/her issue is resolved;
- The portal will differentiate between types of complaints for targeted decision-making and action on behalf of PIU; and
- The portal will allow a quick and easy method for monitoring of the entire complaint lodging and resolution mechanism.

9 Information on Disclosure, Consultation and Participation

9.1 Overview

In order to meet the criteria of meaningful stakeholder consultation process, the consultation was started in December 2021. The consultations were conducted with various potential stakeholders to assess their views and recommendations. The overall objective of the consultation was that stakeholders are kept informed about the project related activities and to identify any contextual issues by obtaining their views and inputs about any Project related issue. Henceforth, the feedback obtained and PIU responses to the issues raised, are directly included as part of the Project planning and decision-making process.

9.2 Identification of Stakeholders

All stakeholders have different types of stakes according to their occupations and involvements in various aspects of the Project. The study team contacted with all the stakeholders at different stages of the Project and shared their views and concerns with respect to implementation of the Project. Following categories of stakeholders were identified:

- Institutional Stakeholders;
- Local community;

9.3 Objectives of the Public Consultation

The objectives of the public consultation are as follows;

- To share full information with the stakeholders bout the Project;
- To obtain feedback/responses about the proposed project;
- To identify the urgency and severity of issues and problems in project; and
- To acquire responses about the needs, preferences/priorities of the stakeholders.

9.4 Information Disseminated

Following issues were discussed with the affected during the consultation meetings:

- Introduction of the project;
- Description of project components;
- Information on perceived benefits from the proposed project;
- Information regarding Grievance Redress Mechanism (GRM) and lodging of complaints during construction activities; and
- Needs, priorities and reactions of the communities and institutions regarding the proposed project.

9.5 Community Consultations

Consultations mainly in form of seven “Focus Group Discussions” (FGD) with Primary Stakeholders have been carried out with the communities located nearest to the project’s AoI. Discussions with the communities have been made in an open and transparent manner in order to solicit their comments and suggestions in the studies. Besides male members, consultations with female members of the communities were also carried out in the project area. Women’s main concerns were generally related to the existing hardships they are facing.

List of participants is provided under **Annexure 9-1,** whereas consultation photographs are provided in **Annexure 9-2**.

Table 9-1: Consulted Communities

S. No	Community	District	No. of Participants	
			Male	Female
1	KWSC Colony – Pipri	Malir	4	3
2	Tatal Jokhiyo	Malir	4	4
3.	Razaqq Abad (Haji Natho Khan Village)	Malir	5	3
4.	Hassan Panhwahar Goth	Malir	5	3
5.	Zafar Town	Korangi	4	6
6.	Future PS Locality	Korangi	4	4
7.	Mohammad Nagar Locality	Korangi	8	4
Total			**34**	**27**

9.5.1 Feedback and Concerns from the Communities

Participants were first briefed about the project objectives and major interventions associated with the project implementation. Afterward, people were asked to express their views regarding various activities of the proposed project. In general participants appreciated the project and offered comments & suggestions to enhance the expected environmental and social benefits and to mitigate the adverse impacts. The community perception about the project was found reasonably good. Majority of respondents favoured the proposed project based on the expectations that the project will provided work opportunities for the local communities. The digest of major issues raised by communities during meetings are given **Table 9-2.** Feedback of women consultations is provided in the subsequent section.

Table 9-2: Summary of Consultation Meetings with Men

Communities	Concerns / Feedback	Responses / Action
1- Pipri KWSC Colony	Workers camp and their possible conflicts with local communities	Worker’s camp site location has been selected far away from the communities. As per the ESMP directives, the Contractor shall be bound to develop campsite at the identified location only and equip it with proper facilities in order to restrict

Communities	Concerns / Feedback	Responses / Action
		access of workers to the outside shops etc. so that their interaction with nearby communities shall be avoided.
	Male family members should be employed in the project related jobs so that they could get the jobs in their hometown. Hiring process should be transparent and hiring of local workers should be ensured.	As per the ESMP directives, the Contractor will be bound to hire local unskilled and semi-skilled workers at the most.
Tatal Jokhiyo	Nuisance related to construction traffic, dust and noise.	Suitable mitigation measures have been made part of the ESMP that shall be followed by the Contractor to protect communities from the impacts of construction traffic, dust and noise. These include, preparation and implementation of Traffic Management Plan, water sprinkling, avoidance of noisy work at night, ensuring low speed driving, immediate collection of excavated material, installation of safety barriers etc.
Near Razaq Abad (Haji Natho)	There is a need to help communities understand, participate in all activities related to this project and also there is a need to work to increase civic engagement in addressing their concerns and facilitate collaboration among local and regional entities to address their problems.	This has been addressed in SEP and problems may be addressed via the robust Grievance Redress Mechanism
Hassan Panhwahar	Local people should be preferred when hiring	The contractor will be contractually bound to disclose the “Recruitment Policy” and follow it. They will be asked to hire at least 60% people who live within close proximity to the Project Area
	Chances of dust emissions due to construction activities.	Construction activity at Bulk Water Mains will be conducted within the already defined corridor however it may result in generation of dust in the AoI. Adequate measures have been

Communities	Concerns / Feedback	Responses / Action
		included in the ESMP that will be implemented by the Contractor for protecting public from dust nuisance.
Zafar Town	Is there a grievance redress mechanism system in place and will it be effective?	There is a grievance redress mechanism in place which with cooperation from the KWSSIP is expected to handle any issues fairly.
	What is the solution of waste generation during construction?	A waste management plan will be developed prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility i.e. designated area with secondary containment.
Future PS	Safety while crossing the road especially students/pupils, old and women.	The traffic management and CHS plans will be prepared and implemented in line with the ESMP guidelines for ensuring public safety.
	Labor influx is a major problem for us	The Contractor will develop and enforce a strict code of conduct for workers to regulate their behaviour in the local communities. Campsites will be far away from communities to restrict chances of interaction. Implementation of ESMP shall ensure protection of communities from any labor influx issues.
Mohammad Nagar	Job preference should be given to local people during construction.	The contractor will be contractually bound to disclose the “Recruitment Policy” and follow it. They will be asked to hire at least 60% people who live within close proximity to the Project Area.
	Contractors familiar with community norms should be hired	PIU - KWSSIP shall review the contractor capacity during bidding with respect to his ability of following community norms and management of other safeguard aspects. Contracts shall be awarded accordingly to

Communities	Concerns / Feedback	Responses / Action
		qualified contractors.

9.5.2 Outcomes of Women Consultations

A total 27 female members from the project area were also engaged in the study, employing a participatory and consultative approach for data collection. The challenges faced by women in participating in development initiatives encompass a lack of necessary capacity, skills, and experience, as well as limited opportunities and available time within these sectors. Prior to sharing their perspectives, female participants were briefed on the project's objectives and interventions, primarily expressing concerns related to the hardships they currently experience. Their feedback and the means by which their concerns will be addressed through the Environmental and Social Management Plan (ESMP) are outlined below:

Table 9-3: Consultation with Community Women

S. No.	Community Women Feedback and Concerns	Actions for Redressal
1	Community is worried about their safety and privacy with strangers around. They asked for assurance that security measures will be in place	In compliance with ESMP requirements, the Contractor will be obligated to ensure that workers adhere to a Code of Conduct and implement measures to address community safety concerns. These measures may include perimeter fencing, security personnel, and community awareness programs.
2	Some community members also expressed fear of harassment from contractors' staff that usually comes from outside the area and is not sensitive to community needs and values. Measures should be taken to prevent and address any harassment issues.	Measures should be taken to prevent and address any harassment issues. The ESMP outlines the project's commitment to zero tolerance for harassment and includes mechanisms for reporting and addressing any incidents, with a specific focus on women's safety. Contractors' will be sensitized on work place harassment through targeted trainings and awareness sessions
3	Community demands that their voice and concerns should be part of the decision-making process	ESMP outlines the project's commitment to engaging with the community, with a specific focus on involving women in decision-making and addressing their concerns. As a result, the PIU, CSC, and Contractor's social teams will maintain frequent coordination with the communities and address their concerns throughout the project's lifecycle.
4	They asked for safer and more abundant drinking water in their area and lack of which leads to various health issues	Implementation of the project will ensure access to clean and ample drinking water that is essential for public health and well-being.

S. No.	Community Women Feedback and Concerns	Actions for Redressal
5	The negative impact of existing water delivery via tankers on road infrastructure and road safety was highlighted.	Implementation of the project will reduce needs for water supply by water tankers and road accidents due to these heavy vehicles

9.5.3 Consultation with Institutional Stakeholders

Various departments, organizations and offices related to the proposed project have been consulted. They were briefed on the ESMP process, the proposed project, proposed interventions and the potential negative and positive impacts of the project. The contacted representatives expressed their interest in the project as it will contribute in solving the acute water supply / shortage problems of Karachi and offered their complete support in all respects.

List of offices visited and officials consulted is provided **Table 9-4** below, whereas, the digest of discussions held with these departments / officials are given in **Table 9-5**.

Table 9-4: Consultation with Institutional Stakeholders

S. No.	Department / Organization	Designation
1.	SEPA	Deputy Director
2.	Public Health Engineering Department	Research Officer
3.	KWSC Pipri Filtration Plant	Residential Engineer
4.	TMO, Malir	Executive Engineer
5.	Urban Resource Center (NGO)	Director
6.	Women Development Department	Project Coordinator

Table 9-5: Feedback and Concerns of Institutional Stakeholders

Department/ Organization	Concerns / Feedback	Responses / Action
SEPA	The ESA study should thoroughly cover all the environmental and social aspects and the report should provide clear-cut guidelines on the mitigation of identified impacts associated with the project.	The ESMP thoroughly covers all the environmental and social aspects and the report will be finalized / submitted to SEPA after careful review of the E&S experts associated with the project from PIU / WB and the ESA Consultants.
Public Health Engineering Department	The effluent from the Contractor's camp should be properly dealt with.	Adequate measures have already been made part of the ESMP, which shall be followed by the Contractor for right campsite effluent disposal.

Department/ Organization	Concerns / Feedback	Responses / Action
KWSC Pipri FP	The project will have far reaching positive impacts on the financial health of the KWSC as it will totally eliminate the nuisance of frequent bursting of rising mains which consumes huge amounts of money for repairs.	It has been agreed that definitely the project interventions shall considerably improve the KWSC's water supply infrastructure.
TMO Malir	It was said in the consultation that the water shortage should be addressed immediately to counter water supplied by tankers.	The proposed project will restrict NRW losses as well as water theft issues.
Urban Resource Centre (NGO)	Training programs should be included in the ESMP for staff and community.	Provisions for trainings and regular interactions with communities have already been kept in the ESMP.
Women Development Department	Strengthen the capacity of women through this project and motivate men and women to work towards gender equality.	This project will take due to care to promote gender equality during implementation of the project.

9.5.4 Consultation Planned throughout the Lifetime of the Project

The project will require public consultation and disclosure activities to continue beyond the ESMP process throughout the lifecycle of the Project as the effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. The key activities of future consultation are summarised in **Table 9-6** below:

Table 9-6: Stakeholder Engagement Implementation Timescales and Responsibilities

Activity	Time	Responsibility
Construction Phase Engagement		
Ongoing Community liaison and grievance logging	◆ Day to day interactions ◆ Visiting local communities for informal consultation once a week at minimum ◆ Weekly grievance reporting ◆ Discussing progress of implementation of project action plans and issues that involve on-going risks or impacts (as needed, but at least annually).	KWSSIP / Social Specialist of CSC/ Contractor's Social Team
Community consultation events	◆ Prior to the start of construction ◆ Prior to the completion of construction ◆ Project website to be regularly	KWSSIP / Social Specialist of CSC/Contractor's Social Team

Activity	Time	Responsibility
	updated ◆ Following each of the community consultation events	
Media notifications of project progress	◆ At least two weeks prior to the community consultation meetings. ◆ Regularly updated on website	KWSSIP's Social Development Specialist

Stakeholder engagement activities will be documented and reported as part of sustainability reporting requirements. To the extent possible, profiles of the stakeholders being consulted will be established and as appropriate, disaggregated gender and other socially relevant data will be presented. Any special measures to include disadvantaged groups, for instance physically challenged persons from affected communities will also be documented.

9.5.5 Stakeholder Consultation Workshop

PIU - KWSSIP with the support ESA Consultants, have organized a Stakeholder Consultation Workshop on 28th July 2022 at Regent Plaza in relation to information disclosure and stakeholder's engagement in relation to the project. The main objective of the workshop was to get their feedback of stakeholders at broader level. The stakeholders being invited include relevant Government Departments, NGOs, Academia, World Bank, Sindh Environmental Protection Agency (SEPA) and Local Community representatives. The stakeholders actively participated and provided precious comments, suggestions and shared their views based on their practical experience at different projects. The session has been completed with the conclusion that the project is the pressing need of time and it should be built within the record time-frame. The stakeholder consultation list of the participants and pictorial view of Stakeholder Consultation are given in **Annexure 9-3.**

10 Conclusion

The Environmental and Social Management Plan (ESMP) study reveals that overall the impacts of Replacement and Rehabilitation of Old Pipri Main (OPM) Project shall be positive. The project shall improve city's overall water supply scenario. Contrary to the present situation, loss of water through leakage points in the main will be restricted. Leakage reduction will reduce the energy footprint of water supplied to consumers. There will be no negative impacts on livelihood during project construction and the project shall not require acquisition of any land as adequate RoW is available within which the construction activities will be performed.

Construction phase impacts include generation of construction related noise and dust and clearance of vegetation, workers health & safety issues, generation of excavated material and solid waste etc. All these and other associated negative impacts shall however be temporary in nature and will be conveniently mitigated by implementing the ESMP providing a detailed account of mitigation measures to control all the identified potential negative impacts of the project. The main monitoring parameters include monitoring of excavation works with disposal, environmental quality monitoring (air, noise and drinking water), occupational and community health and safety etc. PIU-KWSSIP shall ensure that the Contractor prepare site specific SSESMP, OHS / CHS Plans and other site-specific plans as identified and carry out regular and effective monitoring of environmental quality parameters as indicated in this ESMP.

To ensure that the mitigation, enhancement and compensation measures as defined in the ESMP are implemented solely and correctly, the ESMP along with adequate budget (Indicative cost of ESMP already provided) is to be included in the contract documents of the Project with a separate line items on environmental, social, health and safety management in the BOQ. For effective implementation of the ESMP, inclusion of specific conditions in bidding document such as inclusion of ESMP, Contractor's qualification, submitting ESHS performance security, submission of ESHS-MSIP, Recruitment policy for locals and Workers Code of Conduct especially related to SEA/SH/GBV shall be of vital importance. The timely implementation of ESMP will reduce negative impacts. The ESMP is a living document and will need to be updated by PIU-KWSSIP prior to starting of the intervention in case any significant changes in the project scope of work are anticipated.

List of Annexures

Annexure 4-1: Tree Inventory – Old Pipri Mains

S. No.	Name Of Species	Common Names	IUCN Status	Pipri-Y point-Future Pump
TREES				
1.	*Acacia nilotica*	Babur	LC	16
2.	*Albizia lebbeck*	Siris	LC	5
3.	*Azadarichta indica*	Neem	LC	463
4.	*Bombax ceiba*	Simbal, Simal.	LC	1
5.	*Callistemon citrinus*	Bottle brush tree	-	12
6.	*Casuarina equisetifolia*	She oak tree	-	11
7.	*Conocarpus lencifolius*	Cono	NT	874
8.	*Cocos nucifera*	Coconut palm	NE	01
9.	*Dalbergia sissu*	Sheesham	LC	-
10.	*Delonix regia*	Gul e mohar tree	LC	32
11.	*Eucalyptus citriodora*	Safeda	LC	86
12.	*Ficus elastica*	Rubber tree	NE	18
13.	*Ficus Benghalenses*	Bargad	NE	15
14.	*Ficus microcarpa*	Ficus	LC	24
15.	*Ficus palmata*	Phagwara, Anjir, Patguleri	NE	3
16.	*Ficus religiosa*	peeple	NE	27
17.	*Ficus virens*	Jangli Pipit, Man, Palakh	LC	13
18.	*Guaiaum officinale*	Lignum	EN	24
19.	*Leucaena leucocephala*	White lead tree	NE	49
20.	*Mangifera indica*	Mango/ Aam	DD	5
21.	*Manilkara zapota*	Cheeko	LC	-
22.	*Melia azedarach*	Baqain	NE	09
23.	*Moringa oleifera*	Moringa/sowanjhna	LC	21
24.	*Parkinsonia aculeata*	Mexican Palo-Verde	LC	06
25.	*Phoenix dactylifera*	Date palm	NE	23
26.	*Pithecellobium dulce*	Jungle jalebi/ Madras Thorn	LC	9
27.	*plumeria obtusa*	Champa	LC	7
28.	*Plumeria rubra*	White champa	LC	12
29.	*Polyathia longifolia*	False Ashoka	NE	14
30.	*Prosopis glandulosa*	Vilayati keekar	LC	-
31.	*Ricinus communis*	Arand, Castor-Oil Plant.	NE	7
32.	*Salvadora oleidis*	Khabbar	LC	-
33.	*Syzygium cumini*	Jamun/ Java plum,	LC	-

S. No.	Name Of Species	Common Names	IUCN Status	Pipri-Y point-Future Pump
34.	*Tamarindus indica*	Immli	LC	-
35.	*Terminalia catappa*	Badam	LC	1
36.	*Ziziphus jujuba*	Sufi beer	LC	07
			Total	**1795**
Herbs				
1.	*Agave americana*	century plant	LC	x
2.	*Aloe vera*	Aloevera	NE	x
3.	*Alternanthera sessilis*	sessile joyweed	NE	x
4.	*Anagallis arvensis*	Scarlet pimpernel	NE	x
5.	*Asphodelus tenuifolius*	Onion weed	NE	x
6.	*Amaranthus virdis*	Chull	NE	x
7.	*Blepheris sindica*	Asad	NE	x
8.	*Boerhavia procumbens*	Sentori	NE	x
9.	*Brassica juncea*	Sarson	NE	-
10.	*Brassica nigra*	Kali Sarson	LC	-
11.	*Corchorus olitorius*	Jute mallow	NE	x
12.	*Cleome brachycarpa*	Ponwar	NE	x
13.	*Eclipta alba*	Bhringraj	LC	x
14.	*Euphorbia hirta*	Asthma Weed	NE	x
15.	*Heliotropium crispum*	---	NE	x
16.	*Ipomoea cairica*	Messina creeper/ Mile a minute vine	LC	x
17.	*Iphiona grantioides*	Cutch Inula	NE	-
18.	*Canna indica*	Hakik	NE	x
19.	*Cassia senna*	Senna-i-Makki	NE	--
20.	*Convolvulus glomeratus*	Clustered Bindweed	NE	x
21.	*Chenopodium sp.*	wild spinach and fat-hen,	NE	x
22.	*Cleome brachycarpa*	Ponwar	NE	x
23.	*Cressa cretica*	Rudranti	LC	x
24.	*Datura alba*	Tooh	NE	x
25.	*Fagonia indica*	Dhamasa, Dhamana	NE	x
26.	*Musa paradisiaca*	Banana/ keela	NE	-
27.	*Melilotis indica*	-	NE	x
28.	*Pavonia arabica*	Arabian Swamp Mallow	NE	x
29.	*Peristrophe paniculata*	Atrilal, Ubut kundri	NE	x
30.	*Portulaca oleracea*	Kulfe Ka Sag, Salunak,	LC	x

S. No.	Name Of Species	Common Names	IUCN Status	Pipri-Y point-Future Pump
		Lunak, Khurfa.		
31.	*Phyla nodiflora*	Makna, Wakan, Jal-nim	LC	x
32.	*Physalis divaricata*	Pygmy Groundcherry	NE	x
33.	*Rhynchosia minima*	burn-mouth-vine	LC	x
34.	*Sida ovata*	Oval-Leaf Fan	NE	x
35.	*Senna holosericia*	Jangli Sana.	NE	x
36.	*Solanum albicaule*	bittersweet nightshade	NE	x
37.	*Solanum nigrum*	Mako, Kach-Mach	NE	x
38.	*Solanum surratense*	kundiari, 'Momoli, Mokri	NE	x
39.	*Sonchus asper*	Sow thistles	NE	x
40.	*Tetraena simplex*	Alethi, Putlani	NE	x
41.	*Tagetes erecta*	marigold	NE	x
42.	*Tephrosia purpurea*	Wild Indigo	LC	x
43.	*Tribulus terestris*	puncture vine	LC	x
44.	*Tridax procumbens*	coatbuttons or tridax daisy	NE	x
45.	*Trichodesma indicum*	*Indian Borage*	NE	x
46.	*Vernonia cinerea*	Little Ironweed	NE	x
Shrubs				
1.	*Abutilon fruticosum*	Texas Indian mallow	NE	x
2.	*Abutilon indicum*	India Abutilon	NE	x
3.	*Acalypha wilkesiana*	Fire Fiji Plant	NE	-
4.	*Achyranthes aspera*	Ubat kandi	NE	x
5.	*Adenium obesum*	Desert rose	LC	-
6.	*Aerva javanica var javanica*	Booh	NE	x
7.	*Barleria acanthoides*	Asad	NE	-
8.	*Bougainvillea spectabilis*	Great bougainvillea	NE	x
9.	*Capparis decidua*	Karil, Karir	LC	x
10.	*Caesalpinia bonduc*	Katkaranj, Khayah-i-iblis.	LC	-
11.	*Calotropis Procera*	Aak	NE	x
12.	*Catharanthus roseus*	Sada bahar	NE	x
13.	*Cordia myxa*	Lasura	LC	-
14.	*Dracaena marginata*	Madagascar dragon tree	NE	-
15.	*Dracaena reflexa*	Song of india	LC	x
16.	*Dracaena trifasciata*	Snake plant	NE	-
17.	*Echinops echinatus*	Indian globe thistle	NE	-
18.	*Euphorbia caducifolia*	Thuhar/ leafless milk hedge	NE	-
19.	*Euphorbia milii var.*	Crown-of-thorns'.	LC	x

