ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP)

FOR CONSTRUCTION OF

HUMANITARIAN RESPONSE FACILITY AT MARIPUR (KARACHI) & RESCUE STATIONS AT MARIPUR (KHI), JAMSHORO & SUKKUR

REF NO. PK-PDMA-SINDH-227016-CS-CQS

SINDH RESILIENCE PROJECT – PDMA COMPONENT

EXECUTIVE SUMMARY

The world's sixth most populous country. Pakistan, with a population of 207.86 million[1] people (2017 census); is a lower middle-income country and per capita income of US$ 1,188.86 was recorded in 2020[2]. The country is exposed to a number of natural hazards including floods, earthquakes, droughts, cyclones, heatwaves and tsunami. During 2005 – 2015 decade, damages and losses resulting from natural disasters in Pakistan exceeded USD 18 billion[3]. In addition, the country is on 6th rank among the most climate change affected countries in the world, with the fifth highest total losses of all countries attributed to climate change over the 1994-2014 period[4]. In terms of natural disasters, the province of Sindh is more vulnerable due to its geographical

1 https://www.pbs.gov.pk/sites/default/files//population_census/sailent_feature_%20census_2017.pdf

2 https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PK

3 https://www.preventionweb.net/files/68260_682307pakistandrmstatusreport.pdf

4 Global Climate Change Risk Index 2015: Who suffers most from extreme weather events? Weather related loss events from 1994 to 2013.

setting and climatological conditions. The prominent and frequent disasters of the province include floods, drought, heatwaves, windstorm, cyclone and associated storm surge and slow onset sea intrusion. Additionally, social and economic fabric and unplanned urbanization in the province exacerbate Sindh's vulnerability to natural disasters. The scale and frequency of damages caused by floods represents the most recurrent and acute threat to communities in Sindh.

In the context of natural disasters in Sindh and to strengthen provincial capacity to prepare for, and respond to natural disasters and bring disaster and climate resilience, the Government of Sindh with the financial assistance from World Bank has initiated Sindh Resilience Project. The strategic objective of the project is disaster and climate resilience for sustained development and allow the poorest; the most affected by disasters to escape from recurring cycles of poverty. The project promotes vulnerability reduction by supporting the government's capacity to cope with climate change and disaster events, reducing exposure of communities to floods, and decreasing the vulnerability of the communities to drought events. The project development objective is to

"To mitigate flood and drought risks in selected areas and strengthen Sindh's capacity to manage natural disasters and public health emergencies"

Overall, Sindh Resilience Project (SRP) is divided into 3 major parts i.e., Component 1: Strengthening Disaster and Public Health Emergency Management, Component 2: Improving Infrastructure and Systems for Resilience and Component 3: Contingent Emergency Response.

In terms of execution, the SRP is divided into two components i.e., Sindh Irrigation Department (SID) Component and Provincial Disaster Management Authority (PDMA) Component. SID Component specifically focuses on flood and drought mitigation through structural interventions like enforcement of flood protective infrastructure and development of small dams, aquifer recharge and other water harvesting measures. While PDMA Component is aimed to strengthen institutional capacity for disaster risk management, disaster response and public health emergencies.

Description of subproject: The construction of Humanitarian Response Facility at Maripur (Karachi) & Rescue Stations at Maripur (Karachi), Jamshoro and Sukkur is planned under Component 2: Strengthening DRM Capacity of PDMA Sindh and Subcomponent 1.2: Establishing Sindh Emergency Service, respectively. which is being executed by PDMA Sindh. Presently, the province lacks organized and structured rescue service to provide search, rescue and lifesaving services to the citizens during disasters and emergencies. In initial phase, rescue headquarter and 07x rescue stations are planned at divisional headquarter cities of the Province. 02 x rescue stations are planned in Karachi, and 01x station each at Hyderabad, Mirpurkhas, Shaheed Benazirabad, Sukkur and Larkano. In successive phase, the rescue services will be extended to selected districts after conduct of feasibility study. The rescue station located in Jamshoro is planned to provide services in Hyderabad Division. All divisional level rescue stations are planned to be constructed within the premises of the facilities already in-use and legal possession of PDMA Sindh. The facility for rescue stations i.e., office compound, residential compound and vehicles parking sheds have already been developed by PDMA at Mirpurkhas, Shaheed Benazirabad and Larkano. Scope of subproject specific to sites include:

Sr #	*Site*	*Description*	*Scope of Work*
1.	Maripur, Karachi	Humanitarian Response Facility	a) 03x general purpose storage sheds b) 01x cold storage shed
		Rescue Station	a) Rescue station office compound b) Dormitory / residential compound for Rescuers c) Rescue vehicle parking sheds
2.	Jamshoro	Rescue Station	a) Rescue station office compound b) Dormitory / residential compound for Rescuers c) Rescue vehicle parking sheds
3.	Sukkur	Rescue Station	a) Rescue station office compound b) Dormitory / residential compound for Rescuers c) Rescue vehicle parking sheds

Legal and Policy Framework: This ESMP for subproject is governed by Sindh Environmental Protection Act 2014. Additionally, applicable national and provincial laws have also been considered in preparation and formulation of the ESMP. As far as World Bank policies are concerned, the Operational Policy OP 4.01 Environmental Assessment is applicable to proposed subproject. Moreover, the applicable World Bank Environmental Code of Practices have been referred in the ESMP to enable environmental protection and social safety. WB OP 4.12 has not been triggered for this subproject because land has already been acquired and in use of PDMA Further, the land is free of squatters, complainants and litigation.

Environmental and Social Baselines for Subproject Sites: The subproject sites are located in different parts of the province i.e., Karachi, Jamshoro and Sukkur. Due to geographical distribution, different social and environmental condition persist at sites. Brief on environment, climate social environ of the subproject site is as follows;

Maripur: The site is located in Maripur, District Kemari, Karachi within industrial / commercial zone at 24°52'21.3"N 66°54'16.2"E geographical coordinates. The site is enclosed by boundary wall and covers approximately 5 acres. Presently, a general-purpose storage shade of PDMA exists on site. Currently, the site is operational with nominal employees of PDMA. The environmental baseline has been compiled through literature review and field data collection. The site is surrounded by mix of residential societies and commercial properties. Predominant landuse is industrial / commercial and partly residential. Warehouses / storages, barren land, salt fields and residential colonies are major sub-categories of landuse. On western side of the site, Budnai Nala, the natural surface drain flows close to the boundary wall. Precisely, landuse within the site is barren, except, scattered seasonal bushes, shrubs and a storage shed of PDMA. Environmental baseline reveal that noise and air quality levels were within SEQS permissible limits and

Particulate Matter (PM) were dominant pollutant in the area. Ground water of the area is brackish due to sea influence. However, drinking water sample was found fit for consumption. Topographically, the lies in plain and land was leveled. Construction activities of subproject will not alter natural landscape of the area. In Köppen-Geiger climate classification system, climate of Karachi is BW i.e., the dry desert climate and exhibits hot and dry during summer, mild winter and heavy / sporadic rainfall during the monsoon and high humidity levels in March to November. As the city is located on the coast of Arabian Sea, it tends to have a moderate climate due to marine affects. Over the course of year, the average temperature typically varies from 12.7°C to 34.5°C[5] annual average rainfall is 145 mm. Recorded high temperature remained 47.8 ^{0}C while recoded low temperature remained 0 ^{0}C during the month of January[6]. The soil in and around the site is saline and barren except seasonal bushes and shrubs. Due to urban setting, wildlife is absent within and around the site except domestic birds and animals. No heritage site, wildlife sanctuary, game reserve is located within or near the site.

Administratively, the site falls within newly formed Kemari District. Before 2020, Kemari town remained part of District West. According to 2017 census, total population of District West was 3,914,757 with annual growth rate of 3.35[7]. Specifically, with reference to subproject site, primary receptors of subproject impacts will be nominal employees of PDMA, and estimated 5,000 – 10,000 population of secondary impact zone, which includes residents of KANUPP colony and workers of nearby industrial / commercial facilities. In case of health emergency, nearest health facility to the site is Imperial Holy Family Hospital at 1 Km distance.

Jamshoro: The site is located on main Karachi – Hyderabad superhighway **(M-9)** in district Jamshoro, half a kilometer off Karachi– Hyderabad track. The geographical location of site is 25°21'47.36"N, 68°11'57.60"E and covers approximately 9 acres. The site is closed by boundary wall with access gates and houses general purpose storage sheds. Travelling towards Hyderabad city, the Jamshoro toll plaza is approximately 2 Km and Jamshoro interchange is at 8 km from the site. The site is predominantly surrounded by barren land. Some nearby commercial activities include stone crashing sites, limited rain dependent agriculture, petrol stations and highway restaurants. Immediate neighborhood of the site is under development residential society, thinly populated human settlements, highway petrol station and restaurant. No water channel or surface water body exist within or near the site. Environmental baseline reveals, the noise and air quality levels within SEQS permitted range. Drinking water sample was found fit for consumption. Ground water quality is brackish, deep and uneconomical to lift through boreholes.

The site lies on the southeastern fringe of the Khirthar range, which runs along the Sindh-Baluchistan provincial boundary. Primary lithology of the area is of sedimentary origin, consisting of limestone with occasional shale and sandstone. The elevation surrounding the site generally ranges between 66 and 68 m above sea level and slopes towards river Indus in south-southeast direction. Within and around the proximity of site, the area has very shallow soil cover and area is categorized as rough mountain land. The dominant soil group is loamy soils with accumulation

[5] https://weatherspark.com/y/106467/Average-Weather-in-Karachi-Pakistan-Year-Round
[6] https://en.climate-data.org/asia/pakistan/sindh/karachi-992367/
[7] https://www.pbs.gov.pk/sites/default/files//population_census/results/09501.pdf

of secondary calcium carbonates[8]. Construction activities of proposed subproject will not affect or alter natural landscape of the area. The climate of Jamshoro is broadly hot and dry summer, mild winter and rainfall in monsoon. The hottest month is June in which the maximum average monthly temperature exceeds 40 ^{0}C. The winters are mild with temperature dropping to 20 ^{0}C in January. The area receives approximately 178 mm of rain annually. According to Köppen-Geiger climate classification, the climate is arid desert hot climate[9]. The surrounding of the site is barren with scattered wild bushes and trees. Bushes normally grow after rainfall and dry in few months. Wildlife is absent within and around the site except domestic birds and animals. No heritage site, wildlife sanctuary, game reserve is located within or near the site. Boundary of Khirthar National Park starts approximately 30 Km north-west of the site. No surface water resource exists within or nearby site.

Administratively site fall in Taluka Kotri of District Jamshoro. As of 2017 census, total population of Taluka Kotri is 438,063; out of which 231,542 is male while 206,443 is female population. Population density per square kilometer is 416.81. Precisely, no population reside in or nearest neighborhood of subproject site. Employees of PDMA will be primary receptors of potential negative impacts of subproject. Nearest health facility is Liaqat Medical University of Health Sciences Hospital situated in Jamshoro, which is approximately 12 Km from the site. Nearby cities / towns are Jamshoro, Kotri and Hyderabad.

Sukkur: The site is located in Sukkur Industrial area on approximately 5 acres of land bounded by wall and gated entry. The site is situated at 27°44'13.49"N, 68°50'44.43"E geographical coordinates in city and district Sukkur, approximately 3 Km northeast of **N65** highway. The site is already in use of PDMA Sindh and general-purpose storage shades along with necessary offices exists on site. The site is surrounded by mixed landuse including residential, industrial / commercial and agriculture. River Indus flows north-east side of the site where flood protective embankment protects the human habitat from riverine flooding. Environmental baseline suggest that noise and air quality are within permissible limits of SEQS. Generally, ground water quality of Sukkur is sweet and nearby surface water resource is River Indus. However, the characteristic of ground water varies from location to location, with areas close to irrigational watercourses or the distributaries having comparatively better water quality water, while in some area quality is saline / brackish. No natural or manmade water channel passes through the site. Drinking water sample collected from site was found unfit for drinking due presence of bacteria. However, water can be consumed after chlorination or boiling process.

The highest elevation of Sukkur city is about 24 meters above sea level and lies on alluvial plains except limestone hill on which old Sukkur and Rohri city are built. Subproject site is plain land with fertile soil. Specifically, land within site boundary is already developed by PDMA. Climatologically, Sukkur is characterized as hot desert climate in Köppen-Geiger climate classification i.e., by very hot and hazy summers with dry and cool winters. Sukkur is known for its extremely hot summers and temperature reaching to 50 ^{0}C. Wind speed is low throughout the year, and sunshine is abundant. Dry heat is experienced in April to early June until the Monsoon season starts to arrive. The lowest average temperatures in the year occur in January, when it is

[8]https://www.researchgate.net/publication/301849516_STUDY_ON_GENERAL_GEOLOGY_FOSSILS_AND_CUT_STONE_OF_THANO_BULA_KHAN_JAMSHORO_SINDH_PAKISTAN
[9] https://en.climate-data.org/asia/pakistan/sindh/kotri-14796/

around 15.8 ^{0}C. Monsoons in Sukkur are not very wet, but bring high dew points, resulting in high heat indices. The average annual rainfall of Sukkur is 87.6 mm and mainly occurs in the monsoon season[10]. Wildlife is absent within and around the site except domestic birds and animals. No heritage site, wildlife sanctuary, game reserve is located within or near the site. However, 170 km stretch of the River Indus flood plain between two irrigation barrages Guddu and Sukkur bounded by flood protective embankments is the designated as national protected area for Indus River Dolphin and is known as Indus Dolphin Game Reserve. The total area of the reserve is 125,000 ha and has a 3 km buffer zone in the floodplain.

Administratively, the site falls within taluka New Sukkur, district Sukkur. According to 2017 census, total population of Taluka Sukkur is 320,223 with 165,509 males and 154,673 and females. Urban proportion of population is 86.37 and average household size of 5.79[11]. With reference to subproject activities, primary receptors of potential negative impacts of activities will be employees of PDMA and estimated 3,000 – 8,000 population of secondary impact zone. Civil hospital Sukkur and National Institute of Cardio Vascular Diseases (NICVD) are major health facilities situated at approximately 12 Km and 8 Km respectively.

Stakeholder Consultations and Disclosure: Primary stakeholders including nearby residents, owners and staff of adjoining warehouses / storage / offices, officials of SRP / PDMA Sindh and general public in periphery were consulted by organizing a group consultative meeting and questionnaire-based survey. In both modes, participants were briefed about subproject, construction activities and method of construction, grievance redress mechanism and other pertinent information. The participants were also informed about potential negative and positive impacts of the subproject and mitigation plan. The general and specific concerns of participants were recoded and have been made part of ESMP. Overall, stakeholders provided positive feedback and support for subproject.

Impact Assessment and Mitigation: For design, construction and operation of subproject, a detailed potential impacts assessment on environmental and social receptors has been carried out along with mitigation measures. Environmental Management and Monitoring Plan (ESMMP) and checklist have been prepared for monitoring implementation of ESMMP. Preparation of energy and water conservation, emissions and construction waste management plans are included to address the adverse environmental impacts at an early stage. Building Codes of Pakistan with seismic provision for Zone 2A and 2B and best practices are proposed to avoid damage caused by earthquakes. Necessary flood protection measures and design guidelines for flood protection are given to avoid flooding.

The potential adverse impacts associated with construction are contained and temporary in nature related to the soil, noise, air quality, solid waste, increased resource consumption, labor health and safety. Soil erosion and contamination is ensured to be avoided through proper storage of construction materials and disposal of contaminated soil. Impact on air quality from dust and exhaust emissions from soil excavation and movement of heavy vehicles, is mitigated through Emissions Monitoring Plan. For handling of debris and waste from construction activities, a Debris Management Plan and proper storage and disposal of construction materials are proposed

[10] https://en.climate-data.org/asia/pakistan/sindh/sukkur-1227/
[11] https://www.pbs.gov.pk/sites/default/files//population_census/results/08201.pdf

to be in place to minimize the impacts. Workers Health and Safety Plan has been recommended for safety of labor, in order to safeguard them from any adverse impacts while handling heavy machinery and toxic material (if any). Mitigation measures including signage for safety, use of appropriate personal protective kits, safety goggles and training of construction staff is proposed during construction phase. Increased consumption of energy and water during construction and operation phase is ensured by including resource efficient building design.

For effective implementation and monitoring of ESMP, a budgetary provision of PKR **9,386,000/** is calculated. The estimated budget includes implementation cost of ESMP.

Institutional Arrangements: Implementation of the ESMP will overall be supervised by Project Director, Sindh Resilience Project - PDMA Component. The Project Director is responsible for the implementation, monitoring and reporting of the ESMP by arranging the environment and social safeguards firm or individual consultant. The Firm or Individual Consultant will be responsible for ensuring ESMP requirements and implementation by the construction contractor. Implementation of mitigation measures on ground will be responsibility of construction contractor. The ESMP will be part of bidding document and the contract to be signed between selected construction contractor and SRP-PDMA. SRP-PDMA through independent service providers will initiate environmental monitoring of air, water and soil to monitor and report compliance. Detailed roles and responsibilities of the project implementation in accordance with ESMP are defined.

ESMP monitoring checklist will be used by office of the Project Director SRP-PDMA Component, selected Environmental and Social Safeguard Firm or Individual Consultant and Construction Contractor for ESMP compliance. The Firm or individual consultant will provide monthly monitoring reports to the Project Director Sindh Resilience Project - PDMA Component or his authorized official. Project Director or his authorized official will share bi-annual progress reports with World Bank. In case of non-compliance, corrective action will be taken and construction work will be discontinued till measures are enforced and ensured.

Grievance Redressal: Under Grievance Redress Mechanism, a Grievance Redress Committee (GRC) and Public Complaint Cell (PCC) been proposed. GRC will be independent body with its secretariat at the office of Project Director, Sindh Resilience Project – PDMA Component. All complaints will be recorded in Complaint Register held by PCC and Master Compliant Register at GRC. GRM provisions and details will be displayed in the local language at the subproject sites, SRP-PDMA office and PDMA Sindh. Complaint register will be maintained by the GRC Secretariat. If the grievance redressal mechanism fails to satisfy the aggrieved person at all levels, she/he can submit the case to the appropriate court of law.

Disclosure: The ESMP will be disclosed on the websites of SRP-PDMA Component, PDMA Sindh and on the World Bank's projects operation dashboard. Hard copies of this ESMP will also be shared with the Sindh Environmental Protection Agency (SEPA) and relevant project stakeholders. A copy of the ESMP will be placed in the office of Sindh Resilience Project – PDMA Component for public access. The Urdu translation of the Executive Summary of the ESMP will also be distributed to all relevant stakeholders, especially to the communities in the subproject areas.

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List of Acronyms

ESMP	Environmental and Social Management Plan
ESMF	Environmental and Social Management Framework
EPA	Environmental Protection Agency
GoP	Government of Pakistan
HSE	Health, Safety and Environment
IFC	International Finance Corporation
IEE	Initial Environmental Examination
NCS	National Conservation Strategy
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NEQS	National Environment Quality Standards
NGO	Non-Government Organization
NOC	No Objection Certificate
PEPA 97	Pakistan Environmental Protection Act, 1997
PEPC	Pakistan Environmental Protection Council
PNS	Pakistan National Committee
Pvt	Private
GDP	Gross Domestic Product
IEE	Initial Environmental Assessment
EIA	Environmental Impacts Assessment
PMD	Pakistan Meteorological Department
WAPDA	Water and Power Development Authority
PID	Provincial Irrigation Departments
NDMA	National Disaster Management Authority
PDMA	Provincial Disaster Management Authorities
DRM	Disaster Risk Management
NIHL	Noise Induced Hearing Loss
PIU	Project Implementation Unit
FIU	Field Implementation Unit
HRF	Humanitarian Response Facility
CC	Construction Contractor
SRP	Sindh Resilience Project
SEQS	Sindh Environmental Quality Standards

List of Units

°C	Degree Celsius
cm	Centimetre
db	Decibels
Kg	Kilogram
Km	Kilometer
m	Meter
µg/m3	Microgram per cubic meter
%	Percent
W/kg	watts per kilogram
mW/m^2	milliwatts per square metre

Chapter

1

Introduction

Chapter 1. Introduction

1.1. Background

Pakistan is the world's sixth most populous country with an estimated population of 207.86 million[12] people (2017 census) and per capita income of US$ 1,188.86 in 2020[13], falls in lower middle-income category. Pakistan is exposed to a number of adverse natural events and has experienced a wide range of disasters over the past 40 years, including floods, earthquakes, droughts, cyclones and tsunamis. During 2005 – 2015 decade, damages and losses resulting from natural disasters in Pakistan exceeded USD 18 billion[14]; as the population and asset base of Pakistan increases, so does its economic exposure to natural disasters. Also, Pakistan has been ranked 6th among the most climate change affected countries in the world, with the fifth highest total losses of all countries attributed to climate change over the 1994-2014 period[15] . Pakistan faces a major financing challenge arising from natural catastrophes, with flood causing an estimated annual economic impact of between 3 and 4 percent of the Federal Budget[16].

The intricate relationship between climate, calamities, pandemics and economy is pushing poor more towards poverty. Calamities or disasters are prominent factors which disbalance the poor at individual level and economies at country scale. Almost every year, a huge amount is spent on relief and recovery efforts in Sindh. In addition to countable losses, huge uncountable losses occur, which either stop the development or slow down the pace. The poor strata of population suffer the most because of disastrous events. Their meager earning resources are either lost or disturbed and undergo long recovery periods. Various disaster management initiatives are in progress through Sindh Resilience Project - PDMA Component. These initiatives include structural and non-structural reforms, enhancement is service delivery, early warning systems and mechanisms, departmental reforms, community-based disaster management and nonetheless awareness and capacity development of PDMA and line departments to bring a new disaster response paradigm in the province.

In the context of natural disasters in Sindh, and to strengthen provincial capacity to prepare for, and respond to natural disasters and bring disaster and climate resilience, the Government of Sindh with the financial assistance from World Bank has initiated Sindh Resilience Project. The strategic objective of the project is disaster and climate resilience for sustained development and allow the poorest; the most affected by disasters to escape from recurring cycles of poverty. The project promotes vulnerability reduction by supporting the government's capacity to cope with climate change and disaster events, reducing exposure of communities to floods, and decreasing the vulnerability of the communities to drought events. The project development objective is to

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14 https://www.preventionweb.net/files/68260_682307pakistandrmstatusreport.pdf

15 Global Climate Change Risk Index 2015: Who suffers most from extreme weather events? Weather related loss events from 1994 to 2013.

16 Pakistan Fiscal Disaster Risk Assessment. May 27, 2016. Report No. 94474-PK

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Overall, Sindh Resilience Project (SRP) is divided into 3 major parts i.e., Component 1: Strengthening Disaster and Public Health Emergency Management, Component 2: Improving Infrastructure and Systems for Resilience and Component 3: Contingent Emergency Response.

In terms of execution, the SRP is divided into two components i.e., Sindh Irrigation Department (SID) Component and Provincial Disaster Management Authority (PDMA) Component. SID Component specifically focuses on flood and drought mitigation through structural interventions like enforcement of flood protective infrastructure and development of small dams, aquifer recharge and other water harvesting measures. While PDMA Component is aimed to strengthen intuitional capacity for disaster risk management, disaster response and public health emergencies

1.2. Sindh Resilience Project - PDMA Component

The Government of Sindh is implementing Sindh Resilience Project - PDMA Component through Provincial Disaster Management Authority, Government of Sindh. Co-financed by World Bank and Government of Sindh, the project is being implemented in a period of 5 years. The Sindh Resilience Project focuses on improving institutional capacities, performance, and preparedness of key agencies, responsible for managing disaster risk in Sindh. In addition, the Project further contributes towards enhancing resilience to hydro-meteorological disasters including floods and drought through physical infrastructure investments.

Project development objective of Sindh Resilience Project is to mitigate flood and drought risks in selected areas and strengthen Sindh's capacity to manage natural disasters and public health emergencies. The project fulfills Sustainable Development Goal 1 & 3 and aims to strengthen the provincial systems to effectively respond to emergencies and/or disasters by building capacity at provincial, divisional and district levels, which will contribute to "improving service delivery" of public institutions. The project was originally designed in 2016, components / subcomponents of SRP-PDMA were;

- Component I - Strengthening Disaster and Climate Risk Management
    - Subcomponent 1.1. Improving Risk Identification and Using Risk Information for Development Decision-making
    - Subcomponent 1. 2. Strengthening Disaster Risk Management Agencies
    - Subcomponent 1.3. Enhancing Fiscal Resilience
    - Subcomponent 1.4. Project Implementation Support to PDMA Sindh

In 2020, with additional financing from World Bank, original design of the project was revised, and current components and subcomponents of SRP-PDMA are;

- Component 1: Strengthening Disaster and Public Health Emergency Management
    - Subcomponent 1.1: Strengthening the Resilience of Health Systems
    - Subcomponent 1.2: Establishing Sindh Emergency Service
    - Subcomponent 1.3: Project Implementation Support and Technical Assistance to PDMA Sindh
- Component 2: Strengthening DRM Capacity of PDMA Sindh

In revised design, humanitarian response facilities and disaster & emergency rescue service are being established through the project, across the province. Already existing humanitarian response facilities of PDMA Sindh are being augmented with additional general purpose and cold storage sheds and rescue stations to effectively respond to disasters and emergencies in Karachi as well other cities and towns of the province.

The proposed subproject falls in Component 2 and Subcomponent 1.2 of the project. The construction of rescue stations at Maripur, Jamshoro and Sukkur falls under **Subcomponent 1.2: Establishing Sindh Emergency Service** while construction of humanitarian response facility under **Component 2: Strengthening DRM Capacity of PDMA Sindh.**

1.3. Project Location

Overall, the Sindh Resilience Project (PDMA Component) span out to all 30x districts of Sindh province. The proposed subproject activities are located in Keamari, Jamshoro and Sukkur districts. Location map of Project is given in **Figure-1.1**.

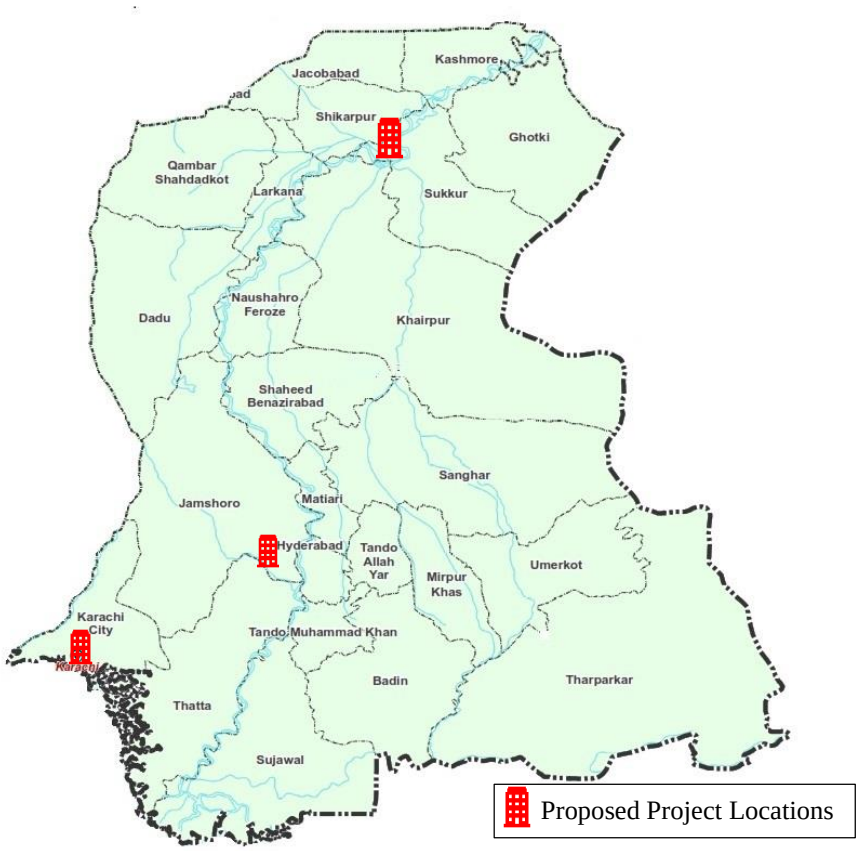


Figure 01.0.1. SRP-PDMA Component Project – Overall project and proposed project locations

1.4. Environmental and Social Management Framework (ESMF)

SRP – SID Component mainly focuses on flood protection measures and drought mitigation, hence involves structural measures and civil works for construction of small dams, aquifer recharge interventions and rehabilitation / construction of flood protective infrastructure. In view of large geographical area of the project, a framework approach was adopted for environmental

and social management. Based on this approach, Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) was prepared to identify all potential but generic negative environmental and social impacts of project activities and mitigation measures. The ESMF provides basic screening criteria for selecting subprojects and lists the instruments to be developed for each individual subproject. Institutional arrangements, Grievance Redress Mechanism (GRM), reporting and documentation requirements regarding environmental and social safeguards are addressed in detail in the ESMF.

As per World Bank Operational Policy 4.01 on Environmental Assessment, the subproject i.e., Construction of Humanitarian Response Facility at Maripur (Karachi) and Rescue Stations at Maripur (Khi), Jamshoro and Sukkur is categorized as a 'Category B' project with site specific, temporary impacts for which mitigation measures can be readily designed.

1.5. Preliminary Environmental and Social Impact Screening

Environmental and Social Impacts screening and subproject categorization provided in the ESMF and approved by the World Bank, were used for preliminary screening of the subproject site to help in identification of impacts. The environmental and social assessment/screening checklist is attached as **Annexure 1**. The criteria for subproject categorization under SRP - ESMF, developed in light of the Sindh Environmental Protection Agency (SEPA) Regulations and World Bank OPs is given in **Table 1.1** below;

Table 1.1- SRP ESMF Criteria For Categorization of Subprojects

Large Subprojects Full EIA / ESIA Required (Category A Subprojects)	Medium sized Subprojects ESMP Required (Category B Subprojects)	Smaller Subprojects Environmental Social Checklist Required
Subproject requiring / involving; • **Large scale construction** • **Requiring land acquisition that may affect more than 20 households** • **Dam height more than 10 meters** • **Category A according to WB OP 4.01** • **Requiring EIA according to SEPA regulations** • **Involving significant degradation of forest or sensitive habitat**	Subprojects involving; • Rehabilitation of existing structures, potentially causing low to moderate level of impacts, temporary, reversable and localized impacts such as minor traffic disturbance, disposal of excavated soil, shallow borrow pits, minor soil erosion, generation of solid and liquid wastes from temporary camp sites • Construction of small-scale civil works • Significant but manageable impacts on no-critical habitats such as forests	All other small projects

Initial screening for potential impact assessment was conducted by field visits of the subproject sites and meetings with SRP project office and PDMA officials. The initial screening identifies the proposed subproject sites as an urban area infrastructure development and established that:

- There is no land acquisition required for construction and rehabilitation work for subproject.
- The available land is free of squatters, claimants and litigation.

- The associated environmental and social impacts of the subproject are confined to construction phase and are of temporary in nature.
- Primary receptors of potential negative impacts are minimal and likely restricted to construction site.
- Based on previous experience of PDMA Sindh, no labour camps will be required at all sites during construction phase of the project. On each site, maximum 30 persons including, skilled and non-skilled labour at a time will be required.
- No or minimal natural habitat and resources will be impacted by subproject as sites are in compound wall. Further, Jamshoro and Sukkur are already developed and Maripur site is partly developed.
- Province in general, and nearby population residing subproject sites will be benefited in terms of livelihood opportunity during construction phase, improved response during disaster and emergencies in operation phase of the project.

As no significant adverse impacts were identified, there is no need for further resettlement impact screening and development of Resettlement Action Plans. Environmental and other social concerns associated with the construction phase of proposed subproject will be minimized and mitigated by adopting best practices for social and environmental protection, proposed in this Environmental and Social Management Plan (ESMP).

1.6. Objectives of Environmental and Social Management Plan (ESMP)

The ESMP for subproject sites follows the identified requirements in the ESMF of Sindh Resilience Project. It sets out responses to potentially adverse impacts of the subproject on physical, ecological, and social environment, thus ensuring the effective implementation of mitigation measures in a timely manner.

The primary objectives of the ESMP are to:

- Identify the potential environmental and social impact of the project activities.
- Propose site specific measures to mitigate environmental and social impacts and facilitate the implementation of the identified mitigation measures.
- Propose institutional structure and define responsibilities of the project proponents, contractors, and other members of the subproject team.
- Define a monitoring mechanism and identify monitoring parameters in order to ensure implementation and effectiveness of the mitigation measures.
- Describe the capacity building and training requirements, along with a budget, for the implementation of the ESMP.

This ESMP shall be integral part of bidding documents for site construction and its compliance by construction contractor shall be mandatory. The construction contractor may request amendments in ESMP for aligning it with ground realities at each site. If change is required, the contractor will make such request to PIU of SRP-PDMA Component. The requirements will be validated by PIU SRP-PDMA and if acceptable, the amendments shall be communicated to the construction contractor. Also, ESMP shall be part of civil work contract and legal binding on the construction contractor.

1.7. Need for Subproject

The Sindh Resilience Project – PDMA Component is aimed to strengthen disaster management authorities and line departments for improved disaster preparedness and response. The Provincial Disaster Management Authority, Government of Sindh is responsible to prepare for, and respond to disaster and emergencies in the province. PDMA's mission is to effectively and efficiently manage disasters of all sorts, in order to minimize loss of lives, damage to property and environment through coordinated efforts. To achieve this mission various structural and non-structural reforms by PDMA Sindh are under development. PDMA Sindh has extended field offices and humanitarian response facilities in all divisional headquarter cities of the province i.e., Karachi, Hyderabad, Mirpurkhas, Shaheed Benazirabad, Sukkur and Larkano for prompt and efficient response during and post disaster events. Other than conventional disaster management, PDMA Sindh also responded to COVID-19 pandemic and played a vital role.

Following are requirements and benefits to be accrued from subproject;

- Absence of storage / warehouse and field office in Karachi to cater requirements. A humanitarian response facility and field office are anticipated to support PDMA's response and relief efforts.
- Cold storages are used to store food items and emergency medicines. Requirement for such facility have been felt by PDMA during last couple of disasters. The cold storage facility will be one of its kind in PDMA to cater for food / medicine storage requirements.
- As humanitarian response facility is situated in Karachi, the port and international airport city of the Province, therefore, the facility will also function as transit store in case of foreign relief / aid.
- Building collapse, industrial emergences, natural disasters, especially floods and similar events happen in Karachi and other major cities of the province with frequent intervals. Absence of fully equipped, trained and skilled response teams, hamper rescue operations. Therefore, establishment of rescue services in province will ensure safety of lives in disaster and emergencies.