S. No.	Name Of Species	Common Names	IUCN Status	Pipri-Y point-Future Pump
	milii			
20.	*Euphorbia tirucalli*	African Milkbush	LC	-
21.	*Euphorbia tithymaloides*	Devil's Backbone	LC	-
22.	*Ficus benjamina*	Kabar	LC	-
23.	*Ficus carica*	Injeer/ fig	LC	x
24.	*Heliotropium rariflorum*	-	NE	x
25.	*Hibiscus rosa-sinensis*	China rose	NE	x
26.	*Ipomoea cornea ssp. fistulosa*	Bush Morning Glory	NE	-
27.	*Ixora coccinea*	Flame of the woods.	NE	x
28.	*Jatropha integerrima*	Peregrina, Spicy Jatropha	NE	-
29.	*Jatropha gossypiifolia*	bellyache bush	LC	x
30.	*Jasminum sp.*	Jasmine	NE	-
31.	*Murraya koenigii*	Karri patta plant	LC	-
32.	*Nerium oleander*	Oleander/ Ganira, Kunair	LC	x
33.	*Ocimum basilicum*	Niazbo	NE	-
34.	*Peristrophe paniculata*	Atrilal, Ubut kundri	NE	x
35.	*Pluchea lanceolata*	armei, Reshami, Phar Buti	NE	x
36.	*Prosopis juliflora*	Vilayati keekar	NE	x
37.	*Pseuderanthemum reticulatum*	Gold-Veined Eranthemum	NE	-
38.	*Rosa indica*	Rose	NE	x
39.	*Salsola imbricata*	Lana, Gora Lana, Hashok	NE	x
40.	*Salvadora persica*	khabar	LC	x
41.	*Sueda fruticosa*	Laani/ Laana	NE	x
42.	*Tamarix indica*	Lai/	NE	-
43.	*Tamarix aphylla*	lai	NE	x
44.	*Tephrosia sp.*	-	NE	x
45.	*Withania somnifera*	Aksan	NE	x
46.	*Ziziphus nummularia*	Jungle berr/ berri	NE	x
Grasses				
1.	*Cenchrus ciliaris*	Buffalo Grass	LC	x
2.	*Chloris barbata*	Ganni, Jargi.	NE	x
3.	*Desmostachya bipinnata*	Drabh	LC	x

S. No.	Name Of Species	Common Names	IUCN Status	Pipri-Y point-Future Pump
4.	*Dactyloctenium aegyptium*	Egyptian crowfoot grass	NE	x
5.	*Dactyloctenium scindicum*	Sind Crowfoot Grass	NE	x
6.	*Phragmites australabalis*	Kaano	LC	x
7.	*Sorghum halepense*	Johanson grass	NE	x
8.	*Saccharum griffithii*	-	NE	-
9.	*Typha sp,*	*Booh/ bulrush*	LC	x

NOTE:

NE=NOT EVALUATED, LC= LEAST CONCERN, DD= DATA DEFICIENT, NT= NEAR THREATENED, EN= ENDANGERED, CR= CRITICALLY ENDANGERED

***=** This mark on *Commiphora wightii* is because we did not observe this plant inside the Hub plant but outside the boundaries, there were many plants seen

Annexure 4-2: Details of Recorded / Reported Fauna

b) Terrestrial Mammals

The presence of mammals was recorded through direct sightings, their burrows, tracks and footprints, and local information about their presence. A total of 07 mammals species have been recorded during the field visits in the AoI. All recorded mammalian species are common in nature. These may be encountered during clearance and excavation, and may get disturbed due to construction activities. No significant impacts are expected on recorded faunal species as these can naturally disperse easily from one habitat to the other during construction activities.

List of the mammalian species observed in the project area is given in **Table A4-1**.

Table A4-1: List of mammalian species observed/reported in the project area

No.	Common Name	Scientific Name	Occurance			Listing
			Common	Less Common	Rare	IUCN Red list
1.	House Mouse	*Mus musculus*	**x**			**LC**
2.	Five stripped-palm Squirrel	*Funambulus pennantii*	**x**			**LC**
3.	House Shrew	*Suncus murinus*	**x**			**LC**
4.	Indian Gerbil	*Tatera indica*	**x**			**LC**
5.	Little Indian field Mouse	*Mus booduga*	**x**			**LC**
6.	Indian Grey Mongoose	*Herpestes edwardsi*	**x**			**LC**
7.	House Rat	*Rattus rattus*	**x**			**LC**

c) Reptiles

A total of 03 reptile species mentioned in **Table A4-2** have been recorded in the project area. All of the species are common in nature. The project activities may disturb them for some time, however, these species are capable of adapting to changes in their habitat.

Table A4-2: List of Reptiles Reported in the Project Area

No.	Common Name	Scientific Name
1	Indian Fringe-toed Sand lizard	*Acanthodactylus cantoris cantoris*
2	Garden Lizard	*Calotes versicolor*
3	Spotted Indian House Gecko	*Hemidactylus brookii brookii*

d) Avifauna / Birds

A total of 21 bird species have been recorded in the project area. Out of the total 21 recorded species, none is on IUCN Red List. However, one species is listed on CMS appendix II and three are listed on Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) appendices i.e. Black Kite, Blue Rock Pigeon and Rose-ringed Parakeet. List of birds observed / reported in the AoI during field surveys is provided in **Table A4-3**. It is to be noted that all the bird species have been recorded in the broader area of the project, and not specifically on or along the project AoI. Due to the distance of their habitat from the project area, no bird species are expected to be disturbed by the project's construction activities.

Table A4-3: Birds Recorded / Reported in the Project Area

S. No	Common Name	Scientific Name	Priority Water Network	Status			Listing		
				Migratory	Resident	W P Act	IUCN Red List	CMS Appendix	CITES
1.	Bank Myna	*Acridotheres ginginianus*	x		x				
2.	Black Drongo / King Crow	*Dicrurus macrocercus*	x		x				
3.	Black Kite	*Milvus migrans*	x		x	P			II
4.	Blue Rock Pigeon	*Columba livia*	x		x				III
5.	Collared Dove	*Streptopelia decaocto*	x		x				
6.	Crested Lark	*Galerida cristata*	x		x				
7.	Grey Partridge	*Francolinus pondicerianus*	x		x				
8.	House Crow	*Corvus splendens*	x		x				
9.	House Sparrow	*Passer domesticus*	x		x				
10.	House Swift	*Apus affinis*	x		x				
11.	Indian Myna/Common Myna	*Acridotheres tristis*	x		x				
12.	Indian Tree-Pie	*Dendrocitta vagabunda*	x		x				
13.	Jungle Babbler	*Turdoides striatus*	x		x				
14.	Koel	*Eudynamys scolopacea*	x		x				
15.	Little Green Bee-eater	*Merops orientalis*	x		x				
16.	Pied Bushchat	*Saxicola caprata*	x		x				
17.	Purple Sunbird	*Nectarinia asiatica*	x		x				
18.	Red-vented Bulbul	*Pycnonotus cafer*	x		x				
19.	Red-wattled Lapwing	*Hoplopterus indicus*	x		x				
20.	Rose-ringed Parakeet	*Psittacula krameri*	x		x				III
21.	White-cheeked Bulbul	*Pycnonotus leucogenys*	x		x				

Annexure 4-3: Social Questionnaire

Questionnaire for Institutional Consultation

Name of department _____ **District** _____

Name of consulted representative _____**Designation** _____

Health

Health facilities	Total Numbers in district
District Hospitals	
BHU	
RHC	
MCH	

What major water brown disease are observed in the district?

_____
_____
_____
_____

What measures are taken by the health department/Ministry to overcome these diseases?

_____
_____
_____
_____

What would be the social or environment impacts on peoples by the implementation of this project?

1. _____
2. _____
3. _____

How your institution can help to this project for increasing its efficacy for the public interest

1. _____
2. _____
3. _____

Name of interviewer _____ **Date** _____ **Designation** _____

Name of interviewer _____ **Date** _____ **Designation** _____

Questionnaire for Institutional Consultation

Name of department _____ **District** _____

Name of consulted representative _____**Designation** _____

Education

Total no of primary schools in district	Girls	Boys
Estimated enrollment		
School having washroom facilities		
Schools having drinking water facilities		

What kind of problems you are facing with current sewerage system /how it is effecting to the enrollment in schools

_____
_____
_____
_____

Through this project implementation, how it would benefit you/education department

_____
_____
_____
_____

Any campaigns are runned by education department or any other institution on health and hygiene if yes what was the campaigns?

_____
_____
_____
_____

Any suggestions

_____
_____
_____
_____

Name of interviewer _____ **Date** _____ **Designation** _____

Name of interviewer _____ **Date** _____ **Designation** _____

Questionnaire for Institutional Consultation

Name of department _____ **District** _____

Name of consulted representative _____**Designation** _____

Fisheries

What are the effects/problems facing the fisherman's due to untreated sewer water wasted in marine

_____
_____
_____
_____

What kind of water born disease are they facing?

_____
_____
_____
_____

What kind of skin disease they are facing due to direct exposure to marine water?

_____
_____
_____
_____

How this project will impact on fisherman's community?

_____
_____
_____
_____

What are your suggestions?

_____
_____
_____
_____

Name of interviewer _____ **Date** _____ **Designation** _____

Name of interviewer _____ **Date** _____ **Designation** _____

Questionnaire for Institutional Consultation

Name of department _____ **District** _____

Name of consulted representative _____**Designation** _____

Agriculture

The vegetables cultivated on waste water are good enough for health ❑ Yes ❑ No

If yes then how

_____
_____
_____
_____

If no then wat are the adverse effects of these on health

_____
_____
_____
_____

How departmentally these are these are prohibited

_____
_____
_____
_____

How this project will effect on improving the public health?

_____
_____
_____
_____

Any suggestion or recommendation

_____
_____
_____
_____

Name of interviewer _____ **Date** _____ **Designation** _____

Name of interviewer _____ **Date** _____ **Designation** _____

Socio-Economic Survey (Key Informant) Questionnaire

Questionnaire No. | | | | |

1. Geographic location

Settlement / Kachi Abadi _____Tehsil/town_____ District _____

North _____ South _____

Respondent Name_____ Fathers Name _____ Age _____

Education (❑ Yes / ❑ No) if yes then what is qualification _____

Family size

Male	Female	System of family		Children
		Joint	Single	

2. Estimated population of area

Total no of HH	No. Mohalla / Streets	Type of Housing Units

3. Source of Drinking water

Water Supply	Groundwater / Hand-Pump	Water Filter Plant	Masjid	Bottle Water

a) Condition of available water sources

Easy Access	Partially Easy Access	Un Fit

b) availability of water supply water for houses

No of hours per day_____ no# houses for available #_____

c) ground water condition for use

Sweet water	Water table

d) Usages of ground water

Cleaning	Bathing	Cooking	Drinking	Other

e) do you use of treatment technique at house

❑ Yes ❑ No if yes what_____

f) how would you rate the quality of drinking water

❑ Good ❑ Acceptable ❑ Poor ❑ don't know

g) is there any water treatment facility available in village

❑ Yes ❑ No nearby is _____ it functional ❑ Yes ❑ No

h) in which months availability of water is most vulnerable _____

i) major water born disease _____

4. Sanitation

Do you have toilet within house premises ❑ Yes ❑ No how many_____

a) Types of toilet available in house

Flush to piped sewer system	Flush to septic tank	Flush to pit	Flush to open sewerage	Compositing toilet	PIT latrine	Bucket	Hanging toilet	Open defecation	others

How your HH disposes off waste water _____

How dispose of the solid waste collection _____

Any treatment measures are taken _____

5. General

Is there any NGO working on water or on sanitation? ❑ Yes ❑ No

If yes specify how / what type of /project doing ? _____

Your suggestions on to improved and effective water and sanitation system

_____

_____

Socio-Economic profile

(Focus Group Discussion)

1. Geographical information

Locality_____ Tehsil/Town_____ District _____

2. Population

Estimated population_____ No. HH_____

Family system

❑ Joint (in percentage) ❑ single_____

Structure of Housing

❑ Kachaa ❑ Pacca ❑ Kacha and Pacca

3. Ethnicity

S. No	Communities	No./Percentage (approx.)
Total		

4. Languages

❑ Sindhi ❑ Urdu ❑ Pashto ❑ Srieky ❑ Others _____

5. Major occupations

S. No	Occupation	Percentage

6. Educational facilities

Description	No. of institution				In case of no. nearest to the locality
	Girls	Boys	Girls	Boys	
Primary school					
Middle school					
High school					
Colledge					
Madersa					
Other (specify)					

7. Health facility

❑ Facility within village _____

❑ Government hospital _____

❑ BHU _____

❑ Mother and child care Health unit _____

❑ Dispensary _____

❑ Hakeem / Practitioners _____

8. Common Diseases in Village

❑ Malaria ❑ Typhoid ❑ Polio ❑ TB ❑ Diarrhea ❑ Haptitas

❑ Skin diseases ❑ Eye Diseases ❑ Any other) _____

9. Civic infrastructure

Type of Amenity	Available in the village	Available in nearby village/locality	Distance from the village
Electricity			
Water supply/Tap water			
Sui-Gas			
Fuel cylinder			
Filling station (patrol/Gas)			
Fuel Agency			
Cable Television			
Access to internet			
Telephone (land line)			
Post office			
Bank			
Mosque			
Graveyard			
Other			

10. Source of drinking water

Tap water/ water supply	Hand-pump	Bottled water	Public Filtration plant	Stream /canal	Others

Water table (ft) _____

Quality of table water for drinking

Excellent	Good	Unfit

11. Sewerage system availability in in locality ❑ Yes ❑ No

If not then where do you disposes your sewerage

Open pit	Septic tank	Open drain	Pipe	Socking pit	Other

Do you have any system for collection of solid waste ❑ Yes ❑ No

a) If yes give details _____

b) If No, then where do you dump your waste _____

Leadership Patterns

12. Who is the most influential person in the village

Designation	Name
MNA/MPA	
UC Member	
Village elder	
Teacher	
Cast/family elder	
Religious leader	
Other	

13. Conflict resolving patterns

How conflicts are resolved

Jirga	Tribal/cast/head	Family head	Court	Any other

14. Women participation

S. No	Activities	Participation Tick (yes/No)	Hours per day	% of Contribution
1.	House Hold			
2.	Child caring			
3.	Farming/crop activities			
4.	Livestock raring			
5.	Sale and purchase of goods			
6.	Produce products			
7.	Do formal jobs			
8.	Others			

a) Women contribute in HH income ❑ Yes ❑ No

If yes, how

_____

_____

b) Are women consulted in decision making matters ❑ Yes ❑ No

If yes, in what matters?

c) Is there any industry in your village or in the vicinity? ❑ Yes ❑ No

If yes which industry?

15. Does any NGO or CBO exist in the area? ❑ Yes ❑ No

If yes: explain their names and activities?

Do there exist any vulnerable households in the area ❑ Yes ❑ No

Widows	Handicapped	Homeless	Others

16. Specify the nearest facility or amenity? (KM)

❑ Police station ❑ Grain Market ❑ Cattel Market ❑ Other

State the pressings needs of the area

Any development in progress at your village regarding community benefit

Community perception about the project

Any specific observations

a) _____

b) _____

Facilitator: _____ **Date:** _____

Facilitator: _____ **Date:** _____

Annexure 5-1: WB Health & Safety Framework – South Asia Region (SAR)

Table of Contents

1 Overview

Health and Safety is defined as the process of anticipation, recognition, evaluation and control of hazards arising in or from the workplace and the community that could impair the health, safety and well-being of workers, considering the possible impact on the surrounding communities and the general environment. The Health and Safety Framework outlines the management of workplace and community hazards and take appropriate preventive measures to make workplace and community safer and healthier.

2 Purpose

This document is a framework for the Borrower to implement a practical approach to manage Occupational Health and Safety (OHS) and Community Health and Safety (CHS) impacts and risks in accordance with national/local regulatory framework, the World Bank Environmental and Social Standards and Environmental Health and Safety (EHS) Guidelines, ISO Standards, Good International Industry Practices (GIIP), etc. This framework document will be in accordance with the following:

- National laws including Acts, Regulations, Codes of Practice, Guidelines, etc. where the project is located.
- ESS2 – Labor and Working Conditions
    - The Borrower will develop and implement written labor management procedures applicable to the Project.
    - Measures relating to occupational health and safety will be applied to the project. The OHS measures will include the requirements of ESS2 and consider the General Environmental Health and Safety Guidelines (EHSGs) and, as appropriate, the industry-specific EHSGs and other GIIP.
    - The OHS measures will be designed and implemented to address, (a) identification of hazards, (b) provision of preventive and protective measures including method statements, safe work procedures, etc., (c) training of project workers, (d) documentation, reporting, and remedies of occupational incidents, (e) emergency prevention and preparedness and response arrangements to emergency situations, and (f) remedies for adverse impacts such as occupational injuries, deaths, disability and disease.
    - All parties who employ or engage project workers will develop and implement procedures to establish and maintain a safe working environment, including that workplaces, machinery, equipment and processes under their control are safe and without risk to health, including by use of appropriate measures relating to chemical, physical and biological substances and agents. Such parties will actively collaborate and consult with project workers in promoting understanding, and methods for, implementation of OHS requirements, as well as in providing information to project workers, training on occupational safety and health, and provision of personal protective equipment without expense to the workers.
    - Workplace processes will be put in place for project workers to report work situations that they believe are not safe or healthy, and to remove themselves from a work environment which they have reasonable justification to believe presents an imminent

and danger to their life or health. Project workers will not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal.

- Project workers will be provided with facilities appropriate to the circumstances of their work, including access to canteens, hygiene facilities, and appropriate areas for rest.
- A system for regular review of occupational safety and health performance and the working environment will be put in place and include identification of safety and health hazards and risks, implementation of effective methods for responding to identified hazards and risks, setting priorities for mitigation actions, and evaluation of results.
- Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) reporting, prevention and management in the workplace must be addressed in the project health and safety management plan and in the labor management procedures.

- ESS4 – Community Health and Safety (CHS)
  - The Borrower will develop, implement and review/update (as required) a CHS Management Plan or CHS Management measures which will be included in the Environmental and Social Management Plan (ESMP) applicable to the Project.
  - Conduct risk assessment to identify and assess the risks and prevent their adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and nonroutine circumstances.
  - Implement appropriate control measures to avoid or minimize community exposure to project-related traffic and road safety risks, diseases, and hazardous materials.
  - Ensure the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.
  - Ensure appropriate community emergency preparedness and response plan is available and communicate to all stakeholders to address emergency events.
  - Community engagement, communication and reporting processes shall be developed and implemented for community members to report health and safety incidents, incidents (including complaints) must be investigated appropriately, and action plans implemented and communicated to the community.
  - The Borrower will promote quality and safety, and considerations relating to climate change and natural disasters, in the design and construction of infrastructure projects, including dams.
  - SEA/SH reporting, prevention and management for local communities must be addressed in the project health and safety management plan.

- World Bank Group Environmental Health and Safety Guidelines (EHSGs), 2007.
- International Labour Organization (ILO) Code of Practice: Safety and Health in Construction Industry, 1992.
- ILO Codes of Practice: Safety and Health in Building and Civil Engineering Work, 1972.
- International Organization of Standardization (ISO) Standards. Examples include 45001 - Occupational Health and Safety Management Systems, ISO 4007 – Eye and Face Protection, ISO

20345 – Safety Footwear, ISO 3873 – Industrial Safety Helmets, ISO 20345 & ISO 16024 – Fall Protection.

- Good International Industry Practices (e.g., UK HSE Executive, Safe Work Australia, US OSHA, Global Reporting Initiative (GRI)).

3 Scope

The Health and Safety Framework is applicable on all World Bank-financed projects in the South Asia Region (SAR).

4 Implementation of the Health and Safety Framework

The implementation of this framework should adopt a risk-based approach when applying to the World Bank-financed projects. It is critically important that the project conducts impact/risk assessments (environmental, social and health & safety) to identify and assess impacts and risks both in the workplace and in the community.

For OHS impacts and risks, the Borrower shall develop and implement a Health and Safety Management Plan (HSMP) to manage OHS impacts/risks. The detail and comprehensiveness of the Project HSMP should be based on the risk and not on the size of the project or types of contracts (ICB, NCB, etc.). All projects are required to have a HSMP that includes all elements of this framework (e.g. policy, organization, emergency management, etc.). In large (mega) projects where the risk assessment identified multiple significant risks (substantia/high), it is advisable that the Contractor (or Subcontractor) prepare and implement H&S sub plans to manage these risks and will be included in the annex of the Project HSMP. A Project HSMP Plan template is provided in Annex 1.

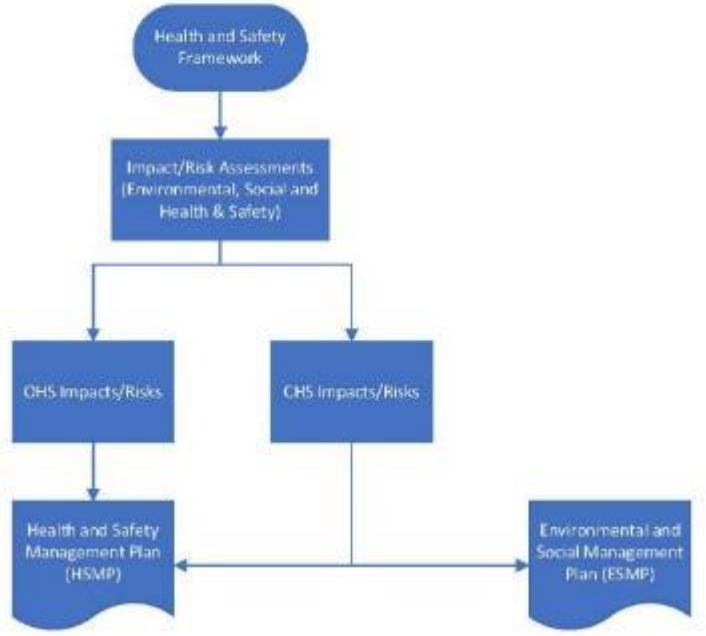
The Borrower is responsible for the project and shall ensure that this Health and Safety Framework is applied. The Borrower can delegate/assign the PIU or Contractor to develop and implement a HSMP to address the Health and Safety Framework requirements and to manage health and safety impacts and risks at the project operational level.

For CHS impacts and risks, the Borrower shall address and manage CHS impacts/risks under the Environmental and Social Management Plan (ESMP) and to some extent in the Health and Safety Management Plan (HSMP).

In some situations, there may be overlapping of the management plans due to project activities impacting both the workers and local communities. For example, road construction projects have significant impacts to workers and local communities and will require robust plans to manage OHS and CHS risks.

The Health and Safety Framework implementation flowchart is provided below (Figure 1).

Figure 1. Health and Safety Framework Implementation Flowchart



Note: CHS impacts and risks may overlap both management plans (HSMP and ESMP) in some projects, e.g. road construction (traffic management plan) will impact both workers and the community.

The Health and Safety Management Plan (HSMP) is the key tool to manage health and safety risks and impacts associated with the Project. Its core purpose is to ensure that all activities are planned, carried out, controlled and directed with consistent, approved, health and safety management practices, procedures or standards.

The HSMP should be applied as a living document and undergo routine review and updates when any of the following happens:

- There is a change in the scope of the project, or
- There is a change in construction methodology/technique based on site condition, or
- Following a major incident/near miss, or
- New or emerging health and safety risks (e.g. disease pandemic), or
- Change in local legal/regulatory requirements, or
- At the end of the Project (to allow for improvements in subsequent projects).

The PIU/Contractor is responsible for the review and update of the HSMP and communicate with relevant stakeholders (e.g. workers, subcontractors, suppliers, local communities, etc.).

In addition, the Contractor/Sub-Contractor can also prepare, submit and implement H&S sub-plans, procedures or SOPs to address specific work activity hazards either as a separate document or as part of the HSMP.

There should be one overall project HSMP that outlines the management of health and safety risks. Do not duplicate efforts by having multiple Health and Safety Plans for contractors, subcontractors, suppliers, etc.

5 Health and Safety Management Strategy - Working Together for Success

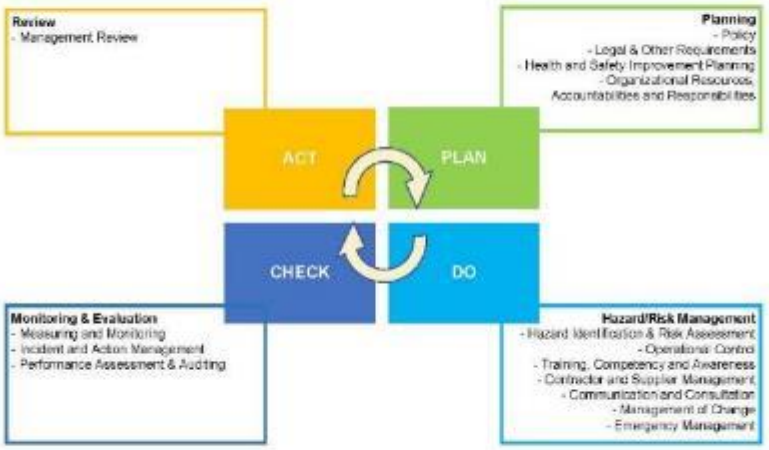
The responsibility for safety cannot be "delegated" to the "OHS Officer or Manager". The OHS staff of the PIU and/or Contractor support line management by assisting in jobsite training, serving as trained and knowledgeable observers, providing administrative assistance, monitoring and evaluating the success of the safety program and acting to continuously improve this plan. While this role is important, commitment and active participation by everyone, every day, on every task, is necessary if the PIU and Contractor are to achieve the level of health and safety excellence, both in the workplace and in the community, that the Borrower expects.

6 Health and Safety Management System

The PIU/Contractor management goal is to aspire Zero Harm to all workers and the community members while carrying operational activities. To achieve this goal, the PIU/Contractor shall prepare a HSMP in accordance with the minimum expectations in line with the policies, standards and best practices noted in this framework (e.g. ESS2 & ESS4, ISO, GIIP, etc.). The HSMP is an overarching health and safety management system for the project. All 15 elements of this framework must be included in the HSMP. In addition, safe work processes and procedures (e.g. Work Statements, SOPs, Work Instructions, etc.) must be developed and implemented for complex and high-risk activities. For example, Operational Control is one of the key elements, and it is expected that in high-risk work activities (e.g. crane lifting, tunnelling, etc.) the Contractor must develop and apply SOPs/Safe Work Procedures to operate safely.

The Health and Safety Management System is designed on the principles of continual improvement and adopts the methodology of Plan, Do, Check and Act (PDCA) (Figure 2). The structure of the management system generally follows the layout of common international standards such as the ISO 45001 and OHSAS 18001 where key elements of the system are aligned to PDCA.

Figure 2. PDCA – Health and Safety Management System



Given all the resources of standards, procedures and guidelines that have been described, the PIU/Contractor shall comply with the following principles:

- Wherever there is a conflict in guidance of the above, the more stringent safety requirement shall be applied. The PIU/Contractor must make sure that all applicable national laws and regulations are always complied.
- In this document 'Shall' and 'Must' signifies a mandatory requirement whereas 'Should' will be used to mention a recommended practice that the PIU/Contractor management will strive to accomplish.

7 Health and Safety Framework Elements

7.1 Element 1 - Health and Safety Policy

The PIU/Contractor must develop a Health and Safety Policy that establishes a clear set of objectives and targets for the effective management of Occupational Health and Safety (OHS) and Community Health and Safety (CHS) performances for the project. It should be consistent with the World Bank's codes of business practice (e.g. Environmental and Social Framework and Standards) and aligned to the local legal framework and requirement.

The Health and Safety Policy must commit to:

a) The prevention of incidents that may lead to injuries, illnesses, pollution, property and environmental damage, security, process losses and product quality impacts.
b) Compliance with legal and other requirements, including international accords and external requirements to which the Borrower is committed.
c) The effective management of OHS and CHS risks and impacts.

d) Establishing measurable objectives and targets for improving OHS CHS performance.
e) Providing the resources needed to meet OHS/CHS performance objectives.
f) Encouraging worker participation and promoting awareness of OHS/CHS risks and opportunities.

The PIU/Contractor shall establish project specific measurable targets to achieve above mentioned objectives. The determination of these targets is based upon the drive for continuous improvement, external peer group benchmarking and stakeholders' input.

7.2 Element 1 - Human Rights Policy

The Borrower's human rights policy should have focus on the responsibility to respect human rights and play a positive role in the communities where they operate. To this end, the Borrower (PIU/Contractor) should commit to respecting human rights as set out in the United Nations Universal Declaration of Human Rights and the International Labour Organization (ILO) Declaration on Fundamental Principles and Rights at Work, as well as adhere to the United Nations Guiding Principles on Business and Human Rights, the Voluntary Principles on Security and Human Rights and the World Bank Environmental and Social Standards (ESS) 2: Labor and Working Conditions.

The Borrower (PIU/Contractor) must continually assess the human rights context of their activities, including impacts that they may cause and those to which they may contribute or be directly linked. This determines the prevention, mitigation and control measures required, including using leverage from their business relationships.

The Borrower (PIU/Contractor) should recognize, respect and abide by all project workers, community worker, and employment laws and expect their subcontractors and other third-party companies to meet the same standards. No child or forced labor and discriminatory behavior is allowed under the project/program – by the contractors or sub-contractors or primary suppliers.

The Borrower (PIU/Contractor) should value and respect the traditions, diversity and the culture of different communities in the project area where they do business.

The Borrower (PIU/Contractor) should recognize the effect that their activities may have on local communities, and they should strive to engage in a meaningful way with the communities where they do business to help ensure that they positively contribute to the welfare of the local communities.

The Borrower (PIU/Contractor) preferably should endeavor to conduct business with communities who share their values and business principles.

7.3 Element 2 - Legal and Other Requirements

All applicable OHS/CHS legal requirements such as national laws and regulations, World Bank ESS2 & ESS4, etc. must be identified, evaluated for compliance and documented in a project legal register.

The project legal register must:

a) Define accountability for maintaining compliance or conformance to each requirement.
b) Be reviewed regularly for currency, and expiry/renewal dates.
c) Include or provide reference to records that show periodic evaluation of compliance.
d) Include relevant legislative obligations (international, federal, state/provincial, regional or local).

e) Include relevant Borrower policies and standards and external voluntary commitments.
f) Include any other requirements, such as license, codes of practice and product quality obligations.
g) Be accessible to the relevant personnel and stakeholders.

Any new/periodic changes or updates must be communicated to relevant stakeholders.

7.4 Element 3 - Risk Assessment

Risk assessment involves hazard identification and risk management, which are core activities to manage OHS/CHS risks and performance. The objective is to ensure OHS/CHS hazards are timely identified, and their resulting risks to people, property, assets and the environment are evaluated and managed.

A risk assessment is a critical examination of health and safety hazards at a project worksite and to ensure the PIU/Contractor to implement corrective measures to protect workers from health and safety hazards in the workplace.

A community health and safety risk assessment is required to identify, assess and manage for all World Bank financed projects. It is critically important that community health and safety impacts resulted from the project be identified and managed to ensure that the project social license to operate will not be impacted.

The process for analyzing and managing OHS/CHS risk includes:

a) Establishing the context, including acceptability criteria for the risk analysis.
b) Hazards identification to determine risk scenarios and select a suitable level of risk evaluation.
c) Risk estimation outcome and assigning risk ownership.
d) Recording the risk analysis in a risk register.
e) Managing risks according to their classification of either High, Substantial, Moderate, and Low to achieve levels that are deemed to be As Low As Reasonably Practicable (ALARP).
f) Utilizing the hierarchy of control:
    - Elimination of the hazard;
    - Substitution with less hazardous materials, processes, equipment, etc.;
    - Use engineering and process controls;
    - Apply administrative controls or management strategies; and
    - Use of personal protective equipment (PPE).
g) Developing and agreeing on further actions or monitoring of the risks, considering the hierarchy of controls.
h) Verifying the completion of actions.
i) Re-evaluating the risk and classification as appropriate.
j) Reviewing and updating the risk register over time.
k) Documenting, reporting and communicating the risk information.

As noted in the framework implementation section, CHS impacts/risks will be addressed and managed under the ESMP and HSMP.

7.5 Element 4 – Health and Safety Improvement Planning

Establish processes and plans to manage performance and to provide for continual improvement. Objectives and targets must be established for the management of OHS/CHS performance. They must be measurable and contribute to the prevention of incidents or reduce their impact(s).

To enable objectives and targets to be met, improvement plans must be developed, documented and integrated into the overall project planning process.

OHS/CHS improvement plans must:

a) Specify the required resources (both human and financial/budget) needed to meet the objectives.
b) Specify role responsibilities for implementing the improvement plans and their actions.
c) Establish the timeframes for completion of the improvement plans and achieving the objectives.

Project Director, Project Manager, Construction Manager and/or Resident Engineer are fully committed to achieve the above-mentioned targets. Leading and lagging indicators should be established to drive performance to meet these targets.

7.6 Element 5 - Organizational Resources, Accountabilities and Responsibilities

Resources, responsibility and accountability is appropriately allocated for the implementation, maintenance and continual improvement of the Health and Safety Management Plan.

The PIU/Contractor shall establish committees with representatives of workers and management or make other suitable arrangement consistent with national laws and regulations (if available) for the participation of workers in ensuring safe working conditions. A Community Health and Safety Committee comprising of community members may be required under the ESMP/HSMP to address for CHS risks.

All roles with health and safety accountability and responsibilities (including regulatory requirements) must:

- Be documented in role descriptions; and
- Be included in the organization chart specific to the managed site. The organizational charts must be available to all workers and local communities.

Where subcontractors and suppliers are involved, these areas of accountability and responsibility must be clarified with respect to those contractors.

7.7 Element 6 - Training, Competency and Awareness

Processes are established to provide the requisite training, competency and awareness to effectively manage OHS/CHS impacts and risks. There must be a process for the delivery and maintenance of awareness and/or competence based training. Every worker shall receive instruction and training regarding the general safety and health measures common to the project site(s).

All new workers, contractors and/or visitors must undertake relevant safety training. At a minimum, safety induction/orientation training must include reference to the significant OHS/CHS risks identified at the managed site. No person shall be employed in any worksite unless that person has received the necessary

information, instruction, and training to be able to do the work competently and safely. All training must be recorded and documented.

All roles requiring technical certification, registration or licensing are verified and documented. The requisite qualifications/competencies must be maintained for all personnel performing such roles and their associated work activities.

There must be a process to communicate and engage with local community members on CHS impacts and risks. Awareness communications, training and outreach should be conducted throughout the life of the project.

7.8 Element 7 - Contractor and Supplier Management

OHS/CHS risks associated with procured materials, equipment, services and labor are effectively managed.

There must be a process to identify and evaluate risks associated with the planned procurement of materials, equipment, services and labor. This must include an analysis of any downstream implications which may be impacted by the selection. This process must be supported by a written procedure that specifies the criteria for contractor/supplier selection, evaluation and re-evaluation and the rejection of product(s) or material(s).

Individuals engaged on a temporary or casual basis to work within existing managed sites are to be inducted and managed in the same way as permanent staff. There must be a process to ensure all contractor tools and equipment are inspected and evaluated to be in a safe condition and conform to the site's standards and procedures.

7.9 Element 8 - Communication and Consultation

There must be a process to encourage the participation of workers, contractors and community members in activities which promote improvements in health and safety performance. In particular, this must include their appropriate involvement in:

- Hazard identification, risk analysis and determination of controls.
- Incident investigation.
- The development and review of the health and safety policy and objectives.

Workers must be informed about their participation arrangements, including:

- Who is their representative(s) on health and safety matters?
- Time and resources necessary to participate in health and safety activities.
- Access to information that is relevant to current or planned health and safety improvement activities.
- The mechanisms to identify and remove obstacles or barriers to participation.
- Disciplinary actions for safety violations and non-compliances.

There must be a process for communicating about the management of OHS/CHS risks at the various levels of the managed site. This includes, but is not limited to:

- Internal communications to raise awareness about OHS/CHS risks, performance measures and changes or improvements.
- Pre-start meetings or briefings (e.g. toolbox talks) for sharing safety observations/ experiences, lessons learned or raising awareness about OHS/CHS risks.
- Sharing knowledge and lessons learned from around the Project (external to the site, business or site); such as relevant incidents, hazardous conditions or suggested practices.

There must be a grievance process to receive feedback, suggestions and complaints on OHS and CHS matters. This process must include a procedure for documenting, evaluating, implementing (as appropriate) and archiving the improvements.

There must be a process to ensure that, when appropriate, relevant external stakeholders are consulted about pertinent OHS/CHS matters (including statutory and regulatory requirements) as needed.

Communications, engagement and consultation with local communities on CHS matters shall be addressed in the ESMP.

7.10 Element 9 - Operational Control

The Contractor is responsible to manage risks associated with the site's work activities. This shall be achieved by implementing operational controls, as well as other mandated or necessary risk treatment processes to control the risk to As Low As Reasonably Practicable (ALARP).

There must be a process for the development of procedures or work instructions that detail the controls required to treat risks associated with the work activities. These procedures must reference applicable operating criteria, be communicated, available to the appropriate users, and followed.

Plant and equipment must be maintained, inspected and tested to ensure they meet the design descriptions and specifications. All equipment or services provided by third parties, must be inspected, and have the controls verified to ensure the safe operation, and adherence to the health and safety performance objectives.

Where new or non-routine tasks and activities are conducted, the controls identified during the pre-task hazard assessment must be implemented.

Operational controls are health and safety controls designed to eliminate, mitigate or manage the risks/impacts. The Contractor shall develop and implement health and safety controls for risks identified by the project risk register. For example, if a project identified working at height, crane lifting and scaffolding as high-risk activities then the Contractor must develop and implement Working at Height, Lifting, Hoisting & Rigging and Scaffolding procedures incorporating the hierarchy on control concepts (i.e. elimination, engineering, safe work procedures and PPE) to manage these risks. By applying a risk based approach, the Contractor will need to develop and implement operational controls/procedures based only on the risk identified.

Table 1 below summarizes the types of health and safety controls/procedures generally found in civil construction projects. This list is not intended to be all-inclusive as there may be other high-risk activities in projects not listed here.

Table 1 – Health and Safety Controls/Procedures

OHS / Safety Rules (e.g., Golden Rules)	Permit to Work Systems
Excavations and Trenching	Fire Safety
Heavy / Mobile Equipment	Electrical Work / Safety
Barricading and Signs	Hazardous Material Management
Cell/Mobile Phone Use	Equipment Inspection & Maintenance
Safe Driving (Light Vehicles)	Dredging
Material Handling (Loading and Unloading)	Demolition
Traffic Interface Planning / Management	Confined Space
Severe Weather Management	Hot Work (Welding, Grinding, Cutting)
Lifting, Hoisting and Rigging	Hand and Power Tools
Scaffolding	Housekeeping
Work at Height	Lockout/Tagout (Isolation)
Working Near or Over Water	Ladder Safety
Illumination	Hazardous Waste
Ground Support	Fitness for Work (Health/Medical Surveillance)
Water Management	Personal Protective Equipment (PPE)
Tunnelling	Noise Hazard & Protection
Bulk Earthworks and Civil Works	Respiratory Protection
Steel Erection	Working in Heat / Cold
Pressurized Equipment	Manual Handling (Ergonomics) / Vibration
Clearing and Land Disturbance	Fatigue Management
First Aid	Travel and Remote Site Health
Project Worker Welfare Facilities	Animal Bites & Stings
Camp Management	Working Alone
Site Security Management	Radiation (Ionizing and Non-Ionizing)
Blasting and Explosives	Infectious / Communicable Disease (e.g. COVID-19)
Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) Reporting and Management	Other hazards/risks on project site identified through risk assessment

The Contractor shall ensure workers are trained, supervised and applied the required health and safety procedures on managed site.

7.11 Element 10 - Management of Change

There must be a procedure to identify and manage changes to the operational processes and controls that may impact on OHS performance. Changes may be planned or unplanned, sudden or gradual, and temporary or permanent. The procedure must include an analysis of the risks associated with a change and include a contingency to cover emergency situations where the full management of change procedure cannot practically be applied. These situations require the Resident Engineer / Project Manager (or his/her designated deputy) who is accountable for the managed activity to approve the change.

Workers and contractors must be trained to identify what constitutes a change and how to initiate the management of change process.

After completing the change, a formal review must be carried out to evaluate the actual impact against the intended impacts, and to identify the reasons for any deviation.

7.12 Element 11 - Emergency Management

To ensure that the appropriate resources and emergency response plans are prepared, practiced and available. The PIU/Contractor is responsible to develop and implement an Emergency Response Preparedness (ERP) Plan that will provide an effective response for the mitigation, control and recovery from incidents/ accidents including natural disasters which can impact or disrupt the project and/or its managed site(s) and activities.