Chapter

2

Subproject Description

Chapter 2: Subproject Description

This section provides a brief description of nature, size and location of the subproject.

2.1. Subproject Proponent

The project proponent for subproject is, Project Implementation Unit (PIU) of Sindh Resilience Project - PDMA Component. The end user is Provincial Disaster Management Authority, Sindh which functions under the administrative control of Rehabilitation Department, Government of Sindh. Provincial Disaster Management Authority also known as PDMA Sindh is an authority established under National Disaster Management Act 2010 and responsible for disaster management in the Province. At grass root level, District Disaster Management Authorities (DDMAs) work in collaboration with PDMA during disaster and emergencies. PDMA's primary role is coordination with other relevant departments for disaster preparedness, early warning and dissemination, disaster response, relief and rehabilitation.

2.2. Construction of HRF and Rescue Stations

Construction of rescue stations and humanitarian response facility falls under project components; **Strengthening DRM Capacity of PDMA Sindh** and **Establishment of Sindh Emergency Services** respectively. The subproject aims to upgrade existing facilities of PDMA Sindh to accommodate more storage sheds and rescue stations. The subproject is likely to construct a ground+2 story building covering an area of approximately 500 Sq Yards for rescue stations and allied facilities and parking sheds of rescue vehicles. The construction is likely to last 18 months. The concrete build and pre-fabricated storage sheds are planned at Maripur, Karachi. It is important to mention that; one storage shed already exists at Maripur.

2.3. Subproject Locations

The subproject sites are located in Maripur District Keamari, Jamshoro and Sukkur districts. Construction of rescue stations and warehouses will be carried out within existing premises of PDMA facilities at subproject locations. Subproject location map along with salient features of sites are given in **Figure 2.1**.

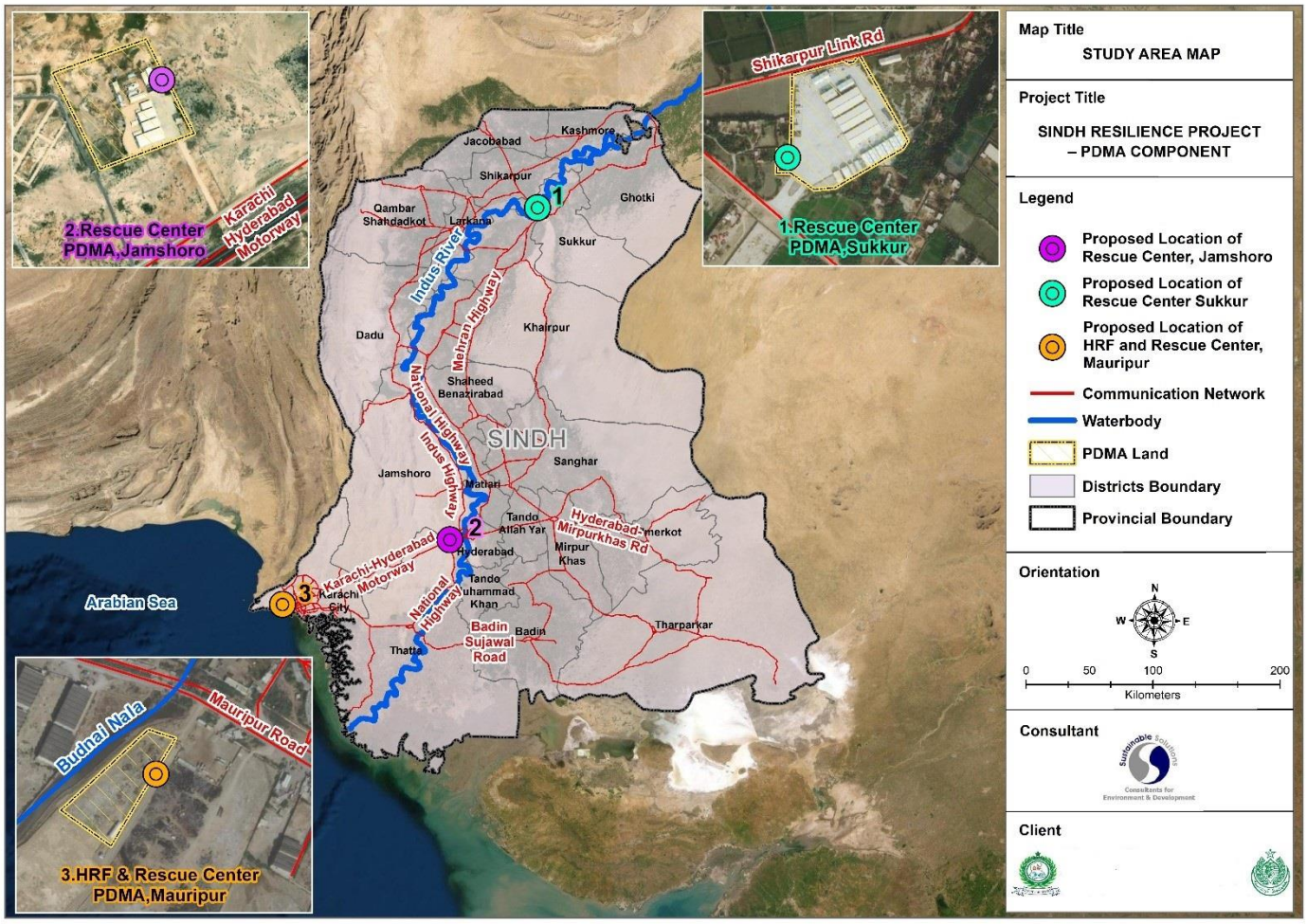


Figure 02.0.1. Subproject Locations

Maripur, Karachi:

GEOGRAPHICAL LOCATION	**24°52'21.3"N 66°54'16.2"E**
ADMINISTRATIVE LOCATION	District Keamari (former district West), Karachi Division
TOTAL LAND AREA	5 Acres
EXISTING FACILITIES WITHIN SITE	01x storage shed
OWNER	Provincial Disaster Management Authority, Rehabilitation Department, Government of Sindh
SURROUNDING LANDUSE	Mixed i.e., Residential, commercial (warehouses), salt work, barren
TERRAIN	Plain
SCOPE OF CONSTRUCTION WORK	Construction of storage sheds / warehouses and rescue station

Zoomed view of Maripur site is given in Figure 2.2.

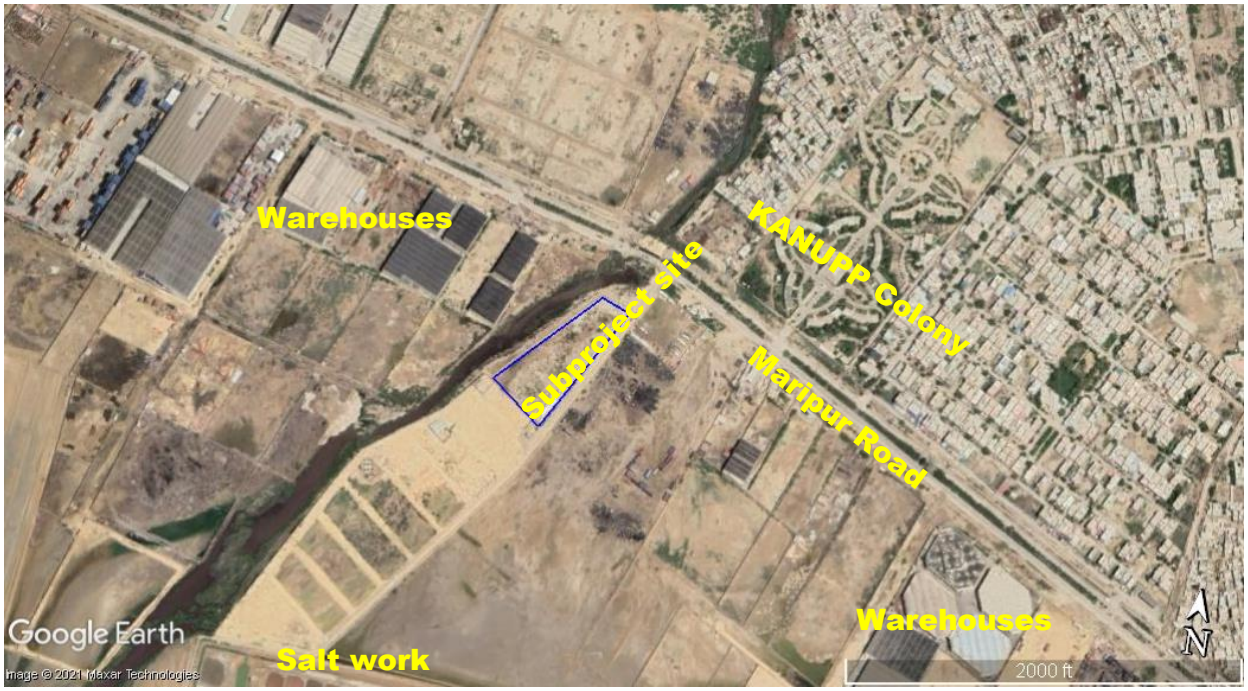


Figure 2. 2. Zoomed view of Maripur site

Jamshoro:

GEOGRAPHICAL LOCATION	**25°21'47.36"N, 68°11'57.60"E**
ADMINISTRATIVE LOCATION	District Jamshoro, Hyderabad Division
TOTAL LAND AREA	9 Acres
EXISTING FACILITIES WITHIN SITE	Storage sheds and offices
OWNER	Provincial Disaster Management Authority, Rehabilitation Department, Government of Sindh
SURROUNDING LANDUSE	Mixed i.e., Residential, commercial (petrol pumps), rain fed agriculture, stone crushing, barren
TERRAIN	Plain (foot hills of Khirthar range)
SCOPE OF CONSTRUCTION WORK	Construction of Rescue Station

Zoomed view of Jamshoro site is given in Figure 2.3.

Figure 0.3. Zoomed view of Jamshoro site

Sukkur:

GEOGRAPHICAL LOCATION	**27°44'13.49"N, 68°50'44.43"E**
ADMINISTRATIVE LOCATION	District Sukkur, Sukkur Division
TOTAL LAND AREA	5 Acres
EXISTING FACILITIES WITHIN SITE	Storage sheds and offices
OWNER	Provincial Disaster Management Authority, Rehabilitation Department, Government of Sindh
SURROUNDING LANDUSE	Mixed i.e., Residential, commercial (industrial), agriculture
TERRAIN	Plain
SCOPE OF CONSTRUCTION WORK	Construction of Rescue Station

Zoomed view of Sukkur site is given in Figure 2.4.

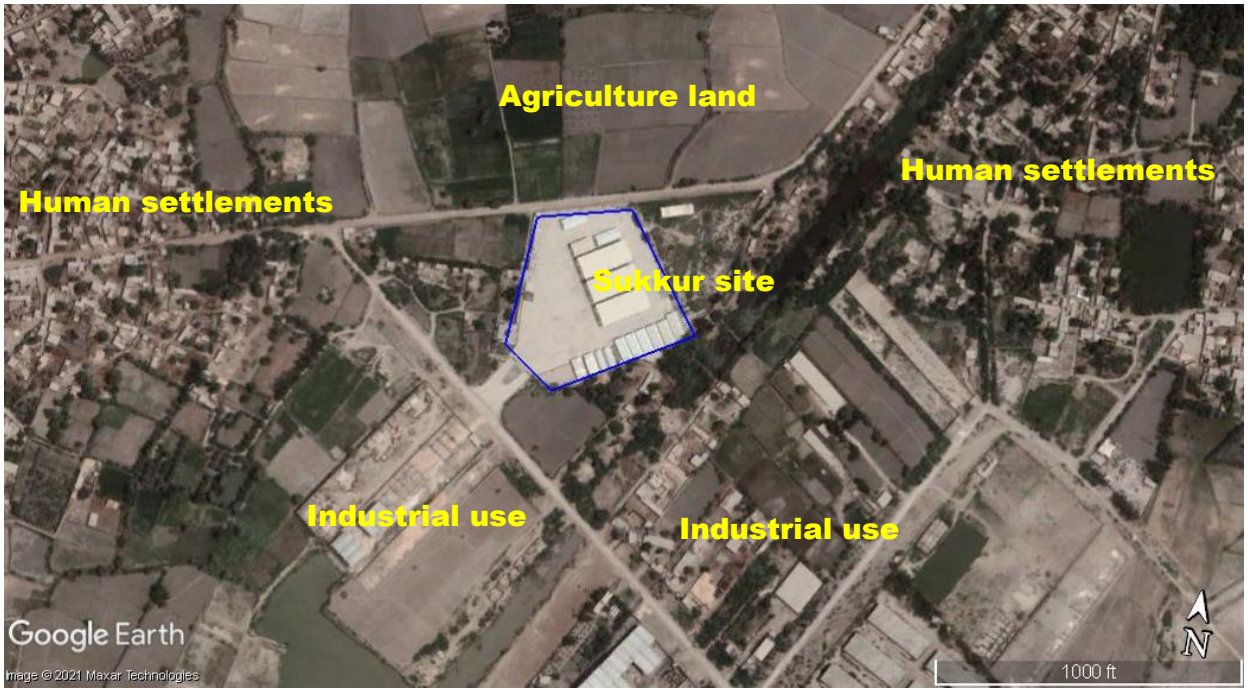


Figure 0.4. Location of Sukkur subproject site

2.4. Layout of HRF at Maripur and Rescue Stations

The Rescue Stations with similar composition and architecture are proposed to be constructed at subproject sites. The ground + 2 story Rescue Station building is proposed on 500 Sq Yard area. Proposed layout of HRF and Recue Stations is given in **Figure 2.5 and 2.6** respectively.

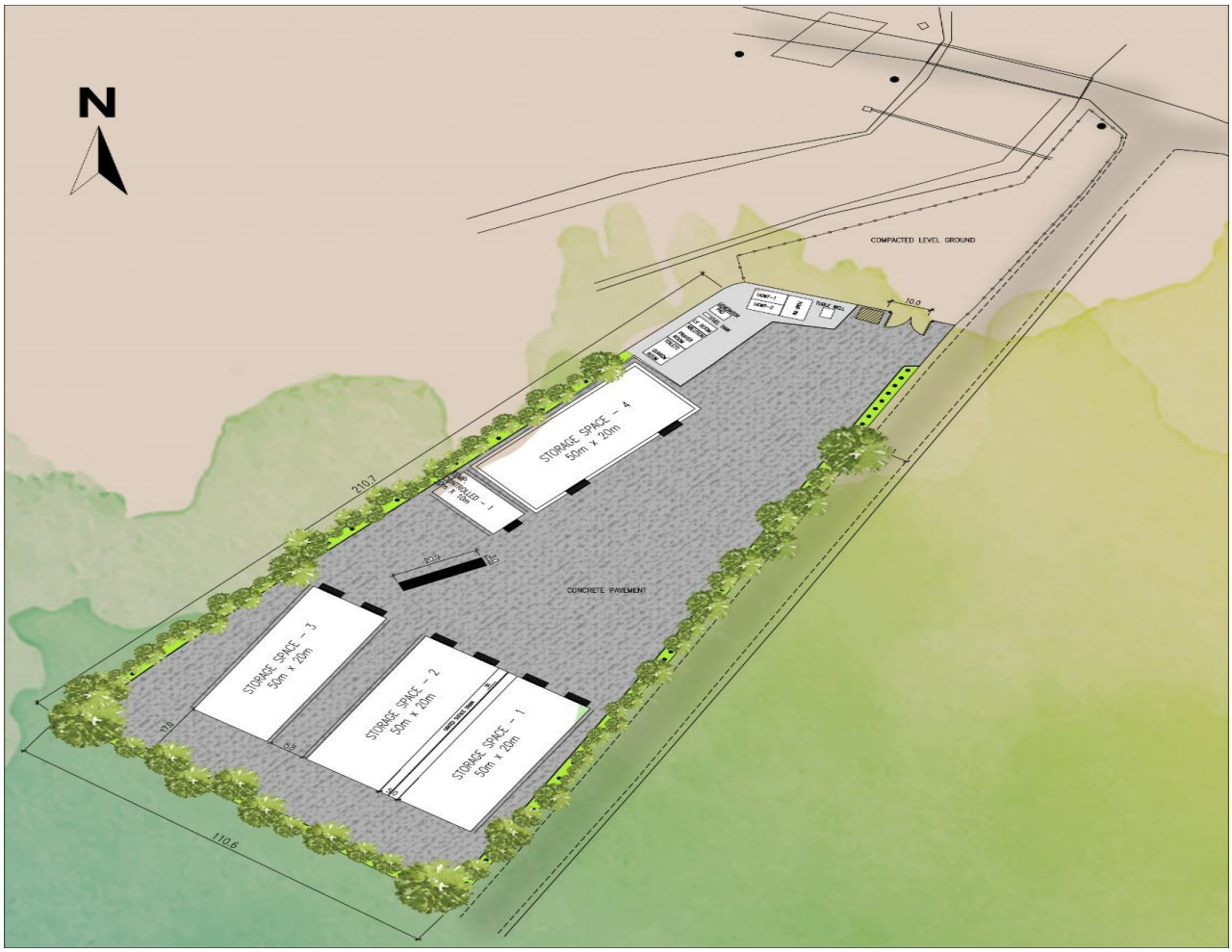


Figure 02.5 Layout of HRF proposed to constructed at Maripur, Karachi

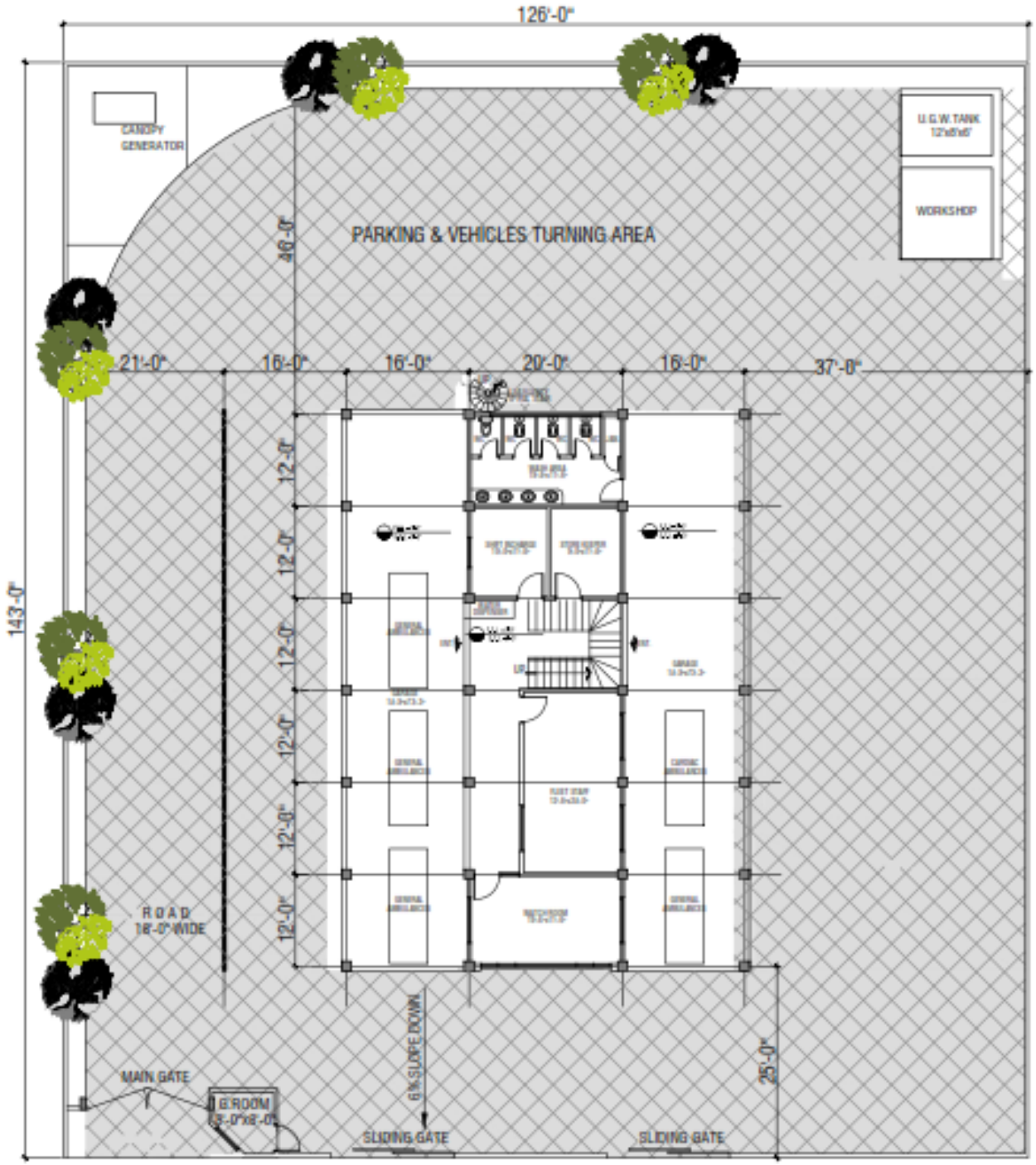


Figure 02.6 Proposed Layout Plan of Rescue Stations

2.5. Subproject Scope

Subproject construction activities covered in ESMP include;

a. Earthen filling / leveling of sites
b. Construction of 03x general-purpose and 01x cold storage sheds at Maripur, Karachi
c. Construction of 03x Rescue Station and parking sheds for rescue vehicles and machinery at Maripur, Jamshoro and Sukkur sites

The civil works of the proposed subproject includes the earthen filling / leveling of construction sites, surface pavement, construction of a ground + 2 story building for rescue stations, construction of storage sheds, and security watch towers along the boundary wall (Maripur site only). The construction duration will be approximately 18 months. The construction will be carried out considering weather conditions to avoid environmental damage such as monsoon rains which often cause blockage to the drainage system and cause urban flooding. Also, for health safety of construction workers, construction contractor will ensure implementation of safety measures during hot summer days, as subproject sites fall in hot and dry summer zones.

Following activities will take place during construction at sites;

a. Construction site clearing and preparation for construction
b. Earthen filling / leveling
c. Civil work including laying of foundation and construction concrete base for rescue station and storage sheds
d. Electrical and plumbing layout including installation equipment and supply of electricity designed to ensure energy and water conservation

The construction work doesn't require major excavation or use of heavy machinery such as cranes. Construction vehicles will be parked in designated parking areas. The construction machinery to be used includes:

- Earth moving equipment
- Construction vehicles
- Material handling equipment
- Construction equipment

The subproject sites are located in city / near cities; therefore, labor will be hired from surrounding areas and communities, hence, labour camp will not be established at the subproject sites. The construction administration is given in Table-2.1.

Table 02.0.1- Construction administration

Phase	Requirement	Activities
Design Phase	Site Survey	Soil tests and hydrology for foundation and input to civil design
	Civil Design	Formulation of conceptual, detailed and final designs
Construction Phase	Site Establishment and Earthworks	Site clearance, laying of foundation, filling earth, anti-termite soil treatment, surface finish

	Concrete Work	Building construction using bricks / concrete blocks, cement and concrete, steel reinforcement, curing and protecting concrete.
	Mechanical Work	Galvanized steel structures, cable trays, steel support structures, roofing.
	Drainage system	Waste water sewage system, surface water drainage system.
	Electrical Work	Power cable trenches and ducts, electricity connection, backup generator, and solar panel installation
	Finishing	Earth mats, testing/inspection of building
Post Construction		• Shifting of manpower and operationalization of humanitarian response facility • Shifting rescue vehicles, machinery and equipment • Operationalization of rescue station and services

2.5.1. Construction Materials

The materials used in construction of the buildings would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement, cement. Fine aggregates are locally available in the area, while the cement and steel will be procured from approved local vendors. The use of hazardous material like asbestos and those identified in the list of Hazardous chemical Rules 2003 will be banned. Special care will be taken for inflammable materials and fuel.

2.5.2. Manpower Requirements

The manpower requirement during construction at each subproject site will be approximately 50-60 persons including managerial staff, skilled and unskilled labor. The labor for construction activities will be hired from local communities, hence there will be no requirement for setting up a labor camp at the subproject sites.

2.5.3. Water Requirements

The ground water quality at Maripur, Karachi and Jamshoro sites is brackish, while sweet ground water is available in Sukkur. Water requirements during construction phase at subproject sites shall be met through water tanker supply.

2.5.4. Waste Generation

There will be an increase of waste generation during construction, including debris, excavated earth and unused construction materials, especially during site clearing and landscaping. The contractor shall be responsible for disposing of construction waste in safe manner at designated solid waste disposal sites.

2.5.5. Electricity

During the construction phase electricity requirement shall be met through power generator supply. During operational phase for green energy and energy conservation solar power is

recommended for installation to meet the major power requirements in addition to conventional electricity supply in the city.

2.6. Project Alternative Analysis

2.6.1. No Project Option

The subproject component is in compliance with Intervention-9 of National Disaster Management Plan 2012 which emphasize establishment of National Emergency Response System and Priority-4 of Sendai Framework for Disaster Risk Reduction 2015-2030 'Enhancing disaster preparedness for effective Response'. Sindh province including Karachi is on the brink of natural and manmade disasters. The urban flood in Karachi caused by rains in August, 2020 jeopardized the city for days. Industrial disasters and building collapse incidents happen in the city with frequent intervals. Improved disaster and emergency response will ensure reduced life losses and property in the province. In absence of efficient and effective emergency response service, business will continue as usual and the province will remain exposed to natural and manmade hazards.

2.6.2. Project Site Alternative

Alternative project sites are considered when the project location is sensitive to environmental and/or social impacts associated either to the construction works or due to the operation of the facility constructed. The subproject sites do not fall in either of the environmental or social sensitive category therefore, no site alternatives have been considered because;

- The land is in legal possession of PDMA Sindh, the end user and operator of facilities and already in use by PDMA.
- The proposed subproject sites / land is free of squatters, claimants and litigation.
- New land acquisition is a tedious process.
- The sites in Karachi and Sukkur are adjacent to industrial and commercial hub, prone to natural and industrial disasters, therefore, availability of nearby disaster response facility will ensure prompt response during emergent events
- There are no environmental and/or social sensitivities within the subproject sites.

Chapter

3

Legal & Policy Framework

Chapter 3: Legal and Policy Framework

After reviewing relevant promulgated national and provincial environmental legislation and guidelines and World Bank safeguard policies the ESMP has been developed. Brief of legislation, guidelines and safeguard policies and their relevance to subproject is given in successive subsections.

3.1. Constitutional Provision

Post 18th amendment in 2010, the provincial governments have been given powers to legislate on the subjects transferred to provinces. The power to legislate and decide on the subject of "environmental pollution and ecology" now lies with the provincial governments, however, climate change remains under federal jurisdiction.

3.2. NATIONAL ENVIRONMENTAL & SOCIAL POLICY, LEGISLATION, GUIDELINES

3.2.1. The Pakistan Environmental Assessment Procedures, 1997

The Pakistan Environmental Protection Agency prepared the Pakistan Environmental Assessment Procedures in 1997. They are based on much of the existing work done by international donor agencies and Non-Governmental Organizations (NGO's). The package of regulations prepared by PEPA includes:

- Policy and Procedures for Filing, Review and Approval of Environmental Assessments;
- Guidelines for the Preparation and Review of Environmental Reports;
- Guidelines for Public Consultation;
- Guidelines for Sensitive and Critical Areas; and
- Sectoral Guidelines for various types of projects.

3.2.2. National Disaster Management Act (NDMA), 2010

This Act was enacted to provide for the establishment of a National Disaster Management System for Pakistan. Sindh Disaster Management Authority enforces the Act at provincial level. The Act defines 'disaster' as a catastrophe or a calamity in an affected area, arising from natural or man-made causes or by accident which results in a substantial loss of life or human suffering or damage to, and destruction of, property. Disaster management includes preparedness and response. The Act provides establishment of disaster management authorities at national, provincial and district levels. The authorities require preparing and implementing disaster management plan for their area.

3.2.3. National Environmental Policy, 2005

The national environmental policy aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development. The objectives of the policy are:

- Conservation, restoration and efficient management of environmental resources.
- Integration of environmental considerations in policy making and planning process.
- Capacity building of government agencies and other stockholders at all level for better environmental management.
- Meeting international obligations effectively in line with the national aspirations.
- Creation of a demand for environment through mass awareness and community mobilization.

3.2.4. Land Acquisition Act, 1894

The Land Acquisition Act (LAA) of 1894 amended from time to time has been the defacto policy governing land acquisition, resettlement and compensation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. It comprises of 55 sections pertaining to area notifications and surveys, acquisition, compensation and apportionment awards and disputes resolution, penalties and exemptions. The land is already acquired by PDMA Sindh and is free of any disputes and claims, therefore, this act is not applicable to proposed subproject.

3.2.5. The Antiquities Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources of Pakistan. The Act is designed to protect 'antiquities' from destruction, theft, negligence, unlawful excavation, trade, and export. The subproject sites do not fall in any known cultural or heritage site of the province, therefore, this act is not applicable to the proposed subproject.

3.2.6. Building Code of Pakistan, Fire Safety Provisions, 2016

The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and structures as prescribed. All the federal and provincial governments, organizations, authorities, both public and private are mandated to adopt and implement Building Code of Pakistan-Fire Safety Provisions-2016, as notified. Any construction and modification of buildings in violation of Building Code of Pakistan (Fire Safety Provisions-2016) shall be considered as violation of professional engineering works as specified under clause (xxv) of section 2 of the Act. The implementation and enforcement of this bye-law shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

- Building Control, Housing and Development Authorities
- District Administration
- Tehsil or Town Administration
- Municipal Administration
- Other Federal / Provincial Authorities as and when notified

This Bye-law shall apply to both new and existing buildings.

a. Buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.

b. Existing buildings constructed prior to adoption of these provisions shall comply with the provisions stated herein as soon as possible but not later than three years of notification of these provisions; and
c. Minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall however be in place as soon as possible but not later than one year of notification of these provisions.

Any person who fails to comply with this Bye-law or fails to carry out an order made pursuant to these provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ. The subproject shall comply fire safety provisions.

3.2.7. Building Code of Pakistan (Seismic Provisions, 2007)

The Pakistan Engineering Council governs the application of Building Code of Pakistan (Seismic Provisions-2007). Prior to the start of construction, the proposed sub-project will take design approval from PEC. This binds the following:

- The provisions of the Building Code of Pakistan (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.
- Construction of buildings in violation of the Building Code (Seismic Provisions-2007) shall be considered as violation of professional engineering work as specified under clause (XXV) of section 2 of the Act.

The subproject will comply with the seismic provision during building design.

3.3. PROVINCIAL LAWS AND REGULATIONS

3.3.1. Sindh Environmental Protection Act, 2014

The Sindh Environmental Protection Act, 2014 (SEPA 2014) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The SEPA 2014 is broadly applicable to air, water, soil, marine and noise pollution. Penalties have been prescribed for those contravening the provisions of the Act. The two primary deliberations of the Act are the conduct of projects only after approval of environmental assessments from the SEPA and adherence with Sindh Environmental Quality Standards (SEQS). The Act provides the framework for protection and conservation of species, wildlife habitats and biodiversity, conservation of renewable resources, the establishment of standards for the quality of the ambient air, water and land, establishment of Environmental Tribunals, the appointment of Environmental Magistrates, Initial Environmental Examination (IEE) and EIA approval. Penalties have been prescribed for those contravene the Act. Under Article 17 (1) of the Act, no proponent of the project shall commence construction or operations unless he has filed with the Agency an initial environmental examination, or environmental impact assessment and has obtained from the Agency approval in respect thereof. The proposed subproject falls under Schedule I and require Environmental Screening (through the checklist).
In compliance to this Act, PIU SRP – PDMA Component shall be liable to get necessary approval from SEPA before start of construction work. Construction contractor shall abide to follow SEQS during construction phase.

3.3.2. Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021

The Review of EC, SEPA IEE and EIA Regulations, 2021 (The 2021 Regulations) promulgated under SEP Act 2014 were enforced on 3rd September 2021. The 2021 Regulations define the applicability and procedures for preparation, submission and review of IEEs and EIAs. The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in two separate schedules. Schedule I projects requiring Environmental Screening (through check list). Schedule II lists projects that may not have significant environmental impacts and therefore require an IEE. Schedule III lists projects of potentially significant environmental impacts requiring preparation of an EIA. The Regulations also require that all projects located in environmentally sensitive areas require preparation of an EIA. The proposed subproject falls under Schedule I and require Environmental Screening (through the checklist). SEPA Regulations are attached as **Annexure 2**. PIU SRP-PDMA Sindh / Construction Contractor is required to submit Environmental Screening Checklist to SEPA for approval before start of construction work.

3.3.3. The Sindh Environmental Quality Standards, 2016

The SEQS will apply to all phases of proposed subproject project. During construction phase SEQS will be applicable to release of effluents and construction material and emissions caused by construction machinery. Complete SEQS 2016 and NEQS are attached as **Annexure 3**. SEQS Standards for disposal of solid waste have not been promulgated yet [17].

3.3.4. Sindh Wildlife Protection (Amendment) Act, 2008

The Sindh Wildlife Ordinance 1972 empowers the government to declare certain areas reserved for the protection of wildlife and to control activities within these areas. It also provides protection to endangered species of wildlife[18]. This act is not applicable to proposed subproject because, sites are neither within wildlife sanctuary nor wildlife is present in subproject sites.

3.3.5. Sindh Forest Act, 2012

The act empowers the provincial forest departments to declare any forest area as reserved or protected. The Act also empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce; quarrying and felling, lopping and topping of trees, branches in reserved and protected forests[19]. This Act do not apply to subproject sites, as all the sites are not within or nearby declared reserved forest or forest land.

3.3.6. Cutting of Trees (Prohibition) Act, 1975

The Cutting of Trees Act prohibits cutting or chopping of trees without prior permission of the Forest Department. Section 3 of this Act states “No person shall, without the prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree.” The land for proposed project is already in used in

[17] Library, Sindh Environmental Protection Agency, 2016
[18] faolex.fao.org, 2009
[19] Sindhforests.gov.pk

developed by PDMA Sindh. Cutting of trees will not be required at any site except clearance of bushed / shrubs, therefore, this Act is not applicable to proposed project.