The PIU/Contractor must clearly define accountability for the ERP and ensure it is adequately resourced. PIU/Contractor must also ensure that individual team members are provided with the relevant training for their required roles. The ERP exercise (drill) must be tested and validated annually. The ERP must be updated to reflect the lessons learned from the exercises and actual incidents.

The process for managing incident communications, notification and reporting must be integrated into the ERP and clearly:

- Identify who is responsible for incident communication, notification and reporting.
- Define how communication protocols are to be conducted with internal and external stakeholders.

The ERP must include local communities during emergencies including natural disasters when the risk and impact assessments identified potential aspects/impacts caused by the project.

7.13 Element 12 - Measuring and Monitoring

The objective is to monitor risks and impacts of the work activities and evaluate the effectiveness of the operational controls. There must be a process for measuring and monitoring the key characteristics of the managed site and its work activities that may have significant OHS/CHS risks. Measuring and/or monitoring can be either qualitative or quantitative but must follow a standardized methodology.

Procedures for measuring and monitoring occupational health exposure and environmental impact must conform to national laws and other international standards that are stated in the contract. Exceedances from specified requirements or limits must be recorded, investigated and reported back to the worker, work area or the community involved. The appropriate actions in response to the exceedance must be recorded, assigned accountability and tracked to completion.

Medical/Health Surveillance

Any medical/health surveillance program must:

- Include project personnel and contractors.
- Be consistent with local regulatory requirements.
- Be designed based on the identification and evaluation of operational health risks.
- Support the project and site's objectives and targets.

7.14 Element 13 - Incident and Action Management

All incidents including near misses must be reported, investigated and corrective actions identified, implemented and communicated. There must be a written procedure for incident management including investigation, reporting and corrective action(s) to prevent recurrence. It must include reference to the appropriate methodologies for:

a) Reporting.
b) Investigating.
c) Analysis of the impact(s) and the potential risk of future incident.
d) Communicating to relevant people/stakeholders.
e) Managing corrective actions to prevent reoccurrence.

The Resident Engineer/Project Director is responsible for all incidents that occurred in the project, and the Site Manager/Supervisor of the involved person(s) must ensure that incident is reported and investigated.

Incident investigations must be completed by competent investigators who have been trained in the appropriate investigation methodology.

All significant incidents must be summarized for lessons learned after the investigation and communicated to all workers and relevant stakeholders.

Community health and safety incidents caused or impacted by the project must be reported, investigated and corrective actions identified, implemented and communicated to the community.

7.15 Element 14 - Performance Assessment and Auditing

A process must be developed for measuring OHS/CHS performance. Metrics must include leading and lagging indicators and be based on qualitative and quantitative data.

Performance must be measured on a regular basis and include an evaluation of:

- the extent to which objectives are being met;
- progress against targets;
- the effectiveness of controls;
- proactive conformance measures; and
- reactive or historical performance measures.

The Contractor should provide a monthly report summarizing the OHS/CHS performance and contain details or summaries of all incidents and progress against corrective actions. The report must be sent to the Project Management Team, the Borrower and other relevant stakeholders.

Audits and Inspections

There must be a process for conducting audits and regular inspections of all work areas including those areas/sensitive areas where there is a potential concern for local communities. The process must include a written procedure, where relevant, to define the scope and depth of audit/inspection and consider:

a) The level of evaluated risk associated with specific activities that the project or site undertakes.

b) The identification of non-conformances with health and safety procedures and the HSMP requirements.
c) The identification of hazards and impacts in the project risk register.
d) Compliance to legal and other requirements as identified and recorded in the legal register.
e) The results of previous audits and inspections.

At the completion of the audit and inspection, a report must be provided to the Resident Engineer/ Project Director, Site Manager and the Supervisor responsible for the work area.

The Project and/or managed site must define an annual schedule of planned audits. The schedule must be developed, based on an evaluation of significant OHS/CHS risks associated with the project or site and the results of previous audits. The audit should be conducted by external third party. Corrective actions to address non-conformance must be assigned and tracked until completion.

7.16 Element 15 - Management Review

The HSMP must be reviewed bi-annually at a minimum. The review must evaluate any need for change and establish actions to improve the HSMP, its processes and resource needs.

Records of completed management review(s) must be retained and include:

a) Decisions and actions relating to possible changes to policy, objectives and targets.
b) Information relating to revised risks and any proposed treatment and controls.
c) Improvement suggestions (including the community) for inclusion into future management plans.
d) Any other alternation, modification and improvement to the HSMP that demonstrates a commitment to continual improvement.

Relevant outputs from the management review(s) must be made available for communication and consultation throughout the project/managed site, the Borrower and relevant stakeholders.

Annex 1 - Health and Safety Management Plan (HSMP) Template

Project title

Effective Date	xxxxxx	**Status**	DRAFT
Version Number	xxx	**Document Number**	xxxxxx

Health and Safety Management Plan

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About the Project Health and Safety Management Plan template

The Project Health and Safety Management Plan (HSMP) is a key document to address the Health and Safety Framework requirements of how OHS and CHS risks will be managed in a project. The HSMP incorporates the 15 elements of the framework to which the Borrower (PIU/Contractor) must address for the project.

Under the Health and Safety Framework, it is mandatory that each project to develop and implement a Project HSMP that identifies the hazard, assess the risk and implement control measures to eliminate or reduce the risk.

The purpose of the Health and Safety Management Plan is to:

- Clearly and succinctly communicate how significant risks in the project will be managed;
- Ensure key requirements including legal / regulatory obligations are considered and met;
- Provide requirements on health and safety standards, procedures and guidelines; and
- Outline how the implementation of the HSMP will be evaluated.

Project personnel and contractors must have access to the HSMP. They should understand it (as it relates to their role) and implement it in their work area, relevant to the hazards encountered by each role.

If a project is subjected to local government regulators management plan template(s), then those templates must be used. Do not duplicate effort.

The Project HSMP should be considered live and dynamic during each stage of the project life cycle. It is recognised that project risks and how they will be managed can change during the life of a project. If the HSMP changes, it must comply with Health and Safety Framework's management of change requirements (Element 10).

This template should be suitable for any project (type and size) with some modifications as required. Additional sub sections may be added as required depending on the size, complexity and risk of the project.

Finally, the Resident Engineer and/or Project Director must determine and justify how this template is to be applied to each project (e.g. a single Plan covering the entire project, or individual Plans or Sub-plans for each work package area, or sub-contractor).

Note: As stated in the Health and Safety Framework, CHS impacts, and risks are addressed in the ESMP. There may be overlapping of CHS and OHS in both the HSMP and ESMP such as road construction where significant risks are found both in the workplace and in the community. In such instances, the Contractor must ensure the HSMP and ESMP requirements are implemented and enforced.

Health and Safety Management Plan

Project title

1 Introduction

1.1 Overview

Describe the purpose of the Project HSMP (e.g. Health and Safety Framework and/or local legal requirements), intended audience (stakeholders), issuance, etc.

1.2 Change Authority

Describe the management of change for any future changes to this HSMP and who can authorize it.

2 Project Description

Provide the project background and scope including the project stage and the activities to be undertaken. Provide brief description of people involved in project (employees, contractors, sub-contractors, suppliers, etc).

3 Objectives

Set out the health and safety objectives and should include Key Performance Indicators (KPIs) to achieve these objectives.

Include any assumptions/ constraints made in the objectives or project scope.

4 Health and Safety Values

4.1 Health and Safety Policy Statement

Insert the Project Health and Safety Policy and/or Contractor Policy (if available) statement.

4.2 Message from Project Leader

Provide an overall vision, values and conduct and behavior expectations from the Resident Engineer or Project Director.

If this template is used by contractors, then the Contractor Director/Manager will address in this space.

5 Health and Safety Organization

Having the appropriate organizational structure and people are essential for the success of a project. Clearly identify and describe the organization structure and people who will be responsible for the management of the project's OHS/CHS risks and compliance to this Plan and other legal requirements. Health and Safety accountability and responsibility must be documented in the role descriptions.

5.1 Team Structure

Short description/ chart of personnel responsible for health and safety management and supervision.

5.2 Roles and Responsibilities

Short description of health and safety roles and responsibilities include the project management team.

Health and Safety Management Plan

6 Legal and Other Requirements

Provide a summary of all the legal obligations with a short description of the main requirement(s) under each obligation (e.g. *Labour Act, Work Bank ESS2 & ESS4, etc.).*

A Project legal register form is provided in Annex 1.

7 Hazard Identification and Risk Management

7.1 Project OHS / CHS Significant Risk Summary

Describe the process of how the Project Risk Register was achieved including the name of the facilitator and participants (e.g. project team members, health and safety staff and contractor representatives) and when it was undertaken.

Insert a brief bullet point summary to outline the key significant **inherent** risks (i.e. substantial and high). Follow a format like this: *the impact arising from a defined hazard due to a specific activity* e.g. "respiratory disease due to the inhalation of respirable crystalline silica during underground drilling".

Provide details of all significant inherent risks for the project showing current controls in Appendix 1. The significant inherent risk register is a subset of the comprehensive risk register for the project.

Community health and safety (CHS) risks must be identified, assessed and documented in the Project Risk Register. The management of CHS risks will be addressed in the ESMP but can may overlap with the HSMP For example, road construction projects will impact both workers and local communities. In this situation, a traffic management plan may be included in the both the HSMP and ESMP as operational control.

7.2 Health and Safety Operational Control

This section outlines how the key significant risks for the project (as defined in Section 7.1) will be managed. At a minimum, the project current controls must comply with the Health and Safety Framework and other legal requirements.

This is the most important section of the HSMP. It needs to be kept specific to the project and written in a clear and concise manner that enables the information to be used during project familiarisation and induction. As in Section 7.1, there is flexibility to communicate this information in a way that best suits for the project. You may use paragraphs, dot points, tables, etc. You may combine this information with the summary presented in Section 7.2.1.

Provide sufficient information to ensure that current and planned controls are understood by the reader.

7.2.1 Impact / Hazard / Activity 1

Describe how the risk will be managed during the project.

8 Communications

8.1 Onsite Communication and Consultation

8.1.1 Health and Safety Training including Induction

Describe the Health and Safety training process and requirements.

8.1.2 Health and Safety Activities, Meetings and Committees

List all activities, briefings and committee meetings such as toolbox talks, daily pre-start meeting, pre-job briefing, safety committee meeting, safety inspections/ audits, etc.

There is flexibility to communicate this information in a way that best suits your project. You may use

paragraphs, dot points, tables, etc.

8.1.3 Health and Safety Message Board

List strategic locations of Health and Safety message boards so that project workforce will be able to receive relevant information.

8.2 Communication with Contractors and Suppliers

8.2.1 Contractors and Sub-Contractors

List processes and types of information to ensure contractors and subcontractors can safety manage the activities and people in their work areas.

8.2.2 Suppliers

List processes and types of information to ensure the supplier can safely manage the activities and people within their responsibility.

8.3 Community / External Communication

8.3.1 Community Liaison

Describe accountability and process to report any OHS/CHS information to the communities as part of the community engagement requirements.

8.3.2 Regulatory/ Local Government

Describe accountability and process to report any OHS/CHS information to local government agencies/ department as part of the legal reporting requirements.

8.4 Consultation and Complaints

Describe the process to promote the active participation of project workforce in health and safety decisions. Employees and contractors are consulted and given opportunity, encouragement, and training to be proactively involved in health and safety matters affecting the project and their work activities. All workplace consultation should be recorded.

Describe the process to ensure health and safety complaints are received, reviewed and managed in accordance with the health and safety framework requirement.

A similar process shall be developed and implemented for CHS consultation and complaints from community members.

8.5 Non-Compliance/ Conformance and Disciplinary Process

Describe the disciplinary process for non-compliance or non-conformance to health and safety policies and procedures including the requirements of this document.

9 Training and Competency

Describe the project specific health and safety training required by workers and contractors including inductions (where relevant). For project personnel refer to the training needs analysis. For contractors, refer to the contractor prequalification to identify and specific training and induction needs on what the contractor approval is conditional. It is not sufficient to just list the types of training. The HSMP should document which role types should receive each type of training.

Role Type	Project Training
All workers and contractors	Safety Induction

9.1 Awareness and Competency

Describe the health and safety training induction, awareness, and competency on the project. Awareness and competency considerations should include:

- Safety induction and training provided by the project to raise awareness levels;
- Task specific competency assessments conducted by the Contractor;
- Training and induction for the Owner's team specific to the area in which the work is conducted; and
- Competency assessment and required training to render workers/contractors competent to carry out the work activity.

10 Emergency Management

10.1 Emergency Response

Provide a brief summary of site's emergency response preparedness (ERP) plan including reporting procedures, emergency contacts, emergency response team (ERT), evacuation plan/ assembly points and emergency test/ evacuation drills. The intent of this section is to ensure that the site manager/supervisor/worker at the operational level will know what to do in an emergency situation. It is not the intention that the complete site's ERP procedure be included in this section. In large, complex projects the ERP should be a standalone document that is managed by the PIU/Contractor.

There is flexibility to communicate this information in a way that best suits your project. You may use paragraphs, dot points, tables, etc.

Fire, spill response and first aid training and competency can be addressed in the sections below.

The ERP must include local communities during emergencies including natural disasters when the risk and impact assessments identified potential aspects/impacts caused by the project.

10.2 Fire Protection and Prevention

Provide a brief summary of the site's fire protection and prevention procedures including fire response (internal/ external), fire notification and alarms, use and management of firefighting equipment (e.g. fire extinguishers), high risk fire activities such as welding, smoking policy, fuel storage and fire inspections.

10.3 Hazardous Substance Spill Response and Prevention

This Section is not mandatory but if the project or site use or store large quantity of hazardous substances you may include a brief summary of the hazardous substance spill response and prevention management procedures.

10.4 First Aid and Medical Facilities

Provide information on the first aid kits, first aiders, eye wash stations and emergency showers including their locations within the project site.

Described the first aid and/or medical facilities available onsite including the location, medical supplies and equipment and personnel (e.g. first responder, paramedic, nurse) manning the facilities. Also provide information in regard to medical evacuation (i.e. ambulance, medivac, etc), hospitals or health clinics.

Health and Safety Management Plan

11 Site Security Plan

Describe the site's security plan addressing building and infrastructure security, exterior boundaries, access/ egress of project personnel and visitors, movement of equipment and materials, site traffic and vehicle parking, patrol and security inspections, responsibility during emergency situations, etc.

12 Incident Reporting and Investigation

Describe the project incident reporting and investigation process which must be aligned to local legal requirements (if available), SAR OHS Incident Reporting and Investigation Guidelines and any other requirements specified in the contract.

There is flexibility to communicate this information in a way that best suits your project. The sub sections below are outlines to assist – add or delete as required. Use paragraphs, bullet points, flow chart, etc.

Community health and safety incidents caused or impacted by the project must be reported, investigated and corrective actions identified, implemented and communicated to the community.

12.1 Roles and Responsibilities

Provide a short description of the investigation team roles including competency. Also include the roles and responsibilities of the corrective action owners.

12.2 Management of Incidents

Refer to SAR OHS Incident Reporting and Investigation Guidelines and/or Contractor's Incident Management Procedure (if available).

12.2.1 Investigation of Incident and Near Miss

12.2.2 Corrective and Preventive Actions

12.2.3 Reporting and Recording

12.3 Injury Management

Describe the project injury management process to ensure that any workplace injury is treated, managed and complied with the project's fitness for work criteria before the individual can return to normal work duties (i.e. return-to-work program).

13 Project Health and Safety Performance

Develop objectives, targets and key performance indicators (KPIs) such as the number of risk assessment, training and inspection/audit conducted that are proactive and where the outcomes can be directly controlled by the project/ owner's team by implementing OHS and CHS operational controls based on the project risk assessment. Do not develop targets that may inadvertently discourage incident reporting or create a blame culture (e.g. zero incident reports raised, zero audit findings etc).

13.1 Measuring and Monitoring

Describe the health and safety monitoring process where the project impacts the workplace, the environment and the community. Environmental and occupational health monitoring will be conducted to verify the efficacy of operational controls identified in the management of 'High' risks.

13.2 Key Performance Indicators

Develop and describe the key performance indicators (KPIs) for project health and safety objectives and targets. This section can be combined with Section 3 Objectives.

13.3 Audits and Inspections

The HSMP shall be audited internally by the PIU and externally by relevant stakeholders (e.g. Bank). During these audits, the auditor(s) must determine if the risks are being mitigated as described and whether the measures of success (e.g. KPIs) are being achieved.

The following table outlines when the plan will be audited and by whom.

Audit / Inspection	Who will audit the plan?	When is it scheduled for?

The table above contains examples only. Delete examples and adjust as required for each project.

The Contractor shall implement a routine inspection program for specific work area and activity. Where the work activity/ process has been identified as 'Substantial or High' risk, daily or pre-start inspection should be applied.

14 Management of Change (MOC)

Describe the MOC process and requirements for changes to the operational processes and controls that may impact on OHS / CHS performance. Changes may be planned or unplanned, sudden or gradual, and temporary or permanent. MOC must be approved by area or process owner(s) and communicated to area workers, community members (if impact the community) and other relevant stakeholders.

14.1 New Significant Risk/ Hazard Identified

Describe the process when a new or unforeseen risk/ hazard has been identified (e.g. through a near miss, incident, new process or non-routine activity that was not planned) and how the risk will be managed.

15 Management Review

Describe the management review of the HSMP process including participants and how often it is done. The review must evaluate any need for change and establish actions to improve the Plan, its processes and resource needs. The review must be documented and communicated to workers, contractors and relevant stakeholders.

Health and Safety Management Plan

Annex 1

Project Legal Register

Health and Safety Management Plan

PROJECT LEGAL REGISTER

Using the Health, Safety, Environment, Community (HSEC) legal obligations identified for the project, list the obligations relevant to the project and describe how they will be met. You may choose to delete rows containing legislation that does not apply to your project. If so, include the statement below. If not, delete the statement below.

Version xxxx of the Legal Obligations Register was reviewed by (names) and legislation deemed to be not applicable to the project was omitted.

Legislation	How does the legislation apply to Project?	H	S	E	C	Last Amendment	How will these obligations be met in this project?

Annex 2

Project Significant Risk Register

You may present your Significant Risk Register in the table below, or as a separate Excel or Word document (provide a link to the document or a specific reference including document name and location).

Health and Safety Management Plan

SIGNIFICANT RISK REGISTER

						Inherent Risk				Current Risk			
Project Activity	OHS / CHS Issue or Hazard	Hazard	Risk Scenario	Risk Scenario Impact Description	Cause(s)	Risk Scenario Consequence	Risk Scenario Likelihood	Risk Scenario Classification	Controls	Risk Scenario Consequence	Risk Scenario Likelihood	Risk Scenario Classification	Comments and Action Items

Revision History

First Issue	Effective date	Prepared by	Approved by	
1.0				
Revision Number	**Revision date**	**Revised by**	**Approved by**	**Reason for change**

Health and Safety Management Plan

Annexure 5-2: Typical Fire Safety Checklist

TYPICAL FIRE SAFETY CHECKLIST
(SELF-INSPECTION FORM FOR CONSTRUCTION WORK)

Adequate protective equipment and planning for fire emergencies helps keep small fires small, limits losses.

Yes	No	CONDITION
		Housekeeping
☐	☐	Are construction materials stored in an orderly manner?
☐	☐	Is combustible scrap and trash removed from the site regularly?
☐	☐	Are metal containers with covers provided for disposal of oily or paint-soaked rags?
		Smoking
☐	☐	Are NO SMOKING signs posted in hazardous areas?
☐	☐	Are NO SMOKING regulations enforced?
		Electrical
☐	☐	Is temporary wiring installed according to the provisions of the *National Electrical Code*?
☐	☐	Is wiring, including connections to junction boxes, panels, equipment, and the like in good condition?
☐	☐	Are overcurrent protective devices (fuses, circuit breakers) in good operating condition?
☐	☐	Are ground fault circuit interrupters (GFCI) provided where required?
		Welding and Cutting
☐	☐	Are any welding, cutting, or brazing operations in progress?
☐	☐	Are any combustible materials exposed by these operations?
☐	☐	Is a fire watch provided during, and for at least 30 minutes after, these operations?
☐	☐	Is portable fire extinguisher or small hose protection available where these operations are carried on?
		Temporary Heaters
☐	☐	Are temporary heaters in use of "approved" type?
☐	☐	Is sufficient clearance maintained between heaters and combustible materials?
☐	☐	Is a competent (licensed, where required) person responsible for temporary heating operations?
☐	☐	Are fuel storage and refueling arrangements satisfactory?
		Flammable-Combustible Liquids
☐	☐	Are flammable-combustible liquids stored and dispensed in a satisfactory manner?
☐	☐	Is adequate ventilation provided where flammable adhesives, paints, solvents, and other chemicals are in use?
☐	☐	Are roofing operations involving tar kettles supervised by a competent person?
☐	☐	Are tar kettles in use equipped with metal covers?
☐	☐	Are asphalt-saturated roofing mops removed from the building and safely discarded after use?
		Exits
☐	☐	Are fire exits unobstructed, including access ways and discharge areas?
☐	☐	Are all exits clearly marked?
☐	☐	Are exits adequately lighted?
☐	☐	Are stair exit fire doors in good operating condition?
☐	☐	Is adequate egress provided from uppermost work areas?