3.3.7. Sindh Occupational Safety and Health Act, 2017

The Act defines and fixes responsibilities of employers, workers and government with respect to OSH related matters. The Act extends the scope of applicability of OSH laws from any establishment / factory employing 10 or more workers to those even employing one person. The Act aims to prevent incidents such as workplace fires and to promote safety and health of the workers. Enhanced occupational safety and health management system, efficient and effective labor inspection mechanism and work-related injuries / accidents compensation mechanism has also been established in the Act. Construction Contractor will abide the Act during construction work, while PDMA Sindh will ensure compliance during operation phase of subproject.

3.3.8. Sindh Prohibition of Child Employment Act, 2017

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines, or any other hazardous employment. In accordance with this Article, the Prohibition of Child Employment Act (PCEA) 2017 disallows the child labor in Sindh. The PCEA defines a child as a person who has not completed his / her fourteenth years of age, and an adolescent, who has completed fourteenth year of age but has not completed eighteenth years. Construction Contractor shall be liable to follow this act and shall ensure that, no child is engaged in construction and related work. However, under permission and guidance of the Act, an adolescent can be employed or permitted to work during construction phase.

3.3.9. Sindh Bonded Labour System (Abolition) Act, 2015

This Act, abolish bonded labour system in Sindh to prevent the economic and physical exploitation of the labour class. Under this Act, no person shall make any advance under, or in pursuance of, the bonded labour system or compel any person to render any bonded labour or other form of forced labour. Further, it establishes protection against discrimination and enforces that, there shall be no discrimination on the basis of sex, religion, sect, colour, caste, creed, ethnic back ground in employment, professional development and the wages for work of equal value. This Act shall be applicable to Construction Contractor during execution of construction and PDMA Sindh shall ensure its compliance during operational phase of the subproject.

3.3.10. The Sindh Transparency and Right to Information Act, 2016

This Act accord rights to information to the citizens of the province, so that they can participate meaningfully in the democratic process, to make the Government more accountable to citizens and further to improve their involvement and contribution kin public affairs. This Act enforces rights of citizens to obtain information in the prescribed manner, exercise the right to acquire information and/or record held by any Public Body. In accordance with the Act, PIU SRP – PDMA Component shall be liable to pubic necessary information on the subproject through all possible means (web, on-site display, provision on request of any applicant) during execution of project. The Construction Contractor shall also be responsible to display necessary subproject information at sites.

3.3.11. Sindh Minimum Wages Act, 2015

This Act provides regulation for minimum rates of wages and various allowances for different categories of workers employed in certain industrial and commercial undertakings and Establishments. This Act shall be applicable to Construction Contractor during construction work, further, he will be responsible to follow decisions of Sindh Cabinet on related matters. During, operation phase of the subproject, PDMA Sindh shall ensure compliance during hiring of contract employees if required.

3.3.12. The Protection Against Harassment of Women at the Workplace Act 2010

Government of Sindh constituted The Sindh Commission on The Status Of Women Act, 2015, and provincial act on workplace harassment is not constituted. However, Protection Against Harassment of Women at the Workplace Act 2010 constituted by Federal Government is effective in province. The act is expedient to make provision for the protection of women from harassment at the workplace. If, female labour is hired in construction phase of the subproject, the construction contractor shall ensure compliance of act. Likewise, PDMA Sindh will ensure its compliance during operation phase of subproject.

3.4. THE WORLD BANK OPERATIONAL POLICIES

3.4.1. Environmental Assessment (EA) (OP 4.01)

This policy defines the Environmental Assessment (EA) process and various types of EA instruments. According to World Bank safeguards policies, projects shall be classified as one of the following three categories, depending on the nature and extent of potential environmental and social impacts:

- Category A: Projects of this type would have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the physical works.
- Category B: A proposed project may have some adverse environmental impacts, but less adverse than those of Category A projects. These impacts are typically site-specific, few if any have irreversible impacts, and in most cases mitigation measures can be readily designed.
- Category C: Projects of this type are likely to have minimal or no adverse environmental impacts.

The environmental screening of the proposed subproject to determine the environmental and social impacts has been carried out. The subproject falls in Category “B” of OP 4.01. In view, Environmental and Social Management Plan (ESMP) is required prior to commencement of the subproject. The short-term and localized negative impacts are anticipated during construction phase, which will span over 18 months. The list of World Bank policies and screening checklist is given in **Annexure 4** and **Annexure 5** respectively.

3.4.2. Natural Habitat (OP 4.04)

The conservation of natural habitats is essential for long-term sustainable development. The World Bank, therefore, supports the protection, maintenance, and rehabilitation of natural habitats and their functions. The aim of the policy is to limit circumstances under which conversion or degradation of natural habitats can occur. The policy can prohibit projects which are likely to result in significant loss of critical natural habitats. No critical natural habitat exists in subproject sites; therefore, this OP is not applicable to subproject.

3.4.3. Indigenous People (OP 4.10)

The term "Indigenous People" is used in a generic sense to refer to a distinct, vulnerable, social, and cultural group possessing the following characteristics in varying degrees.

- Self-identification as members of distinct indigenous groups and recognition of the identity by others.
- Collective attachment to geographically ancestral territories in the project area and to the natural resources in these habitats and territories.
- Customary cultural, economic social, or political institutions that are separate from those of the dominant society and culture.
- An indigenous language is often different from the official language of the country or region.
- The OP defines the process to be followed if the project affects the indigenous people.

There is no known indigenous group as defined by OP 4.10 in the project area, therefore, this policy is not applicable for this subproject.

3.4.4. Cultural Property (OP 4.11)

The World Bank safeguards require full protection to physical cultural heritage on the World Bank-financed project sites. As the sub-project area, does not have any site of cultural, archeological, historical or religious significance so, this policy is not applicable for this sub-project.

3.4.5. Involuntary Resettlement (OP 4.12)

This policy protects the involuntary resettlement of the project affected persons. However, sub-project covered in this ESMP is to be constructed on government own land, which is also free of squatters, claimants and litigation. Therefore, this OP 4.12 does not apply to this subproject. However, this OP 4.12 is triggered on the overall project (Sindh Resilience Project) and the Resettlement Policy Framework (RPF) has been prepared as part of the overall project instruments.

3.4.6. Safety of Dams (OP 4.37)

This policy relates to dam safety, but is equally applicable to reservoirs and ponds. This policy has been triggered for overall Sindh Resilience Project and mentioned in ESMF of the project, because construction of small dams was planned in Irrigation Component of the project. However, this policy is not applicable to proposed subproject under consideration.

3.4.7. Projects on International Waterways (OP 7.50)

This OP is related to the types of projects falling within the ambit of international waterways like (a) any river, canal, lake, or similar body of water that forms a boundary between, or any river or body of surface water that flows through, two or more states. This policy has been triggered for overall Sindh Resilience Project and mentioned in project ESMF because of construction of dams in Irrigation Component of the project. However, this OP is not applicable to proposed subproject under consideration.

3.4.8. World Bank Disclosure Policy

The Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. So, it is the Bank's policy to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience.

3.5. OBLIGATIONS UNDER INTERNATIONAL LAWS/TREATIES

Pakistan is signatory of several Multilateral Environmental Agreements (MEAs), including:

- UN Framework Convention on Climate Change (UNFCCC),
- Kyoto Protocol,
- Montreal Protocol,
- UN Convention to Combat Desertification,
- Stockholm Convention on Persistent Organic Pollutants (POPs),
- Cartagena Protocol.

These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. Therefore, the provisions of these laws and treaties are to be taken care of if any of the project activity falls in the jurisdiction of any of the above mentioned MEAs.

3.6. ENVIRONMENTAL AND SOCIAL GUIDELINES

Two sets of guidelines, the Pakistan-EPA's guidelines and the World Bank Guidelines are reviewed here. Since Sindh EPA has not formulated separate guidelines therefore, Pakistan EPA's guidelines have been benefited from. These guidelines address environmental and social aspects.

3.6.1. Environmental Protection Agency's Environmental and Social Guidelines

The Federal EPA has prepared a set of guidelines for conducting environmental and social assessments. The guidelines derive from much of the existing work done by international donor agencies and NGOs. The package of regulations, of which the environmental and social guidelines form a part, includes the PEPA 1997 and the NEQS. These guidelines are listed below followed by comments on their relevance to proposed project:

- **Policy and Procedures for Filing, Review and Approval of Environmental Assessments, Pakistan Environmental Protection Agency, September 1997**

These guidelines define the policy context and the administrative procedures that govern the environmental assessment process from the project pre-feasibility stage to the approval of the environmental report. The section on administrative procedures has been superseded by the IEE-EIA Regulations, 2000.

- **Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997**

The guidelines on the preparation and review of environmental reports target project proponents and specify:

a) The nature of the information to be included in environmental reports;
b) The minimum qualifications of the EIA conductors appointed;
c) The need to incorporate suitable mitigation measures at every stage of project implementation;
d) The need to specify monitoring procedures;
e) The terms of reference for the reports are to be prepared by the project proponents themselves. The report must contain baseline data on the study area, detailed assessment thereof, and mitigation measures.

- **Guidelines for Public Consultation, Pakistan Environmental Protection Agency, May, 1997**

These guidelines support the two guidelines mentioned above. They deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures the incorporation of their concerns in any impact assessment study.

- **Guidelines for Sensitive and Critical Areas:**

The guidelines identify officially notified protected areas in Pakistan, including critical ecosystems, archaeological sites, etc., and present checklists for environmental assessment procedures to be carried out inside or near such sites. Environmentally sensitive areas include, among others, archaeological sites, biosphere reserves and natural parks, and wildlife sanctuaries and preserves.

3.6.2. World Bank's Environmental and Social Guidelines

The principal World Bank publications that contain environmental and social guidelines are listed below:

- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues.

- Environment, Health, and Safety (EHS) Guidelines prepared by International Finance Corporation and World Bank in 2007.
- Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- Social Analysis Sourcebook.

Chapter

4

Environmental & Social Baseline

Chapter 4. Environmental and Social Baseline

4.1. General Outlines and Scope

This section gives the detailed description of the physical environmental conditions of the proposed study area. The data collection techniques are combination of both primary and secondary means *i.e.*, by field verifications, observations, sampling and monitoring which was supplemented by review of published literature and previous environmental assessment studies conducted in subproject districts. The baseline data defines and elaborate present physical, ecological, and socioeconomic environmental features within and around subproject surrounding. Description of the environment of the subproject requires baseline data on the existing resources of its microenvironment and macro environment, including the following:

1. Physical Resources.
2. Ecological Resources, and
3. Socioeconomic and Cultural Resources.

4.2. Introduction

This section describes the existing environmental and socio-economic conditions in and around proposed subproject sites. The environmental and social baseline aims to provide a generic baseline against which the project impacts can be measured. Successive sections also identify archaeological sites, protected areas, sensitive flora and fauna receptors within or near subproject area.

4.3. Physical Resources

Baseline surveys were conducted between 30th November to 08 December 2021 to evaluate the on-ground profile of the sites. Figure 4.1 depicts some views of the sites. The subproject will be carried out within the Maripur Town of former District West (Current Keamari District), Karachi, Taluka Kotri of District Jamshoro and Taluka New Sukkur of District Sukkur. Following section will explain important elements of physical environment.

Figure 0.1 ***Landscape of Existing and Proposed Areas of Subproject Sites***

4.3.1. Climate

Karachi: The climate of Karachi is characterized as tropical climate with hot and dry during summer, and mild during winter with heavy, sporadic, rainfall during the monsoon. The humidity levels usually remain high from March to November. As the city is located on the coast of Arabian Sea; it tends to have a moderate climate due to marine affects. The summers are hot, oppressive, arid, and windy; the winters are short, comfortable, and dry; and it is mostly clear year-round. Over the course of year, the average temperature typically varies from 12.7°C to 34.5°C[20]. Recorded high temperature remained 47.8 ^{0}C while recoded low temperature remained 0 ^{0}C during the month of January[21].

Jamshoro: The climate of the district is hot and arid generally characterized by hot and dry summer, mild winter and scanty rainfall in monsoon. Over the course of year, the average temperature typically varies from 12°C to 41°C. According to Koppen's climate classification the climate in the area is arid desert hot climate which is largely hot and dry summer with mild winter rainfall. The rainfall in District Jamshoro is mostly restricted to the summer monsoon months with sporadic rains during the winter. The wind direction is mostly towards North in entire winter and shift to southwest direction (northerly wind) in the month of March and remains there for the rest of the year.

[20] https://weatherspark.com/y/106467/Average-Weather-in-Karachi-Pakistan-Year-Round
[21] https://en.climate-data.org/asia/pakistan/sindh/karachi-992367/

Sukkur: In Sukkur, the summers are sweltering and humid, the winters are short and cool, and it is dry and mostly clear year-round. Over the course of the year, the temperature typically varies from 8°C to 44°C and is rarely below 4°C or above 47°C. The district Sukkur is exceedingly dry with mean annual rainfall averaged over a thirty-four-year period less than 88 mm. The available data indicates that there are two wet seasons, the first with low rainfall, while the rainless period of the year lasts for almost 10 months. The wind direction and speed in between the two monsoon seasons, summer and winter are rather unsettled and large variations have been recorded in terms of speed and direction.
In summer, high temperatures and heatwaves are possible at subproject sites, therefore, construction contractor ensures safety of labour against heatstroke and adjust working hours to suitable temperatures.

4.3.2. Physical Features and Topography

Karachi: The topography of the district Keamari is dominated by ridges, plains and coastal belt; the area which at one time was predominantly under agriculture is now crowded with new colonies, township and industrial estates. The landscape of district Keamari is characterized by hills; plain, wide valley mostly eroded islets and a long sea beach. The district can be divided into following areas[22].

a. Moach and upper Layari Plain
b. Mangho Pir and Orangi Hills
c. Hub River Valley
d. The coastal belt

The topography of proposed project area is almost flat over the space with elevations ranging from 2-5 meters above mean sea level. Elevation Map of the subproject sites is shown in Figure 4.2.

Jamshoro: The general topography of the area is that of alternate valleys and hills with their long axes in North South direction. The proposed project area lies in District Jamshoro tehsil Kotri which comprises of elongated hills located within Thano Bula Khan Valley. These hills reach a maximum height of about 393 meters[23]. The area is generally dipping from west to east with difference in elevation of around 10.0 meters. The elevation of the project area ranges from 66-68 meters above mean sea level. It slopes towards the Indus River which runs along the eastern boundary of the district.

[22] EIA of Reconstruction of berths 15-17A and SRB's on East Wharves

[23] Brohi, I. A., S. A. Bablani, and S. H. Solangi. "Geology and economic significance of tertiary rocks, Khorwari Section, Surjan Anticline, Thano Bula Khan, Sindh." Sindh University Research Journal-SURJ (Science Series) 41, no. 1 (2009).

Sukkur: The area within and surrounding of district is predominantly a flat and level plain except the Rohri hills in the southern part of Sukkur. The Indus once flowed past these hills near the ancient town of Aror and was diverted into its present channel through the Bukkur hills by some natural convulsion[24]. The land gradually slopes from north-east to southwest. The general elevation of land surface varies from about 50 to 100 m above mean sea level[25]. The topography of sub-project site is a flat land with an elevation of 63 m.

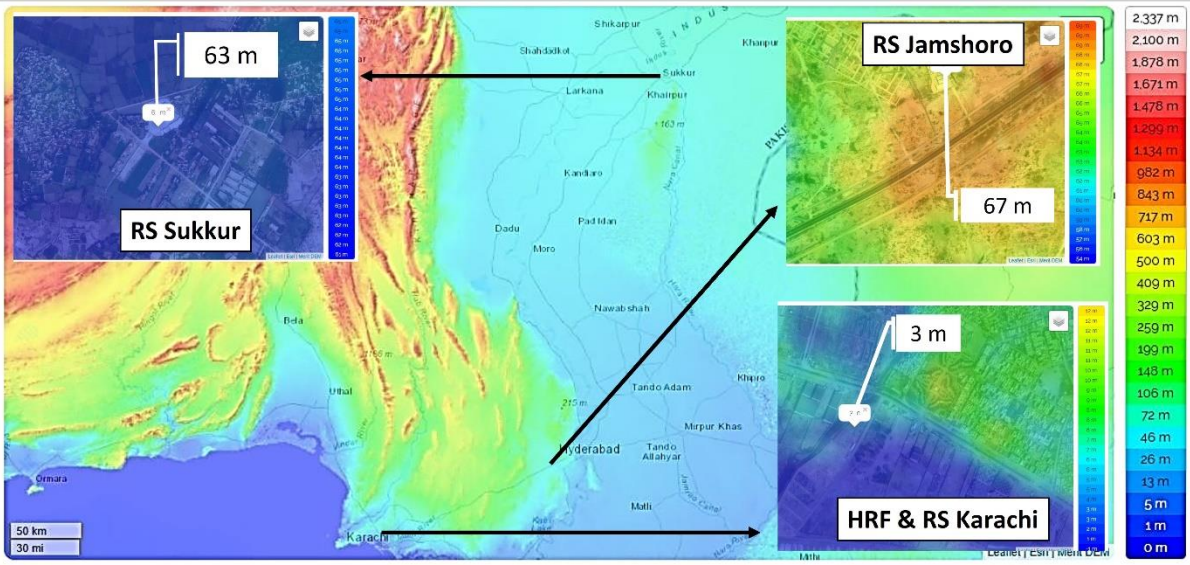


Figure 0.2 Elevation Map of Subproject Sites

The subproject sites, lies in plain / flat topography, hence, subproject construction will not alter landscape of the area.

4.3.3. Geology and Soil

Karachi: Karachi and its peripheral adjoining areas have diversified physical features such as plains, hills, rivers, valleys and coasts. Rocks ranging in age from Eocene to recent, deposited under shallow marine to deltaic conditions are exposed. The major rock formation in the proposed subproject area is from recent quaternary and tertiary period which include Alluvium and Miocene sedimentary rocks from Gaj Formation**.** As far as soil texture is concerned, it is composed of alluvium of Indus Basin contains, unconsolidated surficial deposits of silt, sand and gravel. Specially, within site soil is composed of silt, sand and gravel.

Jamshoro: The subproject lies on the southeastern fringe of the Khirthar range which runs in the north to south direction for about 400 km along the Sindh-Baluchistan provincial boundary. The subproject site and surroundings consist of flood plain deposits of sedimentary rocks including alluvium, stream deposits, piedmont and related deposits.

[24] Osmani & Company (Pvt.) Ltd. (2018), *Revised Final Strategic Development Plan Report, Urban Development Strategy For Sukkur, Sindh (2014-2035)*

[25] National Transmission and Despatch Company, ADB(2009), *Initial Environmental Examination of 132kV Rohri Substation to Gambat Substation Transmission Line Subproject (*37192)

Sukkur: Subproject site in Sukkur lies in alluvium plains formed by the Indus River. It is fairly leveled alluvial flood-plain formed during and since the Pleistocene period, deposited by the river Indus and its tributaries over a base of tertiary shales and limestone[26].

District level geological map of all subproject sites is depicted in Figure 4.3.

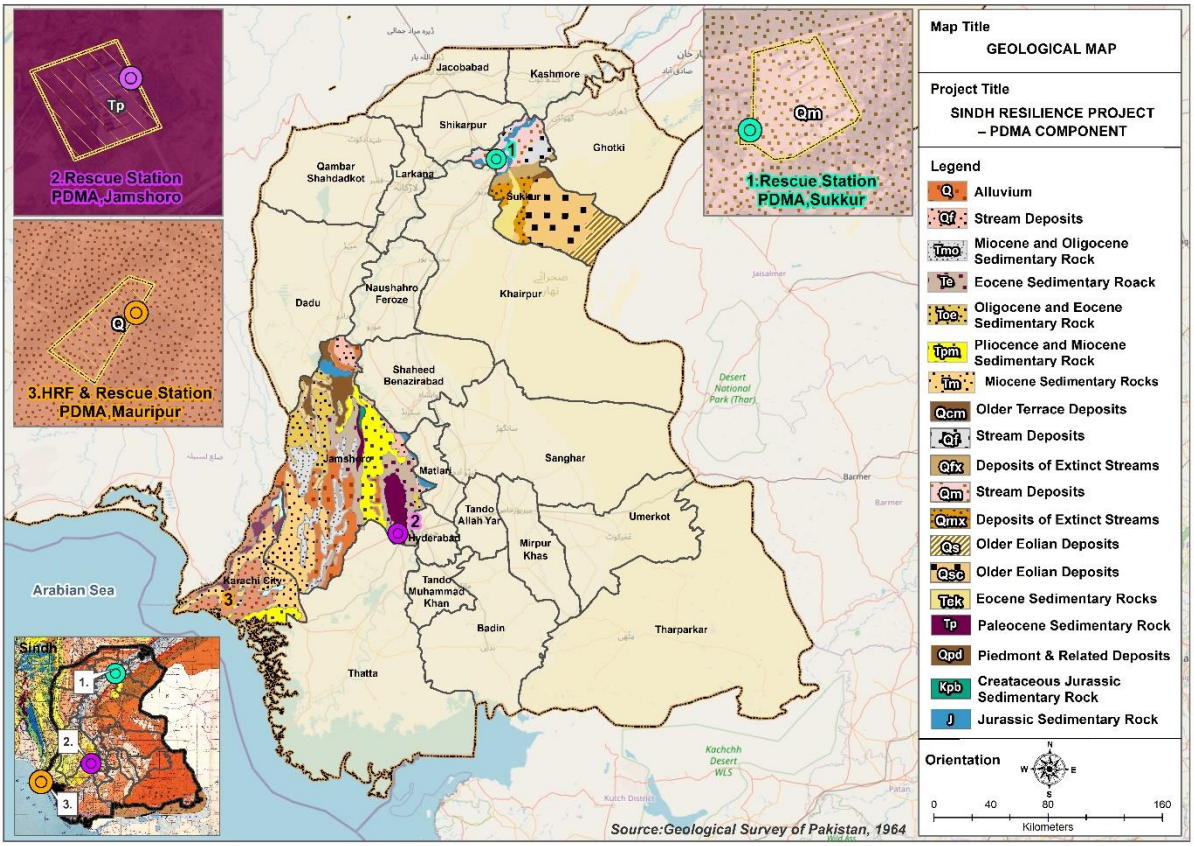


Figure 04.0.3 Geological Map of Subproject Sites

4.3.4. Water Resources and Drainage Pattern

Karachi: District Keamari of Karachi consists of Keamari, Baldia, SITE and Maripur sub-divisions. The water resources in and around the subproject mainly consist of tank water and supply line. District Keamari falls in a dry and arid zone with scanty and intermittent rainfall with prolonged periods of drought and limited groundwater resources. Groundwater aquifers are available at different depths of different strata. The depths of aquifers and the water table in Karachi ranges from 20 feet (6 m) to 300 feet (91 m) below ground surface.

Jamshoro: The main source of surface water in the district is River Indus. District Jamshoro lies both in drought and flash flood zones which increase its vulnerability. Most of the population of district, depends on portable water source, therefore, villages are found near to streams for accessibility[27]. Groundwater is deep and saline and does not constitute major source of drinking water. Due to scarcity of water, the area is thinly populated and small-scale agriculture depends on rainwater. No perennial surface water resource exists in the subproject site, however, natural

[26] https://smeda.org/phocadownload/Sindh/SUKKUR_profile.pdf
[27] Pakistan Emergency Situational Analysis, a Profile of District Jamshoro (2014).

drains filled during rains are present around the site. Currently, PDMA Sindh fulfills water requirement for the site through water tanker supply.

Sukkur: The major surface water resource in the district is Indus River and canals drawn from Sukkur barrage. Other source of water in the district are natural depressions, locally called *Dhunds;* which retain rain water for considerable time. The water supply for Sukkur and Rohri cities is abstracted directly from the Indus. The ground water in the district is of variable quality with respect to area and depth. The fresh potable water is available along canals otherwise groundwater is brackish. The water table along canals and Indus River ranges between 3m to 6m. The subproject is site located near River Indus; therefore, fresh ground water is available for use. Currently PDMA Sindh is using ground water to fulfil water requirements at site.
Surface water source map in and around proposed subproject sites is given in Figure 4.4.

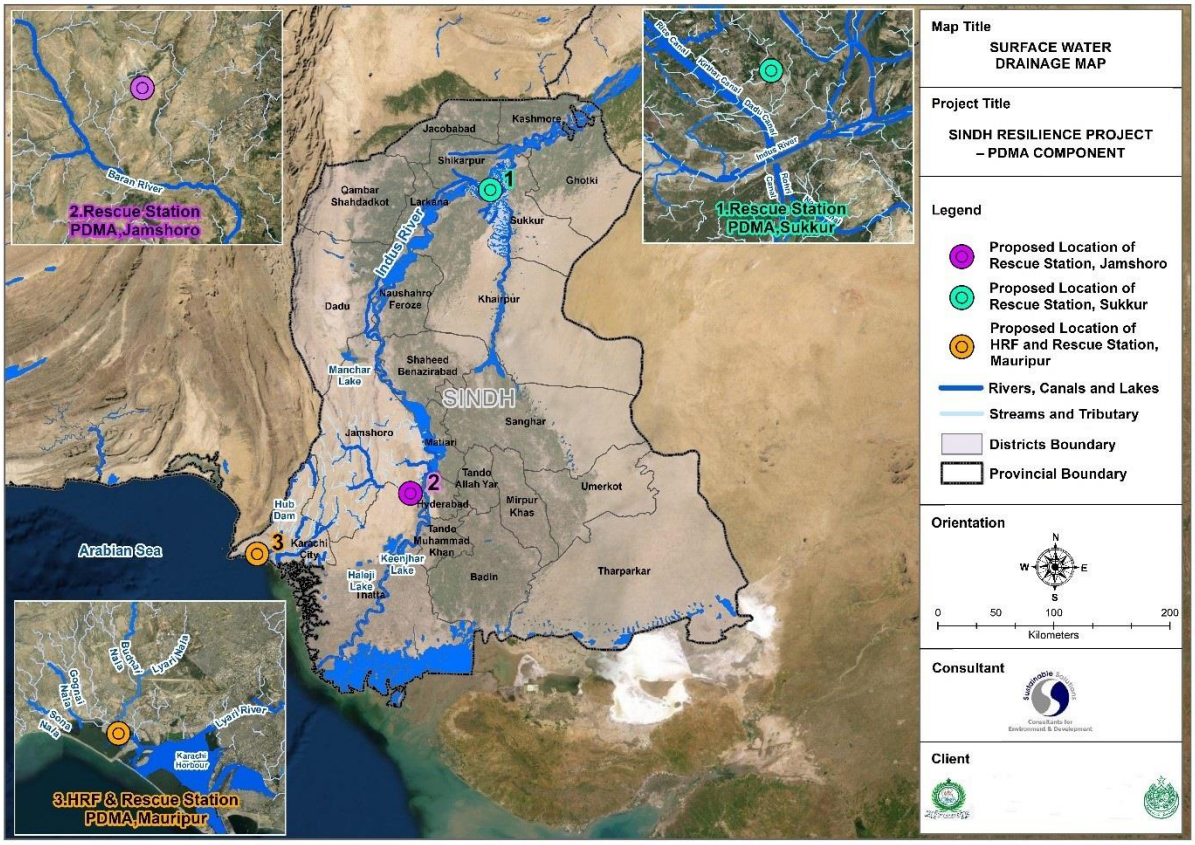


Figure 04.0.4 Surface Water Drainage Map of Subproject sites

4.3.5. Drainage and Sewerage Pattern

Karachi: Various natural drains existed in Karachi, which have been modified over the years due to rapid urbanization. Sewerage system in the city is mainly composed of manmade subdrains which off loads in natural drains i.e., nala / rivers and ultimately to Arabian Sea. The Budhnai Nala, which currently function as sewerage drain; flows nearby subproject site and off loads in Arabian sea. Presently, the site at Maripur is not fully developed therefore, local sewerage does

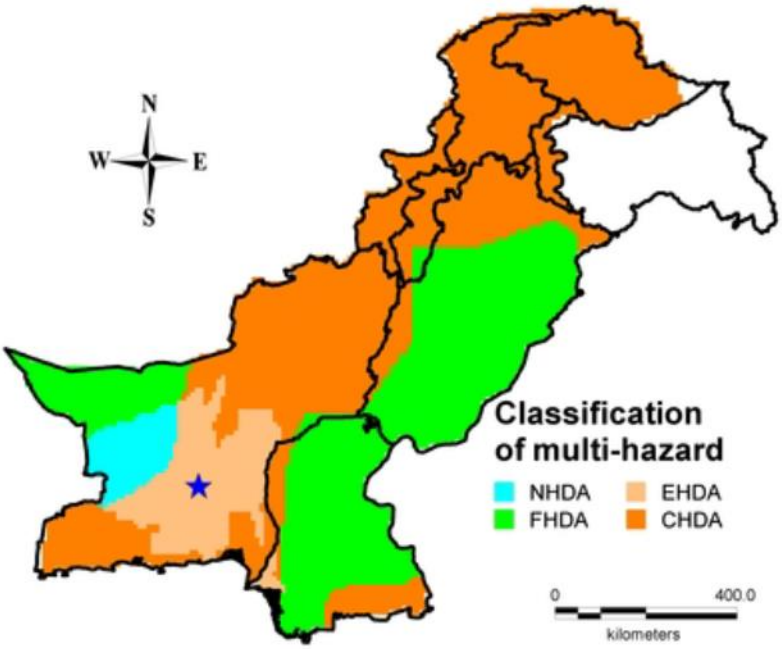
not exist at site and will be developed construction phase of proposed subproject and will be connected to exiting sewerage system of the area.

Jamshoro: The natural drainage pattern around subproject is composed of seasonal rivers / nalas, which flows during rainy season. No manmade sewerage system exists around the site, therefore, PDMA Sindh have developed local system composed of drains and septic tanks to safely drain and dispose sewage.

Sukkur: The subproject site at Sukkur is within Sukkur Municipal Corporation, therefore, city sewerage system exists around subproject site. Currently, sewerage system of the city has been improved and major trunk sewers taking wastewater to treatment plant have been developed for safe disposal. The proposed subproject site is developed by PDMA Sindh and local sewerage is connected to city's drainage and sewerage system to drain waste of the facility.

4.3.6. Natural Hazard

Sindh is prone to flash floods, droughts, urban floods, tropical cyclone, earthquakes, and tsunami. The subproject site at Maripur Karachi predominantly falls in Combined Hazard Dominated Area and potential threats at site are earthquake, urban flood, cyclone, heatwave and tsunami. Whereas, at Sukkur site, potential hazards are urban, riverine flood and high temperatures during summer. Though dominant hazards of district Jamshoro are riverine and torrential flood, but strictly with respect to subproject site, drought, high temperatures during summer and dust blowing wind gusts are potential natural hazards. The multi-hazard classification map of Pakistan is sown in the Figure 4.5**.**



NHDA: No Hazard Dominated Areas
EHDA: Earthquake Hazard Dominated Areas
FHDA: Flood Hazard Dominated Areas
CHDA: Combined Hazard Dominated Areas

Figure 04.0.5 Multi-Hazard Classification Map of Pakistan

4.3.6.1 Seismic Hazard

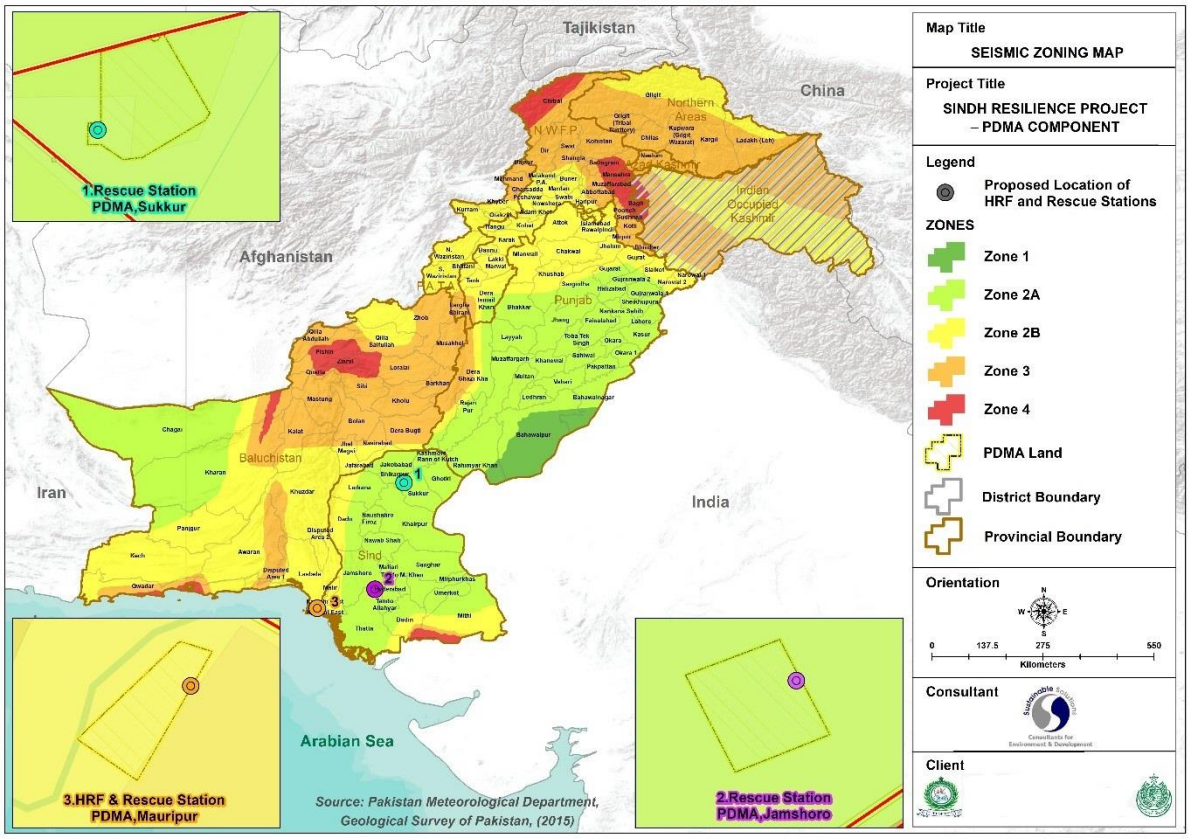


Figure 4.0.6 Seismic Zoning Map of Pakistan showing subproject Areas

Pakistan is divided in four seismic zones i.e., major, moderate, minor, and negligible with respect to ground acceleration values. According to Building Codes - Seismic Provision 2007 of Pakistan, the proposed subproject of Maripur lies in Zone 2B which has minor to moderate damaging effects with peak horizontal ground acceleration of 0.16 to 0.24 g whereas, Jamshoro and Sukkur site lies in Zone 2A which has minor damaging effects with PGA of 0.08 to 0.16 g Seismic Zonation map of Pakistan is shown **Figure 4.6.**

4.3.6.2 Urban Floods

Karachi: Karachi is densely populated city and frequently faces urban flooding. During 1966, 1977, 2009, 2013, 2018, 2019, 2020, 2021 rains caused flooding in the city and led to considerable damage. The proposed subproject site falls in medium flood hazard zone as per National Disaster Management Authority (NDMA) classification **(Figure 4.7)**. Therefore, subproject site must be designed and developed to withstand flooding.