Yes	No	CONDITION
		Extinguishers and Small Hose
☐	☐	Are sufficient portable extinguishers of the proper type provided throughout?
☐	☐	Are extinguishers and small hoses kept in good operating condition?
☐	☐	Is equipment unobstructed and its location highlighted?
☐	☐	Is equipment protected against freezing?
☐	☐	Are selected personnel trained to operate extinguishers and small hose?
		Sprinkler Systems
☐	☐	Is sprinkler installation progressing with construction?
☐	☐	Are sprinkler controlled valves accessible, labeled and open where necessary?
☐	☐	Are systems adequately protected against freezing?
☐	☐	Are sprinkler alarms in service?
☐	☐	Are sprinkler system pumper connections clearly marked and accessible to the public fire department?
☐	☐	Is the public fire department familiar with the sprinkler installation?
		Hydrants
☐	☐	Are hydrants unobstructed and accessible to the public fire department?
☐	☐	Are hydrants in good operating condition?
		Standpipes
☐	☐	Are standpipe systems installed and in service up to the highest level of construction operations?
☐	☐	Are standpipe system hose connections unobstructed and accessible to the public fire department?
☐	☐	Are standpipe systems adequately protected against freezing?
☐	☐	Are standpipe system pumper connections clearly marked and accessible to the public fire department?
		Fire Alarms
☐	☐	Is a standard procedure established for reporting a fire to the fire department?
☐	☐	Are all workers instructed in this procedure?
☐	☐	Is an audible alarm in operation to alert workers of a fire on the site?
☐	☐	Is there a public fire alarm pull box located nearby?
☐	☐	Has the public fire department visited the site during the past month?
		Watchmen-Guards
☐	☐	Is watch service provided during all nonoperating hours?
☐	☐	Does service cover the entire project site?
☐	☐	Are watchmen-guards instructed in the fire reporting procedure?
		Construction Offices, Trailers, Sheds
☐	☐	Are combustible offices, trailers and sheds located at least 30ft (10m) away from major buildings and materials storage?
☐	☐	Are heating devices in offices, trailers and sheds of an "approved" type?
☐	☐	Are heating devices properly installed and vented?
☐	☐	Are fuel cylinders and fuel lines for heating devices protected against vehicular damage?
		Tarpaulins
☐	☐	Are tarpaulins used for temporary enclosure of building construction?
☐	☐	Are tarpaulins in use of the flame-resistant type?
☐	☐	Are tarpaulins in use tightly secured to prevent contact with ignition sources such as temporary heaters?

Annexure 5-3: Security Management Guidelines for Contractors

Security Management Guidelines for Contractors

The Contractor during construction phase shall use security arrangements and personnel to safeguard the installations, sites and personnel.

To accomplish project security objectives, the security should be provided for the following:

- Construction camps
- Project offices and work sites;
- Visitors and foreign consultants
- Critical assets and infrastructure related to the project; and
- Local labors' residential accommodation and other facilities.

Security Guidelines for the Project

- The operations and selection of the Project's security personnel will be guided by the relevant provisions of ESS 2 (Labor conditions) and ESS4 (Community Health, Safety and Security).
- Adoption/compliance with the World Bank Group's Good Practice Notes on Assessing and Managing the Risks and Impacts of the Use of Security Personnel and a project/contract specific Code of Conduct for the security personnel.
- Security will be provided in a manner that does not jeopardize the community's safety and security, or the KWSC's relationship with the community.
- Security arrangements will follow the principle of proportionality, respect for human rights, and good international practice.
- Community engagement will be maintained about the project's impacts on community safety and security, create awareness concerning the Code of Conduct commitment and project grievance mechanism, as outlined in the Stakeholder Engagement Plan (SEP) and SEA/SH mitigation measures given in the ESMP.
- Contractor's Community Liaison Officer will share information with nearby communities if required, about security arrangements, the Contractor's security policies, and the expected conduct of security personnel.
- Arrange dialogue with communities about security issues to identify potential risks and local concerns, and can serve as an early warning system.
- Maintain coordination with the contractors regarding the security issues.

Security Guidelines for Contractors

- Contractors will maintain liaison and coordination with any government's security agencies deployed in the area;

- The Contractor will carry out a continuous risk assessment of the security arrangements in place, monitor its security personnel, and identify any necessary corrective or preventive actions for continuing security operations.
- The contractor will prepare and implement clear standard operating procedures (SoP) for the security personnel;
- Security personnel will not use force or extract work from workers;
- The Contractor will ensure that those providing security are not implicated in past abuses;
- The Contractor will provide adequate training in the use of force and appropriate conduct toward workers and communities;
- The Contractor will ensure that security personnel act within the applicable legislation of the province / country;
- The Contractor will not sanction any use of force except when used for preventive and defensive purposes in proportion to the nature and extent of the threat;
- The Contractor will provide a grievance mechanism to express concerns about the security arrangements and acts of security personnel;
- If security personnel are permitted to use force, instructions must be clear on when and how force may be used, specifying that security personnel are permitted to use force only as a matter of last resort and only for preventive and defensive purposes in proportion to the nature and extent of the threat, and in a manner that respects human rights;
- Security personnel will be instructed to exercise restraint and caution, clearly prioritizing prevention of injuries or fatalities and peaceful resolution of disputes. The use of physical force will be reported to and investigated by the Contractor;
- Any persons injured as a result of the action of security personnel will be transported to medical facilities;
- The instructions for security personnel will make clear that arbitrary or abusive use of force is prohibited;
- Unlawful acts of any security personnel will be reported to the appropriate authorities.
- The Contractor may seek support from government authorities or other providers of the security services to aid preventative planning, evaluation, monitoring and follow-up to ensure security services providers meet Project expectations. Support may include strategies to identify and manage presence of ex-combatants and ex-military personnel within the community and within the Project security services.
- The Contractor’s security services’ responsibilities will include preventing hazardous materials or waste from leaving the Project site or the hazardous waste disposal site for the Project.
- The Contractor will need to establish mitigation measures in relations to engaging and partnering with local stakeholders, such as supporting the extension of policing services to prevent the intensification of violent conflicts.

Annexure 7-1: Environmental Code of Practice

The ECPs are listed below and details are presented subsequently:

- ECP 1: Waste Management
- ECP 2: Fuels and Hazardous Goods Management
- ECP 3: Water Resources Management
- ECP 4: Drainage Management
- ECP 5: Air Quality Management
- ECP 6: Noise and Vibration Management
- ECP 7: Protection of Flora
- ECP 8: Protection of Fauna
- ECP 9: Road Transport and Road Traffic Management
- ECP 10: Construction Camp Management
- ECP 11: Worker Health and Safety

ECP 1: Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	• The Contractor shall • Develop site specific waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to supervision consultant for approval. • Organize disposal of all wastes generated during construction in the designated disposal sites approved by the Project. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes, wherever practical. • Vehicles transporting solid waste shall be covered with tarps or nets to prevent spilling waste along the route. • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. • Provide refuse containers at each worksite.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal. • Potable water should be supplied in bulk containers to reduce the quantity of plastic waste (plastic bottles). Plastic bag use should be avoided.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor shall • Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labelled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution. • Store all hazardous wastes appropriately in bunded areas away from water courses. • Make available Material Safety Data Sheets (MSDSs) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills.

ECP 2: Fuels and Hazardous Goods Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	The Contractor shall • Prepare spill control procedures and submit them for supervision consultant approval. • Train the relevant construction personnel in handling of fuels and spill control procedures. • Store dangerous goods in bunded areas on top of a sealed plastic sheet away from watercourses. • Refueling shall occur only within bunded areas. • Store and use fuels in accordance with MSDSs. Make available MSDS for chemicals and dangerous goods on-site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored; and ensure personnel trained in the correct use. • Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labelled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Store and use fuels in accordance with MSDSs. • Store all liquid fuels in fully bunded storage containers, with appropriate volumes, a roof, a collection point and appropriate filling/decanting point. • Store hazardous materials above flood level considered for construction purposes • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area shall preferably

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		slope or drain to a safe collection area in the event of a spill. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.

ECP3: Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	The Contractor shall • Follow the management guidelines proposed in ECPs 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways or storm water systems.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Discharge from construction sites	Construction activities, sewage from construction sites and work camp may affect the surface water quality. The construction works will modify groundcover and topography changing the surface water drainage patterns of the area. These changes in hydrological regime lead to increased rate of runoff, increase in sediment and contaminant loading, increased flooding, and effect habitat of fish and other aquatic biology.	The Contractor shall • Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials. • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site. • Divert runoff from undisturbed areas around the construction site. • Stockpile materials away from drainage lines • Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot. • Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion. • Ensure that roads used by construction vehicles are swept regularly to remove dust and sediment. • Water the loose material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Drinking water	Untreated surface water is not suitable for drinking purposes due to presence of suspended solids and Ecoli.	The Contractor Shall • Provide the drinking water that meets SEQS standards. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time.

ECP 4: Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	The Contractor shall • Prepare drainage management procedures and submit them for supervision consultant approval. • Prepare a program to prevent/avoid standing waters, which supervision consultant will verify in advance and confirm during implementation. • Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line. Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there. • Rehabilitate road drainage structures immediately if damaged by contractors' road transports. • Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to SEQS, before it is being discharged into the recipient water bodies. • Ensure that there will be no water stagnation at the construction sites and camp. • Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion. • Protect natural slopes of drainage channels

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		to ensure adequate storm water drains. • Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem.
Ponding of water	Health hazards due to mosquito breeding	• Do not allow ponding of water especially near the waste storage areas and construction camp. • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.

ECP 5: Air Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor shall • Prepare air quality management plan (under the Pollution Prevention Plan) and submit the plan for supervision consultant approval. • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel efficient manner. • Cover hauls vehicles carrying dusty materials moving outside the construction site. • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions. • Control the movement of construction traffic. • Water construction materials prior to loading and transport. • Service all vehicles regularly to minimize emissions. • Limit the idling time of vehicles not more than 2 minutes.
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor shall • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors. • Focus special attention on containing the emissions from generators. • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites. • Service all equipment regularly to minimize emissions. • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations.
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard, and also can affect the local crops;	The Contractor shall • Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted. • Minimize the extent and period of exposure of the bare surfaces. • Restore disturbed areas as soon as practicable by vegetation/grass-turfing. • Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations. • Not water as dust suppression on potentially contaminated areas so that a liquid waste stream will be generated. • Crushing of rocky and aggregate materials shall be wet-crushed, or performed with particle emission control systems.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Not permit the burning of solid waste.

ECP 6: Noise & Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall • Prepare a noise and vibration management plan (under the Pollution Prevention Plan) and submit the plan for supervision consultant approval. • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures. • Make sure all drivers and operators will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site.
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Appropriately site all noise generating activities to avoid noise pollution to local residents. • Use the quietest available plant and equipment. • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction equipment. • Avoid the unnecessary use of alarms, horns and sirens.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Notify adjacent landholders prior any typical noise events outside of daylight hours. • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions. • Employ best available work practices on-site to minimize occupational noise levels. • Install temporary noise control barriers where appropriate. • Notify affected people if major noisy activities will be undertaken, e.g. blasting. • Plan activities on site and deliveries to and from site to minimize impact. • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.

ECP 7: Protection of Flora

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora are important to provide shelters for the birds, offer fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very friendly to human-living. As such damage to flora has wide range of adverse environmental impacts.	The Contractor shall • Prepare a plan for protection of flora and submit the plan for supervision consultant approval. • Minimize disturbance to surrounding vegetation. • Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetation. • Get approval from supervision consultant for clearance of vegetation. • Make selective and careful pruning of trees where possible to reduce need of tree removal. • Control noxious weeds by disposing of at designated dump site or burn on site. • Clear only the vegetation that needs to be cleared in accordance with the engineering

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		plans and designs. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill a, etc. • Not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages re-growth and protection from weeds. • Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. • Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil. • Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible. • Ensure excavation works occur progressively and re-vegetation done at the earliest • Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction • Supply appropriate fuel in the work camp to prevent fuel wood collection.

ECP 8: Protection of Fauna

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The location of construction activities can result in the loss of wild life habitat and habitat quality	The Contractor shall • Prepare a plan for protection of fauna and submit the plan for supervision consultant approval. • Limit the construction works within the designated sites allocated to the contractors. • check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Impact on migratory birds, its habitat and its active nests	The Contractor shall • Not be permitted to destruct active nests or eggs of migratory birds. • Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and locate active nests. • If bird nests are located/ detected within the ledges and roadside embankments then those areas should be avoided. • Petroleum products should not come in contact with the natural and sensitive ecosystems. Contractor must minimize the release of oil, oil wastes or any other substances harmful to migratory birds' habitats, to any waters, wetlands or any areas frequented by migratory birds.
	Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas	The Contractor shall • Restrict the tree removal to the minimum numbers required. • Relocate hollows, where appropriate. • Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.
Night time lighting	Lighting from construction sites and construction camp may affect the visibility of night time migratory birds that use the moon and stars for navigation during their migrations.	The Contractor shall • Use lower wattage flat lens fixtures that direct light down and reduce glare, thus reducing light pollution, • Avoid flood lights unless they are absolutely required. • Use motion sensitive lighting to minimize unneeded lighting. • Use, if possible, green lights that are considered as bird's friendly lighting instead of white or red colour lights. • Install light shades or plan the direction of lights to reduce light spilling outside the construction

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		area.
Construction camp	Illegal poaching	The Contractor shall • Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching. • Ensure that staff and Subcontractors are trained and empowered to identify, address and report potential environmental problems.

ECP 9: Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	The Contractor shall • Prepare a traffic management plan and submit the plan for supervision consultant approval. • Strictly follow the Project's 'Traffic Management Plan' and work with close coordination with the Traffic Management Unit. • Prepare and submit additional traffic plan, if any of his traffic routes are not covered in the Project's Traffic Management Plan, and requires traffic diversion and management. • Include in the traffic plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs / lights, road signs etc. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistan Traffic Regulations.
	Accidents and spillage of fuels and chemicals	The Contractor shall • Restrict truck deliveries, where practicable, to day time working hours. • Restrict the transport of oversize loads. • Operate vehicles, if possible, to non-peak periods to minimize traffic disruptions. • Enforce on-site speed limit.

ECP 10: Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camp	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor shall • Prepare a construction camp management plan and submit the plan for supervision consultant's approval. • Locate the construction camp within the designed sites or at areas which are acceptable from environmental, cultural or social point of view; and approved by the supervision consultant. • Consider the location of construction camp away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camp on the surrounding communities. • Submit to the supervision consultant for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camp. • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	Contractor shall provide the following facilities in the Campsites • Adequate housing for all workers. • Safe and reliable water supply, which should meet SEQS. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time (World Health Organization -WHO guideline). • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by location. The minimum number of toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Storm water drainage facilities. • Paved internal roads. • Provide child crèches for women working construction site. The crèche should have facilities for dormitory, kitchen, indoor and outdoor play area. Schools should be attached to these crèches so that children are not deprived of education whose mothers are construction workers. • Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camp to be discouraged/prohibited to the extent possible.
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor shall • Ensure proper collection and disposal of solid wastes within the construction camp. • Insist waste separation by source; organic wastes in one container and inorganic wastes in another container at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camp and disposed in approval waste disposal sites.
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor shall • Provide fuel to the construction camp for their domestic purpose, in order to discourage them to use fuel wood or other biomass. • Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the Project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted including	• The Contractor shall • Provide adequate health care facilities within

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading Sexually Transmitted Infections (STIs) and Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS). In adequate safety facilities to the construction camp may create security problems and fire hazards	construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. • Provide ambulance facility for the labourers during emergency to be transported to nearest hospitals. • Initial health screening of the labourers coming from outside areas. • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work. • Provide HIV awareness programming, including STIs and HIV information, education and communication for all workers on regular basis. • Provide adequate drainage facilities throughout the camp to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellent sprays during rainy season in offices and construction camp and yards. • Not dispose food waste openly as that will attract rats and stray dogs. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camp containing messages on best hygienic practices. The Contractor shall • Provide appropriate security personnel (police or private security guards) and enclosures to prevent unauthorized entry in to the camp area. • Maintain register to keep a track on a head count of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labour housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camp • Display emergency contact numbers clearly and prominently at strategic places in camp. • Communicate the roles and responsibilities of labourers in case of emergency in the monthly

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		meetings with contractors.
Site Restoration	Restoration of the construction camp to original condition requires demolition of construction camp	The Contractor shall • Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. • Dismantle camp in phases and as the work gets decreased and not wait for the entire work to be completed. • Give prior notice to the labourers before demolishing their camp/units. • Maintain the noise levels within the national standards during demolition activities. • Different contractors should be hired to demolish different structures to promote recycling or reuse of demolished material. • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camp with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner.

ECP 11: Worker Health and Safety

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc.), (ii) risk factors resulting from human behavior (e.g. STD, HIV etc.) and (iii) road accidents from construction traffic.	The Contractor shall • Prepare an OHS plan and submit the plan for supervision consultant's approval. • Implement suitable safety standards for all workers and site visitors which should not be less than those laid down on the international standards (e.g. International Labour Office guideline on 'Safety and Health in Construction; WBG's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with Pakistan standards. • Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas. • Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. • Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job. • Appoint an EHS manager to look after the health and safety of the workers. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camp so as to maintain effective surveillance over public health, social and security matters.
Child and pregnant labour accident	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	The Contractor shall • Ensure health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work. • Document and report occupational accidents, diseases, and incidents. • Prevent accidents, injury, and disease arising

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards, in a manner consistent with good international industry practice. • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures. • Provide awareness to the construction drivers and operators to strictly follow the driving rules. • Provide adequate lighting in the construction area, inside the tunnels, inside the powerhouse cavern and along the roads.
Construction Camp	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards	The Contractor shall provide the following facilities in the Campsites to improve health and hygienic conditions as mentioned in ECP 10 Construction Camp Management • Adequate ventilation facilities • Safe and reliable water supply. • Hygienic sanitary facilities and sewerage system. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. • Recreational and social facilities • Safe storage facilities for petroleum and other chemicals in accordance with ECP 2 • Solid waste collection and disposal system in accordance with ECP1. • Arrangement for trainings • Paved internal roads. • Security fence at least 2 m height. • Sick bay and first aid facilities
Other ECPs	Potential risks on health and hygiene of construction workers and general public	The Contractor shall follow the following ECPs to reduce health risks to the construction workers and nearby community • ECP 2: Fuels and Hazardous Goods Management • ECP 4: Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• ECP 5: Air Quality Management • ECP 6: Noise and Vibration Management • ECP 9: Road Transport and Road Traffic Management .
Training	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor shall • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of STIs HIV/AIDS). • Train all construction workers in general health and safety matters, and on the specific hazards of their work. Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. • Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on on-going and regular basis. This should be complemented by easy access to condoms at the workplace as well as to voluntary counselling and testing.

Annexure 7-2: Guidelines for the Preparation of Site-specific Plans and Procedures during Construction phase

Specific plans relevant to the ESMP are as follows:

Site Specific Environmental and Social Management Plan (SSESMP)

Project- specific Stakeholder Engagement Plan / Communication Plan

1. Occupational health and safety plan
2. Community health and safety plan
3. Emergency preparedness and response plan
4. Workers camp management plan and COVID 19 Precautionary Measures
5. Waste Management Plan (WMP)
6. Traffic management plan
7. Spill prevention and response plan
8. Pollution prevention plan
9. Material Transportation Plan

1. Site Specific Environmental and Social Management Plan (SSESMP)

The Contractor will develop a construction phase SSESMP in line with the ESMP. The Contractor will also be expected to have its own Environmental and Social Management System aligned to the principles of ISO 14001:2015 and OHSAS 45001 or equivalent. These plans will be formally approved by PIU-KWSSIP and CSC before any work occurs on site. The SSESMP will consist of the following as a minimum and be structured as follows:

a. Section 1: Master SSESMP Document

The master SSESMP document will clearly define the Contractor's ESHS commitments and requirements, including:

- Place a high emphasis on good housekeeping practices.
- ESHS policy, committing to compliance with the ESMP.
- Identification of all regulations, standards, and regulatory limits, and specify the means for maintaining compliance.
- Training plan outlining training and capacity building (covering both introductory sessions and technical training).
- Contractor's ESMS and H&S management system
- Organizational capacity and structure, roles and responsibilities, key resources
- Procedures, logistics and communication channels

- Monitoring, inspections, audits and evaluations
- Reporting
- Management of nonconformity procedures (including management and tracking)
- A permit register, with all permits required by the national requirements relating to the project, including timeframes and renewal dates and procedure
- An environmental, social, health and safety (ESHS) risk assessment register, to be maintained and updated monthly and discussed with PIU KWSSIP.
- Description of project areas, including the number, a map, key activities, opening and closing schedule, and access plans.
- A pre-construction plan, which outlines the pre-construction surveys planned to be carried out to record the existing baseline of each site, any changes to the baseline, and any additional measures (following the mitigation hierarchy) to avoid, minimize and mitigate. This will include detailed photographic and video footage for each specific work area

b. Section 2: SSESMP Sub-plans and Procedures

Development and implementation of specific sub-plans, which are detailed as follows shall be referenced under the SSESMP. **Table 7-1** outlines various sub-plans to be developed and implemented by the Contractor under its own SSESMP. All plans need to be developed in line with the applicable standards and GIIP. In addition to GIIP measures, the sub-plans will include the specific mitigation measures identified within the ESMP. The key mitigation measures identified in the ESMP shall require to be included in the relevant sub-plans. The plans will typically include a similar structure , such as:

- A standard introduction referencing the project, summarizing the project description, linkage of the plan to the SSESMP and other plans, the purpose and scope of the plan
- Requirements and standards
- Roles and responsibilities
- Impact and risk assessment
- Control measures
- Training requirements
- Monitoring and reporting procedures
- Other relevant details
- Document/record control

It is important to note that many plans have overlapping or cross-cutting measures that may need to be considered and included in multiple plans. All plans, when developed, will be reviewed and considered together by the Contractor as part of its overall system, to ensure that key environmental, social, health, safety and security measures are appropriately included, and there is no contradictions between plans.

Table A7-1: Sub-plans to be prepared by the Contractor and Summary of the Aspects to be Covered

Plan	Objectives and Contents
Social and community	
Project- specific Stakeholder Engagement Plan / Communication Plan	◆ Ensuring that the mechanism for information disclosure on purpose and nature of the construction activities, early notification of construction start date, scheduling and duration and potential impacts and health and safety measures/ mechanisms is in place ◆ Mechanism for issuance of notification to communities and sensitive receptors for any transport disruptions, construction activities, pedestrian accessibility, etc. is intact ◆ Feedback and grievance redress mechanism is followed ◆ Recruitment and Procurement, Employment of Local Workers details are clear to communities
Health and safety	
Occupational health and safety plan	To implement a safe working environment, procedures and culture during the construction phase. Further policies / procedures to be developed if need identified through site audits.
Community health and safety plan	To avoid, minimize and manage community health and safety risks.
Emergency preparedness and response plan	To cover potential emergencies during construction
Workers camp management plan	To ensure that all Project accommodation areas are designed, constructed and maintained as healthy, clean and pleasant locations for workers to live in.
Environmental	
Waste management plan	To identify predicted waste streams, appropriate handling, reuse and recycle opportunities and, as a last resort, disposal methods
Traffic management plan	To plan, coordinate and management all traffic and access risks in relation to the construction phase of the project.
Spill prevention and response plan	To prevent spills and plan for appropriate responses
Pollution prevention plan	To effectively control air, noise, water and wastewater pollution
Material Transportation Plan	Construction material logistics planning entails managing materials and equipment both to and from construction sites. These two vital processes are inbound logistics and outbound logistics. Both of these equipment and material management activities require a detailed and thorough plan.

1. Occupational and Community Health & Safety Plan

Occupational and Community Health and Safety Plans (OHS / CHS Plans) are key document to address how OHS and CHS risks will be managed in a project. A Health & Safety Framework (Attached as **Annexure 5-1**) has been prepared by the World Bank E&S Safeguards Unit which is applicable on all World Bank-financed projects in the South Asia Region (SAR). The framework provides guidelines not only to the proponent but also to the project Contractors to implement a practical approach to manage Occupational Health and Safety (OHS) and Community Health and Safety (CHS) impacts and risks in accordance with national/local regulatory framework, the World Bank Environmental and Social Standards and Environmental Health and Safety (EHS) Guidelines, ISO Standards, Good International Industry Practices (GIIP), etc. The framework also includes a template for OHS / CHS Plans which should be followed by the Contractor for making these plans.

Some key guidelines to be covered under the plan includes the following:

Specific Mitigation Guidelines for Dealing with OHS Hazards

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1.	**Trench Excavation** Collapse of Excavation and falling of materials while working in excavations could result in workers injuries or fatalities. Workers could be at risk from: ◆ Excavations collapsing and burying or injuring people working in them; ◆ Material falling from the sides into excavation; ◆ People or plant falling into excavations. ◆ Serious accidents could occur if buried services are damaged during excavation work. ◆ Excavation inside water stream or at dry areas during wet weather can cause many safety hazards including intrusion of water into excavation, slippery conditions for the drivers of equipment, causing the ground to be slippery and muddy thereby creating the possibility of slips and falls, and making the site work less stable. (*Ref:https://www.hse.gov.uk/construction/safetytopics/excavations.htm)*	**Collapse of excavations:** a- **Temporary support** - Before digging any trench pit, or other excavations, Contractor shall decide what temporary support will be required and accordingly plan the precautions to be taken. b- Contractor shall make sure the equipment and precautions needed (trench sheets, props, baulks etc.) are available on site before work starts. c- **Battering the excavation sides** - Battering the excavation sides to a safe angle of repose may also make the excavation safer. d- In granular soils that may come across during trenching, the angle of slope should be less than the natural angle of repose of the material being excavated. In wet ground a considerably flatter slope will be required. **Falling or dislodging material:** a- **Loose materials** - may fall from spoil heaps into the excavation. Edge protection should include toe boards or other means, such as projecting trench sheets or box sides to protect against falling materials. Head protection should be worn. b- Effect of plant and vehicles - Do not park plant and vehicles close to the sides of

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		excavations. The extra loadings can make the sides of excavations more likely to collapse. **Falling into excavations** a- **Prevent people from falling** – Contractor shall protect edges of excavations with substantial barriers where people are susceptible to fall into them. b- To achieve this, use of following options shall be made: ◆ Guard rails and toe boards inserted into the ground immediately next to the supported excavation side; or fabricated guard rail assemblies that connect to the sides of the trench box ◆ The support system itself, e.g. using trench box extensions or trench sheets longer than the trench depth. **Inflow of surface or ground water** a- Depending on the permeability of the ground, water may flow into any excavation below the natural groundwater level. b- The supports to the side of the excavation should be designed to control the entry of groundwater and the design should take any additional water loading into account. c- Particular attention should be given to areas close to lakes, rivers and the sea. d- Water entering the excavation needs to be channeled to sumps from where it can be pumped out; however, the effect of pumping from sumps on the stability of the excavation should be considered. **Safety Measures for Excavation in Wet Weather** a- Weather conditions needs to be checked before daily work to be aware of rain and storm possibilities. b- Inspection of trenches to be done every day before construction begins. c- Workers shall not be allowed to go near unprotected trenches. d- Heavy equipment shall be kept away from trench edges.

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		e- Workers shall be trained to have the skills needed to identify wet weather hazards and how to minimize risks. f- Protective equipment shall always be worn and in a correct manner. g- All power tools shall be correctly maintained and used properly. h- Protective systems including benching, sloping, shoring, and shielding shall be utilized. i- Planning and implementation of safety systems and inspections shall be used regularly on the construction sites. **Other aspects of excavation safety** a- Safe means of getting into and out of an excavation shall be provided. If a risk assessment identifies that ladders are a reasonable means of access and egress from an excavation, ladders with suitable length and of sufficient strength shall be provided for the purpose. b- Use of petrol or diesel engines in excavations shall be avoided without arranging for the fumes to be ducted safely away or through forced ventilation. **Inspection** a- A competent person who fully understands the dangers and necessary precautions shall inspect the excavation at the start of each shift. b- Excavations shall also be inspected after any event that may have affected their strength or stability, or after a fall of rock or earth. c- A record of the inspections shall be maintained and any faults that are found should be corrected immediately. d- A written report shall be made containing the following information: ◆ Location and description of the place of work or work equipment inspected; ◆ Date and time of the inspection; ◆ details of: ◆ Any matter identified that could give

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		rise to a risk to the health or safety of any person; ◆ Any action taken as a result of any matter identified; ◆ Any further action considered necessary; and ◆ Name and position of the person making the report.
2.	**Excavators** Most fatal and serious injuries involving excavators occur when the excavator is: ◆ **Moving** – and strikes a worker / pedestrian, particularly while reversing; ◆ **Slewing** – trapping a person between the excavator and a fixed structure or vehicle; or ◆ **Working** – when the moving bucket or other attachment strikes a worker or when the bucket inadvertently falls from the excavator. ◆ Most excavator related deaths involve a person working in the vicinity of the excavator rather than the driver. *(Ref:https://www.hse.gov.uk/construction/safetytopics/excavators.htm)*	**Controlling the risk** It is important to select the right excavator for the job. There are five main precautions needed to control excavator hazards. These are: a- **Exclusion:** People should be kept away from areas of excavator operation by the provision of suitable barriers. Bunting or fencing can be used to create and maintain a pedestrian exclusion area. b- **Clearance:** When slewing in a confined area the selection of plant with minimal tail swing is preferred. Clearance of over 0.5m needs to be maintained between any part of the machine, particularly the ballast weight, and the nearest obstruction. c- **Visibility:** Excavators with the best view around them directly from the driver position should be selected. Excavators should be equipped with adequate visibility aids to ensure drivers can see areas where people may be at risk from the operation of the machine. d- **Plant and vehicle marshal/banksmen:** A Plant and vehicle marshal/banksmen should be provided in a safe position to direct excavator operation and any pedestrian movements. e- **Bucket attachment:** Quick hitches can be used to secure buckets to the excavator arm. **Training and competence** There are three categories of people who must be trained and made competent regarding the excavator hazards and precautions: a- **Drivers:** should be trained, competent and authorized to operate the specific excavator.

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		Training certificates from recognized schemes help demonstrate competence and certificates should be checked for validity; b- **Plant and vehicle marshal:** should be trained, competent and authorized to direct excavator movements and, where possible, provided with a protected position from which they can work in safety; and c- **Pedestrians:** should be instructed in safe pedestrian routes on site and the procedure for making drivers aware of their presence through sign boards and on-site instructions. **Inspection and maintenance** a- A program of daily visual checks, regular inspections and servicing schedules shall be established in accordance with the manufacturer's instructions and the risks associated with each vehicle. b- Drivers shall be advised to report defects or problems. Reported problems shall be put right quickly and the excavator taken out of service if the item is safety critical.
3.	**Lifting Operations (Cranes)** ◆ **Collapse of the Crane** – such incidents present significant potential for multiple fatal injuries, both on and off-site; ◆ **Falling of the Load** – these events also present a significant potential for death and major injury. *(Ref:https://www.hse.gov.uk/construction/safetytopics/lifting-operations.htm)*	**Pre-requisite:** a- Cranes and lifting accessories such as slings shall be of adequate strength, tested and subject to the required examinations and inspections. b- All crane operators, and people involved in slinging loads and directing lifting operations, shall be trained and competent. **Planning lifting operations** a- All lifting operations shall be planned so they are carried out safely with foreseeable risks taken into account. b- The person appointed to plan the lifting operation shall have adequate practical and theoretical knowledge and experience of the lifts being undertaken. c- The plan will need to address the risks identified by a risk assessment, the resources required, procedures and the responsibilities so that any lifting operation

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		is carried out safely. d- The plan shall ensure that the lifting equipment remains safe for the range of lifting operations for which the equipment might be used. **Supervision of lifting** a- The right level of supervision shall be in place for lifting operations, reflecting the degree of risk and personnel involved in the particular lifting operation. b- The crane supervisor shall direct and supervise the lifting operation to make sure it is carried out in accordance with the method statement. c- The crane supervisor shall be competent and suitably trained and should have sufficient experience to carry out all relevant duties and authority to stop the lifting operation if it is judged dangerous to proceed. **Thorough examination** a- Lifting equipment shall be thoroughly examined at the prescribed intervals. This shall be a detailed and specialized examination by a competent person. b- Records of thorough examinations and tests shall be: made readily available to the relevant authorities; secured; and capable of being reproduced in written form.
4.	**Heat Stress / Heat Stroke** ◆ Workers who are exposed to extreme heat may be at risk of heat stress. ◆ Exposure to extreme heat can result in occupational illnesses and injuries. ◆ Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. ◆ Burns may also occur as a result of accidental contact with hot surfaces. *(Ref:https://www.cdc.gov/niosh/topics/heatstress/r*	**Control of Heat Stress** Work practice recommendations include the following: a- Limit time in the heat and/or increase recovery time spent in a cool area. b- Use tools intended to minimize manual strain. c- Increase the number of workers per task. d- Train supervisors and workers about heat stress. e- Use a buddy system where workers observe each other for signs of heat-related illnesses. f- Require workers to conduct self-monitoring

S. No.	Work Activities and Associated Hazards	Mitigation Guidelines
	ecommendations.html)	and create a work group (i.e., workers, a paramedic, and a safety manager) to make decisions on self-monitoring options and standard operating procedures. g- Provide adequate amounts of cool, potable water near the work area and encourage workers to drink often. h- Use a heat alert program whenever the weather service forecasts a heat wave. i- Institute a heat acclimatization plan and encourage increased physical fitness. **Training** Contractor shall implement a heat stress training program for all workers and supervisors which will cover the following: a- Training of workers before hot outdoor work begins. b- Recognition of the signs and symptoms of heat-related illnesses and administration of first aid. c- Causes of heat-related illnesses and steps to reduce the risk. These include drinking enough water and monitoring the color and amount of urine output. d- Proper care and use of heat-protective clothing and equipment and the added heat load caused by exertion, clothing, and personal protective equipment. e- Effects of other factors (drugs, obesity, etc.) on tolerance to occupational heat stress. f- The importance of acclimatization. g- The importance of immediately reporting any symptoms or signs of heat-related illness in themselves or in co-workers to the supervisor. h- Procedures for responding to symptoms of possible heat-related illness and for contacting emergency medical services. Supervisors shall also be trained on the following: a- Implementing appropriate acclimatization plan. b- Procedures to follow when a worker has

S. No.	Work Activities and Associated Hazards	Mitigation Guidelines
		symptoms of heat-related illness, including emergency response procedures. c- Monitoring weather reports. d- Responding to hot weather advisories. e- Monitoring and encouraging adequate fluid intake and rest breaks. **Hydration** The Contractor shall provide the means for appropriate hydration of workers and ensure that: a- Water should be potable, <15°C (59°F), and made accessible near the work area. b- Estimate how much water will be needed and decide who will get and check on water supplies. c- Provide individual drinking cups for each worker. d- Encourage workers to hydrate themselves. e- Workers should drink an appropriate amount to stay hydrated. f- For moderate activities in the heat that last less than 2 hours, drink 1 cup (8 oz.) of water every 15–20 minutes. g- If sweating lasts for several hours, drink sports drinks containing balanced electrolytes. h- Avoid alcohol and drinks with high caffeine or sugar. i- Generally, fluid intake should not exceed 6 cups per hour.
5.	**Confined Space Working** The most likely hazards related to confined spaces include: ◆ A risk of fire or explosion can arise flammable substances and oxygen enrichment. ◆ Hot conditions can lead to a dangerous rise in core body temperature and this can be made worse by wearing PPE, highly physical or strenuous work. ◆ The presence of toxic gas, fume or vapour can lead to asphyxia or	**Work in confined spaces** a- No person at work shall enter a confined space to carry out work for any purpose unless it is not reasonably practicable to achieve that purpose without such entry. b- A site specific method statement shall be produced by the Contractor and all workers shall adhere to the method statement instructions before the work is carried out. c- It shall be ensured that there is suitable ventilation within the workplace. d- Damaging any underground utilities shall be avoided.

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	unconsciousness ◆ A lack of oxygen in the atmosphere may also lead to asphyxia or unconsciousness. *(Ref:https://www.hse.gov.uk/pubns/priced/l101.pdf)*	e- It shall be ensured that workers are provided with the following: ◆ Head, hand and foot protection ◆ Eye and hearing protection ◆ Waterproof and thermal clothing ◆ Respirators and breathing apparatus ◆ Appropriate safety harnesses. f- It shall be ensured that Emergency arrangements such as First aid procedures, arrangements for the safety of rescuers and mechanism of liaison with emergency services are in place before any work starts to make sure that the workers can be rescued safely if required. g- Those who are identified as rescuers need to be: ◆ Ready at hand ◆ Properly trained ◆ Fit to carry out their task ◆ Protected against the cause of the emergency ◆ Capable of using any equipment provided for rescue, for example breathing apparatus, lifelines and fire-fighting equipment. h- Training is critical in all work with confined spaces. The Contractor shall ensure that all workers are given suitable and appropriate training to carry out the workplace task. This will include trainings on; emergency procedures and use of breathing apparatus.
6.	**Welding Safety** There are a variety of welding methods available, all of which have inherent safety and health hazards associated with them, such as: a- Metal fumes are formed when a metal is heated above its boiling point and its vapors condense into very fine particles. Health effects can range from short-term illnesses such as metal fume fever with flu-like symptoms to longer-term issues such as lung damage or neurological	**Safety Measures** The Contractor shall ensure the following: a- Welders, bystanders and work space are properly protected. b- Use of local exhaust ventilation, such as an exhaust trunk, while performing welding activities whenever possible to minimize exposures to welding fume. c- Use of respiratory protection below the recommended air quality levels. d- Protecting worker's exposures to UV and infrared radiation by providing a properly fitted welding helmet, with proper grade of

S. No.	Work Activities and Associated Hazards	Mitigation Guidelines
	disorders. b- Burns may be caused by contact with hot surfaces or hot flying particles. c- Eye injuries can result from exposure to ultraviolet and infrared radiation created from the arc or from particulates or spattering. d- Electric shock may occur due to improper grounding and/or contact with current through damp clothing, wet floors and other humid conditions. Even if the shock itself is not fatal, the jolt may still cause welders to fall from their work positions. In addition, stray welding current may cause extensive damage to equipment, buildings and electrical circuits. e- Fire caused by heat, sparks, slag or flames contacting combustible or flammable materials in the welding area. f- Improper use and storage of oxygen and acetylene may result in fire or explosion g- Strains, neck and lower back injuries resulting from repetitive motions and work orientation. h- Lacerations resulting from accidental contact with sharp edges and burrs. *(Ref:https://www.hse.gov.uk/welding/index.htm)*	filter plate while ensuring that it must be worn. An auto-darkening welding helmet is highly recommended as these helmets do not need to be raised to check welds and can be kept in the lowered position all the time, reducing fume exposure. These helmets also reduce the urge to use the neck muscle to flip the helmet to the “up” position, which can cause significant neck discomfort and possible injury. e- Safety glasses should also be worn under the welding helmet to provide impact protection and to protect eyes from particulates when hoods are lifted. f- Pant cuffs and rolled up sleeves should be avoided. g- Workers shall be trained to protect their body from spatter and arc flash with flame-resistant gloves and apron or jacket, flame-resistant natural fiber clothing (such as wool or cotton) and leather boots etc. h- Any combustible or flammable materials shall be put away from the welding area to prevent fires. i- A clear egress path shall be maintained out of the welding area as well as to the nearest emergency equipment such as fire extinguisher, emergency eyewash and emergency shower. j- Check welding equipment and personal protective equipment (PPE) for defects and damage before beginning work. Ensure PPE is properly stored and maintained when not in use. k- Position welding curtains as needed to protect others in the area from splatter, flash and glare. l- Setting up any signs or safety cones as needed. m- Prevent lacerations by identifying sharp edges and burrs, wearing appropriate gloves, deburring, and proper storage methods. n- Ensure good insulation from work surfaces,

S. No.	Work Activities and Associated Hazards	Mitigation Guidelines
		the electrode, the electrode holder and grounding surfaces is obtained and maintained. o- Practice good lifting techniques by workers and considering ergonomics when setting up the work and minimizing awkward postures. p- Workers shall be trained on the safe use, transportation and storage of compressed gases prior to use.
7.	**Construction Dust** a- Drilling, cutting, sanding and driving over dusty areas can pose risks for the workers involved. b- Dust that can enter the nose and mouth during breathing is referred to as 'total inhalable dust'. Some dust may consist of larger or heavier particles that tend to get trapped in the nose, mouth, throat or upper respiratory tract where they can cause damage. c- Chronic effects of dust in the lungs are usually permanent and may be disabling, so prevention of the onset of disease should be given the highest priority. *(Ref:https://www.hse.gov.uk/construction/healthrisks/hazardous-substances/construction-dust.htm)*	**Control Measures** a- Contractor shall ensure that workers are protected from excessive exposure to dust. b- Keep construction areas shall be kept as clean as possible. c- Workers shall be provided with clothing that resists dust and essential PPEs. d- Working shifts shall be rotated to limit inhalation of polluted air by workers specially the potentially dusty work sites. e- Dust shall be suppressed and dampen at project sites by sprinkling water. f- Construction vehicles shall be driven at slow speeds to keep dust emissions limited. g- Contractor shall provide construction workers with information / training about potential dust hazards and instructions on how to avoid them. h- Workers shall be trained to wet the tools before cutting into any materials as it can reduce dust accumulation.
8.	**Construction Noise** a- Exposure to high levels of noise can cause permanent hearing loss. b- Loud noise can create physical and psychological stress, reduce productivity, interfere with communication and concentration, and contribute to workplace accidents and injuries by making it difficult to hear warning signals. *(Ref:https://www.hse.gov.uk/noise/hearingprotecti*	**Control Measures** a- As a first step, the Contractor shall choose quieter equipment and machinery to save the cost of introducing noise-reduction measures and providing hearing protection, health surveillance and associated trainings etc. b- Hearing protection shall be issued to employees: ◆ where extra protection is needed above what has been achieved using

S. No.	Work Activities and Associated Hazards	Mitigation Guidelines
	on.htm)	noise control ◆ as a short-term measure while other methods of controlling noise are being developed. c- Contractor shall make sure that the protectors give enough protection - at least to get below 85 dB at the ear. d- Use of protectors to the noisy tasks and jobs in a working day shall be made mandatory. e- No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. f- Periodic medical hearing checks shall be performed on workers exposed to high noise levels.
9.	**Fire Safety** a- Fire at a construction site can endanger the lives of workers and others who happen to be on the site. b- A fire during the course of construction also can result in severe structural damage; destruction of machinery, equipment or materials; and untimely delay in project completion.	**Control Measures** a- The Contractor shall develop an effective fire prevention and extinguishing plan before the onset of construction. The plan shall be put into practice as soon as construction operations begin and shall be closely followed throughout the course of construction. b- Contractor shall ensure that fire safety and firefighting trainings are provided to selected workers from each worker groups so that they can handle the localized fires. c- Contractor shall ensure the availability of right fire extinguishers at project construction and Campsites to deal with different types of fires in accordance with the following chart:

S. No.	Work Activities and Associated Hazards	Mitigation Guidelines
		 d- The local fire department shall be made aware of construction plans and kept up to date during the course of construction regarding items such as access to the sites during both working and non-working hours; and the location of fuel storage, power and fuel shutoffs, power generators, and fixed-fire extinguishing systems. e- The project requires considerable works related to welding. Cutting and welding sparks cause more construction fires than any other ignition source. The personnel responsible for fire safety shall ensure that adequate precautions are taken during welding works and adequate numbers of fire extinguishers are present in proximity to the work areas. f- Suitable fire extinguishers are Carbon Dioxide or Dry Powder because of the risk of electrical fires in the welding area, whereas use of water based extinguisher shall be avoided. g- Fuel gas and oxygen cylinders shall be placed upright and secured at safe locations, protected from high temperatures and adequately separated from each other. h- Typical Fire Safety Checklist is attached as Error! Reference source not found. which shall be followed by the Contractor during construction phase.