Jamshoro: District Jamshoro is prone to riverine and torrential flooding **(Figure 4.7)**. The district was affected during 2010 riverine flood and in 2011 by heavy rains. In 2010, 49% of district population was affected in 16 union councils. As far as subproject site is concerned, location of site is safe with respect to both riverine and torrential floods.

Sukkur: Sukkur district falls in Flood Prone categorization and potential causes of floods are heavy rains and Indus River. During 2010, 2011 and 2012, Sukkur city was affected by moderate floods. The subproject site is already developed by PDMA Sindh and capable to withstand

medium floods. With respect to subproject, it is necessary to design and develop construction activities in view of potential flooding in the area.

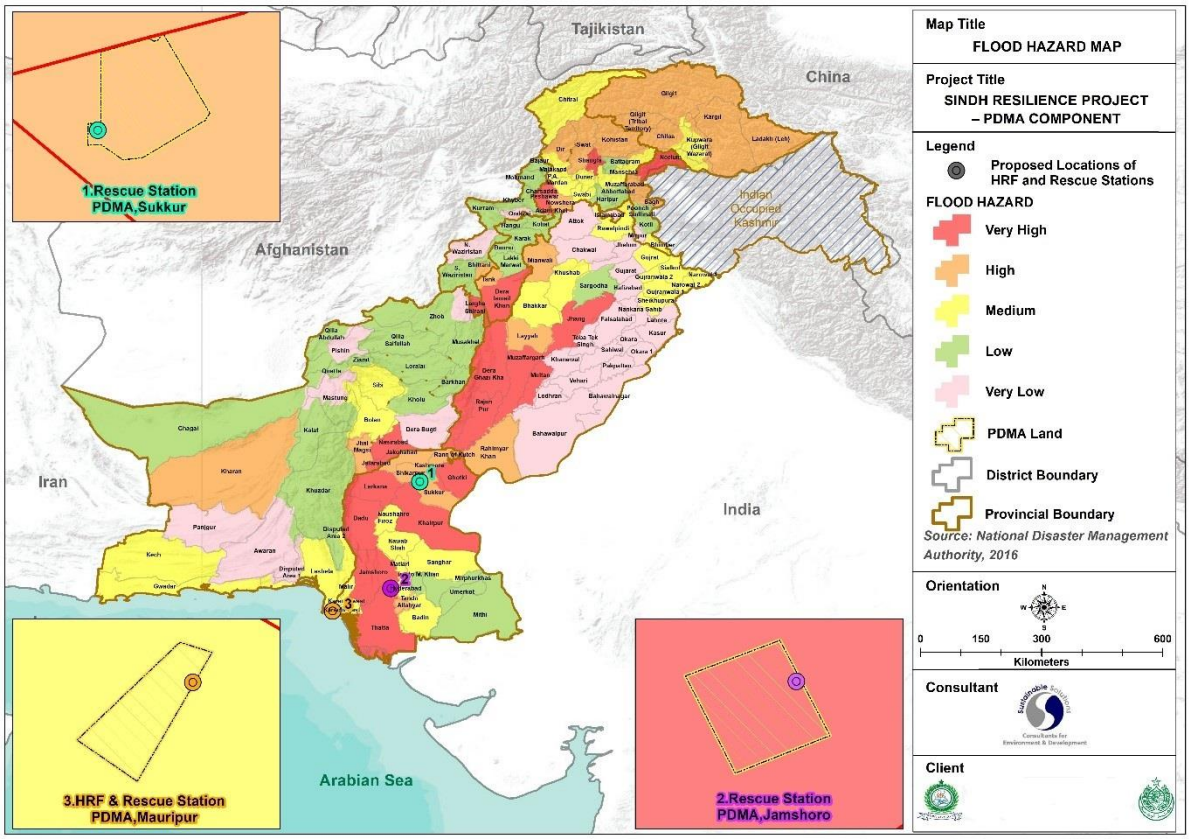


Figure 0.7 Flood Hazard Map of Subproject Area

4.3.6.3 Cyclones

Being on sea coast, the subproject site at Karachi is prone to cyclones. The subproject must be designed to withstand cyclonic winds, accompanied heavy downpour and possible storm surge. However, sites at Jamshoro and Sukkur are safe from direct cyclonic effects.

4.3.6.4 Heatwaves

Heatwaves are most frequent events in Sindh. High death toll caused by heatwaves occurred in 2015 and mostly reported from Karachi. During same year, heatstroke cases were also reported from Hyderabad, Noshero Feroz, Dadu, Badin, Thatta and Tharparkar[28]. All three subproject sites are prone to heatwaves; therefore, the construction contractor shall ensure safety of labour against heatstroke during construction work especially when heatwave warnings are issued by concerned authorities.

[28]http://www.pmd.gov.pk/rnd/rndweb/rnd_new/journal/vol13_issue26_files/7_Socio_Economic_Impacts_of_Heat_Wave_in_Sindh.pdf

4.3.7. Environmental Baseline Survey

For environmental baseline ambient air, noise, drinking quality samples were collected from subproject sites. At Maripur site, the ambient air quality data collection held twice during September and October, 2021. Whereas, at Jamshoro and Sukkur, data was collected in mid-October 2021. The 1-hr interval data for 24-hrs was collected for SO_2, NO, NO_2, CO, Surface Ozone (O_3), PM_{10}, $PM_{2.5}$ and TSP/SPM. Onsite meteorological parameters (wind speed, wind direction, humidity temperature) were also collected during baseline environmental survey.

4.3.7.1. Ambient Air Quality and Noise Levels

Collected data is tabulated and given in Table 4.1. Following conclusions and results are drawn from the data.

Karachi:

- Average levels of pollutants were within the prescribed limits of SEQS. However, PM_{10} level was slightly higher during September.
- During October average levels of pollutants were within prescribed SEQS limits.
- The noise levels were measured for 24 hrs. Average value of 69.4 dB_A was obtained during day time of September, 2021, while in night, level was 51.3 dB_A. In October, levels were 57.6 and 54.3 dB_A during day and night respectively.
- The average noise levels were within permissible limits of SEQS allowed in industrial area.

Jamshoro:

- Average levels of pollutants were within the permissible limits of SEQS at the time of measurement.
- The average noise levels were 60.4 and 51.2 dB_A during day and night time respectively.
- The average noise levels were within permissible limits of SEQS allowed in commercial and industrial areas.

Sukkur:

- Average levels of pollutants were within the permissible limits of SEQS at the time of measurement.
- The average noise levels were 56.2 and 48.2 dB_A during day and night time respectively.
- The average noise levels were within permissible limits of SEQS allowed in commercial and industrial areas.

Table 04.0.1 Ambient Air Quality Monitoring Results at Sub-Project Areas

Pollutants	SO2	NO	NO2	CO	O3	PM 2.5	PM 10	TSP
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(mg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)
SEQS*	120	40	80	5	130	75	150	500
IFC/WB EHS/ WHO Limits	20	N/A	200 (1 hour)	N/A	100 (8 HOURS)	25	50	N/A
September 2021 (Maripur, Karachi)								
Min	26.58	23.58	11.50	3.91	19.37	16.40	NA	NA
Max	33.65	28.39	13.92	4.37	31.91	27.01	NA	NA
Average (24-hours)	**29.75**	**25.86**	**12.78**	**4.09**	**25.38**	**21.48**	**158**	**370**
October 2021 (Maripur, Karachi)								
Min	20	22	12	2	10	22	NA	NA
Max	31	32	16	2.9	19	36	NA	NA
Average (24-hours)	**25.375**	**27.41667**	**13.45833**	**2.477083**	**13.72917**	**29**	**114**	**322**
October 2021 (Jamshoro)								
Min	3.71	0.09	4.52	1.10	3.71	12.55	NA	NA
Max	19.14	5.11	14.31	7.66	19.14	68.44	NA	NA
Average (24-hours)	**8.99**	**2.75**	**8.80**	**1.55**	**9.55**	**38.00**	**89.00**	**229.00**
October 2021 (Sukkur)								
Min	10.03	0.10	0.31	2.41	5.99	16.77	NA	NA
Max	14.48	231.70	74.45	5.20	59.56	57.38	NA	NA
Average (24-hours)	**10.76**	**31.52**	**20.31**	**3.00**	**15.09**	**44.00**	**111.00**	**315.00**

4.3.7.2. Drinking Water Quality

One sample of drinking water was collected from each subproject site and samples were analyzed for physical and biological drinking water quality parameters. Results were compared with Sindh Standards for Drinking Water Quality (SSDWQ) and are given in Table 4.2**.**

Conclusion: Water sample of Maripur and Jamshoro was fit for drinking, while sample from Sukkur unfit due to presence of E-coli. (bacteria). However, after proper chlorination and boiling, it can be used for drinking purposes.

Table 0.2 Drinking Water Quality Analysis Results

S. No	Sample ID	pH	Lead	TDS	Total Hardness	Calcium	Magnesium	E-Coliform	F- Coliform	Total Coliform
Units			**mg/l**	**mg/l**	**mg/l**	**Mg/l**	**Mg/l**	**MPN*/100 ml**	**MPN/ 100 ml**	**MPN/ 100 ml**
SSSDWQ		6.5-8.5	<0.01	<1000	< 500			0	0	0
1	KHI-01	7.63	0.001	811	215	130	195	0	0	0
2	JM-01	7.22	0.002	541	185	130	195	12	0	12
3	SU-03	6.62	0.001	611	305	130	195	20	10	30

4.4. Ecological Resources

For the evaluation of the habitat in and around subproject sites, high-resolution satellite imagery, in-situ observations, and available literature was reviewed. Site-wise details on resources and finding are given in successive subsections.

4.4.1 Flora

Karachi: Karachi falls under the category of Dry Sub-Tropical Scrub Forests, where xerophytic vegetation can grow. Main tree species found are Ficus, Neem, Babul, Koonbhat, Kandi, Imli, etc.[29] Dominant plant / tree species around the project site were Neem, green button wood (Chanar), apple of Sodom (Akk), Ficus, date palm and Kikar (wilayati babul). Specifically, proposed subproject site was devoid of trees except seasonal bushes and shrubs.

Jamshoro: Based on the physical features, district Jamshoro can be classified into four main habitats i.e., gravel plains, hills, agricultural fields and wetlands. The vegetation of this region is typical of arid regions and consists of xerophytic species. Most common species in the district and around subproject site were Babul, Kandi, Imli, Kikar, Karir (Caper-berry), Jangli Ber. Shrubs are normally grown after rains and sustain shorter life. Subproject site is mostly developed and plantation is carried out by PDMA Sindh.

Sukkur: The subproject site and surrounding is plain and physio-graphically urban, agricultural and wetland habitat. Most common trees around the subproject site were date palm, Babul, Neem, Sheesham, Lai, Kandi, Kikar, Imli, etc. Fruit trees, agricultural crops and shrubs were also dominant vegetation class near subproject site. However, precisely subproject site had already been developed and plantation is carried out by PDMA Sindh.

None of the endangered / sensitive floral species were present within or nearby subproject sites, which could be threatened by construction activities.

Pictorial glimpses of flora in neighborhood of subproject sites are given in Figure 4.8.

[29] http://www.epasindh.gov.pk/kklp2.pdf

Maripur, Karachi

Jamshoro

Figure 04.0.8 Dominant Floral Species Observed During Survey in and Around Subprojects Sites

4.4.2. Fauna

Sporadic flora of the area provides few opportunities for fauna to exist in small numbers. Information on fauna was compiled through literature review, local knowledge and during field visits of the sites and surroundings. The faunal species observed during the survey were urban birds. Most common birds were crows, red vented bulbul, green bee-eater, doves, kites, egrets, red wattled lapwing, rock pigeon and sparrows.

Out of recorded birds at subproject sites and neighborhood, none of the species are protected under the Sindh Wildlife Protection Ordinance (SWPO) and IUCN Red List 2006.

4.4.2.1. Mammals and Reptiles

The neighborhood of subproject sites sustains few domesticated mammals such as; dogs, cats, cows, donkeys, goats, buffalos, five striped palm squirrel, and Bengal monitor. Some burrow pits of snakes and rat holes were observed in surroundings of site in Jamshoro. However, none of the recorded species were protected, threatened, or included in the IUCN appendices. Pictorial glimpses of fauna are shown in Figure 4.9.

Figure 04.0.9 Dominant Faunal and Avifaunal Species Observed During Survey

4.4.3. Marine Protected Areas (MPAs)

The MPAs area located along the coast of Karachi and nearest MPA from Maripur subproject is Sandspit / Hawkesbay at a distance of 3.2 Km. Construction activities at site will not pose any threat to this nearest MPA.

4.4.4. Cultural Heritage Sites

At provincial scale, various cultural, archaeological, religious and tourist sites are protected under the provincial, Sindh Cultural Heritage (Protection) Act, 1994. At divisional or district scale, such sites in Karachi are Mohatta Palace Museum, Quaid-e-Azam House, Wazir Mansion Museum, Baloch Graveyard (Lakakho Shaikh), Jam Bijar Fort, Frere Hall, Khaliq Dina Hall, and Chaukandi

Tombs[30]. In Jamshoro Ranikot Fort and Tombs of Burfat Tribe in Taung Thana Bula Khan and Khirthar National Park. While in Sukkur district, famous cultural heritage sites are Lakhanjo-Daro (remains of Indus civilization), Mir Masoom Shah Minar, Sadh Belo (island of Indus River), Sone Tool Factory Rohri (Prehistoric), Lansdowne Bridge, (cantilever bridge), Satyan jo Than Rohri, OM Kanhiya Lal Cottage, and Bakhar Fort (Island).[31]

Specifically with reference to subproject sites, none of the cultural, archeological, religious or tourism place lies within or 5 Km radius of the site. Therefore, subproject activities will not impact any declared or undeclared cultural or heritage site.

4.4.5. National Parks and Game Reserves

In district Jamshoro, Kirthar Protected Area Complex including Kirthar National Park, Mahal Kohistan Wildlife Sanctuary (MKS), Hub Dam Wildlife Sanctuary (HDS), the Surjan, Sumbak, Eri, and Hothiano Game Reserves lies. Khirthar National Park is in Protected Category II of IUCN and United Nation's list of National Parks and Equivalent Reserves. Whereas, in district Sukkur Takkar National Park of Kot Diji Taluka, Mando Dero Forest and Indus River (Dolphin Reserve) from Sukkur to Guddu Barrage is declared as game reserve.
However, none of the national park or environmental sensitive site is situated within 5 km radius of subproject sites at all stations.

4.5. Socioeconomic Resources

4.5.1. Land Cover and Land Use

Karachi: General pattern of landuse and landcover of taluka Maripur is given in Table 4.5. and map shown in **Figure 4.10.** Immediate surrounding beyond boundary wall of the subproject site is in commercial / industrial and residential use. Main Maripur road divides industrial / commercial landuse and the nearest residential colony i.e., KANUPP is at a distance of about 0.5 Km in northeast of subproject site. In south-southwest of the site, lies coastal and marine environment. Specifically, subproject site is barren with scattered bushes and shrubs and one built-up storage shed of PDMA Sindh. During execution of the subproject, hardly any local community / amenities will face anticipated negative impacts of construction activity.

Table 04.0.3 Land use of taluka Maripur

S.No.	Land use Classes	Percentage
1.	Industrial Land	**6.7**
2.	Residential	**6.4**
3.	Commercial Land	**0.5**
4.	Agricultural Land	**2.2**
5.	Built-up Land	**4.9**
6.	Barren Land	**51.4**
7.	Amenities	**0.7**

[31] https://stdc.gos.pk/index.php/tours/all-locations/item/72-om-kanhiya-lal-cottage-rohri-sukkur

8.	Recreational Land	**0.4**
9.	Island	**0.2**
10.	Graveyard	**0.3**
11.	Mangroves	**3.3**
12.	Hilly Land	**13.8**
13.	Transportation	**1.4**
14.	Waterbody	**7.8**

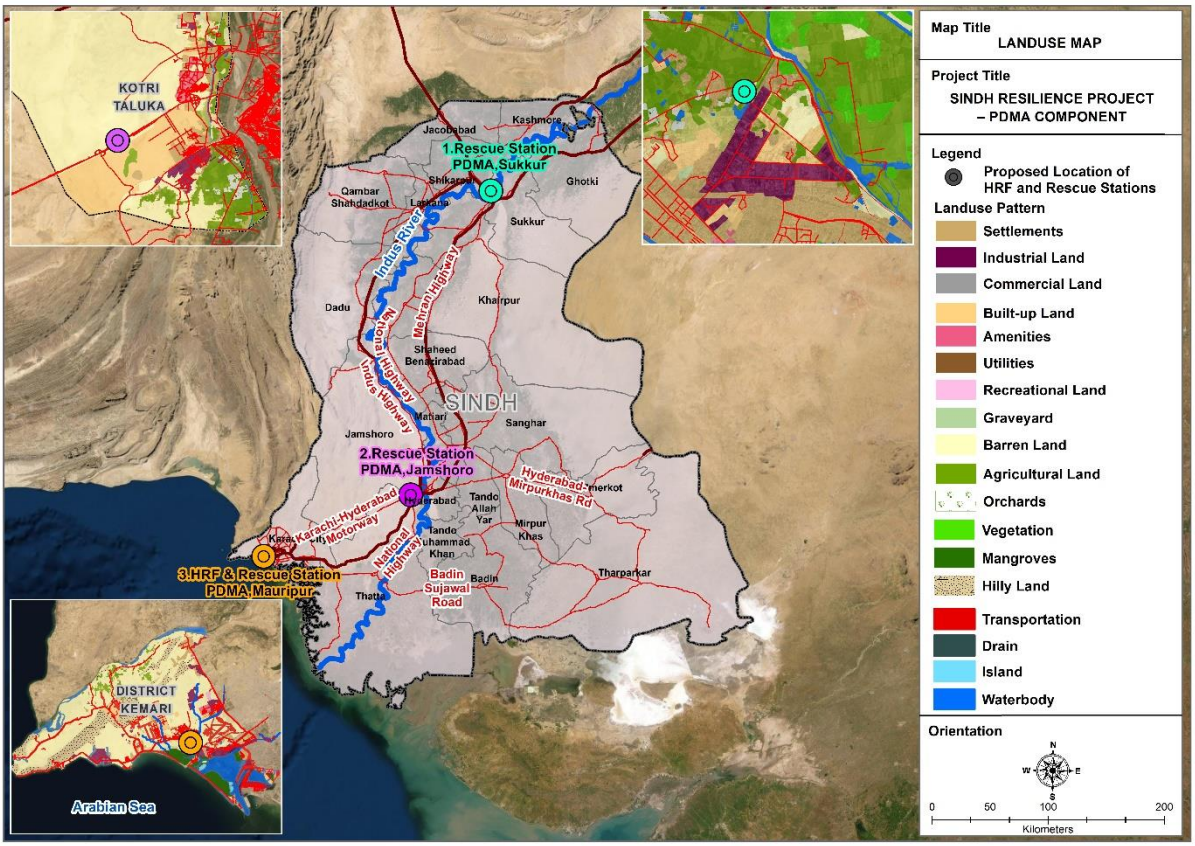


Figure 04.0.10 Land Use Map of Sub-Project Areas

Jamshoro: General landcover categories of taluka Kotri, district Jamshoro are given in **Table 4.6** [32] and map shown in **Figure 4.10.** Predominant landuse and landcover in immediate surrounding of the site is barren, under developing residential colony, thinly populated scattered villages and some commercial facilities along Karachi – Hyderabad superhighway. Human settlements are beyond 5 Km radius of the site. Precisely, within the subproject site, land is being used for warehouses / storage sheds, offices, internal roads / tracks and plantation carried out by PDMA Sindh. During execution of the subproject, no local community / amenities will face anticipated negative impacts of construction activity except employees of PDMA Sindh.

[32] Environmental Impact Assessment of Jamshoro Power Generation Project, 2013

Table 04.0.6 Land use of Taluka Kotri, District Jamshoro

Sr #	Land use Classes	Percentage
1.	Industrial Land	**0.70**
2.	Residential	**2.29**
3.	Commercial Land	**0.02**
4.	Agricultural Land	**5.44**
5.	Orchards	**0.30**
6.	Built-up Land	**4.99**
7.	Barren Land	**83.23**
8.	Saline Land	**1.37**
9.	Amenities	**0.52**
10.	Utilities	**0.14**
11.	Graveyard	**0.01**
12.	Transportation	**0.34**
13.	Waterbody	**0.49**
14.	Drains	**0.15**

Sukkur: General landuse and landcover categories of taluka New Sukkur, district Sukkur are in **Table 4.6** and map shown in **Figure 4.10.** Primary landuse in immediate surround of subproject site is commercial / industrial, agriculture, build-up and barren. Precisely, within the subproject site, land is being used for warehouses / storage sheds, offices, internal roads and tracks and plantation carried out by PDMA Sindh. During execution of the subproject, hardly any community / amenities will face anticipated negative impacts of construction activity except employees of PDMA Sindh.

Table 04.0.4 Land use of Taluka New Sukkur, District Sukkur

Sr #	Land use Classes	Percentage
1.	Industrial Land	7.68
2.	Residential	25.49
3.	Agricultural Land	36.73
4.	Orchards	0.92
5.	Built-up Land	7.05
6.	Barren Land	3.69
7.	Saline Land	2.66
8.	Amenities	0.81
9.	Graveyard	0.26
10.	Transportation	2.49
11.	Waterbody	5.08
12.	Vegetation	7.07
13.	Drains	0.08

4.5.2. Administrative setup of subproject sites

Karachi: The subproject site is located in taluka Maripur of district Keamari. Keamari Town was formed in 2001 as part of Local Government Ordinance 2001 and as the town system was disbanded in 2011, it was re-organized as part of Karachi West District in 2015. In September 2020, Keamari has been carved out from Karachi West District. Cabinet of Sindh Government approved the formation of a new district in Karachi. According to the notification (No.08/KEAMARI DISTT/2020/Rev-1 (11)/719) issued by the Board of Revenue, the new district includes Keamari, Baldia, Site and Maripur subdivisions or talukas.

Jamshoro: The subproject site is located at a distance of about 120 Kilometers in North-East of Karachi on M-9 Motorway. Administratively, subproject site falls in Taluka Kotri, district Jamshoro. The district comprises four talukas namely Kotri, Manjhand, Thana Bula Khan and Sehwan.

Sukkur: The subproject site lies in Taluka New Sukkur, District Sukkur. The district is further divided in five Talukas i.e., Sukkur, Rohri, Pano Aqil, Salehpat and new Sukkur.
Administrative map of subproject sites is shown in **Figure 4.11.**

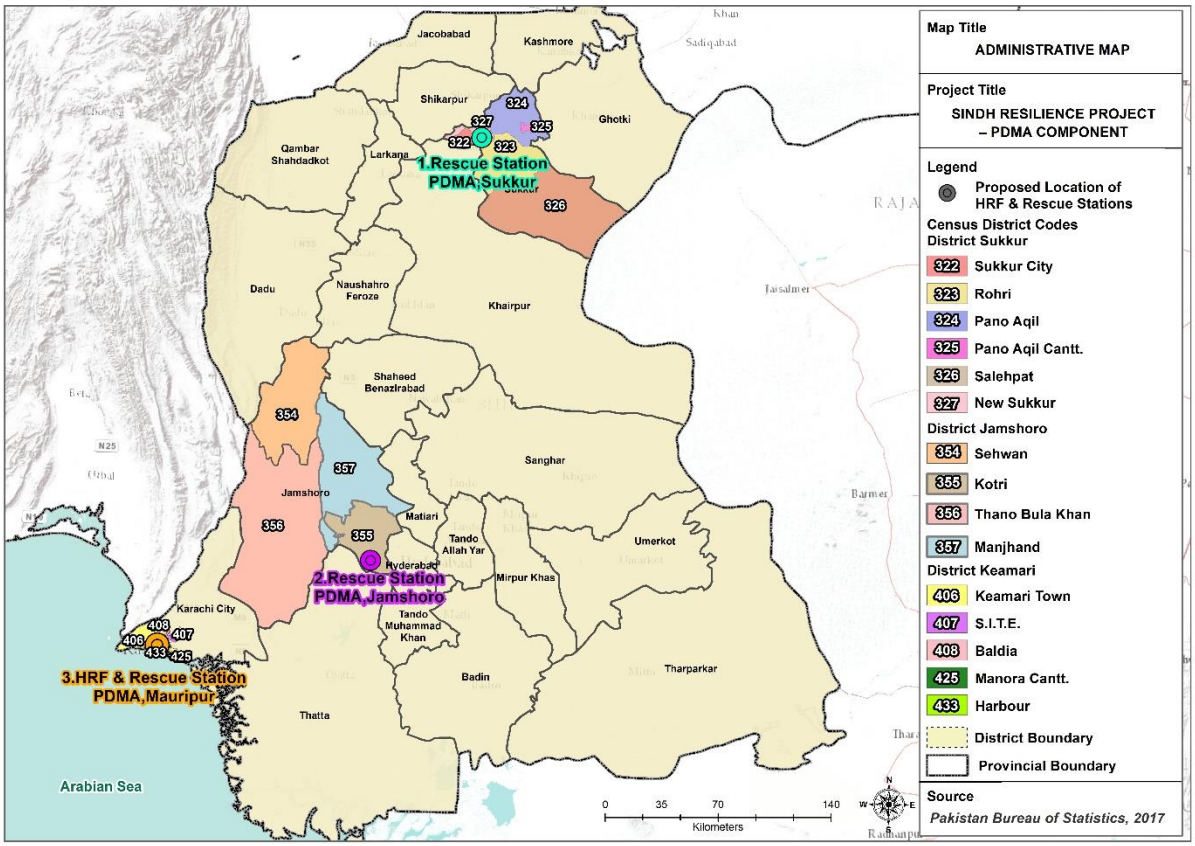


Figure 04.0.11 Administrative Map of Subproject sites

4.5.3. Demography

Karachi: Keamari district spreads over an area of 552.67 sq. km with a population density of 529.9 persons per square kilometers[33]. Keamari is rural by its characteristics as majority of the population resides in rural areas. Precisely, with reference to subproject site, estimated population in surrounding of the site would be in range of 5,000 to 10,000 people. This population includes residents of KANNUP Colony which is at 0.5 Km distance from the site, nearby warehouses and offices. Population within the site i.e., employees of PDMA is 3 -5 persons including security guards and warehouse in-charge.

Jamshoro: District Jamshoro spreads over an area of 11,517 sq. km with a population density of 88.28 persons per square kilometers. District Jamshoro is rural by its characteristics as 77 percent of the population resides in rural areas. As far as immediate population within and around the site

[33] https://www.citypopulation.de/php/pakistan-karachi.php

is concerned, only employees of PDMA are likely to receive potential negative impacts of the subproject. Around 20- 30 employees work in PDMA facility. Other local thin and scattered population is beyond 5 Km radius around the site.

Sukkur: District Sukkur spreads over an area of 5,165 sq. km with a population density of 288 persons per square kilometers. Urban and rural population is 48.5% and 51.5% respectively. Immediate neighborhood population of the site is village Nisar Khoso, workers in nearby industries and employees of PDMA Sindh. Collective population in vicinity of site would be in estimated range of 3,000 to 8,000 people. Most immediate receptors of potential negative impacts of subproject would be 20 - 30 employees of PDMA Sindh.

4.5.4. Settlements

Karachi: Settlements nearby site are Hawksbay town, Javed Behria Co-Operative Housing Society, Massror colony, Budhni Goth, KANUPP Colony, and Shah Latif Colony. KANUPP colony is nearest neighborhood of site and is located at a distance of 0.5 Km northeast of the site.

Jamshoro: Vicinity of **s**ubproject site is un-inhabited. Few thinly populated villages exist near site. To name a few. small, little known villages in surrounding are Haji Ishaq Khoso and Haji Lal Muhammad Khoso.

Sukkur: Nearest neighborhood settlement of subproject is village Nisar Khoso. Major earning source of population is agriculture, business, teaching, shop keeping, labour, sales and distribution.

Pictorial glimpse of settlements in vicinity of subproject sites is shown in **Figure 4.12.**

Figure 04.0.12 Settlements around Subproject Sites

4.5.5. Communication Network

Karachi: The major access road to the subproject site is Maripur Road. The other primary, secondary and tertiary transportation network includes Liyari Expressway, Estate Avenue, Manora Road, Kakapir Road, SUPARCO Road, Hub Chowki Road etc.

Jamshoro: The subproject lies on main Karachi-Hyderabad Motorway (M-9) on track leading to Hyderabad.

Sukkur: Subproject site can be accessed through Sukkur – Jacobabad highway via link road. Additionally, site can be access via various other link roads from Sukkur city

Major road network leading to subproject sites is shown in Figure 4.13.

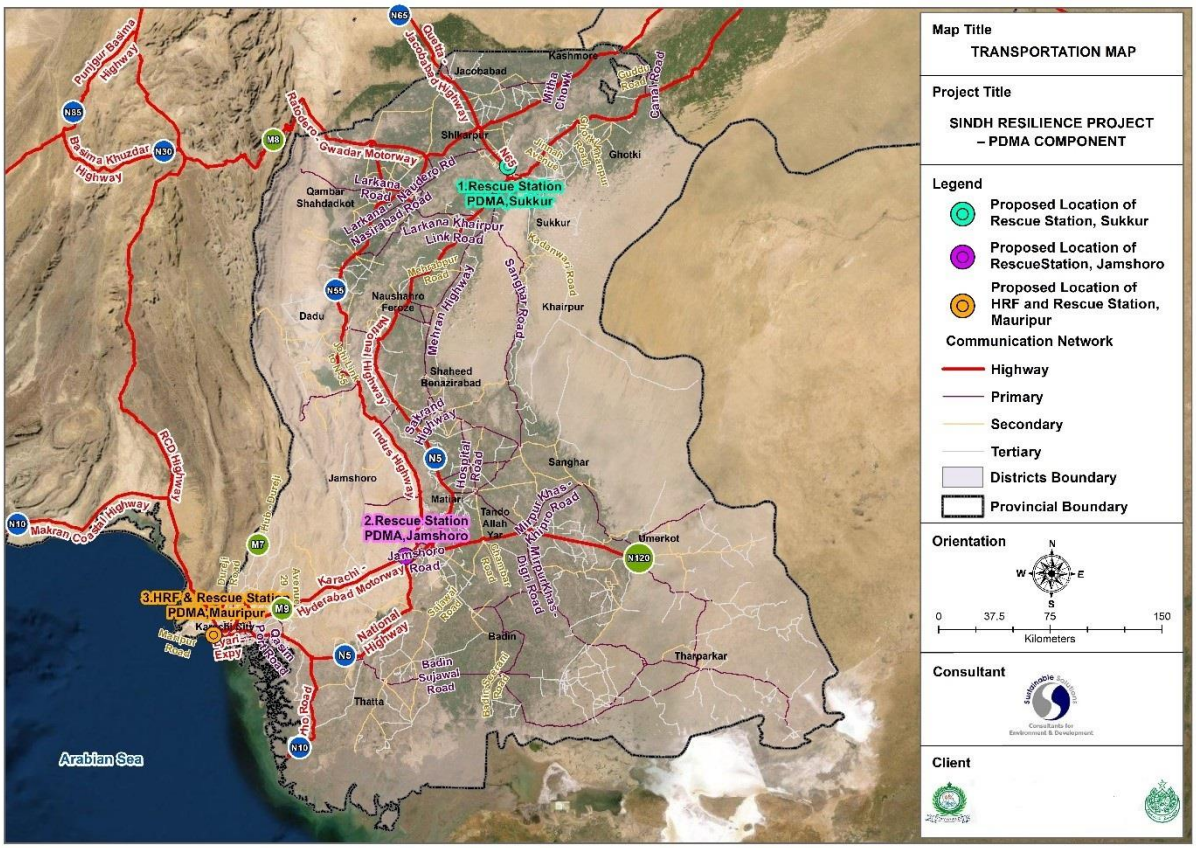


Figure 04.0.13 Road network and access roads to subproject sites.

4.5.6. Health Care Facilities

Karachi: Nearest health facility with respect to subproject site is Imperial Holy Family Hospital, which is within 1 Km distance and can be reached in case emergency at site. Other well-known nearby healthcare facilities are Zakar Medical Centre, Dr. Ziauddin Hospital (Keamari), Maripur Medical Centre and Family Welfare Center.

Jamshoro: Surroundings of the site is predominantly barren and undeveloped., Nearest large and well-equipped health facility is Liaqat Medical University of Health Sciences and its hospital, situated in Jamshoro town at approximate distance of 12 Km.

Sukkur: Civil Hospital Sukkur and National Institute of Cardio Vascular Diseases (NICVD) are two major health facilities situated at approximate distance of 12 Km and 8 Km respectively from site. These facilities can be approached in any health emergency at site.

4.6. General Socio-economic Settings of Subproject Environs

The contents of this subsection are based on field visits conducted during consultative meetings. 62% of males and 38% of females were consulted. General concerns of the population were; unemployment, non-availability of educational institutions, poor drinking water quality, hygiene, absence of healthcare facility, transportation, courier service, non-availability of gas and electricity. Extract of views of local people is given below;

Healthcare facilities: With regard to healthcare faculties; communities said that facilities are available nearby but in health emergencies, it is difficult to transport patient to nearby faculties. Communities near Maripur site told that healthcare facilities are at 3-10 Km distance. While, communities living nearby Jamshoro site told that Civil Hospital LUMS Jamshoro is around 19 Km from villages. However, residents near Sukkur have to travel 2 to 8 Km to visit closet BHU or major health facility.

Major livelihood sources: Agriculture, livestock, labour, shopkeeping, private and government jobs.