2. Emergency Preparedness and Response Plan (EPRP)

The Contractor will be responsible for ensuring adequate emergency preparedness and response planning for the construction phase of the project. Following Table presents the contents to be covered under EPRP.

Impact to be addressed	Management/Mitigation/ Enhancement to be included in plan	KPI
Construction phase emergency preparedness and response plan, including flooding, medical emergencies etc.	◆ Develop and implement a regularly updated EPRP so that project staff, relevant local authorities and emergency services are prepared to respond to accidental and emergency situations in a manner that prevents and mitigates harm to people and the environment. The EPRP will include: ◆ Identification of accidents and emergency situations and the communities and individuals that may potentially be impacted. ◆ Identification of response procedures, provision of equipment and resources, designation of responsibilities, communication systems and channels and periodic response training ◆ Routine inspection of work sites ◆ Maintenance of plant, equipment, supplies and materials required for preventative measures and emergency responses ◆ Clearly defined evacuation procedures ◆ Training requirements for staff and managers, including details on who provides training ◆ Identification of relationship to and integration with other plans ◆ Identification of revision timeframe and process ◆ Template for incident reporting forms ◆ Identify a set of procedures to assist in rapid and early identification and responses to potential and occurring emergencies relevant to the construction phase. These are likely to include	◆ Records of training drills ◆ Disclosure of EPRP to affected communities, emergency services and operations workers ◆ Type, duration and adequacy of emergency response in specific situations

Impact to be addressed	Management/Mitigation/ Enhancement to be included in plan	KPI
	categories such as: ◆ Flooding ◆ Equipment failure or malfunctioning ◆ Seismic activity ◆ Terrorism ◆ Address specific situations such as emergencies occurring: ◆ In the dark: with extra attention on emergency power sources, backup lighting systems, mobile lighting for response teams ◆ In adverse weather: with extra attention placed on emergency shelter and clothing for responders, and shelter for evacuees ◆ Produce detailed information on internal and external equipment, personnel, facilities, funding, expert knowledge and material that will facilitate appropriate responses to specific types of emergencies ◆ Identify procedures for using, inspecting, testing and maintaining emergency response equipment, which may include equipment under the control of third parties (such as local fire brigades or emergency medical teams) ◆ Produce inundation maps that will be provided to aid evacuation plans and be distributed to local authorities ◆ Develop a rescue and relief plan to cover actions required in the event of a flood. This will include details on: ◆ Support for evacuees to provide food, fuel and shelter ◆ Securing potable water supplies to affected areas ◆ Identification of buildings for use as relief camp ◆ Identification of health facilities and contact details of key personnel	

3. Workers Camp Management Plan

Contents to be covered in the plan by the Contractor include the following:

Impact to be addressed	Management/Mitigation/ Enhancement to be included in plan	KPI
Construction worker well-being in accommodation facilities Community, health, safety and security and relations/conflict between workers and host communities	◆ Describe the minimum national legislative requirements plus the applicable international requirements relevant to the facility standards and management of labour accommodation – these are aligned with the WBG guidance note on workers accommodation. ◆ Describe standards to be met that will avoid safety hazards and protect workers from disease, illness, exposure to natural hazards, including but not limited to ◆ Types and materials of living facilities ◆ Provision of minimum amounts of space for each worker ◆ Adequate drainage, dormitories, bed and storage ◆ Provision of sanitary, laundry, cooking and medical facilities and potable water ◆ Location of accommodation in relation to the workplace ◆ Any health, fire, safety or other hazards or disturbances and local facilities ◆ Provision of first aid and medical facilities ◆ Heating and ventilation ◆ Workers freedom of movement to and from the employer-provided accommodation will not be unduly restricted ◆ Include an accommodation code of conduct with rights, rules and regulations for workers' accommodation ◆ Identify a grievance and maintenance response mechanism for the accommodation facilities and services	◆ Worker accommodation plan compliant with the WBG guidance note on workers' accommodation ◆ Types of accommodation (on site, offsite) ◆ Number of accommodated employees and rooms ◆ Ratio of facilities to workers ◆ Accommodation inspections ◆ Worker and community grievances ◆ Disease type / incidence, and lost time impacts ◆ Water / food quality inspections test results ◆ Waste segregation and appropriate disposal monitoring results ◆ Hygiene inspection results

Covid 19 Precautionary Measures

Government of Pakistan
Ministry of National Health Ser
Regulations & Coordination

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Guidelines
Health & Safety of Building & Construction Workers during COVID-19 Outbreak

Objective
To provide guidelines for the workers involved in building and construction work during the current epidemic of COVID-19.

Rationale

Construction processes are dynamic with significantly varying number of workers on a construction project site from day to day. The workers coming from diverse environments and working closely together increases the risk of exposure to COVID 19.

Building construction involves earth work, procurement of materials and supplies and their storage, construction work done by masons, blacksmiths, electricians, carpenters, plumbers, painters, supervisors, managers and security personnel. These guidelines provide the safety measure to be implemented at the construction site having a dusty environment, continuous flow of different materials and make-shift type of arrangements for storage, food and sanitation calls for implementation of safety precautions at the very basic level of personal hygiene only.

Advice for Site Managers:
Without prejudice to the following, all possible and prescribed actions shall be taken at the project site, as should facilitate the health of all life present at the site.

- Every construction project shall make proper arrangements for uninterrupted building services including but not restricted to, electricity, fuel, water supply, water disposal and sanitation, communication links, washrooms with hand hygiene and shower facility and with proper and adequate supply of soaps and disinfectants.
- Workers should not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site
- Ensure the availability of the thermal gun at the entry and exit of the construction site and no worker should be allowed without getting his/her temperature checked.
- Site manager must maintain a register of all contact details with NID number and addresses of all present at the site in case a follow up or tracing and tracking of contacts is required at a later stage.
- Develop the employee roaster to decrease the number of people on the site very day. Split the shifts of the workers in morning and evening with limit of each shift to 8 working hours.

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- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.
- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must be provided with a face mask. It must be ensured that everyone during his or her presence at the site continues to wear the mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Non-essential work trainings must be postponed avoiding gathering of people.
- Ensure the physical distance by creating more than one route of entry and exit to the site.
- Instruct the workers to inform the construction manager (or authorities) if
    - They develop any symptoms of cough, flu or fever.
    - They have been exposed to someone suspected or confirmed with COVID 19.
    - They have met someone who has a travel history of COVID 19 endemic country
    - They have travelled in last couple of days or plan to travel soon
- All incidences of appearance of the symptoms of COVID-19 shall be immediately documented and maintained at the site and information regarding which shall be immediately communicated through e-mail or else, to the designated health facility, and the sick worker shall be transported to the health facility for further advice and action. The site manager must establish a link with a nearby healthcare facility with arrangements for quick transportation of workers in case of an emergency.
- Persuade the workers to inform the authorities for their safety and of other if they observe any signs and symptoms in a colleague
- Do not allow any worker at the construction site who has the symptoms
- Display the awareness banners about hand hygiene and physical distancing, where you can, around the work site.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers shall be requested and required to wash their hands as frequently as practicable and shall also be advised not to touch their face with their hands during work.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Only sanitize-able dinning surfaces shall be used, which must be cleaned before each service. Food must be heated to a temperature to no less than 70° C before consumption and shall preferably be served in disposable utensils. If reusable utensils are used, these must be washed with soap and water immediately after use and stored at a safe place.
- The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers. Workers must not sit at less than 2 meters distance while having meals and while any other activity requiring interpersonal communications.
- In the wake of current restrictions on transportations site mangers will ensure safe transport arrangements for worker which should not be crowded and should have social distancing in place during the entire process from pickups till drops at destination

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- In case of workers sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms
- A supply of safe drinking water must be made available at the project site and maintained.

Advice for Construction Workers:

- All possible and prescribed measures shall be taken to ensure your and others health
- Enter your contact details in the register maintained at the site, in case a follow up or tracing and tracking of contacts is required at a later stage.
- Follow hygiene practices at washrooms and shower facility with proper and adequate use of soaps and disinfectants.
- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.
- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must use face mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Workers should wash their hands as frequently as practicable and shall not to touch their face with their hands during work.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Sick worker should immediately inform the site manager and must get medical advice from nearby health centre.
- Only sanitize able dinning surfaces shall be used. Food must be heated to a temperature to no less than 70° C before consumption and shall preferably be in disposable utensils. If reusable utensils are used, these must be washed with soap and water immediately after use and stored at a safe place.
- Do not sit at less than 2 meters distance while having meals and while any other activity requiring interpersonal communications.
- Do not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.
- Use safe transport arrangements which should not be crowded and should have social distancing in place during the entire process from pickups till drops at destination.
- In case sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms.

Deliveries or Other Contractors Visiting the Site

- Non-essential visits to the construction sites should be cancelled or postponed.

- Delivery workers or other contractors who need to visit the construction site must go through temperature check before entering and should be given clear instructions for precautions to be taken while on site.
- Designate the workers, with protective gears or at least gloved and mask, to attend to the deliveries and contractors.
- Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries.
- Instruct the visiting truck drivers to remain in their vehicles and whenever possible make use of contactless methods, such as mobile phones, to communicate with your workers.

Note: The above recommendations are being regularly reviewed by the Ministry of National Health Services, Regulations & Coordination and will be updated based on the international & national recommendations and best practices.

The Ministry acknowledges the contribution of Irfan Mirza, Syeda Shehrbano Akhtar and HSA/ HPSIU/ NIH team to compile these guidelines.

For more information, please contact:

HSA/ HPSIU/ NIH, PM National Health Complex, Islamabad

http://covid.gov.pk/

http://nhsrc.gov.pk/ https://www.facebook.com/NHSRCOfficial
http://www.hsa.edu.pk/ https://twitter.com/nhsrcofficial
https://www.nih.org.pk/ https://www.youtube.com/channel/UCdYuzeSP4Ug1f__ZZKI

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4. Waste Management Plan

The waste management plan will identify predicted waste streams, appropriate handling, reuse and recycle opportunities and, as a last resort, disposal methods. Contents to be covered in waste management plan by the Contractor include the following:

Topic to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
General waste management plan requirements	◆ Identify predicted waste streams, appropriate handling, reuse and recycle opportunities and, as a last resort, disposal methods. ◆ Prepare in accordance local waste regulations and the WBG EHS Guidelines for Construction Materials Extraction (2007), the WBG General EHS guidelines ◆ Cover all waste streams from the project (solid, liquid, hazardous, non-hazardous), for all activities, including construction works and worker facilities and accommodation. ◆ Develop a waste management system reflected in the plan that addresses issues linked to waste minimisation, generation, transport, disposal, and monitoring including: ◆ Contractor training requirements with respect to waste handling procedures ◆ Waste generation data collection for each waste stream by volume. This will include the proportion of each waste stream going for reuse, recycling or disposal. Any unusual waste volumes will be investigated ◆ An audit schedule which details the frequency of waste management audits and those responsible for undertaking them ◆ Procedure for reporting any environmental incidents related to waste ◆ The specific regulatory licensing and reporting requirements as they relate to waste. ◆ A map showing each temporary waste storage location for the Project ◆ Strict conditions on handling and storage	Waste record completion Recycling rates Amount of waste generated by stream

Topic to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	of fuel, explosives, and chemicals will be imposed on the Contractor and suppliers to prevent accidental pollution and injury. ◆ Procedures for, and identification of, licensed contractors to collect, transport and dispose of waste ◆ If any waste facilities are developed detailed management plans would be required following national and international standards.	
Waste segregation	◆ Segregate wastes in designated storage areas, such that hazardous and non-hazardous wastes are not mixed and to allow for recycling and reuse where appropriate ◆ Segregate hazardous waste (such as oils, lubricants, batteries, chemicals and medical waste) from other waste types to avoid cross contamination ◆ Label waste streams for identification and warning purposes	No non- compliances of waste being mixed identified in inspections
Storage requirements	◆ Correctly identify wastes and stored pending collection/transfer for reuse, recovery, recycling or disposal in an environmentally sound manner ◆ Locate waste storage areas on areas of impermeable hard standing to prevent leaching of any contaminants should spillage or leakage occur ◆ Identify a suitable method to cover all skips ◆ Store liquid wastes/oil/chemicals in tanks or drums located in bunded areas which can hold 110% of the capacity of the largest tank or drum or, for multiple drum storage, 25% of the total volume of material stored ◆ Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site ◆ Store hazardous waste in closed containers away from direct sunlight, wind and rain in designated storage areas. Limit access to hazardous waste to those who	◆ No non- compliances with management measures identified ◆ No spillages resulting from chemical storage in bunded areas.

Topic to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	have received training. ◆ Provide adequate ventilation where volatile wastes are stored, safety datasheets. ◆ Have spill management equipment (spill kits, eyewash stations, PPE) and readily available information on chemical compatibility for workers including labelling each container, demarcation of the area (e.g. on a facility map/site plan) ◆ Include visual and emissions management measures implemented as appropriate (e.g. screening)	
Handling and transportation	◆ Train staff to carry out handling and storage ◆ Make available and maintain spill response equipment in areas where hazardous wastes may be spilt ◆ Train an appropriate number of site personnel in spill response techniques ◆ Prepare and implement spill prevention and response plan and emergency preparedness and response plan to address any accidental release and leakage ◆ Assign each waste shipment a unique waste consignment number. The Contractor is responsible for ensuring that a register is kept at site recording all waste shipments leaving the site and their disposal destination ◆ Ensure a waste transfer note accompanies all waste consignments from the construction site to the disposal destination ◆ Confirm that contractors handling, treating, and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and following good international industry practice for the waste being handled ◆ Design transportation of waste to minimise and prevent spills releases or exposures to workers, the public or the environment.	◆ All staff involved with waste management trained on waste management and materials handling ◆ No spills

Topic to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	◆ Secure and label waste containers designated for off-site shipment with the contents and associated hazards ◆ Confirm that the waste containers are correctly loaded on the transport vehicles before leaving the site, and that they are accompanied by relevant documentation that describes the load and its associated hazards, consistent with the reference framework.	
Recycling and reuse	◆ Evaluate waste production processes and identify potentially recyclable materials ◆ Investigate external markets for recycling ◆ Establish recycling objectives and formal tracking of waste generation and recycling rates ◆ Provide training and incentives to employees	Recycling targets included in plan and audited against.
Disposal	◆ Use offsite waste treatment or disposal facilities appropriately permitted, or if not available based on the most suitable site in consultation with authorities ◆ Do not release the waste if there is concern about the standard of transport or destination of the waste ◆ Dispose of any medical waste at licensed facilities ◆ Do not permit burning of waste	◆ Permits held for waste treatment and disposal sites ◆ Medical waste licensed facilities records kept
Wastewater management	◆ Establish wastewater management system for worker and facilities wastewater. Treated water discharged in line with WBG and national limits, or tankered off site to appropriate licensed treatment facility or Include appropriate capacity of septic tank ◆ Include the importance of using project toilets and related procedures in site induction procedures.	◆ Wastewater treated in line with relevant standards ◆ No effluent not meeting standards discharged.
Contaminated materials or areas	◆ Develop procedure to identify, manage and remove any identified contaminated land as part of construction areas	◆ Any contaminated soils or ground managed in line with national and international requirements.

Topic to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
		◆ Minimisation of pollution to ground and surface water resources

5. Traffic Management Plan

1. The TMP shall ensure the following:

- ◆ Providing a safe environment for all road users;
- ◆ Providing protection to the general public from traffic hazards that may arise as a result of the construction vehicles movement;
- ◆ Minimizing disruption, congestion and delays to all road users;
- ◆ Ensuring access to adjacent private/commercial premises maintained at all times.
- ◆ Ensure whenever possible, that a sufficient number of traffic lanes to accommodate vehicle traffic volumes are provided.
- ◆ Ensure that delays and traffic congestion are kept to a minimum and within acceptable levels.
- ◆ Ensure that appropriate/sufficient warning and information signs are installed and that adequate guidance is provided to delineate the travel paths through the event site.
- ◆ Ensure that the roads are free of hazards

Contents to be covered in traffic management plan by the Contractor include the following:

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
Reduced road safety and impacts upon communities	◆ Undertake a road safety awareness programme along the main site access routes in coordination with PIU ◆ Provide information regarding construction activities and activities to stakeholders ◆ Plan and coordinate transport timings to minimise bottlenecks and avoid peak high-risk periods (e.g. school runs).	◆ Implementation of road safety awareness program along main site routes ◆ Provision of construction information to communities / stakeholders regarding construction activities. ◆ Quarterly stakeholder consultation meetings
Reduced road safety	◆ Train drivers fully in road safety and appropriately licensed certified and medically fit to operate the class of vehicle and for the vehicle's operation on and off site. ◆ Implement a no tolerance policy to	◆ Inspect contractor's licences ◆ Inspect transportation contractors for knowledge and compliance with the traffic management plan

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	alcohol and drugs including testing of drivers. ◆ Prohibit hand-held cell phones and radios while driving	
	◆ Ensure all vehicles are road worthy, drivers made aware of the potential risks as part of training. ◆ Include fatigue management as part of training ◆ Review likelihood of local workers using motorcycles as means of transportation to and from work or during off hours and decide whether such use is permitted and conditions for doing so, in particular use of helmets and possibly other protective gear.	◆ Vehicle inspections undertaken monthly
	◆ Undertake routine vehicle inspections and monitoring on an on-going basis ◆ Use hazard identification and risk assessment for vehicles on a regular basis ◆ Prohibit vehicles will be prohibited from being overloaded ◆ Utilize low emissions vehicles for the transportation of materials (wherever practicable) ◆ Install seat belts and require they are worn by all occupants	
	◆ Use licensed contractors for waste and fuel transportation ◆ Undertake due diligence of subcontractors (e.g. those bringing equipment to site), and adequately brief them on the traffic management plan. ◆ Include clauses related to traffic management plan implementation and use of qualified drivers in contracts.	◆ Inspect contractor's licences ◆ Inspect transportation contractors for knowledge and compliance with the traffic management plan
	◆ Require adherence to all national	◆ Monitor vehicle speeding and

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	and specific area speed limits ◆ Impose and monitor speed restrictions for project traffic ◆ Organize delivery schedules are reasonable and achievable to prevent speeding by drivers	driver's schedules
	◆ Designate crossing points along the access roads based on consultation with local communities	Designated crossing points implemented.
	◆ Erect road signs to i. clearly indicate the route of construction traffic and speed limits, ii. identify where the road is single carriageway about the dangers of overtaking and iii. be in accordance with local laws and rules ◆ Appoint and locate flag staff at intersections in the case of intensive traffic ◆ Where the access roads join the main road, erect illuminated and flashing signs to warn road users of the crossing points ◆ Restrict night-time use of road for large vehicles	◆ Erect traffic and road safety signs along project routes in-line with local laws ◆ Flag staff at intersections. ◆ Illuminated / flashing signs at crossing points
	◆ Put in place an action plan in case of an accident ◆ Communicate the action plan to all drivers ◆ Report and investigate all accidents and incidents/	◆ Action plan in place and training provided. ◆ Any incidents/accidents responded to rapidly and in line with GIIP including investigations undertaken and measures to prevent reoccurrence identified and implemented within short timeframes
	◆ Implement no-driving policy at night except for exceptional circumstances ◆ Prohibit traffic movements during extreme weather conditions such as heavy rainfall, to avoid potential road accidents associated with driver's visibility and road hazards	◆ No road traffic incidents at night ◆ No road traffic incidents in extreme weather ◆ No complaints about vehicle emissions