Environment and Health: Main concern of local communities was drinking water quality and hygiene related diseases. Common water born diseases shared by locals are diarrhea, dengue, malaria and hepatitis.

Natural Disaster: Residents of Maripur were more concerned about urban flooding, which they face during every monsoon season. People told that during 2019 flood, streets were submerged and life was paralyzed for days till water receded from the areas. They proposed effective mechanism for managing rain water.

Chapter

5 Stakeholder Consultations

Chapter 5. Stakeholder Consultation

5.1. Background

Stakeholder consultation is the process to disseminate information about the project. This section envisions to describe the overview of whole process of stakeholder consultation along with the aims, objectives, methodology and the activities undertaken during the stakeholder engagement, consultation and information disclosure. It includes the key issues, comprehensive picture of the outcomes with the concerns and priorities of stakeholders raised during the entire process of engagement and consultation.

5.2. Consultation Objectives

The objectives of stakeholder consultative meeting were:

a) Identification of key stakeholders.
b) Dissemination of information related to project.
c) Increase awareness among community and stakeholders
d) Providing the opportunities to the stakeholders to actively participate to meet the objective (a) and (c).
e) Establishment of community understanding and mutual support for the project accomplishment.
f) Identification of key issues of project activities and their mitigation measures.
g) Identification of negative impacts of project activities.
h) Incorporation of stakeholders in the project documentation process.

5.3. Consultations

Consultation methodology for the subproject has been undertaken according to national and World Bank guidelines whereas, methodology of the consultation and stakeholder engagement process includes two stages. First stage includes the identification of the preliminary list of stakeholders and second stage involves the identification of those specific and significant stakeholders who may likely be affected by subproject activities. This stage also considers the interest of the stakeholders.

The stakeholders of a project can vary depending on the details of project. During the field visits of subproject sites, efforts were made to identify different stakeholders including potential affectees and other interested parties. During the designing and development of ESMF for Sindh Resilience Project on 30th December 2015, major relevant departments (Sindh Wildlife and Forest Departments, WWF, IUCN, Sindh EPA, Irrigation department, Fisheries department, Consulting firm, SIDA, Education department, and NGOs) had been consulted through consultative workshop at Irrigation office, Thatta. In current stakeholder constative meetings, PDMA officials, staff of adjoining industries/warehouses, commercial units, local communities / public and vulnerable community (women, poor & indigenous) etc. were consulted with help of designed questionnaire **(Annexure 7)** and available checklist. Further, this ESMP shall be shared with Sindh EPA for

review and necessary approval. Initiation of approval process and sharing of ESMP shall be decided and carried by PIU SRP PDMA.

Following are the key stakeholders with whom focused group discussions were conducted to get their primary perceptions about the subproject:

- Governmental Departments
- Associations
- Non-Governmental organizations
- Nearby Communities/Villages/Goths

The stakeholder consultation was carried out between November 30th to December 8th, 2021, in and around subproject sites to disclose subproject information and to record discussion, feedback, expectations or grievances. The formal and informal Focused Group Discussions (FGDs) were held with the residents, laborers, shopkeepers, housewives, academician, social workers in addition to local PDMA supervisors / in-charge at warehouses. Site-wise summary of consultative sessions is given in **Table 5.1.**

Efforts were made in stakeholder identification and to determine level of effective communication appropriate for the subproject. The consultation meeting progressed in the following manner:

- An overview of the subprojects and screening process was provided to the community representatives in the local language.
- Participants were given opportunity to raise queries or concerns regarding subprojects.
- The queries were responded to, and concerns were documented.

The following information was shared with the local community:

- Benefits to be incurred from proposed subproject.
- Information related to subproject location and construction activity that may cause any type of environmental / health hazard and their mitigation measures.
- Information related to environment and social policy / safeguards of Government of Sindh and World Bank
- Potential problems to be faced by the locals in their daily activities due to construction work,
- Proposed Grievance Redress Mechanism to register complains if any; during and post construction phase of subproject.

Table 05.0.1 Summary of Stakeholder Consultations

Site: Maripur, Karachi	
Visit Date	30th November, 2021
Number of Session held	14
Groups	14 (5 Female Groups and 9 Male Groups)
Total Number of Participants	52
Site: Jamshoro	

Visit Date	1st December, 2021
Number of Session held	10
Groups	10 (3 Female Groups and 7 Male Groups)
Total Number of Participants	121
Site: Sukkur	
Visit Date	7 & 8th December, 2021
Number of Session held	15
Groups	15 (7 Female Groups and 8 Male Groups)
Total Number of Participants	107

5.3.1. Stakeholders Concerns

Identified stakeholders were consulted (**Table 5.1**) and their concerns were documented. Site-wise locations of consultative meetings are given **Figure 5.1-3** and summarized major concerns, feedback, suggestions given in **Table 5.2.**

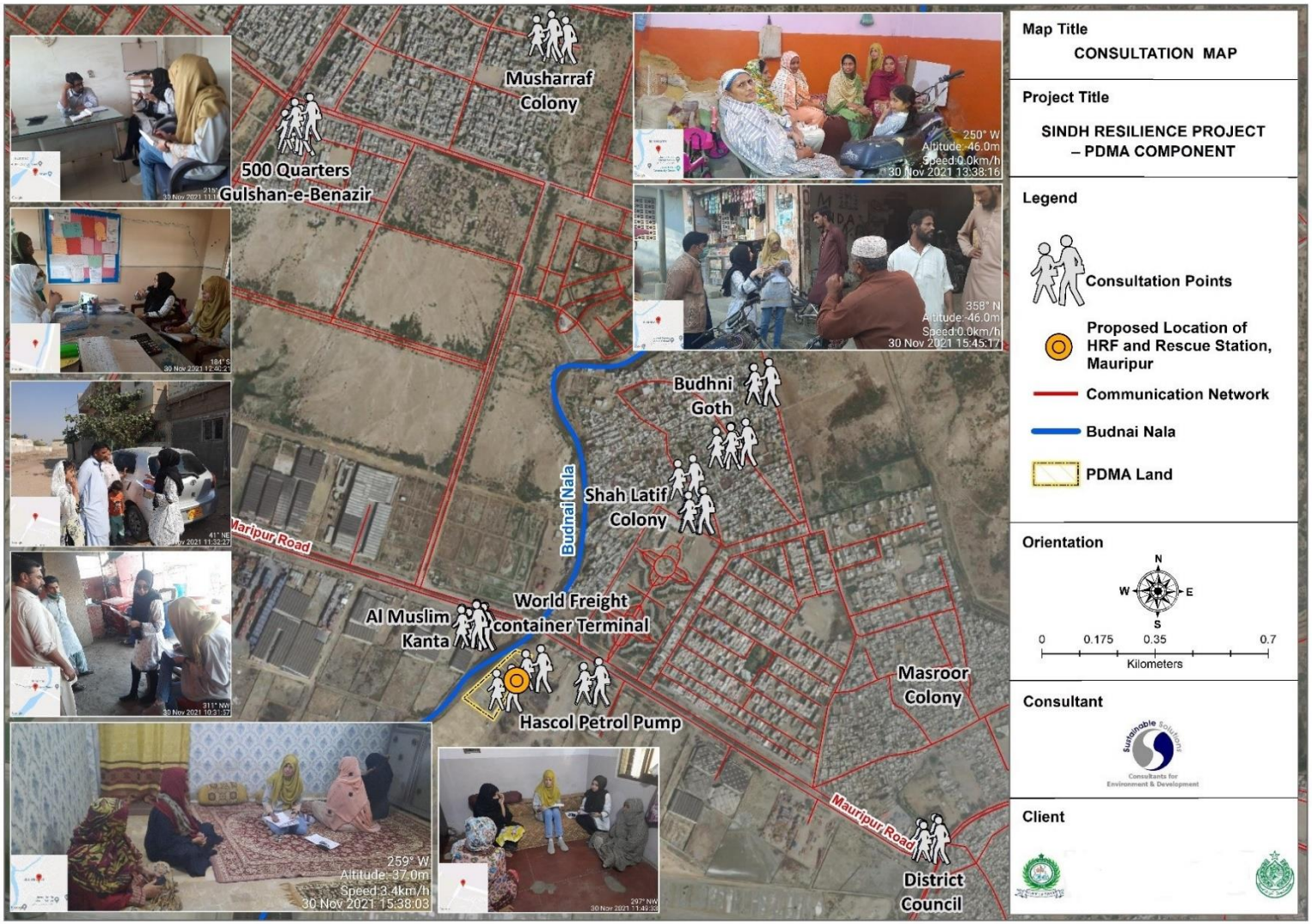


Figure 05.0.1 Locations of consultative session at Maripur

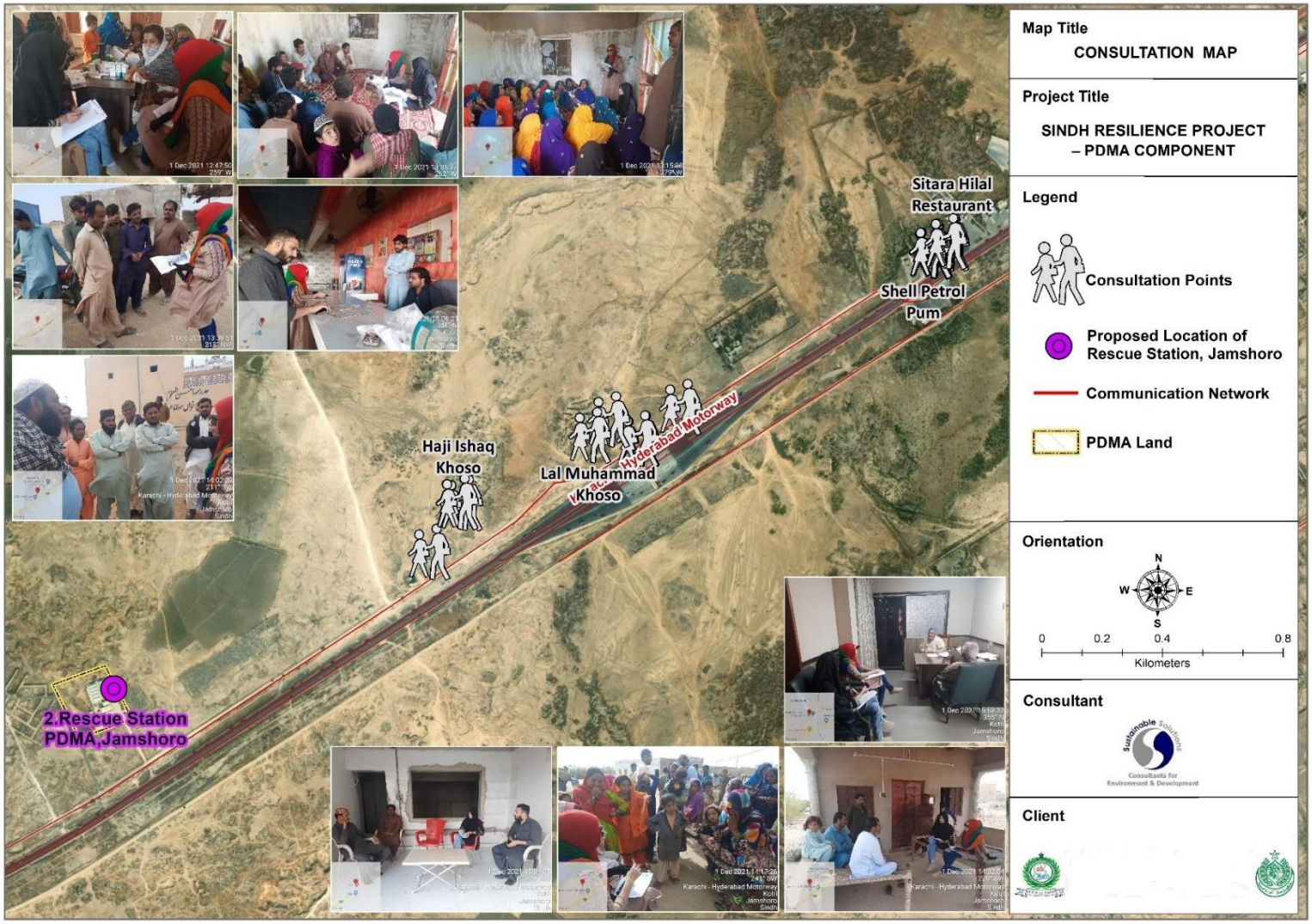


Figure 05.0.2 Locations of consultative session at Jamshoro

Figure 05.0.3 Locations consultative session at Sukkur

Table 05.0.2 Summary of major concerns, feedback and suggestion

#	Stakeholders	Suggestions	Proposed Action
1.	Dilshad Khan and Nehal Khan Khoso; Representatives of goths from Sukkur	In rescue stations, there must be ambulances with female doctors and paramedic to provide proper medication and do necessary checkups of females in the surrounding areas as their customs/traditions do not allow their women to go outside and discuss health issues with male doctors.	May be considered by Project Management
2.	Haji Ishaq Khan and Sitara Halal Hotel Representatives Jamshoro	More engagements of locals during construction and post development should be attained in order to resolve possible conflicts between management and locals.	PIU of SRP PDMA may consider this suggestion and advice Construction Contractor to maintain friendly environment with locals and ensure to solve problems before they turn into conflicts. In order to address such issues / problems, Grievance Redress Mechanism has been defined in ESMP and locals can register complaints through GRM procedure.
3.	PDMA Staff Sukkur	Communication network (metaled roads) should be proper so in case of emergency time saving and quick actions could be taken**.**	May be considered by Project Management for bringing it to concerned departments
4.	Budnai Goth Representative Maripur	Dewatering machines and boats during flash floods, fire brigades, ambulances with dispensaries are needed for emergency situation.	Rescue stations and HRF will be equipped with all emergency kits, tools, and machineries
5.	Al Muslim Goods Transport Company Representative Maripur	Training and mock drills sessions should be given to the staff and workers to cope up emergencies**.**	On operationalization of rescue stations, training of communities would be regular feature.

6.	500 Quarters Gulshan-e- Benazir and Lal Muhammad Khoso Representatives of Maripur and Jamshoro	There must be a mechanism through which people seek direct help during emergency because normal procedure via DC/UC office is time consuming and not entertaining.	Central Command and Control Centre for emergency operation is planned and will be established during operation phase of subproject. This central system will ensure easy access to emergency services.
7.	Rahooja Goth Sukkur	Rescue services should not be only limited to emergencies during natural disasters but for daily life emergencies also.	These services or facilities will not be limited to natural disasters only.
8.	Lal Muhammad Khoso Representative Jamshoro	Safety measures at all phases must be ensured.	It will be ensured by the construction contractor construction phase of subproject. The safety measures for labour, potential population and local communities are integral part of ESMP and will be strictly monitored and reported during subproject construction phase.

5.3.2. Pictorial Glimpses of Stakeholder Consultative Meetings

Annexure – 7 refers.

5.4. Views of Locals on Proposed Subproject

Overall, the local population had no major concerns about activities to be carried during construction phase of subproject. People appreciated the efforts of government and have shown satisfaction on establishment of rescue services in province. People were of the opinion that, overall project will be beneficial for the province, and at local scale will solve disaster and emergency related problems of nearby communities. Besides, the subproject activities will bring earning and livelihood opportunities for the local communities.

Chapter

6

Environmental & Social Impact Assessment and Mitigation Plan

Chapter 6. Environmental & Social Impact Assessment and Mitigation Plan

This chapter intends to describe potential localized environmental impacts which may arise from the project activities and their mitigation measures for avoiding and minimizing impacts. Recommended mitigation measures shall be executed by construction contractor.

6.1. Impact Assessment Approach

The subproject is a small-scale construction project with localized and short term social and environmental impacts in low to medium range. The potential environmental and social impacts during preconstruction, construction and operation phases were identified and evaluated in accordance with the impact assessment framework with approach as given in Figure. 6.1.

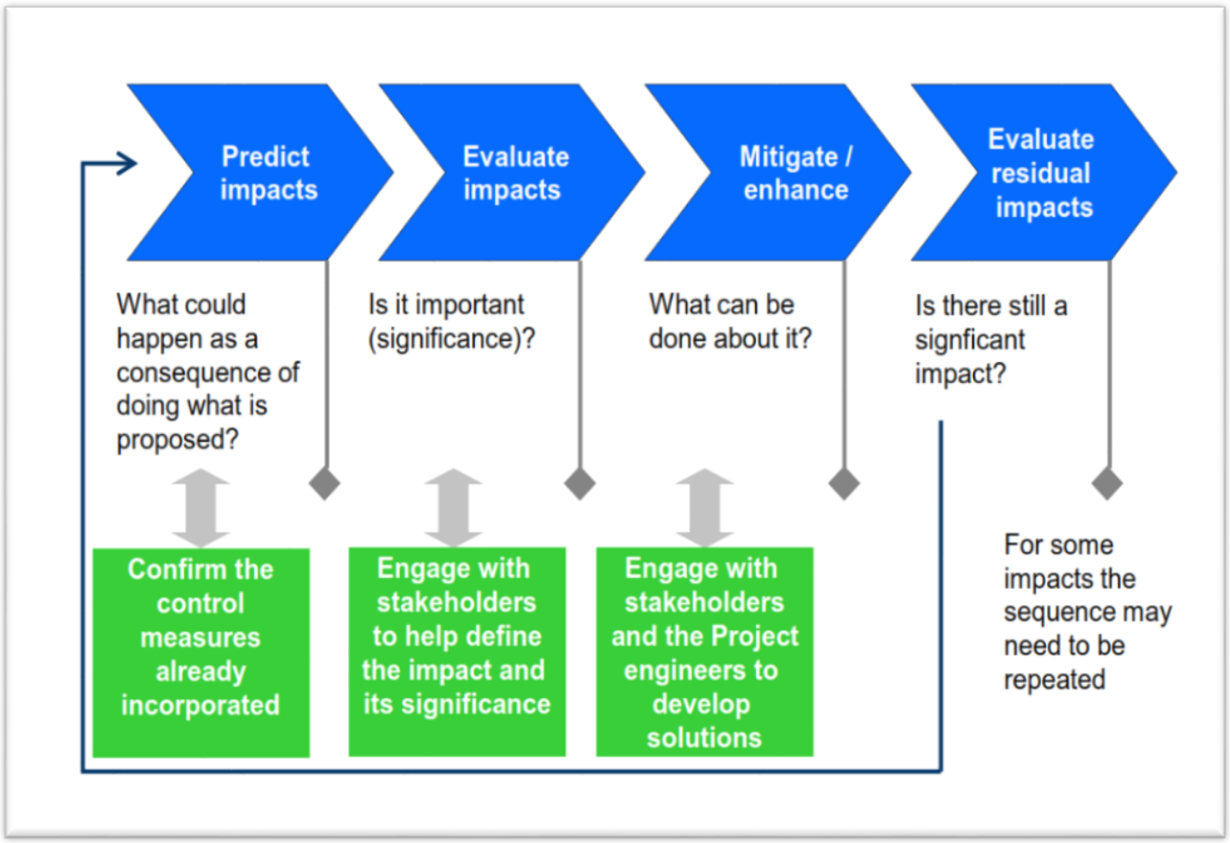


Figure 06.00.1. Identify, Assess and Mitigate Approach

6.2. Subproject Area of Impact

All 03 subproject sites are fenced with boundary wall, therefore, most of the potential negative impacts of construction phase will be local and short term in nature. Corridor of Impact (Col) for overall SRP has already been defined in project ESMF. In the light of CoI, Primary and Secondary Impact Zone has been defined for subproject in this ESMP.

Primary Impact Zone: Primary impact zone has been considered as the footprint of the subproject's permanent and temporary components where construction activities will directly impact e.g., construction site, disposal areas, contractor's temporary facilities etc. at the site. The human habitat and natural resource existing in this zone will be direct receptors of potential negative impacts of subproject.

Secondary Impact Zone: With respect to proposed subproject, secondary zone of impact is where possible emissions or dust can travel during construction phase. In addition, the access roads leading to subproject sites can be temporarily affected due to movement of construction material and machinery.

In this scenario, primary impact zone of subproject is restricted within boundary wall of sites and no residents / community will receive likely negative impact of the subproject. For Secondary Impact Zone, 5 Km circumference with respect to center of subproject site have been considered, which include residential, commercial, industrial facilities and access roads.

Secondary Impact Zone for subproject sites is shown in **Figure 6.2 to 6.4**.

Figure 06.0.2. Secondary Impact Zone of subproject at Maripur

Landuse in Secondary Impact Zone: KANUPP Colony, warehouses, petrol stations and salt work.

Figure 06.00.3 Secondary Impact Zone for subproject site at Jamshoro

Landuse in Secondary Impact Zone: Thinly populated scattered human habitat, highway petrol stations and rain fed agriculture lands.

Figure 06.0.4 Secondary Impact Zone of subproject site at Sukkur

Landuse in Secondary Impact Zone: Human habitat, industry / commercial and agriculture.

6.3. Potential Impacts and Grading

The construction activities at subproject sites may temporarily impair physical and ecological environment within primary and secondary zones. The identified potential impacts with grading are given in Table 6.1.

Table 06 Potential Impacts and grading

Project Activities		**Impacts on Physical Environmental**									**Impacts on Ecological Environment**			**Impacts on Social Environment**							
	Soil Erosion	**Land use**	**Ambient Air Quality**	**Surface Water Quality**	**Groundwater Quality**	**Water/ Electricity /Gas / Fuel Consumption**	**Solid Waste**	**Ambient Noise level**	**Electromagnetic Field**	**Climate**	**Flora**	**Fauna**	**Biodiversity /Ecology**	**Traffic Management**	**Public Health and Safety**	**Health and Safety of Workers**	**Economy**	**Employment**	**Drinking Water**	**Loss of land holdings and**	**Cultural/religious and**
Design Phase																					
Technology selection	M-		M-	M-		M-	M-	M-		M-			M-								
Building design		M-	M-	M-		M-															
Construction Phase																					
Site clearing and preparation	H-		M-	M-		M-	M-	M-		M-	M-	M-		M-	M-	M-	M-	H+			
Civil work including laying of foundation	M-		M-	M-		M-	M-	M-		M-	M-	M-		M-	M-	M-	M-	H+			
Mechanical work for the water and natural gas supply, distribution and drainage.						M-	M-	M-						M-	M-	M-		H+			
Electrical Layout							M-	M-		M-				M-	M-	M-		H+			
Backup generator for the machinery			M-					M-						M-	M-	M-		H+			
Solar panel installation at roof top			H+			M-	H+	H-		H+								H+			
Installation of Fabricated storage sheds							M-	M-	M-					M-	M-	M-	H+	H+			
Cleaning and Restoration	H+	H+	H+	H+	H+		H+											H+			

Operations/ Post Construction Phase

Movement of Rescue Vehicles and Machinery			M-	M-	M-	L-	M-		M-							H+	H+			

Key:
H- = High Negative Impact; M- = Moderate Negative Impact; L- = Low Negative Impact
H+ = High Positive Impact; M+ = Moderate Positive Impact; L+ = Low Positive Impact. Blank=None

6.4 Mitigation Measure Guidelines

Key:
H- = High Negative Impact; M- = Moderate Negative Impact; L- = Low Negative Impact
H+ = High Positive Impact; M+ = Moderate Positive Impact; L+ = Low Positive Impact. Blank=None

The proposed mitigation measures have been prepared keeping in view the international best practices and guidelines. The World Bank publications on the subject matter are listed below.

- ✓ Environment, Health, and Safety (EHS) Guidelines prepared by International Finance Corporation and World Bank in 2007
- ✓ Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- ✓ Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues
- ✓ Social Analysis Sourcebook

6.4.1. Environmental, Health, and Safety (EHS) IFC General Guidelines

The EHS Guidelines discuss industry-specific examples of Good International Industry Practice (GIIP). The General EHS Guidelines are designed for use in conjunction with relevant Industry Sector EHS Guidelines to guide industry specific users on environmental, health and safety issues. As the subproject does not fall in any specific sector therefore, General guidelines will be applicable to the pre-construction, construction and post construction activities. The construction contractor will follow the applicable guidelines including 1.1 to 1.8, 2.1 to 2.9 and 3.1 to 3.7 given in **Figure 6.5**.

Figure 06.0.5 General EHS Guidelines

6.4.2. World Bank Environmental Code of Practices

Even to consider less significant environmental impacts likely to be caused by subproject, the World Bank Environmental Code of Practices (ECoPs) shall be followed by the construction contractor for sustainable management of environmental issues. List of ECoPs to be followed is given below;

- ✓ ECP 1: Waste Management
- ✓ ECP 2: Fuels and Hazardous Substances Management
- ✓ ECP 3: Water Resources Management
- ✓ ECP 4: Drainage Management
- ✓ ECP 5: Soil Quality Management
- ✓ ECP 6: Erosion and Sediment Control
- ✓ ECP 8: Air Quality Management
- ✓ ECP 9: Noise and Vibration Management
- ✓ ECP 10: Protection of Flora
- ✓ ECP 11: Protection of Fauna

- ✓ ECP 13: Road Transport and Road Traffic Management
- ✓ ECP 15: Cultural and Religious Issues
- ✓ ECP 16: Workers Health and Safety

Detailed ECoPs are attached as **Annexure 8**.

6.5. Potential Environmental and Social Impacts and Mitigation-Design Phase

The design phase of subproject covers infrastructure design, site selection within the existing land and preparation for civil works. Potential impacts of subproject on physical, social and human environment are;

6.5.1. Biodiversity and Natural Resources

All 03 sites of the subproject are not located within or nearby environment sensitive locations, therefore, none of the activities will be harmful to nature, biodiversity and natural resources. The sites are within urban settings with no wildlife, and are at reasonable distance from critical and sensitive receptors including reserved forests, national parks, wetlands, marine protected areas and wildlife sanctuaries. Similarly, there are no sensitive habitats present within the subproject sites that support endangered mammal or bird species. Hence impact on flora and fauna is nil / negligible. However, as a precaution, mitigation measures in line with ECP 10 Protection of Flora are:

Mitigation Measures:

- ✓ Incorporate technical design measures to minimize unnecessary removal of trees and vegetative cover;
- ✓ Plan for compensatory planting of eight trees against each fallen tree of similar floral function;
- ✓ Disallow introduction of invasive/ exotic species; and recommend native species for plantation.

6.5.2. Natural Disasters

The subproject site at Maripur, Karachi falls in seismic Zone 2B, while Jamshoro and Sukkur in 2A and are prone to minor to moderate damage from earthquakes. There is also minor chance of flooding due to blocked drainage during monsoon rains specially at sites in Maripur and Sukkur. Keeping in view natural hazard risks, following mitigation measures are proposed;

Mitigation Measures:

- ✓ The building design will be earthquake resistant according to Building Codes of Pakistan with site specific relevant provisions and international best practices to avoid damage caused by earthquake;
- ✓ Primary focus of earthquake design is initial life safety and getting people out of the building safely, not necessarily the ability of a building to withstand the effects

of an earthquake, or to ensure occupancy or functionality following an event. Therefore, building design will include emergency exits and alarm system;

- ✓ Planning, designing and constructing the building to minimize any potential flood damages using guidelines of **Annexure 9**. Following are proposed:

    - elevating as much of the building as possible above the design flood level;
    - designing the building foundation and any portions subject to flooding to withstand design flood conditions and loads;
    - using flood-damage-resistant materials for any portions of the building below the design flood level;
    - where flood proofing is permitted, employing appropriate methods and materials to either dry-flood proof or wet-flood proof those portions of the building below the design flood level.

6.5.3. Water /Electricity/ Natural Gas/ Fuel Consumption

In order to limit increased consumption of resources, especially water during civil works and energy during operations, following mitigation measures are recommended;

Mitigation Measures

- ✓ Construction contractor shall prepare energy and water conservation plan for construction and during operations
- ✓ Use of renewable energy especially solar energy;
- ✓ Procurement of low voltage electrical appliances to save energy

6.5.4. Air Quality and Noise Levels

Ground preparation and civil work associated with construction may increase the ambient air quality and noise levels at sub-project sites. The noise and air pollution sources include site clearing, construction machinery, generators, civil and mechanical work. The impacts are likely to be negligible, localized and short in nature because nature of civil work is minor and sites are closed by boundary wall. However, proposed mitigation measures are in line with ECP 8 Air Quality Management and ECP 9 Noise and Vibration Management and will include;

Mitigation Measures:

- ✓ Provision of compliance to SEQS of vehicular emission will be made in the contract of construction contractor and SOP's of PDMA & SRP vehicles;
- ✓ Locations of concrete mixers and other noise generating equipment will be identified away from residents' other human receptors at construction site;
- ✓ Contractor shall prepare an Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles with operations and maintenance plan for the same;

- ✓ If required, Traffic Management Plan for construction will be formulated during design phase that enable continuous traffic flow and avoid congestions which result in increased vehicle smoke density at a given area;
- ✓ Plan to neutralize dust emissions from construction activity, such as regular watering of sub-project sites to settle dust;
- ✓ Use of Hazardous material list will be strictly prohibited in construction and provision will be made part of the contract.

6.5.5. Solid Waste Management

Improper disposal of solid waste and its burning can increase air pollution, vector borne diseases, contamination of water sources and ambient aesthetics for surrounding communities. Impact is likely to be negligible to low. However, mitigation measures in line with ECP 1 Waste Management and ECP 2 Fuel and Hazardous Substances Management have been recommended and will include:

Mitigation Measures:

- ✓ Construction contractor shall prepare a detailed Solid Waste Management Plan for construction site minimizing use of plastics and encourage recycling;
- ✓ Identify current municipal systems of waste management or private waste disposal services;
- ✓ Placement of waste collection containers throughout the project area;
- ✓ Disallow the burning of any of type of waste;
- ✓ Prepare plans for the safe handling, storage and disposal of harmful materials and hazardous waste.

6.5.6. Workers Health and Safety

Use of heavy machinery and handling of chemicals by workers can result in health impacts and accidents. Mitigation measures in line with ECP 16 include:

- ✓ Prepare a Workers Health and Safety Plan for the construction phase,
- ✓ Construction contractor shall ensure to provide safety gadgets to labour and construction related staff,
- ✓ Construction contractor shall ensure to cordon off construction site for safety of workers and at-site employees of PDMA Sindh.
- ✓ Subproject sites lies in high temperature and heatwave zone during summer, which may affect health of labour and other staff. In view, construction contractor must ensure safety measures against heatwaves and plan alternative working hours during hot days.

The contractor will ensure following precautionary measures for keeping workforce safe from effects and spreading of pandemic COVID-19,

- ✓ Use of face masks by the skilled and labor workforce;
- ✓ Regular check of temperature, cough and other related signs in workforce;

- ✓ The contractor will ensure water, sanitation, health and hygiene practices during sub-project life cycle, especially washing hands for at least 20 seconds or use hand sanitizer if soap and water are not available;
- ✓ Awareness to labors and other staff working at the site on signs and symptoms of COVID-19;
- ✓ Safety measures on COVID-19 will be placed in the local language with illustrations.

6.5.7. Accessibility for Persons with Disability

In General, barriers to full social and economic inclusion of persons with disabilities include inaccessible physical environments and transportation, the unavailability of assistive devices and technologies, non-adapted means of communication, gaps in service delivery, and discriminatory prejudice and stigma in society[34]. Buildings to be developed in subproject ensure the accessibility for disable person, especially for persons using wheelchairs and people with limited walking abilities. Following shall be considered in building design;

- ✓ Provision for separate entry at main gate of facility for PWD
- ✓ Ramps along staircase for wheelchairs
- ✓ Railings along stairs for support of aged and people with limited walking abilities

6.6. Potential Environmental and Social Impacts and Mitigation-Construction Phase

The potential impacts are described below;

6.6.1. Landscape / Soil

The existing landuse at Maripur is mostly open barren land with scattered seasonal shrubs and a storage shade, while Sukkur and Jamshoro sites are fully operational facilities. Sufficient land is available to accommodate subproject construction. There will be no drastic change in the landscape due to construction, as the subproject sites are plain terrain. Construction at sites is likely to carry out clearance, vehicular, labor and machinery movement causing soil erosion and compaction. There is also a potential for contamination of soil via runoff from construction activities including oil spills, construction material, dredged / spoil materials and construction waste. The impact is likely to be low to moderate, however, it be will be confined to construction site. Mitigation measures in line with ECP 4 Drainage Management, ECP 5 Soil Quality Management and ECP 6 Erosion and Sediment Control will include:

Mitigation Measures:

Removal of trees will be avoided to the extent possible;

- ✓ Safe drainage of run-off from construction activities will be ensured;

[34] https://www.worldbank.org/en/topic/disability#1

- ✓ Removal of vegetation and trees will be avoided to the extent possible (In view of landuse within subproject sites, no tree will be removed for construction, however the measure must be considered, while land preparation / leveling);
- ✓ Water will be sprinkled during construction to avoid soil erosion and dust pollution;
- ✓ Construction materials will be stored in proper stores on impervious sheets to avoid any soil contamination;
- ✓ Machinery and vehicles will be operated at designated routes to avoid erosion and compaction of un-impacted soils;
- ✓ Visual inspection will be carried out for land contamination and dust emissions;
- ✓ The soil contaminated from minor and moderate spills will be removed and will be handed over to waste contractor for treatment at nearest incineration facility or waste disposal and treatment;

6.6.2. Ambient Air Quality and Climate

The construction activities will likely produce some adverse impacts on air quality. Cement mixers, movement of the machinery and soil excavation may release particulate matter 2.5/10 and fugitive dust which will deteriorate ambient air quality in the vicinity of the subproject sites. Construction vehicles and generators are likely to generate dust and exhaust emissions such as oxides of Carbon (COx) Oxides of Sulphur (SOx), Oxides of Nitrogen (NOx). The construction work is not likely to impact the climate of the area, however, there will be minimal increase in GHG emission from above mentioned sources. The impact is likely to be low to moderate.

Mitigation Measures:

SEQS and ECP 8 Air Quality Management as performance indicators will be followed with precautionary measures;

Contractor shall execute the Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles with operations and maintenance plan for the same;

- ✓ Water will be sprinkled twice a day to avoid fugitive dust emissions;
- ✓ Construction machinery and vehicles will be kept in good conditions to avoid vehicular emissions. Vehicular and generator exhaust emissions will be monitored to ensure compliance;
- ✓ Unnecessary movement of vehicles will be avoided at the construction location;
- ✓ Open burning of solid waste from the Contractor's work areas should be strictly banned;
- ✓ Raw materials such as cement, gravels and sand will be kept under sheet covers to prevent air flow;
- ✓ In order to further reduce the environmental impact of cement works, the concrete mixing plant will incorporate the following design and practices:
    - All mixing will be in the enclosed motor driven plant mixer, NOT in trucks.
    - Truck loaded with concrete will be in wet form.
    - All washing water used by the concrete mixing plant and storm water will be collected, stored and recycled for re-use.

- No water will be discharged outside the construction boundary.

6.6.3. Surface/Ground Water Resources

Surface drainage channel in close vicinity of Maripur site is Budnai Nala, while no surface drain passes nearby Jamshoro and Sukkur sites. All 03 sites are enclosed by boundary walls, there is less likely chance of contamination of surface or ground water channels or drainage. The sources of contamination and wastewater may likely be from the following sources;

- ✓ Disposal of construction waste and solid waste into the water channel;
- ✓ Accidental oil spills from machinery and vehicles
- ✓ Surface runoff due to rainfall causing blockage of drainage;
- ✓ Used oil, paints, cleaning solvents and other chemicals may generate liquid hazardous wastes.

The impact is likely to be low as the construction sites are away from surface water resources. However, mitigation measures in line with ECP 3 Water Resources Management and ECP 4 Drainage Management will be followed which include:

Mitigation Measures:

- ✓ The construction contractor shall prepare Debris Management Plan and will follow and ensure that construction debris does not fall in drainage or water channels which may get clogged;
- ✓ The construction contractor will prohibit washing of machinery and vehicles in surface waters;
- ✓ Used oil and vehicle related waste will be transported to local contractors for recycling or reuse;
- ✓ Proper disposal of solid and sewage waste from workers sanitation facilities to ensure it is not disposed in the drainage channel.

6.6.4. Water / Electricity / Natural Gas and Fuel Consumption

There will be an increase in water, electricity, natural gas and fuel consumption from the baseline during construction. Preparation of sand, cement mortar, curing of walls before and after plastering require a large amount of water. The impact is likely to be low to moderate. However, the construction contractor will prepare Energy and Water Conservation Plan and ensure implementation of following mitigation measures;

Mitigation Measures:

- ✓ Construction contractor will execute the Energy and Water Conservation Plan;
- ✓ Will monitor water consumption at subproject sites;
- ✓ Construction staff will be trained on water conservation practices to avoid excessive loss;
- ✓ Water required for construction should be obtained in a way so that water availability and supply to residing area remains unaffected.

6.6.5. Solid Waste Generation

During construction phase, solid waste can be generated from discarded parts, scrap metals, equipment boxes, wood parts, empty bags, leftover construction debris, empty color containers, termite containers and bitumen containers, pieces of tiles and marble etc. The excavated material may also be considered as solid waste as it would require disposal. Estimated solid waste at sites in Jamshoro and Sukkur will be in range of 10 – 12 tones at each site. As construction work at Maripur site will be more than other sites, therefore, estimated solid waste generation will be in range of 25 – 30 tones. Solid waste will also be generated from workers facilities at the construction sites. The construction contractor will ensure safe disposal of solid waste at designated waste disposal site. The impact is likely to be low to moderate. Mitigation measures in line with ECP 1 Solid Waste Management and ECP 2 Fuels and Hazardous Substances Management include;

Mitigation Measures:

- ✓ Solid Waste Management Plan will be executed by construction contractor. In case of the occurrence of toxic / hazardous chemical materials, it will be handled according to hazardous waste management best international practices. The plan will be prepared with following provisions:
    - Solid waste collection, segregation, storage and disposal will be carried out for generated waste. At source segregation, separate waste bins will be placed at subproject sites. Recyclable material will be segregated whereas non- hazardous waste will be disposed-off at designated disposal sites;
    - Labeling of containers will be carried out including identification and quantity of the contents and hazard information;
    - If generated, marking of hazardous / toxic waste separately and disposal using international best practices through registered contractor;
    - Used oil will be collected in separate containers stored on impervious platform with restricted access and must be sold to licensed contractor;
    - Burning of solid and waste oil will be strictly prohibited;
    - Training of workers will be carried out in storage and handling of materials and chemicals that can potentially cause soil contamination;
    - Emergency Response Plan to be prepared by construction contractor to address the accidental spillage of fuels and hazardous/toxic material, fire, vandalism and natural hazards;
- ✓ On completion of the construction phase, the contractor will be required to assimilate the site. Assimilate will include removal of construction materials and wastes, and the grading and landscaping of all exposed sites that may be prone to erosion.

6.6.6. Noise Levels

Noise may cause disturbance and hearing impacts on workers and communities in immediate vicinity. The construction activities are likely to generate high noise levels. The sources may be;

- ✓ Construction and excavation work such as heavy earth moving equipment / machinery, pilling work, welding, cuttings, drilling, grinding.
- ✓ Material loading / offloading and caused by other transport vehicles used by construction contractor.

The subproject construction activities are restricted to a confined area. Impact of noise is likely to be low to moderate. The impact will be high to the workers and low to moderate to nearby communities not causing hearing loss. Mitigation measures in line with ECP 9 Noise and Vibration Management will include:

Mitigation Measures:

- ✓ The location for stationary noise sources like concrete mixer plant, grinding, drilling and welding machinery will be selected at a reasonable distance from nearby population;
- ✓ The construction material loaders will only operate during allowed times as per rules of traffic police;
- ✓ Blowing of horn will be strictly prohibited;
- ✓ Noise monitoring will be carried using noise meters. Labor working in high noise areas where noise level exceeds 85 dB, will wear earplugs and ear muffs

6.6.7. Biodiversity and Ecology

Since the subproject locations at Maripur and Sukkur are in urban areas, therefore, no potential impacts on local flora and fauna. The site at Jamshoro is devoid of wildlife, except local birds and no evidence of sensitive fauna or flora. However, the construction may require clearing of seasonal bushes and shrubs, especially at Maripur site. The potential ecological impacts of the subproject will not be beyond the immediate footprint of the construction site. In general, following mitigation measures will followed, if required;

Mitigation Measures:

- ✓ Planting of eight trees for every tree cut during construction;
- ✓ Do not introduce invasive or exotic species through plantation.

6.6.8. Public Health and Safety

There is less likely chance of road side accidents and traffic congestion on roads during movement of construction machinery and vehicles. The site at Jamshoro is situated on M-9 motorway therefore, little chances of road congestion. The site at Sukkur is situated in industrial area with less residential communities nearby, however, the movement of machinery and equipment may impact the local residents. The same is valid for Maripur site. In view, the impact is likely to be low.

Mitigation Measures:

- ✓ Training of drivers operating heavy vehicles on general and pedestrian road safety;
- ✓ Set appropriate speed limits to avoid accidents;

- ✓ Use of heavy vehicles on public roads will be avoided during peak public rush hours

6.6.9. Workers Health and Safety

Use of heavy machinery and handling of hazardous waste and chemicals may result in health impacts for workers on the construction site along with noise produced by the tools and machines. For health and safety of workers, following is recommended in accordance with ECP 16 Workers Health and Safety;

Mitigation Measures:

- ✓ The workers have full access to health facilities and emergency response centers and police station. In case of emergency, the injured will be taken to the nearest medical facility.
- ✓ Provision of clean drinking water to workers;
- ✓ Hygiene inspections will be carried out to avoid disease epidemic;
- ✓ In case of unlikely incidents (fire, vandalism) the workers will be evacuated and emergency response and law enforcement agencies will be engaged;
- ✓ Fire safety alarms will be installed at various locations;
- ✓ Fire extinguishers will be placed at various locations to control fire incidents;
- ✓ Fire safety and emergency response trainings will be conducted;
- ✓ Hazards indicator signs and firefighting equipment will be installed;
- ✓ The construction workers will be trained on important aspects of workplace safety;
- ✓ Construction machinery operators and drivers will be trained to avoid associated accidents using machines and vehicles;
- ✓ Flammables and other toxic materials will be marked and stored at secured sites;
- ✓ Onsite first aid kits will be kept at construction sites and randomly moving vehicles \ machinery.
- ✓ Provision of appropriate and high quality Personal Protective Equipment (PPE) to workers such as gloves, vests, hard-hats, masks etc.;
- ✓ Train workers in the use of PPE and safety measures while using heavy machinery and handling chemicals.
- ✓ Follow guidelines for Asbestos and Asbestos based product use in construction (**Annexure 10**)
- ✓ Workers will be educated on COVID-19 restrictions and precautions and construction contractor will ensure the implementation of precautions.
- ✓ During hot summer days, construction contractor to ensure safety of workers against heatstroke and plan alternative working timings.

6.6.10. Physical / Cultural / Archeological Resources

There is less likely chance of impact on religiously, culturally and archeologically important sites because no such site exist in proximity of the subproject sites. Excavation work during

construction may result in the uncovering of ancient sites or artifacts. Impact is likely to be low. In line with ECP 15, mitigation measures include:

Mitigation Measures:

Construction staff will be trained and informed on identifying the evidence of archaeological / historic remains. In case of evidence of any archaeological remains, the actions listed below will be undertaken;

- ✓ Excavation work in the vicinity of the find will be stopped;
- ✓ Assistance will be sought from Department of Archaeology to identify the remains;
- ✓ Detailed procedure for Archaeological Chance Finds included in **Annexure 11** will be followed.

6.6.11. Traffic Management

All 03 subproject sites are away from busy public places. The site at Maripur and Sukkur are within industrial zones with thin resident population in surroundings. Being located in industrial sites access roads are already used by heavy traffic. As Jamshoro site is located on main M-9 highway therefore, impact of traffic due to construction activities will be insignificant. Additionally, the construction activities will be within boundary wall therefore, presence of machinery and heavy vehicles will have less likely impact on the surroundings. However, to avoid any likely traffic problem following is recommended in the light of ECP 13 Road Transport and Road Traffic Management;

Mitigation Measures

- ✓ Contractor will execute the Traffic Management Plan.
- ✓ Vehicles will be inspected prior to start of construction work.
- ✓ Movement of construction equipment on access roads will be limited to specific duration when there is least disturbance;
- ✓ The contractor will be advised to follow vehicular maintenance to reduce engine noise;
- ✓ Drivers will be trained to follow the designated routes;
- ✓ The construction trucks will be adequately covered with tarpaulin covers to avoid flow into air.

6.6.12. Positive Socioeconomic Impacts

The likely positive socio-economic impacts of subproject are:

- ✓ The subproject will host and operate highly important segment of disaster management in the province. Disaster preparedness and response will be greatly improved and consequently will assist in life and property saving of the masses of Sindh province.

- ✓ The rescue services lack in province which limit the disaster response. Establishment of rescue station and services will enhance the public service delivery in disaster management.

- ✓ Strengthening of warehouses and storage capacity of PDMA Sindh will greatly improve disaster response time. Multi-purpose storages will be used to house disaster response equipment and relief goods and increased capacity for both items will be highly important for providing timely relief to disaster affectees.

- ✓ Though nominal but new job and earning opportunities will be created during construction and operation phase of the subproject.

6.7. Potential Environmental and Social Impacts and Mitigation-Operations Phase

6.7.1. Air Quality and Climate

During operation phase of project, there will be increase in manpower and vehicles entering subproject sites. If not regulated, this will lead to increased vehicular emissions which, may pose potential negative impact on the air quality of the area. Emissions may carry over long distances, depending on wind speed and direction, the temperature of the surrounding air, and atmospheric stability. However, the impact is likely to be low to moderate.

Mitigation Measures:

- ✓ The project staff will be advised to use car pool and local transport;
- ✓ Provision of pick and drop for staff to avoid additional load on air quality;
- ✓ Vehicles with excessive smoke emissions should not be allowed to enter the sub-project locations.

6.7.2 Solid Waste

In operation phase, there will likely be an increase in solid waste generation due to additional building maintenance and staff employed. Hazardous waste will include batteries of solar panels. Mitigation measures to reduce impacts include;

Mitigation Measures:

- ✓ Collection and segregating of solid waste at source with labeled dust bins for biodegradable, non- biodegradable and recyclable products and disposing through local government waste management services;
- ✓ Clearance of reusable and recyclable waste to certified recycling companies;
- ✓ Recycle rechargeable batteries through certified companies.

6.8 Environmental and Social Mitigation and Management Plan (ESMMP)

ESMMP is a tool to manage and monitor environmental impacts and specifically focuses on implementation of mitigation measures on ground against likely environmental and social impacts. The activities related to the subproject will be managed and monitored according to the management plan.

The primary objectives of the ESMMP with respect to subproject activities are to:

- ✓ Define the responsibilities of the subproject proponent and partners during design, construction and operations phase to ensure effective communication of environmental and social issues;

- ✓ Define the responsibilities of the subproject proponent and contractors to comply with the mitigation measures against every potential impact discussed in the ESMP.

- ✓ Define a monitoring mechanism, identify monitoring parameters and training requirements in order to ensure the effectiveness of the mitigation measures and provide a plan for implementation of training session and monitoring plan;

- ✓ Provide a mechanism for taking timely action against any unanticipated environmental situations;

- ✓ Identify the resources required to implement the ESMP and outline the required budget. The environmental monitoring and mitigation plan is summarized in Table 6.2.

Table 6.2. Environmental Monitoring and Mitigation Plan

Design Phase

Design Phase	Implementation			Monitoring Plan			
Aspects	**Environmental and Social Impacts**	**Proposed Mitigation Measures**	**Responsibility**	**Monitoring Parameter(s)**	**Frequency**	**Responsibility**	**Compliance Criteria**
Biodiversity and Natural Resources	The subproject sites may require site clearing.	1. Incorporate technical design measures to minimize unnecessary removal of trees and vegetative cover; 2. Plan for compensatory planting of eight trees against each fallen tree of similar floral function; 3. Disallow introduction of invasive / exotic species; and recommend native species for plantation.	✓ SRP-PDMA Component ✓ Design Contractor	✓ Construction design ✓ Tree count ✓ Compensatory Tree Plantation Plans ✓ Tree Species	✓ At the time of design preparation ✓ At the time of design finalization	✓ SRP-PDMA Component ✓ Design / Construction Contractor	ESMP
Natural Disasters	The subproject sites are in Zone 2A & 2B with low to moderate chances of damages in case of earthquakes. Also, there are chances of drain blockage during monsoon rains and consequent flooding	1. The building design will be earthquake resistant according to Building Codes of Pakistan with Seismic provision and international best practices to avoid damage caused by earthquake; 2. Primary focus of earthquake design is initial life safety and getting people out of the building safely, not necessarily the ability of a building to withstand the effects of an earthquake, or to ensure occupancy or functionality following an event. Therefore, building design will include emergency exits and alarm system. 3. Planning, designing and constructing the building to minimize any potential flood damages using guidelines of **Annexure 9**. Following is proposed: • elevating as much of the building as possible above the design flood level, • designing the building foundation and any portions subject to flooding to withstand design flood conditions and loads,	✓ SRP-PDMA Component ✓ Design Contractor	✓ Subproject design with incorporation of building codes for Zone 2A & 2B ✓ Construction contractor	✓ At the time of design	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ ESMP ✓ Building Codes of Pakistan with Seismic Provision using earthquake Zone 2A & 2B standards

		• using flood-damage-resistant materials for any portions of the building below the design flood level • where flood proofing is permitted, employing appropriate methods and materials to either dry-flood proof or wet-flood proof those portions of the building below the design flood level					
Water /Electricity/ Natural Gas/ Fuel Consumption	There will be an increase in infrastructure utilities/ resource consumption due to construction work.	1. Construction contractor will prepare an Energy and Water Conservation Plan for construction 2. Design of buildings will include installation of Solar Panels; 3. Procurement and provision of low voltage electrical appliances and procedures.	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ Design provision for water, electricity, natural gas and fuel conservation	✓ At the time of design	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ ESMP ✓ Green Building Council guidelines / international best Practices
Air Quality and Noise Levels	Project activities associated with construction may increase the ambient air quality and noise levels of the at the sub- project sites. The impacts are likely to be low to moderate.	1. Provision of compliance to SEQS of vehicular emission will be made in the contract of construction contractor and SOP's of SRP, PDMA vehicles; 3. Locations of concrete mixing plant and other noise generating equipment will be identified away from residents; 4. Construction contractor shall prepare an Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles with operations and maintenance plan for the same;	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ Emissions Monitoring Plan ✓ Traffic Management Plan ✓ Site Management Plan	At the time of design	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ ESMP ✓ ECP 8, 9 ✓ SEQS for Ambient Air Quality and Noise.

		5. Traffic Management Plan for construction will be formulated during design phase that will enable continuous traffic flow and avoid congestions which result in increased vehicle smoke density at a given area; 6. Plan to neutralize dust emissions from construction activity, such as regular watering of subproject sites to settle dust; 7. Use of hazardous material list will be strictly prohibited in construction and provision will be made part of the contract.					
Solid Waste Management	Improper solid waste disposal can result in increased air pollution through burning of waste, vector borne diseases, contamination of water sources and ambient aesthetics for surrounding communities. The impacts are likely to be low to moderate.	1. Preparation of detailed Solid Waste Management Plan for construction site minimizing use of plastics and encourage recycling 2. Identify current municipal systems of waste management or private waste disposal services; 3. Placement of waste collection containers throughout the subproject sites; 4. Disallow the burning of any of type of waste; 5. Prepare plans for the safe handling, storage and disposal of harmful materials and hazardous waste	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ Solid Waste Management Plan ✓ Contractual binding on prohibited use of Hazardous Material for construction contractor	✓ At award of construction Contract	✓ SRP-PDMA Component ✓ Construction contractor	✓ ESMP ✓ ECP 1 Hazardous Substance Rules 2003 ✓ ToRs for construction contractor
Workers Health and Safety	Use of heavy machinery and handling of chemicals by workers can result in health impacts and accidents. The impacts are likely to be low to moderate.	1. Prepare a **Worker Health and Safety Plan** for the construction phase	✓ SRP-PDMA Component ✓ Design / Construction Contractor	✓ Worker Health and Safety Plan	✓ At award of Construction Contract	✓ SRP-PDMA Component ✓ Construction Contractor	✓ ESMP ✓ ECP 16

Accessibility for Persons with Disability	Barriers to full social and economic inclusion of persons with disabilities include inaccessible physical environments and transportation.	In construction design phase, following measures will be included in building design for persons using wheelchairs and people with limited walking abilities; 1. Provision for separate entry at main gate of facility for PWD 2. Ramps along staircase for wheelchairs 3. Railings along stairs for support of aged and people with limited walking abilities	✓ SRP- PDMA Component ✓ Design / Construction contractor	✓ Building design provision	✓ At the award of construction contract	✓ SRP-PDMA Component ✓ Design / Construction contractor	✓ ESMP

Construction Phase

Construction Phase	Implementation			Monitoring Plan			
Aspects	**Environmental and Social Impacts**	**Proposed Mitigation Measures**	**Responsibility**	**Monitoring Parameter(s)**	**Frequency**	**Responsibility**	**Compliance Criteria**
Landscape/Soil	Construction at sites is likely to carry out site clearance, vehicular, labor and machinery movement causing soil erosion and compaction. There is also a potential for contamination of soil via runoff from construction activities including oil spills, construction material, dredged / spoil materials and construction waste. Impact on soil quality is high in case of the spill.	1. Removal of vegetation and trees will be avoided to the extent possible; 2. Safe drainage of run-off from construction activities will be ensured; 3. Sprinkling of water during construction building; 4. Construction materials will be stored in proper stores on impervious sheets to avoid any soil contamination; 5. Machinery and vehicles will be operated at designated routes to avoid erosion and compaction of un- impacted soils; 6. Visual Inspection will be carried out for land contamination and dust emissions; 7. The soil contaminated from minor and moderate spills will be removed and will be handed over to waste contractor for treatment at nearest incineration facility; 8. Major spills may require specialized treatment such as incineration, bioremediation and biodegradation. The biological agents will be introduced to the spill to hasten biodegradation. Most of the components of oil will be broken down by bacteria and other microorganisms into harmless substances such as fatty acids and carbon dioxide. To stimulate the growth of the microorganisms, fertilizing nutrients like nitrogen and phosphorous will be placed near the oil tanks.	✓ Construction Contractor	✓ Visual inspections and photographic record of site clearing and oil spills ✓ Water sprinkling	✓ Daily	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP ✓ ECP 5,6,8

Ambient Air Quality and Climate	The construction activities at sub-project sites will cause impact on air quality, cement mixers, movement of the machinery, generators soil excavation, construction vehicles, is likely to generate dust and exhaust emissions. Impact on local air quality is moderate	1. Contractor shall provide an **Emissions Monitoring Plan** to ensure constant checking of emissions by construction machinery and vehicles; Contractor should provide an operations and maintenance plan for the same; 2. Water will be sprinkled twice a day to avoid fugitive dust emissions; 3. Construction machinery and vehicles will be kept in good conditions to avoid vehicular emissions. Vehicular and generator exhaust emissions will be monitored to ensure compliance; 4. Unnecessary movement of vehicles will be avoided at the construction location; 5. Open burning of solid waste from the contractor should be strictly banned; 6. Wind breaks /barriers (either natural or constructed) will be deployed to reduce the possibility of suspended particles in air; 7. Raw materials such as cement, gravels and sand will be kept under sheet covers to prevent air flow; 8. In order to further reduce the environmental impact cement works, the concrete mixing will incorporate the following design and practices: • Cement will be transferred directly from barges to the mixer. • All mixing will be in the enclosed electric motor driven plant mixer, NOT in trucks. • Truck loaded with concrete will be in wet form. • All washing water used by the mixer and storm water will be collected and stored and recycled for re-use. • No water will be discharged outside the site boundary. • Concrete recycling machine be used to recycle waste material to slurry water and aggregates for reuse.	✓ Construction Contractor	✓ Ambient Air Quality monitoring for SOx, NOx and Particulate Matter PM2.5/10	✓ Monthly	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP ✓ SEQS ✓ ECP 8

Surface/Ground Water Resources	Construction activities may encourage soil erosion and waste may increase the sediment loads into the city drainage, while accidental leaks/spills of oil/fuel from storage tanks or maintenance vehicles can also pollute surface waters. The impact is likely to be low.	1. The construction contractor shall prepare Debris Management Plan and will follow and ensure that construction debris does not fall in drainage or water channels which may get clogged; 2. The construction contractor will prohibit washing of machinery and vehicles in surface waters; 3. Used oil and vehicle related waste will be transported to local contractors for recycling or reuse; 4. Proper disposal of solid and sewage waste from workers sanitation facilities to ensure it is not disposed in the drainage channel.	✓ Construction Contractor	✓ Surface Water Quality	✓ Monthly / Quarterly	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP ✓ SEQS ✓ ECP 2, 4
Water /Electricity/ Natural Gas and Fuel Consumption	Construction activities require a large amount of water that may impact the availability of water in area. It will add load to the electricity, natural gas fuel consumption increasing GHG emissions. The impact is likely to be low to moderate.	1. Contractor will execute the Energy and Water Conservation Plan 2. Construction staff will be trained on water conservation practices to avoid excessive loss; 3. Water required for construction should be obtained in a way so that water availability and supply to residing area remains unaffected; 4. Approval will be attained from local authorities prior to construction work.	✓ Construction Contractor	✓ Water, Electricity and Natural Gas Consumption and Energy Conservation Plan	✓ Monthly / Quarterly	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP

Solid Waste Generation	During construction phase, solid waste can be generated from discarded equipment parts, scrap metals, equipment boxes, wood parts, empty bags, and leftover construction debris. The construction material and waste may include toxic/hazardous chemical materials. If not contained the impact of solid waste is likely to be high.	1. Solid Waste Management Plan will be executed by Construction Contractor. In case of the occurrence of toxic/hazardous chemical materials, it will be handled according to hazardous waste management best international practices. The plan will be prepared with following provisions: • Solid waste collection, segregation, storage and disposal will be carried out for generated waste. For at source segregation separate waste bins will be placed at sub-project sites. Recyclable material will be segregated whereas non-hazardous waste will be disposed-off at approved disposal site; • Labeling of containers will be carried out including the identification and quantity of the contents, hazard information; • If generated' marking of Hazardous/toxic waste separately and disposal using international best practices through registered contractor; • Used oil will be collected in separate containers stored on impervious platform with restricted access and must be sold to licensed contractor; • Burning of solid and waste oil should be strictly prohibited • Training of workers will be carried out in the storage and handling of materials and chemicals that can potentially cause soil contamination; • Emergency Response Plan will be prepared to address the accidental spillage of fuels and hazardous/toxic material, fire, vandalism and natural hazards; • On completion of the construction, the contractor will be required to rehabilitate the site. Rehabilitation will include removal of all construction materials and wastes, and the grading and landscaping of all exposed sites that may be prone to erosion. The purposes of site rehabilitation will be to minimize the potential for soil erosion, enhance the aesthetic appearance of the site and restore safe public access to the surrounding area	✓ Construction Contractor	✓ Solid Waste Management Plan ✓ Amount and type of solid waste generated; ✓ List of hazardous chemicals used for construction	✓ Monthly	✓ SRP-PDMA ✓ Construction Contractor	✓ ECP 1,2 ✓ Hazardous Chemicals Rules, 2003

Noise Levels	The construction activities are likely to generate noise levels. The sources of noise in construction include concrete mixer, excavation work, heavy earth moving equipment/ machinery, pilling work, welding, cuttings, drilling, grinding and material loading/offloading vehicles. Impact is likely to be low to moderate.	1. The location for stationary noise sources like concrete mixer, grinding, drilling and welding machinery will be selected at a reasonable distance from residing population. The cement tankers will be working inside enclosure with cladding to reduce noise; 2. The subproject construction activities are restricted to a confined area. Impact of noise is likely to be low to moderate. The impact will be high to the workers and low to moderate to nearby communities not causing hearing loss. Mitigation measures in line with ECP 9 Noise and Vibration Management will include: • The location for stationary noise sources like concrete mixer plant, grinding, drilling and welding machinery will be selected at a reasonable distance from nearby population; • The construction material loaders will only operate during allowed times as per rules of traffic police; • School time and late-night construction activities will be avoided; • Blowing of horn will be strictly prohibited; • Noise monitoring will be carried using noise meters. Labor working in high noise areas where noise level exceeds 85 dB, will wear earplugs and ear muffs	✓ Construction Contractor	✓ Noise Monitoring	✓ Monthly	✓ SRP-PDMA ✓ Construction Contractor	✓ SEQS ✓ ECP 9
Biodiversity and ecological resources (Flora and Fauna)	The impacts on ecology are negligible. However, construction may require site clearing and removal of seasonal shrubs and bushes.	Precautionary measures; 1. Eight trees will be planted for every tree cut during construction; 2. Invasive or exotic species will not be introduced through plantation.	✓ Construction Contractor	✓ Tree count ✓ Tree Plantation in designated area and count eight for one cut	✓ Prior /Start/ Post construction	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP ✓ ECP 10

Public Health and Safety	Construction activities and movement of heavy vehicles may impact public safety. Similarly, emissions and noise from the site may impact the health of residing communities	1. Use signage to inform general public of construction area and its limits; 2. Train drivers operating heavy vehicles in road and pedestrian safety; 3. Set appropriate speed limits to avoid accidents; 4. Use of heavy vehicles on public roads will be avoided during hours when students are coming to school or leaving school; 5. Placement of construction and diversion signage, particularly at urban areas and at sensitive/accident-prone spots, in accordance to a Public Safety Plan; 6. Provision of alternate routes for use by the public will be planned	✓ Construction Contractor	✓ Traffic Management Plan ✓ Public Safety Plan ✓ Complaint/ Accident Register	✓ Monthly	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP
Workers Health and Safety	Use of heavy machinery and handling of hazardous waste and chemicals may result in health impacts for workers on the construction site.	1. The workers will have full access to health facilities and emergency response centers and police station. In case of emergency, the injured will be taken to the nearest medical facility. 2. Provision of clean drinking water will be ensured for the construction workers; 3. Hygiene inspections will be carried out to avoid disease epidemic; 4. In case of unlikely incidents (fire, vandalism) the workers will be evacuated and emergency response and law enforcement agencies will be engaged; 5. Fire extinguishers will be placed at various locations including a water hose installation at ground level; 6. Fire safety and emergency response trainings will be conducted; 7. Hazards indicator signs and firefighting equipment will be installed; 8. The construction crew will be trained on important aspects of workplace safety; 9. Construction machinery operators and drivers will be trained to avoid associated accidents using machines and vehicles;	✓ Construction Contractor	✓ Workers Health and Safety Plan and trainings ✓ Medical record of workers	✓ Monthly	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP ✓ ECP 16

		10. Construction machinery operators and drivers will be trained to avoid associated accidents using machines and vehicles; 11. Flammables and other toxic materials will be marked and stored at secured sites; 12. Onsite first aid kits will be kept at construction sites and randomly moving vehicles\machinery. 13. Provision of appropriate and high quality Personal Protective Equipment (PPE) to workers such as gloves, vests, hard-hats, masks etc.; 14.Train workers in the use of PPE and safety measures while using heavy machinery and handling chemicals. 15. Follow guidelines for Asbestos and Asbestos based product use in construction (**Annexure 10**) 16. Worker's health safety against heatstroke and inclusion of alternate working hours.					
Physical /Cultural/ Archeological Resources	The sub-project has religiously and culturally important sites at a reasonable safe distance. Excavation work during construction may result in the uncovering of ancient sites or artifacts. Impact is likely to be low.	No know important site exist in or nearby subproject site. Therefore, no likely impact on such sites. However, construction staff will be trained and informed on identifying the evidence of archaeological/historic remains during excavation at sites. In case evidence of archaeological remains is found during construction activities, the actions listed below will be undertaken. 1. Excavation work in the vicinity of the find will be stopped; 2. Assistance will be sought from the Department of Archaeology to identify the remains; 3. If the department decides to salvage the find, SRP=PDMA will provide assistance. 4. Detailed procedure for Archaeological Chance Finds included in **Annexure 11**.	✓ SRP-PDMA	✓ Consultation with the relevant departments ✓ Preparation of PCR Plan, if needed.	✓ At the start of construction	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP ✓ ECP 15

Traffic Management	The sub-project site is in an urban area close to social sensitive receptors like houses, schools, colleges and offices. The construction work may highly impact the traffic flow.	1. Contractor will execute the Traffic Management Plan. 2. Vehicles will be inspected prior to start of construction work. 3. Movement of construction equipment will be limited to specific duration when there is least disturbance on site access roads 4. Adequate road signs will be erected to warn general public; 5. The contractor will be advised to follow vehicular maintenance to reduce engine noise; 6. Drivers will be trained to follow the designated routes; 7. The construction trucks will be adequately covered with tarpaulin covers to avoid flow into air.	✓ Construction Contractor	✓ Traffic Management Plan ✓ Construction vehicles drivers' trimmings ✓ Accident register	✓ Continuous	✓ SRP-PDMA ✓ Construction Contractor	✓ ESMP

Operation Phase

Operation Phase	Implementation			Monitoring Plan			
Aspects	**Environmental and Social Impacts**	**Proposed Mitigation Measures**	**Responsibility**	**Monitoring Parameter(s)**	**Frequency**	**Responsibility**	**Compliance Criteria**
Air Quality and Climate	An increase in number of vehicles entering the offices may pose moderate negative impacts on the air quality of the area**.**	1. The project staff will be advised to car pool and use and local transport; 2. Provision of pick and drop for staff to avoid additional load on air quality; 3. Vehicles with excessive smoke emissions should not be allowed to enter the subproject locations.	✓ PDMA Sindh	✓ Vehicular Emissions	✓ Quarterly	✓ PDMA Sindh	✓ SEQs Permissible limits of vehicular exhaust
Solid Waste Generation	There will be an increase in solid waste generation due to additional staff and building maintenance. In the presence of waste disposal system in the area impact is low to Moderate. Hazardous waste will include rechargeable batteries from the and solar system.	1. Decrease solid waste going to landfills by segregating at source with labeled dust bins for biodegradable, non-biodegradable and recyclable products; 2. Disposal of biodegradable to the municipality for treatment; 3. Clearance of reusable and recyclable waste to certified recycling companies; 4. Recycle rechargeable batteries through certified companies.	✓ PDMA Sindh	✓ Weight of waste generated and disposal	✓ Monthly	✓ PDMA Sindh	✓ Solid Waste Management Plan

Chapter

7 Institutional Arrangements

Chapter 7. Institutional Arrangements

7.1 Project Implementation Unit

The activities and investments under the sub project will be implemented through Rehabilitation Department, Provincial Disaster Management Authority, Government of Sindh through Project Implementation Unit of Sindh Resilience Project – PDMA Component. PIU is already operational and is headed by Project Director. PIU of SRP-PDMA will assist in the implementation of the project activities. If required, hiring for personnel for implementation of ESMP shall be the responsibility of SRP-PDMA Component.

The PIU SRP-PDMA would have responsibility for subproject implementation including, but not limited to, reporting, monitoring and evaluation, social and environmental management, procurement, financial management, audit and disbursements, as well as coordination with the line agencies and the World Bank. The PIU will be adequately resourced with skillsets and competencies required for project implementation and monitoring.

The PIU SRP-PDMA component shall hire the Environmental Safeguards Specialist and Social Safeguards Specialist at the PIU for appropriate duration on contract basis or per visit basis as deemed fit by the Project Director. Both Environmental Safeguards Specialist and Social Safeguards Specialist will be directly responsible for the compliance of ESMP and its effective implementation as well as internal monitoring and progress reporting. The Specialists will have close coordination with EPA and other line Departments to address their concerns regarding sub-project interventions. The ESMP will be implemented under the overall supervision of the Project Director SRP-PDMA Component. PIU will also be responsible for hiring of Construction Contractor and supervise contractor's work on the sites in accordance with ESMMP.

Roles and responsibilities of the PIU have been detailed in Table 7.1. In cases of overlapping roles by more than one Specialist, higher authority will have the authority to re- designate the roles and responsibilities of those officers in the best interest of the project and to ensure clarity of responsibilities for ESMP implementation.