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	◆ Require all loads to be secured ◆ If road crossing is required, schedule movements to ensure that vehicles arrive and leave at the same time (two-way movement) ◆ Fit vehicles with warning alarms for reversing ◆ Maintain site vehicles in accordance with the manufacturer's instruction, with catalytic convertors installed and maintained. Older construction vehicles to be replaced with more fuel-efficient ones. ◆ Enforce a 'no-idling' policy ◆ Do not allow parking outside of site areas (e.g. along local roads)	

6. Spill Prevention and Response Plan

Contents to be covered in Spill Prevention and Response Plan by the Contractor include the following:

Topic to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
Spill prevention and response plan	◆ Develop a spill prevention and response plan to follow GIIP and include: ◆ Procedures for immediate spill response actions specified for all relevant scenarios relating to hazardous materials used in the construction processes. ◆ Complete list of equipment available for use in emergency situations. ◆ Procedures for immediate information to authorities in case of discharges and standards for reporting irregular events. ◆ Programme for training of key staff in emergency responses. The training is to be based on various emergency scenarios.	No pollution events

7. Pollution Prevention Plan

Contents to be covered in Pollution Prevention Plan by the Contractor include the following:

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
Dust	Use covers and/or control equipment such as water suppressors	No excessive dust levels reported in visual inspections No dust related grievances
Dust resuspension on unpaved roads	Implement dust suppression techniques on unpaved roads, such as applying water or non-toxic chemicals to minimise dust from vehicle movements Compact and periodically grade and maintain all construction roads Enforce a speed limit for heavy goods vehicles (HGVs) on-site at 20km per hour	No excessive dust levels reported in visual inspections. No dust related grievances No reports of speeding
Dust from open area sources, including storage piles	Use control measures such as installing enclosures and covers, and increasing moisture content Use vegetation on exposed surfaces of stockpiled materials	All stockpiles are enclosed or covered. No non-compliance recorded in visual inspections
Emissions from burning materials	Prohibit bonfires and burning of waste materials	No burning of waste materials
Emissions from generators	Consider the location and height of exhaust pipes to ensure proper dispersion of pollutants Use generators of a modern design and keep them well maintained	Generators of modern design and in good working order
Dust emissions from cement batching plant	Contain and arrest the dusty processes Suppress dust using water or proprietary suppressants that are fitted with a low-level water supply alarm. Protect external sources, such as stockpiles and external conveyors, from wind whipping by dampening or covering during the delivery, storage, and handling of crushed rock/sand/coarse aggregate	All stockpiles are enclosed or covered. No dust related grievances.
Emissions from construction vehicles	Implement the manufacturer recommended engine maintenance programs regardless of the size or type of vehicle Instruct drivers on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits	Maintain records of the engine maintenance programmes for all vehicles Records of driver training maintained No idling vehicles noted during site inspections Newer more fuel-efficient

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
	Enforce a 'no-idling' policy Replace old construction vehicles with newer more fuel-efficient alternatives where possible Convert high use vehicles to cleaner fuels where possible Install and maintain emission control devices such as catalytic converters	vehicles recommended onsite
Noise and vibration due to construction traffic on existing roads	Manage project vehicles to not wait or queue up with engines running at the entrance to the site access or on the public roads Maintain vehicles Restrict deliveries to be within working hours of the site minimising significant movements during sensitive times Use adjustable or directional audible vehicle-reversing alarms or use alternative warning systems, e.g. white noise alarms (including arrangements to minimise the need to perform reversing manoeuvres) Avoid unnecessary revving of engines, reducing speed of vehicle movement and maintaining the condition of the road surface to avoid body slap from empty lorries, designing and maintaining access routes to minimise vehicle noise. Explain and train drivers to minimise vehicular noise impacts	Construction traffic use identified routes No community grievances raised with respect to construction traffic-related noise
Noise complaints	Investigate noise and vibration complaints raised using the project grievance mechanism	Complaints are satisfactorily resolved in line with timeframes given in the grievance mechanism No further complaints regarding previous resolved issues are received
Noise from construction	Restrict access of the general public to the site access road and transmission	No incidents of members of the public accessing the

Impact to be addressed	Management / mitigation/ enhancement to be included in plan	KPI
activities	line construction zone	restricted zone
Noise from construction works	Use site terrain, material stockpiles and suitable work locations to screen work locations and maximise the distance between work activities and nearest noise sensitive receptors.	Noise levels to not exceed threshold values
Noise from construction activities	Where feasible, prioritise noisy activities to be undertaken in the daytime (i.e. avoid night working)	Night-time noise levels do not exceed threshold values

8. Material Transportation Plan

Aspects to be covered under this plan includes the following:

Inbound transportation logistics: Inbound transportation is highly sensitive to a reciprocal relationship between cost and time. Products and machinery have to be available exactly when needed. Delayed deliveries can stop production while early arrivals can make material and equipment management stressful.

Outbound transportation logistics: No matter how detailed the logistics plan is, there will always be some excess material that needs returning. Rented construction equipment also has to go back to the dealer promptly to avoid unnecessary costs. Part of outbound transportation logistics also includes waste disposal.

Construction material logistics: Different construction materials arrive at different milestones throughout the project, requiring skilled coordination to ensure a smooth workflow. Good material logistics also account for the true costs involved in transporting materials, such as truck rental fees, operating costs and fuel expenses. Included in material logistics is also the cost associated with loading and offloading.

Construction equipment logistics: Having a construction material logistics plan starts with knowing what machinery and attachments are required for specific tasks. Equipment logistic plans also identify timeframes when vital tools have to be sourced, transported, used and returned.

Site management logistics: Construction manager has to prepare sites to accept deliveries as they arrive and have the resources present to efficiently deal with removing items from trucks, securely storing them and having them available precisely when needed. Any break in logistical chain links could result in lost time. Good site management plans account for every logistical step required for smooth trucking to and from construction sites.

Communication logistics: Clear and concise communications are the key to successfully executing construction material and equipment logistic plans. Everyone involved in the supply chain needs to know what their role is and when they’re required to fulfill it.

Regulation logistics: Good logistic plans account for regulatory compliance both on and off the road. Safety should be the number one concern for all construction managers who develop logistic plans. Failing to safely transport construction materials can have devastating consequences. However, tragic accidents can be prevented by knowing all transportation regulations and building strict compliance into a logistics plan.

Annexure 7-3: Environmental & Social Field Monitoring Report Template

Environmental & Social Field Monitoring Report

Note: This template will be updated by the contractor as per site specific mitigation measures/impacts that will have to be monitored. The checklist will be reviewed and approved by the ESC.

Project Name

Reporting Period: Week / Month

Prepared by: Contractor Name

Abbreviations

Notes

Table of Content

A. INTRODUCTION

To be filled.

B. OVERALL CONSTRUCTION AND ESMP IMPLEMENTATION STATUS

To be filled.

Table 1: Progress Status

S.N.	Project Site Name / Section	Construction Progress Status	Environmental and Social Safeguard Status
1.			
2.			
3.			
4.			

C. IMPLEMENTATION STATUS OF ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

Has ESMP been incorporated into the bidding and contract documents? Provide details here.

Have E&S Monitoring Checklists been filled during this reporting period? Provide details here. Sample E&S monitoring checklist is attached in **Annexure I** (Contractor will have to extend / revise the checklist keeping in view the project/site requirements and attach the filled checklists as Annexure I). Attach Construction Progress Photographs as **Annexure II** and E&S Non-Compliance and Compliance Photographs as **Annexure III**.

1. Summary of the environmental compliances are presented below.

I. Air, Noise and Water pollution

Have mitigation measures for air, noise and water pollution been adopted according to ESMP? Provide details here.

II. Stockpiling of Construction Materials

Have the materials such as aggregates, sand, cement, steel etc. stockpiled near to the work sites and kept safely at designated places with proper coverage to avoid surface runoffs? Provide details here.

lll. Excavated Material Management

Excavation of the ground will be required for trenching / laying of pipes and related civil works which will result in generation of excavated material. Have mitigation measures for excavated material management been adopted according to ESMP? Provide details here.

IV. Occupational / Community Health and Safety

Provide details on the implementation of occupational & community health and safety measures which have been followed on the construction sites.

Have the workers been adequately provided with safety gears like jackets, helmet, goggle, facemasks, boots, ear plugs etc.?

Are workers utilizing those PPEs?

Have the excavated areas been barricaded to ensure public safety?

Status of construction traffic speed?

Are work hours being regulated?

V. Employment Opportunity

Have the local communities been employed at construction sites for working as unskilled / skilled labor in line with ESMP requirements? Provide details here.

VI. Camp Site Management

Status of Camp Management Plan and ESMP Camp / Labor Management Measures implementation.

VII. Training and Awareness Program

Include here the project specific training plan and provide status on implementation of ESMP trainings requirements.

VIII.Public Consultation

Provide status of Stakeholders Engagement Status against the ESMP Stakeholders Engagement requirements.

D. IMPLEMENTATION OF E&S MONITORING PLAN

Provide here the status of implementation for ESMP's E&S Monitoring Plan and attach the Monitoring Results / Reports / Actions Taken or Planned for controlling any parameters not meeting the WBG / SEPA standards.

E. IMPLEMENTATION OF GRIEVANCE REDRESS MECHANISM

Grievance Redress Mechanism (GRM) has been established to receive and facilitate the resolution of affected people's concerns, complaints, and grievances on various environmental / social management and other construction related issues. The GRM is willing to be proactive and accessible to all donors to address their concerns grievances and issues effectively and swiftly, in accordance with WB Guidelines. Provide here the status on receipt and resolution of complaints under GRM. Also

attach as **Annexure – II,** the GRM Meeting Attendance Sheets / Minutes / List of Register Complaints / Details of Decided Actions for their Resolution.

F. CORRECTIVE ACTION PLAN

Provide here a detailed corrective action plan (CAP) finalized in consultation and agreement to the PIU / CSC with details of Active E&S Issues, Corrective Actions for the resolution of these issues, Responsible entity for the resolution of the issues and Deadlines for resolution.

G. CONCLUSION

Provide here a brief conclusion and way forwards for the next reporting period.

Annex I: Environmental & Social Monitoring Checklist Format

Replacement of 4.5 km PRCC Old Pipri Main (OPM) Section from Pipri Reservoir to FAW Motors - National Highway (N5)

Environmental & Social Monitoring Checklist

Date: ……..

SN	Activity	Details	Remarks
1.	**Employment generation**		
a.	Number of local labour employed during construction		
b.	Number of construction workers hired from outside		
c.	Number of child workers involved (if any)		
d.	Number of women employed during construction phase		
2.	**Training and awareness program**		
a.	Participants on awareness program on electrocution, health and safety		
b.	Participants on awareness program on environment management		
c.	Participants on income generating training (if any)		
3.	**Occupational health and safety measures**		

SN	Activity	Details	Remarks
a.	First aid facility and emergency services provided at work sites		
b.	Protective gears provided to workers and using helmet, facemasks, gloves, muffle, boots, jacket, goggles etc.		
c.	Sexual Exploitation, GBV / SH / HIV/AIDS awareness provided to workers		
d.	Number and types of accident occurred		
e.	Accidental insurance for worker		
f.	Information, sign, signboard used at construction sites		
4.	**Camp site management**		
a.	Clean drinking water supply at camp site		
b.	Temporary pit latrine at campsite		
c.	Kitchen waste management at camp site		
d.	First aid facilities available at camp sites		
e.	Types of fuel used for cooking (kerosene/LPG gas/firewood)		
5.	**Vegetation Removal and Compensatory Plantation**		
a.	Number of trees cut		
b.	Compensatory plantation land allocation status		
c.	Compensatory plantation status		

SN	Activity	Details	Remarks
6.	**Spoil management**		
a.	Quantities of excavated materials generated		
b.	Reuse status of excavated materials		
7.	**Air, water and noise quality**		
a.	Dust generation from construction sites		
b.	Noise generation from construction sites		
c.	Drinking water quality at campsite		
8.	**Safe disposal of construction waste**		
9.	**Grievance received in last month**		
10.	**Establishment of safeguard unit**		

Annexure II: Construction Progress Photographs

Annexure III: E&S Non-Compliance and Compliance Photographs

Annexure IV: GRM Status and Details

Annexure 9-1: Attendance Sheets of Socio-Economic Baseline Participants

Female Participants

Participants List of Pipri KWSC Colony		
S. No.	Name	Settlement
1.	Shahida Majid	Pipri KWSC Colony
2.	Zaib Un Nissa	
3.	Zakia	

Participants List of Jokhio Goth		
S. No.	Name	Settlement
1.	Sherbano	Jokhio Goth
2.	Suleha Khatoon	
3.	Taherah	
4.	Sughra Umar	

Participants List of Hassan Razaqq Abad Haji Natho Khan Village		
S. No.	Name	Settlement
1.	Rehana	Razaqq Abad Haji Natho Khan Village
2.	Choti Beghum	
3.	Ameena	

Participants List of Hassan Panhwahar Goth		
S. No.	Name	Settlement
1.	Naeeba Banaras	Hassan Panhwahar Goth
2.	Marium Banaras	
3.	Nimra Haris	

Participants List of Zafar Town		
S. No.	Name	Settlement
1.	Uzma Dowood	Zafar Town
2.	Naseema	
3.	Faiza Farhat	
4.	Naheed	
5.	Shazia	
6.	Mrs. Saira Rehman	

Participants List of Future PS		
S. No.	Name	Settlement
1.	Shazia	Future PS
2.	Zakia	
3.	Asia Batool	
4.	Saira	

Participants List of Mohammad Nagar		
S. No.	Name	Settlement
1.	Salma	Mohammad Nagar
2.	Husan Zeba	
3.	Fatima	
4.	Shahida	

Male Participants

Participants List of Pipri KWSC Colony		
S. No.	Name	Settlement
1.	Roshan Ali	Pipri KWSC Colony
2.	Amer jalil	
3.	Muhammad arif	
4.	Muhammad Saleem	

Participants List of Jokhio Goth		
S. No.	Name	Settlement
1.	Usman Ghani	Jokhio Goth
2.	Sheriyar	
3.	Wajad Ahmed	
4.	Mushtaq Ahmed	

Participants List of Hassan Razaqq Abad Haji Natho Khan Village		
S. No.	Name	Settlement
1.	Abbas Ali	Razaqq Abad Haji Natho Khan Village
2.	Amin Baksh	
3.	Meboob Ali	
4.	Ghulam Rasool	
5.	Mir Ali	

Participants List of Hassan Panhwahar Goth		
S. No.	Name	Settlement
1.	Abdul Ghani	Hassan Panhwahar Goth
2.	Samiullah	
3.	Waqas	
4.	M.Saleem	
5.	Shah Khan	

Participants List of Zafar Town		
S. No.	Name	Settlement
1.	Shah Khan	Zafar Town
2.	Duran Khan	
3.	Adnan Rafiq	
4.	Shahi Mohad	

Participants List of Future PS		
S. No.	Name	Settlement
1.	M. Arif	Future PS
2.	Ibrahim	
3.	Shehyar	
4.	Ibrahim	

Participants List of Mohammad Nagar		
S. No.	Name	Settlement
1.	Obead	Mohammad Nagar
2.	Ayaz	
3.	Arif	
4.	Shoheeb	
5.	Irfan	
6.	Mohammad Arif	
7.	Imran	
8.	M. Arif	

Annexure 9-2: Social Baseline and Stakeholders Consultation Photographs

Public Consultation (Female)


Jokhyio Goth


KWSC Colony Pipri

Public Consultation (Male)




Jokhyio Goth

KWSC Colony Pipri

Institutional Consultations

Consultation at Pipri Filtration Plant

Women development Department

Pictorial views of Stakeholder Consultation Workshop

The Welcome address given by Mr. Syed Salahuddin (Project Director)

Question from the stakeholder

Group photo after the successful completion of stakeholder meeting

Annexure 9-3: Attendance Sheets of Stakeholder Consultation Workshop

KWSSIP

THE WORLD BANK AIIB

Stakeholder Consultation Workshop – Environmental & Social Assessment Studies

SOP 02 Projects for Karachi Water & Sewerage Services Improvement Project (KWSSIP)

28th July 2022

S. No.	Name	Designation / Department	Signature
1.	Muhammad Tariq	ASE	
2.	Bilal Zafar	KWSSIP	
3.	Sibtain Mughal	Joint Director Comm	
4.	Dr. Abdul Ghaffar	Env. Engg. Deptt. NED University	
5.	Mr. Shoaib Qureshi	Addl Director SEPA	
6.	Ali Larosh	Sr. Project officer WWF-Pakistan	Aliharosh
7.	Farooq Bhutto	K Electric	
8.	Yar Muhammad	Transport Deptt.	
9.	Huma Haleposto	Safeguard Specialist	
10.	Zahid Farooq	Joint Director LRC KWSC	

1071PO1 I 01 (Stakeholder Consultation Workshop – Attendance List)

MMP NESPAK EMC

KWSSIP

THE WORLD BANK AIIB

Stakeholder Consultation Workshop – Environmental & Social Assessment Studies

SOP 02 Projects for Karachi Water & Sewerage Services Improvement Project (KWSSIP)

28th July 2022

S. No.	Name	Designation / Department	Signature
11.	UZAIR HAMEED KHAN	MANAGER ROW OPS PTCL	
12.	Mushtaque Ahmed Soomro	Coordinator Protocol NRL.	
13.	CDR Rehan Sadiq	Sr. Mgr Administration	
14.	KHALID M. SIDDIQUI	Member (Service) P&D Board GOS	
15.	SYED ALI NAUMAN	CHIEF ENGINEER, K.D.A.	28/07/2022
16.	Kamran Akbar	Sr. Social Div SP	
17.	SARFARAZ	KWSIP	
18.	Mazhar Ali Shaikh	Director Katchi Abadi KWSSIP	
19.	Ibad ur Rehman	WB	
20.	Engr: M. Usman Memon	S.E I/c (BWSD). Pak: Steel.	

1071PO1 I 01 (Stakeholder Consultation Workshop – Attendance List)

MMP NESPAK EMC

KWSSIP

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SOP 02 Projects for Karachi Water & Sewerage Services Improvement Project (KWSSIP)

28th July 2022

S. No.	Name	Designation / Department	Signature
21.	KAMRAN UMAR	EE / KDA	
22.	Khurram Shah	SDS / KWSSIP	
23.	Syed Waqar Hussain	ES / KWSSIP	
24.	ARSLAN ASGHAR	PRINCIPAL ENVIRONMENTALIST - PK	
25.	Aqeel Ahmed Maggi	SA. Asstt. Engineer M.C	
26.	Muhammad Saqib Siddiq	Sr. Social & Resettlement Spec.	
27.	Muhammad Norman	Junior Engineer WAPDA K-4	
28.	Muhammad Yusuf	Manager (LAND) PSP	
29.	Mazhar Abbas	Asstt. Manager (PSM)	
30.	Intelehab A Rajput	Chief Engineer (ESM) KWSSIP	

MMP NESPAK EMC

KWSSIP

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28th July 2022

S. No.	Name	Designation / Department	Signature
31.	Tuba Noman	GIS Specialist	
32.	Muhammad Sajjad	Resettlement Expert NESPAK	
33.	M. A. Shishahzad	MMP	
34.	M. Shafiq Ahmed	Nespak Lhr. (PM-C1)	
35.	Fahad Saleem	Nespak (Env. spec.)	
36.	OMAR ARIF	EMC Pakistan	
37.	Talal Ahmed	MMP	
38.	Rameez ul Islam	MMP	
39.	GUL MIR KHAN	Chief, Engr (T&C) KIV BSO	
40.	Hajeeb-ur-Rehman	Manager PTCL N/WD	

1071PO1 I 01 (Stakeholder Consultation Workshop – Attendance List)

MMP NESPAK EMC

KWSSIP

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28th July 2022

S. No.	Name	Designation / Department	Signature
41.	Dr. Aamir Alamgir	Assistant Professor / Institute of Environmental Studies, UoK	
42.	Ghulam Kibria	Energy update	
43.	Wg Cdr DARYA KHAN	OC Admin / PAF SWEEP. Karachi	D. Coord
44.	Muhammad Nawaz	Social safeguard specialist	
45.	Zulfiqar Lashari	Sr. Social Development Specialist	
46.	Muhammad Zafar Iqbal	Resettlement MMP Specialist	Muhammad Zafar Iqbal
47.	Muhammad Rahim Jamro	M.M.P.	M. Rahim
48.	A. Rehman	Lewis.	
49.	Nasreen Baloch	Assistant Director Social welfare Dept	
50.	Jawed Shami	Team leader Lewis PAS	

MMP