Table 07.0.1 Details of Roles and Responsibilities

Organization	Position	Responsibility
Sindh Resilience Project – PDMA Component	Project Director	Ensure ESMP implementation
Sindh Resilience Project – PDMA Component	Environmental Safeguards Specialist	• Ensure implementation of the ESMP during various stages of design and construction; • Ensure that timely and robust environmental monitoring is carried out in the field; • Ensure that the construction contracts include clauses for ESMP implementation; • Ensure that environmental trainings are planned and implemented; • Overall monitoring and reporting of ESMP; • Coordinate and ensure development of awareness material; • Commission annual third-party validations of the subproject; • Prepare Environmental Progress Reports for the subproject • Conduct financial management of the ESMP;
Sindh Resilience Project – PDMA Component	Social Safeguards Specialist	• To carry out the screening of the sub-projects with respect to the social aspects as defined in the ESMF; • Monitor and check the proper implementation of all social mitigation measures as suggested in ESMF / ESMP; • Monitoring and evaluation of social related matters of the subproject and maintain a social complaint register to document social issues; • Supervise the Contractor's activities and make sure that all the contractual obligations related to the social compliance are met; • Review of periodic social reports being prepared by the contractor and submitting the same to the Bank • Ensure inclusion of ESMP guidelines in project designs. • Remain the focal point for managing the project GRM, and maintain analysis and reports on types of complaints received, resolved, time taken to action, etc.

Sample TORs for Environmental and Social Specialists are given in **Annexure 12**.

7.2. Third Party Consultant

A third-party consultant will be hired to validate the overall implementation process and compliance of subproject's ESMP.

7.3. Construction Contractor

The subproject Construction Contractor (CC) will be responsible for on-field implementation of the ESMP. All the required liabilities under the World Bank guidelines and applicable laws will be fulfilled by the construction contractor at the subproject sites. ESMP will be an integral part of the contract documents and details will also be included in the bid to address the budget for environmental and social mitigation measures. Contractor will hire requisite staff to ensure compliance of ESMP. PIU SRP-PDMA Component will ensure that the following plans have been prepared by Construction Contractor, while the contractor will ensure that these plans are being implemented:

- ✓ Energy and Water Conservation Plan
- ✓ Traffic Management Plan
- ✓ Solid Waste Management Plan
- ✓ Hazardous Waste Management Plan
- ✓ Workers Health and Safety Plan
- ✓ Emissions Monitoring Plan
- ✓ Debris Management Plan
- ✓ Emergency Response Plan
- ✓ Public Safety Plan
- ✓ Workers Health and Safety Plan
- ✓ Labor Training Plan
- ✓ Site Restoration Plan

Construction Contractor will ensure that the proposed subproject activities are in compliance with the ESMP, SEQS and World Bank operational policies. Provision will be made in the agreement with the contractor to:

- ✓ Train staff on regular basis on Environment, Health and Safety compliance;
- ✓ Implement ESMP in the field;
- ✓ Ensure safe working conditions;
- ✓ Provide Provisions of PPEs to workers;
- ✓ Report every incident/accident to SRP-PDMA Component;
- ✓ Monitor regular compliance with environmental mitigation measures as per ESMP.
- ✓ Execute onsite environmental testing

Specific roles and responsibilities are included in Table 7.2.

Table 07.0.2: Specific Roles & Responsibilities

#	Aspect	SRP-PDMA Component	Contractor's Responsibilities	Relevant Documentation
1	Contracting	Ensure mitigation and monitoring requirements to be included in the contract between SRP and construction contractor	Understand the requirements and estimating the required resources for implementation of the ESMP	Contract between the SRP and CC

2	Resources	Ensure the availability of finances required for environmental monitoring	Ensure the availability of resources required for environmental monitoring	ESMP budget
3	Environmental staff	Designate an environmental staff for the project	Appoint an officer dedicated to environment, health and safety	Job descriptions
4	Corrective Actions	Verify that the activities are carried out comply with the ESMP and identify corrective actions, if needed	Carry-out the required corrective actions	Corrective action record

7.4. ESMP Monitoring Plan

7.4.1. Internal Monitoring

The overall supervision of the ESMP will be with the Project Director, SRP-PDMA Component. The Environmental and Social Specialists will conduct regular monitoring of the subproject sites. Monitoring reports by Environment and Social Safeguard Specialists shall be submitted in the PIU SRP for necessary corrective action.

7.4.2. External Monitoring/Third Party Validation

External Monitoring will be used to ensure that both construction and the operation phase activities have been undertaken in line with the ESMP. Third Party Validation (TPV) exercises, conducted through an independent monitoring agency will be carried after period as deemed necessary / set by the Project Director to evaluate the overall ESMP compliance and implementation progress, and to ensure that the mitigation measures are implemented as per the mitigation plan. In case of any deviation, corrective actions will be taken where necessary.

7.5. ESMP Reporting

Implementation monitoring reports regarding environment and social compliance will be prepared by Environment Safeguard and Social Specialist on regular basis. Specialists in the PIU will also compile monthly and quarterly ESMP implementation progress reports and the final report once the proposed subproject is completed. Table 7.3 below shows the periodic distribution of reports to be prepared for the subproject.

Table 07.0.3 Distribution of Sub-Project Reports

#	Report	Prepared by	Reviewed by	Distribution
1	Monthly	Construction Contractor	Environmental and Social Safeguards Specialists	Project Director, SRP-PDMA
2	Bi-annual	Environmental and Social Safeguards Specialists	Project Director, SRP-PDMA	PDMA Sindh, World Bank

3	Annual	Third Party Validator	n/a	PDMA Sindh, World Bank
4	Final	Environmental and Social Safeguards Specialists	Project Director, SRP-PDMA	PDMA Sindh, World Bank

The Quarterly Progress Reports (QPRs) will provide progress on implementation of mitigation measures, safeguard monitoring, capacity building, and any other ESMP implementation activity carried out during the reporting quarter using monitoring checklist (**Annexure 13**). Format of the QPR is provided in **Annexure 14**. These reports will be shared with, among others, the World Bank within one month of the completion of each quarter. The reports will also include sub-sections on air quality and emission monitoring.

7.6. ESMP Capacity Development and Trainings

Capacity building and training of the staff and contractors associated with ESMP implementation will be required for effective environmental and social management. Specific trainings on environmental and social impacts and mitigation will be arranged for the Project Directors, Environment and Social Safeguards Specialists and other members of the Project Implementation Units to deliver their monitoring responsibilities in an organized and effective manner as per requirement of the monitoring plan. The main objective of the trainings is to enhance the technical capacity of staff associated with ESMP implementation, keep the PIU aware of the emerging environmental and social issues, and enable them to resolve those issues through proposed mitigation measures. Trainings will also be held for contractors on implementation of the ESMP. Table 7.4 gives a tentative program for capacity building and trainings. 4 workshops will be required throughout life of the subproject. The workshops will focus on environmental and social issues arising during ESMP implementation, mitigation measures, and health & safety. They will also focus on sensitizing the participants about environmental and social responsibility, managing the on-ground problems, and assuring implementation of the ESMP. Lum-sum estimated cost of training and workshops is PKR 5 million (inclusive of taxes). SRP – PDMA will arrange and pay separately for training and workshops sessions.

Table 07.4 Capacity Building and Training Plan Training Plan

Description of Training	Training Module	Location	Frequency	Participation
Two-day Training Workshop	✓ Objectives, need and use of ESMP; ✓ Legal requirements of the ESMP (Legislations and World Bank Operational Policies); ✓ Management of environmental and social issues and mitigation strategies as per ESMP; ✓ Monitoring Mechanism Documentation and reporting procedures.	SRP-PDMA Office Karachi	Launching workshop at the start of the project	SRP-PDMA Staff, PDMA Sindh Staff
One Day Training Workshop	ESMP with special focus on mitigation measures during design stage	SRP-PDMA Office Karachi	One training workshop at design stage of project	Architects, contractors, sub-contractors, and supervision consultants of construction contractor, SRP-PDMA staff and PDMA staff
One Day Training Workshop	ESMP with special focus on mitigation measures during construction stage	SRP-PDMA Office Karachi	One training workshop at start of construction	All contractors, sub-contractors, and supervision consultants, SRP-PDMA staff and PDMA staff
One Day Training Workshop	ESMP with special focus on mitigation measures during operational phase	SRP-PDMA Office Karachi	One workshop at the end of the construction	PDMA Sindh staff

Chapter

8

ESMP Estimated Budget

Chapter 8. ESPM Estimated Budget

The implementation for environmental and social mitigation plan will be the responsibility of the construction contractor. Most of the mitigation measures are covered in the engineering costs of the respective works. However, cost for some of the mitigation and monitoring activities are estimated below in Table 8.1.

Table 08.0.1 Estimated ESMP Budget

#	Description	Unit	Quantity	Unit Rate PKR	Total PKR
1	Site specific ESMP Trainings (including materials, logistics, venue)	Workshops	4	250,000	1,000,000
2	Water Sprinkling	No of Water Tankers per	60	2,000	1,200,000
3	Community and Labor Awareness (Signage Cost) in Urdu and Sindhi and Pamphlets	Number of Pamphlets	200	500	100,000
4	First aid kits with non-prescriptive medicines, medicated creams, temperature guns	Number of kits per site	6	Lum sum	200,000
5	Diesel Generators & Construction Machinery and Vehicular Exhaust Emission Monitoring	Number of Testing per site	9	50,000	450,000
6	PPE including face masks, soap, sanitizers, and maintenance	Months	18	Lum sum	300,000
7	Fire Fighting Equipment purchase and refilling	Number of equipment per site	12	3000	36,000
8	Health & Hygiene including; provision of waste collection bins, cleaning of site and dormitory areas, use of disinfectants and solid waste management	-	=	Lum sum	500,000
9	Third Party Validation (2 bi-annual and 1 end of project	Reports	3	1,000,000	3,000,000
10	Environmental Testing Air, Water, Soil, Noise	Months	10	250,000	2,500,000
11	Plantation Native Plant Saplings	-	-	Lum sum	100,000
	Total				**9,386,000**

Chapter

9

Grievance Redress Mechanism

Chapter 9. Grievance Redress Mechanism

9.1 GRM

Broadly, a grievance can be defined as any discontent of dissatisfaction with any aspect of the project or organization. The grievance redress system is proposed for the subproject to handle issues that emerge from construction activities of the subprojects. Grievances may arise from the implementation of the proposed subprojects activities. GRM for overall SRP has been defined in ESMF. In the light of ESMF, GRM has been articulated for proposed subproject.

9.2 Overview and Scope

The Grievance Redress Mechanism proposed here spans the entire subproject implementation and will cater direct and indirect affected population / beneficiaries. Though, GRM proposed here has been designed to address identified environmental and social problems, it will also cater to manage any disconnects that emerge from field level and has significant implications on effective implementation of the subproject interventions. GRM has been designed in line with World Bank safeguard policies and to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits.

9.3 Objectives of the Grievance Redress Mechanism

The overall objective of the GRM is to provide a system of procedures and processes that provides transparent and rapid resolution of concerns and complaints identified at the local level. The objectives of GRM are;

- Open channels for effective communication, including identification of new environmental issues and concerns arising from the subproject;
- Demonstrate concerns about community members and their environmental well-being; and;
- Prevent and mitigate any adverse environmental impacts on communities caused by project implementation and operations.

The GRM will be accessible to diverse members of the community, including more vulnerable groups such as women and youth.

9.4 Communication & Awareness on GRM

The processes and procedures for the GRM will be translated into local language and disseminated at all subproject locations. These shall be made available (in both leaflet and poster format) at all subproject sites.

9.5 Principal Procedures and Timelines

Defined procedures in ESMF have been tailored to address PDMA Component. Following standard procedures will underpin the GRM process;

1. All grievances submitted in writing to staff assigned under the proposed Public Complaints Cell (PCC) will be formally recorded, and a written acknowledgement issued;
2. Grievances will be dealt with on a referral basis; those that the Contractor or the PCC are unable to resolve will be referred to the Grievance Redress Committee (GRC), with a final provision for appeal to Project Director SRP-PDMA Component or DG, PDMA Sindh or Secretary Rehabilitation Department Government of Sindh or Sindh Project Steering Committee (PSC) if an issue cannot be resolved with the Committee.
3. Every effort will be made to address or resolve grievances within the following fixed time-lines. Acknowledgement of a written submission will be issued to the complainant within three working days. If not resolved earlier by the Contractor or PCC on site, grievances will be tabled for discussion/resolution during GRC meeting within one week of receipt of the written submission. If not satisfactorily resolved by the GRC the grievance will be referred to consideration any of the higher forum within one week.
4. If the complainant is not satisfied, the complaint will have the option to seek redress through court of law.

9.6. Records and Monitoring

The secretariat of GRM will maintain database to document all complaints received from the local communities. The information recorded in the database register will include date of the complaint, particulars of the complainant, description of the grievance, actions to be taken, the person responsible to take the action, movement of the document (forwarded to whom/ which Committee), follow up requirements and the target date for the implementation of the mitigation measure. The database will also record the actual measures taken to mitigate these concerns. All complaints received in writing or received verbally will be properly recorded and documented.

9.7 Mechanism for Grievance Redress

Following mechanism is proposed;

- Public Complaints Cell (PCC), will be established at each subproject site. PCC will be managed by construction contractor and site in-charge of PDMA Sindh. PCC will maintain Complain Register (CR) at site and record all verbal and written complaints received at site related to project implementation. PCC will consult GRC and if problem is solvable at PCC level, correction actions will be initiated. PCC will acknowledge to complainant in writing about corrective measures, and name, address, telephone number of higher tier of GRM i.e., GRC so that, if complainant is not satisfied, he / she can approach higher tier for remedy. PCC will keep GRC in loop for all actions and record shall be maintained as per **section 9.6.**

- A Grievance Redress Committee (GRC), an independent committee with secretariat at the office of Project Director, SRP-PDMA shall be constituted notified by Secretary Rehabilitation Department will oversee all matters related to GRM. The committee will be composed of Environmental and Social Safeguard Specialist of SRP-PDMA, a senior officer from PDMA Sindh, a representative from concerned DC office and a member from local civil society of each subproject site. The GRC shall maintain Master Complain Register (MCR) and will record all details with respect to GRM. GRC will manage all those complaints which are

not solvable at PCC level. Once a compliant is received at GRC, actions as defined for PCC shall be taken.

- If matter is not solvable at GRC level, complaint will be forwarded to PD SRP-PDMA or DG PDMA or Secretary Rehabilitation of Steering Committee of the SRP. Appropriate higher channel shall be determined by GRC keeping in view gravity of the matter. In case complainant is not satisfied with corrective measures actions of GRC he / she appeal to any of the higher channels for resolution.

- If complainant (s) is / are not satisfied with corrective measure of any the above GRM channel, he / she can enter the reference in the Court of law.

9.8. Grievance Closure

The complaint shall be considered as disposed-off and closed when:

- ✓ The designated officer / authority has acceded to the request of the complainant fully;
- ✓ Where the complainant has indicated acceptance of the response in writing;
- ✓ Where the complainant has not responded to the concerned / designated officer within one month of being intimated about the final decision on his / her grievance;
- ✓ Where the complainant fails to attend the proceedings of the concerned officer within the stipulated period of the disposal of the complaint; and
- ✓ Where the complainant withdraws his/her complaint.

9.9. Reporting

The GRC secretariat will record the complaints, investigations, and subsequent actions and results in the monthly Environmental Management and Monitoring reports. These reports will be shared with World Bank and other project stakeholders.

Chapter

10

Disclosure

Chapter 10. Disclosure

This ESMP will be disclosed on the websites of SRP-PDMA Component, PDMA Sindh, and on the World Bank Info Shop. Hard copies of this ESMP will also be shared with the Provincial EPA, project stakeholders, contractors, Civil Society Organizations etc. A copy of the ESMP will be placed in the Project Implementation Unit, Sindh Resilience Project – PDMA Component and for public access. The Urdu translation of the Executive Summary of the ESMP will also be distributed to all relevant stakeholders, especially to the communities in the project areas. The purpose will be to inform them about the project activities, negative environmental and social impacts expected from the project and proposed mitigation measures.

The SRP-PDMA Component office and social safeguards specialist will keep the residing population informed about the environmental and social impacts and facilitate in addressing grievance(s). The ESMP study team has made an endeavor to hold consultative and scoping sessions with these stakeholders to evince their views on the subproject, *inter-alia*, their opinions, suggestions, understanding on various issues and concerns.

Annexures

Annexure 1. Screening Checklist

A.	Type of Activity- Will the subproject	Ye	No
1.	Involve Solid Waste Management	✓	
2	Involve Community Forestry		✓
3	Build or Rehabilitate any structures or buildings?	✓	
4	Be located in or near an area where there is an important historical, archaeological or cultural heritage site?		✓
5	Be located within or adjacent to any areas that are or may be protected by the government (e.g. national park, national reserve world heritage site) or local tradition, or that might be a natural habitat?		✓
6	Depend on water supply from existing dam, weir or other water diversion		✓
B.	**Environment- Will be subproject**		
7	Risk causing the contamination of drinking water?		✓
8	Cause poor water drainage and increase the risk of water- related diseases such as malaria or bilharzias?	✓	
9	Harvest or exploit a significant number of natural resources such as trees, fuel wood or water?		✓
10	Be located within or nearby environmentally sensitive areas (e.g.) intact natural forests, mangroves, wetlands) or threatened species?		✓
11	Create a risk of increased soil degradation or erosion?	✓	
12	Create a risk of increasing soil salinity?		✓
13	Produce, or increase the production of, solid or liquid wastes (e.g., water, medical, and domestic or construction wastes)?	✓	
14	Affect the quantity of surface waters (e.g., rivers, streams, wetlands), or groundwater (e.g., wells)?		✓
15	Result in the production of solid or liquid waste, or result in an increase in waste production, during construction or operation	✓	
C.	**Land Acquisition and access to resources- will the subproject:**		
16	Require that land (public or private) be acquired (temporarily or permanently) for its development?		✓
17	Displace individuals, families or businesses?		✓
18	Result in temporary or permanent loss of crops, fruit trees or household infrastructure such as granaries, outside toilets and kitchens?		✓
D	**Indigenous people- Are there:**		
19	Any indigenous groups living within the boundaries of, or nearby, the project		✓
20	**Members of these indigenous groups in the area who could benefit from the project?**		✓

Annexure 2. Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021

SCHEDULE-I

(See Regulation 3)

List of projects requiring Environmental Screening (through check list)

a. Subject to the compliance with concerned zoning laws:

i. Construction of residential and commercial buildings having total covered area from 60,000 sq feet to 100,000 sq feet

ii. Housing Schemes covering an area from 05 acres to 15 acres.

iii. Ware Houses for Non-Hazardous substances having total area from 1000 sq.yards to 5,000 sq yards

iv. Warehouse for Fertilizers

v. Marriage Halls/Banquet/Restaurants/Baking facilities having total area more than 500 sq yards

vi. Motor vehicle workshops/Service Stations having total area of more than 500 sq yards.

b. Construction/Reconstruction/Rehabilitation of roads in urban area from 500 meters to 01 kilometers and in rural area from 500 meters to 05 kilometers.

c. Construction of Flyover, underpasses and bridges of length from 100 meters to 500 meters

d. On-farm dams and fish farms

e. Pulses mills

f. Flour Mills

g. Lining of existing minor canals and /or water courses.

h. Canal cleaning

i. Forest harvesting operations

j. Rain harvesting projects

k. Health care units of less than 50 beds

l. BTS Tower

m. Lime Kilns

n. Ice factories and cold storage.

o. Cotton oil mill

p. Construction of LPG, CNG, LNG filling station and petrol pumps

q. Carpet manufacturing units

r. Rain harvesting projects

s. Industrial Effluent Treatment Plant

t. Sanitary Landfill site up to 500 tons/day

Schedule-II

(See Regulation 4)

List of projects requiring an Initial Environmental Examination

A. Agriculture, Livestock and Fisheries

1. Poultry, livestock and fish farms
2. Warehousing for pesticides and pharmaceuticals
3. Projects involving packaging, formulation, cold storage and warehouse of agricultural, livestock and fish products.
4. Construction & Operation of Slaughter houses

B. Energy

1. Hydroelectric power generation up to 25 MW
2. Thermal power generation up to 100 MW
3. Coal fired power plants with capacity up to 50 MW
4. Transmission lines up to 132 KV, and grid stations
5. Waste-to-energy generation projects including bio-mass up to 25 MW
6. Construction of Coal Handling and storage facilities
7. Handling, Transportation & Storage of Biofuel Facility
8. Handling and storage of edible grains and seeds
9. All Renewable energy Projects (excluding Protected/Sensitive area under any law)

C. Oil and Gas projects:

1. Oil and gas 2D/3D Seismic survey and drilling activities (on and off shore)
2. Oil and gas extraction projects including exploration and production located outside the environmentally sensitive/protected areas
3. Oil & Gas transmission gathering, storage, separation & transportation system
4. Construction of CNG, LPG Petroleum and LNG bulk storage facility
5. Oil blending and recycling units

D. Manufacturing and processing

1. Ceramics and glass units

2. Food processing units
3. Pharmaceutical units.
4. Rice mills, ghee/oil mills, Cotton ginning
5. Man-made fibers and resin projects
6. Tanning and leather finishing projects
7. Manufacturing of apparel, textile garments units, including weaving, spinning, dyeing, bleaching and printing
8. Woodwork units manufacturing products
9. Steel re-rolling mills
10. Waste recycling plants
11. Battery manufacturing plant
12. Brick Kilns
13. Marble processing units
14. Stone Crushing units

E. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, Sulphur and other minerals not included in Schedule I.
2. Crushing, grinding and separation processes
3. Metal Smelting plant production capacity up to 20 tons/day

F. Transport

1. Construction of flyovers, underpasses and bridges having length more than 500 meters to 1000 meters in urban areas and more than 5km in rural areas
2. Bus terminals/ railway station/ metro stops and construction & operation of transport related terminals
3. Rehabilitation or rebuilding or reconstruction of existing roads more than one kilometer in urban areas and more than 5 km from rural areas

G. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of less than 25 million cubic meters of surface area less than 4 square kilometers
2. Irrigation systems and drainage system with the area of less than 15,000 hactors
3. Flood protection bunds

H. Water supply and filtration

1. Water supply schemes and filtration plants

I. Waste disposal and wastewater treatment

1. Solid and Non-hazardous waste with annual capacity up to 10,000 tonnes (excluding municipal landfill sites and commercial facilities) including Garbage Transfer station/composting plant
2. Wastewater treatment for sewerage treatment facility less than 100 mgd
3. Hospital waste disposal facilities including incineration units owned by Hospitals for own use excluding commercial facility.

J. Urban development

1. Housing schemes more than 15 acres to 50 acres
2. Residential, Commercial multistory High rise construction projects having covered area more than 100,000 sq.feet to 500,000 sq.feet.
3. Laboratories
4. Hospitals, health care unit of more than 50 beds
5. Construction of Educational and Academic institutions.

K. Other projects

Any other project for which filing of an IEE is required by the Agency under sub-regulation (2) of Regulation 6.

Schedule-III

(See Regulation 5)

List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation more than 50 MW
2. Thermal power generation more than 100 MW
3. Coal power projects more than 50 MW
4. Transmission lines above 132 KVA and distribution projects.
5. Nuclear power plants
6. Wind, Solar or renewable energy projects if falls under any environmental sensitive and protected area.

B. Oil and Gas projects

1. Oil Petroleum refineries.
2. LPG and LNG Terminals Projects
3. Coal Handling Terminals Projects

C. Manufacturing and processing

1. Cement plants
2. Chemical manufacturing industries
3. Fertilizer plants
4. Steel Mills
5. Sugar Mills and Distilleries
6. Establishment of Industrial estates & Export processing zones
7. Petrochemicals complex
8. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, printing and publishing, paints and dyes.

D. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Metal Smelting plant production capacity more than 20 tons/day

E. Transport

1. Airports
2. Construction of highway, motor ways, major roads (Intercity roads) more than one km and above
3. Ports and harbor development
4. Mass transit projects
5. Railway works
6. Construction of Flyover, underpass and bridges having total length more than one km.

F. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 25 million cubic meters and above having surface area of 4 square kilometers and above
2. Irrigation and drainage projects serving more than 15,000 hectares and above

G. Water supply and filtration

Public water supply schemes and **filtration** plants.

H. Waste Disposal and treatment

1. Facilities for handling, storage or disposal of hazardous or toxic wastes or radioactive waste (including landfill sites, incineration units, etc.)
2. Solid waste municipal landfill sites.
3. Combine Effluent Treatment Plant
4. Domestic wastewater treatment plant more than 100mgd

I. Urban development and tourism

1. Housing schemes above 50 acres
2. Residential, Commercial High rise buildings subject to compliance of building bylaws of relevant organizations more than 500,000 sq.feet
3. All Projects located in High Density Zones notified by Government and relevant land controlling organization, irrespective of their size.
4. Commercialization of major corridors/roads in urban centers

5. Large Scale public facilities
6. Large-scale tourism development projects

J. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas being identified by the Agency.

K. Other projects

1. Any other project for which filing of an EIA is required by the Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect.

Annexure 3. SEQS and NEQS

SEQS

Environmental Quality Standard for Ambient Air			
Pollutant	**Time-weighted average**	**Concentration in**	**Method of Measurement**
Sulfur Dioxide (SO_2)	Annual Average*	80 µg/m^3	Ultraviolet Fluorescence Method
	24 hours**	120	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	40 µg/m^3	
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	80 µg/m^3	
O_3	1 hour	130 µg/m^3	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m^3	High volume Sampling, (Average flow rate not less than 1.1m^3/minute)
	24 hours**	500 µg/m^3	
Respirable Particulate Matter (PM_{10})	Annual Average*	120 µg/m^3	B Ray absorption method
	24 hours**	150	
Respirable Particulate Matter ($PM_{2.5}$)	Annual Average*	40 µg/m^3 ***	B Ray absorption method
	24 hours**	75 µg/m^3	
	1 hour	15 µg/m^3	
Lead (Pb)	Annual Average*	1 µg/m^3	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 µg/m^3	
Carbon Monoxide (CO)	8hours**	5 mg/m^3	Non-Dispersive Infra-Red (NDIR) method
	1hours	10 mg/m^3	
*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.			
**24 hourly / 8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.			

Environmental Quality Standard for Ambient Air
*** or 9 µg/m^3 plus baseline, whichever is low

The Motor Vehicle Ordinance (1965) and Roles (1969)		
Parameter	**Standards (maximum permissible limit)**	**Measuring method**
Noise	85dB(A)	Sound-meter at 7.5meter from the source

S. No.	**Category of Area / Zone**	**Effective from 1st January, 2015**	
		Limit it in dB(A) Leq*	
		Day Time	**Night Time**
1	Residential area (A)	55	45
2	Commercial area (B)	65	55
3	Industrial area (C)	75	65
4	Silence Zone (D)	50	45

Note: 1	Day time hours: 6.00 a. m to 10.00 p. m
2	Night time hours: 10.00 p. m to 6.00a.m.
3	Silence zone; Zone which are declared as such by competent authority. An area
4	Mixed categories of areas may be declared as one of the four above-mentioned
*dB(A) Leq	Time weighted average of the level of sound in decibels on scale A which is

Sindh Environmental Quality Standard for Municipal & Liquid Industrial Effluents					
S. #	**Parameter**	**Into Inland Waters**	**Into Sewage Treatment**	**Into Sea**	**unit**
1	Temperature or Temp. increase	<3	<3	<3	^oC
2	pH value (H^+)	6-9	6-9	6-9	
3	Biological Oxygen Demand (BOD)5 at	80	250	80	mg/l
4	Chemical Oxygen Demand (COD)	150	400	400	mg/l
5	Total Suspended Solids (TSS)	200	400	200	mg/l
6	Total Dissolved Solids (TDS)	3500	3500	3500	mg/l
S. #	**Parameter**	**Into Inland Waters**	**Into Sewage Treatment**	**Into Sea**	**unit**
7	Oil and Grease	10	10	10	mg/l
8	Phenolic Compounds (as Phenol)	0.1	0.3	0.3	mg/l
9	Chloride (as Cl^-)	1000	1000	SC	mg/l
10	Fluoride (as F^-)	10	10	10	mg/l
11	Cyanide (as CN^-)total	1.0	1.0	1.0	mg/l
12	An-ionic detergents (as MBAS)	20	20	20	mg/l
13	Sulphate($SO4^{2-}$)	600	1000	SC	mg/l
14	Sulphide (S^{2-})	1.0	1.0	1.0	mg/l
15	Ammonia (NH_3)	40	40	40	mg/l
16	Pesticides	0.15	0.15	0.15	mg/l
17	Cadmium	0.1	0.1	0.1	mg/l
18	Chromium (trivalent and hexavalent)	1.0	1.0	1.0	mg/l
19	Copper	1.0	1.0	1.0	mg/l
20	Lead	0.5	0.5	0.5	mg/l
21	Mercury	0.01	0.01	0.01	mg/l
22	Selenium	0.5	0.5	0.5	mg/l
23	Nickel	1.0	1.0	1.0	mg/l
24	Silver	1.0	1.0	1.0	mg/l
25	Total toxic metals	2.0	2.0	2.0	mg/l

NEQS

Table 1: Effluent Discharge Standards NEQS 2000 Applicable to the Works

#.	PARAMETRS	NEQS
1	Temperature	40 ^oC =≤3 deg.
2	pH	6 – 9
3	BOD5	80 mg/l
4	Chemical Oxygen Demand (COD)	150 mg/l
5	Total Suspended Solid (TSS)	200 mg/l
6	Total Dissolved Solids	3500 mg/l
7	Grease and Oil	10 mg/l
8	Phenolic compounds (as phenol)	0.1 mg/l

9	Ammonia	40 mg/l
10	Chlorine	1.0 mg/l
11	Chloride	1000.0 mg/l
12	Sulphate	600 mg/l
13	Manganese	1.5 mg/l
14	Fluoride	10 mg/l
15	Cyanide (as CN') total	1.0 mg/l
16	An-ionic detergents (as MB As)	20 mg/l
17	Sulphide (S-2)	1.0 mg/l
18	Pesticides	0.15 mg/l
19	Cadmium	0.1 mg/l
20	Chromium trivalent and hexavalent	1.0 mg/l
21	Copper	1.0 mg/l
22	Lead	0.5 mg/l
23	Mercury	0.01 mg/l
24	Selenium	0.5 mg/l
25	Nickel	1.0 mg/l
26	Silver	1.0 mg/l
27	Total Toxic metals	2.0 mg/l
28	Zinc	5.0 mg/l
29	Arsenic	1.0 mg/l
30	Barium	1.5 mg/l
31	Iron	8.0 mg/l
32	Boron	6.0 mg/l

Table 2: National Environmental Quality Standards (NEQS) for Gaseous Emission (mg/Nm³, Unless Otherwise Defined)

#	Parameter	Source of Emission	Existing Standards	Revised Standards
1.	Smoke	Smoke Opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate Matter (I)	(a) Boilers and Furnaces		
		(i) Oilfired		
		(ii) Coalfired	300	300
		(iii) CementKilns	500	500
			200	200
		(b) Grinding, crushing, clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	500	500
3.	Hydrogen Chloride	Any	400	400
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen Sulphide	Any	10	10
7.	Sulphur Oxide (2) (3)	Sulfuric acid/ Sulphonic acid plants		
		Other plants except power plants operating on oil and coal	400	1700

#	Parameter	Source of Emission	Existing Standards	Revised Standards
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen (3)	Nitric acid manufacturing unit. Other plants except power plants operating on oil or coal:	400	400
		Gas fired	-	600
		Oil fired	-	1200
		Coal fired		

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent sulphur content in fuel. Higher content of Sulphur will case standards to bepro-rated.
3. In respect of emissions of sulphur dioxide Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards.

Table 3: National Environmental Quality Standards (NEQS, 2009) for Vehicular Emission

#	Parameter	Standard (Maximum permissible Limit)	Measuring Method	Applicability
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 meters or more	Immediate effect
2	Carbon Monoxide (CO)	6%	Under idling condition: Non-dispersive infrared detection through gas analyzer.	

3	Noise	85 dB(A)	Sound Meter at 7.5 meters from the source	

Table 4: National Environmental Quality Standards (NEQS, 2010) for Noise

#	Category of Area / Zone	Effective from 1st July, 2010		Effective from 1st July, 2013	
		Limit in dB (A) Leq*			
		Daytime	Night-time	Daytime	Night-time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Daytime hours: 6:00 a.m. to 10:00p.m.
2. Night-time hours: 10:00 p.m. to 6:00a.m.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters round hospitals, educational institutions and courts.
4. Mixedcategoriesofareasmaybedecidedasoneofthefourabovementionedcategoriesbythecompetentauthority.

**dB (A) Leq: Time weighted average of the level of sound in scale "A" which is relatable to human hearing.*

Table 5: National Environmental Quality Standards (NEQS, 2010) for Drinking Water

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
BACTERIAL				
1	All water is intended for drinking (E.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
2	Treated water entering the distribution system (E.Coli or Thermotolerant	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
	Coliform and total Coliform bacteria)			
3	Treated water entering the distribution system (E.Coli or Thermo tolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period.	Most Asian Countries also follow WHO Standards
PHYSICAL				
4	Colour	≤15 TCU	≤15 TCU	
5	Taste	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable	
6	dour	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable	
7	Turbidity	<5 NTU	<5 NTU	
8	Total hardness as $CaCO_3$	<500mg/l	---	
9	TDS	<1000	<1000	
10	pH	6.5-8.5	6.5-8.5	
RADIOACTIVE				
11	Alpha Emitters bq/L or pCi	0.1	0.1	
12	Beta Emitters	01	01	

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
CHEMICAL				
Essential Inorganics		**mg/litre**	**mg/litre**	
13	Aluminum (Al) mg/l	≤0.2	0.02	
14	Antimony (Sb)	≤0.005	0.02	
15	Arsenic (As)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
16	Barium (Ba)	0.7	0.7	
17	Boron (B)	0.3	0.3	
18	Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing Countries
19	Chloride (Cl)	<250	250	
20	Chromium (Cr)	≤0.05	0.05	
21	Copper (Cu)	2	2	
Toxic Inorganics		**mg/litre**	**mg/litre**	
22	Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to most Asian developing Countries
23	Fluoride (F)	≤1.5	1.5	
24	Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
25	Manganese (Mn)	≤0.5	0.5	
26	Mercury (Hg)	≤0.001	0.001	
27	Nickel (Ni)	≤0.02	0.02	

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
28	Nitrate (NO_3)	≤50	50	
29	Nitrite (NO_2)	≤3	3	
30	Selenium (Se)	0.01	0.01	
31	Residual Chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	---	
32	Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing Countries
Organics				
33	Pesticides mg/L	---	PSQCA No. 4629-2004, Page No.4, Table No. 3, Serial No. 20-58 may be consulted	Annex-II
34	Phenolic Compounds (as Phenols) mg/L	---	≤0.002	
35	Poly nuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	

****PSQCA: Pakistan Standards Quality Control Authority*

Table 6: National Environmental Quality Standards (NEQS, 2010) for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of Measurement
		Effective from 1st July 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO_2)	Annual Average*	80µg/m³	80µg/ m³	Ultraviolet Fluorescence Method
	24 hours**	120µg/m³	120µg/m³	
Oxides of Nitrogen as (NO)	Annual Average*	40µg/m³	40µg/m³	Gas Phase Chemiluminescence
	24 hours**	40µg/m³	40µg/m³	
Oxides of Nitrogen as (NO_2)	Annual Average*	40µg/m³	40µg/m³	Gas Phase Chemiluminescence
	24 hours**	80µg/m³	80µg/m³	
Ozone (O_3)	1 hour	180µg/m³	130µg/m³	Non disperse UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400µg/m³	360µg/m³	High Volume Sampling, (Average flow rate not less than 1.1m³/minute)

Annexure 4. World Bank Environmental and Social Safeguard Policies

#	Subject	Policy Reference	Triggered	Source Web
1.	Environmental Assessment	OP/BP 4.01	Yes	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3900&ver=current
2.	Natural Habitats	OP/BP 4.04	Yes	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1581&ver=current
3.	Pest Management	OP 4.09	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1637&ver=current
4.	Forestry	OP 4.36	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1585&ver=current
5.	Safety of Dams	OP 4.37	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1576&ver=current
6.	Physical and Cultural Resources	OP/BP 4.11	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1583&ver=current
7.	Involuntary Resettlement	OP/BP 4.12	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1584&ver=current
8.	Indigenous Peoples	OP 4.10	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1582&ver=current
9.	Disputed Areas	OP 7.60	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1841&ver=current
10.	International Waterways	OP 7.50	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=2660
11.	Bank Disclosure Policy	BP 17.50	Applicable	http://siteresources.worldbank.org/OPSMANUAL/Resources/DisclosurePolicy.pdf

Annexure 5. Screening Checklist

a. Brief Description of the Project:

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b. Location:

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c. Name of Proponent:

#	Questions to be Considered	Briefly Describe Yes/No?	Is this likely to result in a
Environmental and cumulative Impacts			
1	Will construction or operation of the project use natural resources? Such as land, water, materials or energy, especially any resources which are non-renewable or in short supply**?**		
2	Will the project involve use, storage, transport, handling or production of substance or materials, which could be harmful to human health or the environment or concerns about actual or perceived risks to human health**?**		
3	Will the Project produce solid waste during construction, operation, or decommissioning**?**		
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air**?**		
5	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation**?**		
6	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters and groundwater**?**		
7	Will there is any risk of accidents during construction or operation of the project, which could affect human health or the environment**?**		
8	Are there any other factors, which should be considered such as consequential development that could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality**?**		
9	Are there any areas on or around the locations, which, are protected under international, national, or local legislation for their ecological, landscape, cultural, or other value, which could be affected by the project**?**		

10	Are there any other areas on or around the location, which are important or sensitive for reasons of their ecology e, g. wetlands, watercourses or other water bodies, mountains, forests or woodlands, which could be affected by the project**?**		
11	Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, over wintering, migration, which could be affected by the project**?**		
12	Are there any in land or underground water sources around the location that could be affected by the project**?**		
13	Are there any areas or features of high landscape or scenic value on or around the location, which could be affected by the project**?**		
14	What kind of effluents can be discharged during operation of this project/ units**?**		
15	Is this project likely to affect the soil, water and air of the surrounding environment**?**		
16	Are there any transport routes passing through or around the project site?		
	location which are susceptible to congestion or which cause environmental problem, which could be effected by the project**?**		
17	Is the project located in a previously undeveloped area where there is a loss of Greenfield land**?**		
18	Are there any areas on or around the locations which are occupied by the sensitive land-use e.g. hospitals, schools, worship places, community facilities which could be affected by the project**?**		
19	Are there any areas on or around the locations which contain important high quality or scarce resources e.g. ground & surface water forestry, agriculture, fisheries tourism, minerals which could be affected by the project**?**		

20	Are there any areas on or around the locations which that are already subject to pollution or environmental damage e.g. where existing legal environmental standers are exceeded which could be affected by the project**?**		
21	Is the project location is susceptible to earthquake, subsistence, landslide erosions flooding or extreme adverse climate conditions e.g. temperature inversion, fogs, severe winds, which could cause the project to present environmental problem**?**		
22	What would be the source of energy supply for this project**?**		
23	What would be the mechanism of solid waste disposal/management when this project would become functional?		
24	What would be the mechanism of waste water drainage/disposal / treatment when this project would become functional**?**		
25	What kind of effluents are expected /discharged when this project would become functional**?**		
Social and land use impacts			
1	Will the Project result in social changes, for example, in demography, traditional lifestyles, employment**?**		
2	Are there any routes or facilities on or around the locations, which are used by the public for access to recreation, or other facilities, which could be affected by the project**?**		
3	Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project**?**		
4	Are there existing land uses on or around the location e.g. homes, gardens or other private property, industry, commerce, recreation, public open space, community? facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project**?**		

5	Are there any plans for future land uses on or around the location which could be effected by the project?		
6	Are there any areas on or around the location which are densely populated or built up, which could be affected by the project?		

Observations/Recommendation:-

1.
2.
3.

Survey Conducted by

Name and Designation

_____

Signature

Verified by

Name and designation

Signature

Annexure 6. Consultative Meeting Questionnaire and Survey Locations

Sindh Resilience Project – PDMA Component
Environmental and Social Management Plan (ESMP)
For Construction of Humanitarian Response Facility & Rescue Station at Maripur, Jamshoro and Sukkur

تاریخ: _____

نام:		پتہ:	
عمر:		مادری زبان:	
تعلیم:		ٹیلیفون نمبر:	
شناختی کارڈ نمبر:		شامل افراد کی تعداد:	

Project Description:

The Government of Sindh aims to implement Sindh Resilience Project (PDMA Component) through Provincial Disaster Management Authority, Government of Sindh. Presently, the Province lack organized and structured rescue service to provide search, rescue and lifesaving services to the citizens during disasters and emergencies. Hence, establishment of Sindh Rescue Services is envisioned by PDMA Sindh. The Sindh Resilience Project focuses on improving institutional capacities, performance, and preparedness at key agencies responsible for managing disaster risk in Sindh. In addition, the Project further contribute towards enhancing resilience to hydro-meteorological disasters including floods and drought through physical infrastructure investments. The subproject aims to upgrade existing facilities of PDMA Sindh to accommodate more Humanitarian Response Facility (3x general purpose and 01x cold storage shed) and rescue stations at Mauripur, Jamshoro and Sukkur sites. The subproject is likely to construct a ground+2 story building covering an area of 500 Sq. Yards for rescue station and allied facilities, parking sheds of rescue machinery and vehicles. Both HRF and rescue station will be built at Mauripur site whereas, only rescue stations will be developed in Jamshoro and Sukkur.

اس وقت، صوبے میں آفات اور ہنگامی حالات کے دوران شہریوں کو تلاش، بچاؤ اور جان بچانے کی خدمات فراہم کرنے کے لیے منظم اور منظم ریسکیو سروس کا فقدان ہے۔ اس لیے پی ڈی ایم اے سندھ کی جانب سے سندھ ریسکیو سروسز کے قیام کا تصور کیا گیا ہے۔ حکومت سندھ کا مقصد صوبائی ڈیزاسٹر مینجمنٹ اتھارٹی، حکومت سندھ کے ذریعے سندھ ریزیلینس پروجیکٹ (PDMA اجزاء) کو نافذ کرنا ہے۔

سندھ ریزیلینس پروجیکٹ سندھ میں آفات کے خطرے سے نمٹنے کے لیے ذمہ دار اہم ایجنسیوں کی ادارہ جاتی صلاحیتوں، کارکردگی اور تیاری کو بہتر بنانے پر توجہ مرکوز کرتا ہے۔ اس کے علاوہ، یہ پروجیکٹ بنیادی ڈھانچے کی سرمایہ کاری کے ذریعے سیلاب اور خشک سالی سمیت ہائیڈرو میٹرولوجیکل آفات سے بچاؤ میں مزید تعاون کرتا ہے۔ ذیلی پروجیکٹ کا مقصد PDMA سندھ کی موجودہ سہولیات کو اپ گریڈ کرنا ہے تاکہ ماڑی پور، جامشورو اور سکھر کے مقامات پر مزید انسانی امداد کی سہولت (x3 عام مقصد اور x01 کولڈ اسٹوریج شیڈ) اور ریسکیو اسٹیشنوں کو ایڈجسٹ کیا جاسکے۔ ذیلی پروجیکٹ میں ریسکیو اسٹیشنوں اور متعلقہ سہولیات، ریسکیو مشینری اور گاڑیوں کے پارکنگ شیڈز کے لیے 500 مربع گز کے رقبے پر مشتمل گراؤنڈ+2 منزلہ عمارت تعمیر کیے جانے کا امکان ہے۔ ایچ آر ایف اور ریسکیو اسٹیشن دونوں ماڑی پور سائٹ پر بنائے جائیں گے جبکہ جامشورو اور سکھر میں صرف ریسکیو اسٹیشن بنائے جائیں گے۔

1. کیا بارش کے دنوں میں آپ کو کبھی ندی نالوں کی وجہ سے سیلاب کا سامنا ہوا ہے؟

أ. ہاں

ب. نہیں

2. آپ کے علاقے میں سیلاب یا قدرتی آفات سے نمٹنے کیلئے ا اقدامات میسر ہیں؟ اگر نہیں تو کسی سہولیات میسر ہونی چاہے؟

أ. ہاں

ب. نہیں

ج. _____

3. اس علاقے میں بارش کے دنوں میں کونسی بیماریاں عام ہوتی ہیں؟

أ. ہیضہ

ب. اسہال

ج. ملیریا

د. ڈینگی

ھ. کوئی اور _____

4. آپ کے علاقے میں کوئی ایمرجنسی طبی مرکز موجود ہے؟

أ. ہاں

ب. نہیں

5. کیاآپ اس تعمیری منصوبے سے آگاہ ہیں اور اسکے حق میں ہیں؟

أ. ہاں

ب. نہیں

6. اس منصوبے کی تعمیر سے ماحولیات پر کیا اثرات مرکب ہونگے یا ہوسکتے ہیں؟

أ. فضائی آلودگی

ب. شور

ج. پانی کی آلودگی

د. زمینی کٹاؤ

ھ. حیاتیاتی ماحول پر اثرات

و. قدرتی وسائل پر اثرات

7. آپکے خیال سے اس منصوبے کی وجہ سے روزگار کے مواقع بڑھیں گے؟

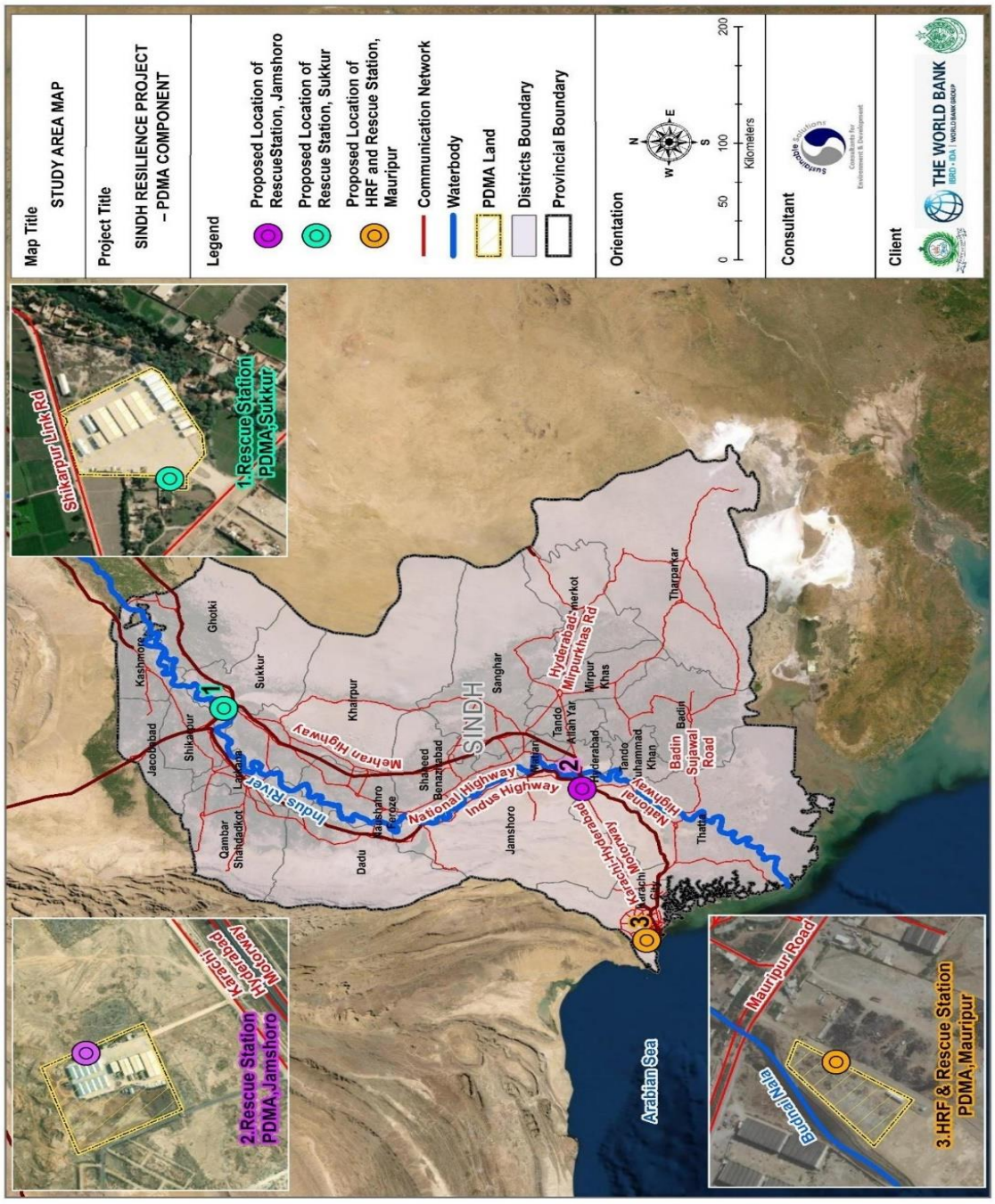
أ. ہاں

ب. نہیں

8. اس منصوبے کے حوالے سے کچھ کہنا چاہیں گے یا کوئی تجویز دینا چاہیں گے؟

أ. _____

Sindh Resilience Project – PDMA Component
Environmental and Social Management Plan (ESMP)
For Construction of Humanitarian Response Facility & Rescue Station at Maripur, Jamshoro and Sukkur



Concerns of Stakeholder:

Annexure 7. Pictorial Glimpses of Stakeholder Consultation

<table>
<tr><th colspan="2">Site: Maripur, Karachi</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>PDMA warehouse staff briefing about existing facility</td><td>Consultation with Muslim weighbridge In-charge and workers</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Consultation with Hotel Owner at Musharraf Mor</td><td>Manager Al Muslim Goods Transport Company describing issues of the area</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Consultation with Manager Hascol pump about employment opportunities in the surroundings</td><td>Consultation with female residents and social workers of 500 Quarters Gulshan-e- Benazir</td></tr>
</table>

	
Consultation with Principal of TCF ST-6 School about educational facilities in Budnai Goth	Consultation with Lal Bhakar Goth Residents
	
Consultation with Kutchi Colony Residents	Discussing roles and responsibilities of Union Council with UC Office Staff Maripur
	
Consultation with Lal Bhakar colony social workers and Residents	Consultation with Budnai Goth Residents
Site: Jamshoro	

	
PDMA warehouse Jamshoro Supervisor briefing about existing facility and proposed development	New Sheds are under construction within the premises of Jamshoro warehouse
	
Discussion with Dr. Maria about health issues and healthcare facilities at Haji Ishaq Goth	Consultative session with residents of Haji Ishaq Goth
	

An awareness campaign was conducted by Population Welfare Department for maternal health	Briefing about Sub-project details to the female residents of Haji Ishaq Goth
	
Consultation with prayer offerors at Masjid of Lal M Khoso Goth	Consultation with female residents of Lal M Khoso Goth
	
Consultation with residents of Lal M Khoso Goth	Consultation with fuel pump employee
	

Consultation with Sitara Halal Hotel Owners	Consultation with PA District Commissioner Jamshoro
Site: Sukkur	
	
Discussion with supervisor PDMA Sukkur warehouse	Consultation with female residents of Ali Khan Khoso Goth
	
Consultation with residents of Dilshad Khan Khoso Goth	Consultation with residents of Nehal Khan Khoso Goth

	
Consultant briefing about sub-project benefits to the residents of Nehal khan Khoso Goth	Consultation with female residents of Lakhanay Community at Rahooja Goth
	
Senior Citizens of Khosa community at Rahooja Goth discussing health issue and absence of healthcare facilities for females	Consultation with Memon Community members of Rahooja Goth
	

Discussion with Principal of Govt. Boys Elementary School at Rahooja Goth regarding how to create awareness about proposed rescue station among teaching staff and students	Sub-Project Disclosure and awareness session to the residents of Khosa Community near Katcha Karachi area of Rahooja Goth

Annexure 8. Detailed ECoPS

Introduction

The objective of preparation of the Environmental Code of Practices (ECP) is to address less significant environmental impacts and all general construction related impacts of the proposed project implementation. The ECPs will provide guidelines for best operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues.

ECP 1: Waste Management

ECP 2: Fuels and Hazardous Substances Management

ECP 3: Water Resources Management

ECP 4: Drainage Management

ECP 5: Soil Quality Management

ECP 6: Erosion and Sediment Control

ECP 8: Air Quality Management

ECP 9: Noise and Vibration Management

ECP 10: Protection of Flora

ECP 11: Protection of Fauna

ECP 13: Road Transport and Road Traffic Management

ECP 15: Cultural and Religious Issues

ECP 16: Workers Health and Safety

The Contractor can also prepare a 'Construction Environmental Action Plan' (CEAP) demonstrating the manner in which the Contractor will comply with the requirements of ECPs and the mitigation measures proposed in the ESMMP of the ESA Report. The CEAP 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 contractors.

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 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 WAPDA for approval. - Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less environmental impact. - Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. - Segregate and reuse or recycle all the wastes, wherever practical. - Collect and transport non-hazardous wastes to all the approved disposal sites. - 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. - 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.
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 labeled 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 (MSDS) 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 Substance 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 the plan for WAPDA approval. - Train the relevant construction personnel in handling of fuels and spill control procedures. - Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses. - Refueling should occur only within bunded areas. - Make available MSDS for chemicals and dangerous goods on-site. - Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by EPA. - Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored and 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 labeled 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 hazardous materials above flood plain level. - 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 should preferably slope or drain to a safe collection area in the event of a spill. - Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		- 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.

ECP 3: 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, storm water systems or underground water tables
Discharge from construction sites	During construction both surface and groundwater quality may be deteriorated due to construction activities in the river, sewerages from construction sites and work camps. The construction works will modify groundcover and topography changing the surface water drainage patterns, including infiltration and storage of storm water. The change in hydrological regime leads to increased rate of runoff and in sediment and contaminant loading, increased flooding, groundwater contamination, 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 a 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.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
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 sediment. - Water the 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)
Construction activities in water bodies	Construction works in the water bodies will increase sediment and contaminant loading, and effect habitat of fish and other aquatic biology.	The Contractor shall: - Dewater sites by pumping water to a sediment basin prior to release off site – do not pump directly off site - Monitor the water quality in the runoff from the site or areas affected by dredge plumes, and improve work practices as necessary - Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers - 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, storm water systems or underground water tables. - Use environment friendly and non-toxic slurry during construction of piles to discharge into the river. - Reduce infiltration of contaminated drainage through storm water management design - Do not discharge cement and water curing used for cement concrete directly into water courses and drainage inlets.
Drinking water	Groundwater at shallow depths might be contaminated and hence	The Contractor shall: - Control the quality of groundwater to be used for drinking water on the bases of

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	not suitable for drinking purposes.	NEQS and World Bank standards for drinking water. Safe and sustainable discharges are to be ascertained prior to selection of pumps. - Tube wells will be installed with due regard for the surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross contamination - All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned
	Depletion and pollution of groundwater resources	- Install monitoring wells both upstream and downstream areas near construction yards and construction camps to regularly monitor and report on the water quality and water levels. - Protect groundwater supplies of adjacent lands

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 a program for prevent/avoid standing waters, which EMSU 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 the relevant standards provided by EPA, before it being discharged into recipient water bodies. - Ensure the internal roads/hard surfaces in the construction yards/construction camps that generate has storm water drainage to accommodate high runoff during downpour and that there is no stagnant water in the area at the end of the downpour. - Construct wide drains instead of deep drains to avoid sand deposition in the drains that require frequent cleaning. - 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 to ensure adequate storm water drains. - Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem. - Reduce infiltration of contaminated drainage through storm water management design

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Ponding of water	Health hazards due to mosquito breeding	- Do not allow ponding of water especially near the waste storage areas and construction camps - Discard all the storage containers that are capable of storing of water, after use or store them in inverted position

ECP 5: Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor shall: - Strictly manage the wastes management plans proposed in ECP1 and storage of materials in ECP2 - Construct appropriate spill contaminant facilities for all fuel storage areas - Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals - Train personnel and implement safe work practices for minimizing the risk of spillage - Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site - Remediate the contaminated land using the most appropriate available method to achieve required commercial/industrial guideline validation results
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall: - Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds

ECP 6: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of construction sites	Cleared areas and slopes are susceptible for erosion of top soils that affects the growth of vegetation which causes ecological imbalance.	The Contractor shall: - Reinstate and protect cleared areas as soon as possible. - Mulch to protect batter slopes before planting - Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turfings/tree plantations
Construction activities and material stockpiles	The impact of soil erosion are: (i) Increased run off and sedimentation causing a greater flood hazard to the downstream, (ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by erosion and/or deposition of sediment damaging the spawning grounds of fish, and (iii) destruction of vegetation by burying or gullying.	The Contractor shall: - Locate stockpiles away from drainage lines - Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds - Remove debris from drainage paths and sediment control structures - Cover the loose sediments and water them if required - Divert natural runoff around construction areas prior to any site disturbance - Install protective measures on site prior to construction, for example, sediment traps - Control drainage through a site in protected channels or slope drains - Install 'cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion - Observe the performance of drainage structures and erosion controls during rain and modify as required.

ECP 8: 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: - Fit vehicles with appropriate exhaust systems and emission control devices, in compliance with the NEQS. Maintain these devices in good working condition. - Operate the vehicles in a fuel efficient manner - Cover haul 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. - 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
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	- 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) - Minimize the extent and period of exposure of the bare surfaces - Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		periods of high wind and if visible dust is blowing off-site - 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.

ECP 9: Noise and 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: - Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures - Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc.
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 - Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines) - Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures - Install acoustic enclosures around generators to reduce noise levels. - Fit high efficiency mufflers to appropriate construction equipment
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall: - Notify adjacent residents prior to any typical noise event 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 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.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		- Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas

ECP 10: 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: - Reduce disturbance to surrounding vegetation - Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetations. - 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 plans. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill and construction of diversion roads, etc. - Do 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

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		- Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction - Supply appropriate fuel in the work caps to prevent fuel wood collection

ECP 11: 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: - 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
	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 located active nests - Minimize the release of oil, oil wastes or any other substances harmful to migratory birds to any waters or any areas frequented by migratory birds.
Vegetation clearance	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 required. - Retain tree hollows on site, or relocate hollows, where appropriate - Leave dead trees where possible as habitat for fauna - 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.
Construction camps	Illegal poaching	- Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.

ECP 13: 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 and submit a traffic management plan to WAPDA for their approval at least 30 days before commencing work on any project component involved in traffic diversion and management. - Include in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, 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 Pakistani Traffic Regulations. - Install and maintain a display board at each important road intersection on the roads to be used during construction, which shall clearly show the following information in Urdu: - Location: chainage and village name - Duration of construction period - Period of proposed detour/alternative route - Suggested detour route map - Name and contact address/telephone number of the concerned personnel - Name and contact address/telephone number of the Contractor - Inconvenience is sincerely regretted.
	Accidents and spillage of fuels and chemicals	- Restrict truck deliveries, where practicable, to day time working hours. - Restrict the transport of oversize loads. - Operate road traffics/transport vehicles, if possible, to non-peak periods to minimize traffic disruptions. - Enforce on-site speed limit

ECP 15: Cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor shall: - Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. - Do not block access to cultural and religious sites, wherever possible - Restrict all construction activities within the foot prints of the construction sites. - Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious/educational institutions close to the construction sites and users make objections. - Take special care and use appropriate equipment when working next to a cultural/religious institution. - Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the PMU - Provide separate prayer facilities to the construction workers. - Show appropriate behavior with all construction workers especially women and elderly people - Allow the workers to participate in praying during construction time - Resolve cultural issues in consultation with local leaders and supervision consultants - Establish a mechanism that allows local people to raise grievances arising from the construction process. - Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters

ECP 16: 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: - 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 Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national acts and rules of the Government of Pakistan - 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 environment, health and safety 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 camps so as to maintain effective surveillance over public health, social and security matters
	Child and pregnant labor	- The Contractor shall: - not hire children of less than 14 years of age and pregnant women or women who

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		delivered a child within 8 preceding weeks, in accordance with the Pakistani Labor Laws and Employment of Child Act (1977).
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	- Provide 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 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 to strictly follow the driving rules - Provide adequate lighting in the construction area and along the roads
Construction Camps	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 14 Construction Camp Management: - Adequate ventilation facilities - Safe and reliable water supply. Water supply from deep tube wells that meets the national standards - Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. - 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

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		- Paved internal roads. - Security fence at least two m height. - Sick bay and first aid facilities
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	- The contractor shall provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities should be at least six m away from storm drain system and surface waters. These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment. - Contractor should provide bottled drinking water facilities to the construction workers at all the construction sites.
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 - ECP 8: Air Quality Management - ECP 9: Noise and Vibration Management - ECP 13: Road Transport and Road Traffic Management
Trainings	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 sexually transmitted infections (STI) 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. - Commence the malaria, HIV/AIDS and STI education campaign before the start of the

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		construction phase and complement it with by a strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing. - 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 ongoing and regular basis. This should be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

Annexure 9. Flood Resistant Design Guidelines

Any proposed development in the regulated floodplain must be consistent with the need to minimize flood damage. This can be accomplished, in part, by using materials, equipment, and construction techniques that are resistant to flood damage in locations that would be wet during a 100-year flood.

- New construction and substantially improved structures (including accessory structures): It is required that materials and equipment located below the flood protection level (and outside of dry flood proofed areas) be resistant to flood damage. This may apply to foundations, floor beams, joists, enclosures, and equipment servicing the building (electrical, plumbing, mechanical, ducts, etc.).
- Non-substantial improvements to existing (pre-FIRM) buildings and non-building development: New and replacement electrical, plumbing, and mechanical equipment must be located or designed to resist flood damage. The entire project should utilize

What Does "Flood Resistant" Mean?

Floodplain areas can be subjected to hydrostatic (standing water) and hydrodynamic (flowing water) pressures during floods. These pressures can result in displaced foundation walls, collapsed structures, floating fuel tanks, scouring, and other damage. Flood resistance thus requires that structural and non-structural components be durable, resistant to flood forces (including buoyancy), and resistant to deterioration caused by inundation with floodwater. Options that require emergency operation (such as shutting off electricity or removing vulnerable components) should be avoided if possible, particularly in areas subject to flash flooding. "Flood resistant" is not "dry floodproofing" of non-residential structures.

Flood Damage-Resistant Building Materials

It is important that all parts of a building or other project that are susceptible to flooding (including fasteners and connectors) be made of materials that are resistant to flood damage. "Flood-resistant materials" include any building product capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. "Prolonged contact" means at least 72 hours, and "significant damage" is any damage requiring more than cleaning or low-cost cosmetic repair (such as painting). The need to replace flood damaged drywall or other material is considered "significant damage" and is thus not acceptable. Components that are not inundated should be resistant to excessive humidity.

Flood damage-resistant materials include:

- Glazed brick, concrete, concrete block, glass block or stone (with waterproof mortar or grout);
- Steel trusses, headers, beams, panels, or hardware;
- Naturally decay resistant lumber, recycled plastic lumber, or marine grade plywood;
- Clay, concrete, rubber, or steel tiles (with chemical-set or waterproof adhesives);
- Cement board;
- Metal doors, cabinets, and window frames;
- Mastic, silicone, or polyurethane formed-in-place flooring;
- Sprayed polyurethane foam or closed-cell plastic foam insulation;
- Water-resistant glue; and
- Polyester epoxy paint (mildew-resistant paint contains toxic ingredients and should not be used indoors).

Anchoring

Foundations, equipment, accessory structures, and other components located below the flood protection level must be firmly anchored to resist flotation, collapse, and lateral movement.

Mechanical, Plumbing, and Electrical Systems

Location above the flood protection level is generally the best way to protect service equipment, such as heating, ventilating, air conditioning, plumbing appliances, plumbing fixtures, duct systems, and electrical equipment (service panels, meters, switches, and outlets). If these components are at a lower level, they must be designed to prevent damage from flooding. This may involve waterproof enclosures, barriers, protective coatings, or other techniques to protect vulnerable components. The municipality may require certification from a licensed professional that the standards for resistance to flood damage are met.

Backflow and Automatic Shut-Off Valves

Flooding can cause sewage from sanitary sewer lines to back up into buildings through drain pipes, causing both damage and health hazards. Backflow valves are designed to temporarily block pipes and prevent flow into the building and should be installed on any pipes that leave the building or are connected to equipment located below the flood protection level. In addition to sanitary sewer and septic connections, this may include water lines, washing machine drain lines, laundry sinks, downspouts, and sump pumps. Fuel supply lines must be equipped with float operated automatic shut-off valves.

Storage Tanks

Unanchored fuel tanks can be easily moved by flood waters, posing a serious threat of contamination and other damage. Even a buried tank can be pushed to the surface by buoyant effects. A tank can be anchored by attaching it to a concrete slab that is heavy enough to resist

the force of flood waters or by running straps over it and attaching them to ground anchors. Tanks and other containers should have watertight fill caps, vents that extend above the flood protection level, and accurate labeling of contents (so that emergency personnel know what it contains if the tank breaks loose and floats away).

Additional Resources

- *Wet Flood proofing Requirements for Structures Located in Special Flood Hazard Areas*, Technical Bulletin 7-93, FEMA FIA-TB-7 (1993), available at http://www.fema.gov/library/viewRecord.do? id=1720, includes planning, safety, and engineering considerations for wet flood proofing.
- *Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*, Technical Bulletin 2, FEMA FIA-TB-2 (2008), available at http://www.fema.gov/library/ viewRecord.do?id=1580, includes lists of acceptable materials for flood-resistant construction.
- *Protecting Building Utilities from Flood Damage: Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems,* FEMA 348 (1998), available at http://www.fema.gov/hazard/flood/pubs/pbuffd.shtm. This publication provides technical guidance for the design and construction of flood-resistant utility systems, including HVAC systems, fuel systems, electrical systems, sewage management systems, and potable water systems.
- *Elevator Installation for Buildings Located in Special Flood Hazard Areas*, Technical Bulletin 4-93, FEMA FIA-TB-4 (1993), available at http://www.fema.gov/library/viewRecord.do?id=1717. Provides guidance concerning the installation of elevators below the Base Flood Elevation.
- *Flood-Resistant Design and Construction,* American Society of Civil Engineers (ASCE) 24-05, purchase at www.asce.org, highlights available at http://www.fema.gov/library/viewRecord.do?id=3515. ASCE 24 is a referenced standard in the NYS Building Code and the NYS Residential Code. Buildings designed according to ASCE 24 are better able to resist flood loads and flood damage

Annexure 10. Asbestos Handling Guidelines

Guidelines Asbestos and Asbestos Based Product use during Construction

Asbestos is a group of naturally occurring fibrous silicate minerals. It was used widely in the production of many industrial and household products because of its useful properties, including fire retardation, electrical and thermal insulation, chemical and thermal stability, and high tensile strength[4].

Asbestos based products include Asbestos –Cement (A-C) construction materials such as A-C flat and corrugated sheets, A-C pipe, and A-C water storage tanks. Over 90% of the asbestos fiber produced today is chrysotile which is found in these products. Vehicle brake, clutch pads, roofing and gaskets are some other products that are still being manufactured with asbestos content. Due to international laws banning the use of asbestos, it is hardly used in construction materials other than asbestos –cement products. However, it is still found in older buildings in the form of friable surfacing materials, thermal system insulations, non-friable flooring materials, and other applications. In Sri Lanka, asbestos roofing sheets are widely used as it is the most cost effective and durable material given climate, environment and other factors. Other alternatives to asbestos roofing sheets in Sri Lanka are clay tile, zinc-aluminum, cadjan (matted coconut/Palmyra/palm leaves) and concrete. These alternatives have disadvantages such as:

- Clay tiles are easy to remove, and in areas where there are monkeys it poses a practical problem. Monkeys tend to travel over roofs and either deliberately or accidentally break tiles, thus expenses for replacing is high.
- Zinc-Aluminum – While durable and long lasting, given the tropical climate and monsoon rains, such roofing heats up during the day and during rainy periods the noise makes it impractical especially to use in classrooms.
- Cement – due to the climate in Sri Lanka if not properly treated can result in leaks and damage to the structure. Furthermore, in high temperatures the heat absorption is high thus increasing the temperature in the buildings. In classrooms, it would make it difficult for students and teachers to work. Furthermore, concrete roofs are costly, and will not be affordable, given the large number of school infrastructure requirements that will need to be met through the project.
- Cadjan roofs while environmentally friendly, need to be replaced frequently, causes leaks and will not be acceptable on school buildings.

Ban on Asbestos Use:

As health risks related to exposure to asbestos is widely known, many countries have banned the commercial use of asbestos. The International Labor Organization (ILO) established an Asbestos Convention (C162) in 1986 to promote national laws and regulations for the "prevention and control of, and protection of workers against, health hazards due to

occupational exposure to asbestos". As of March 4, 2008, 31 countries had ratified the Convention, 17 of them have banned asbestos use. ILO asbestos convention requirements include:

- Work clothing to be provided by employers,
- Double changing rooms and wash facilities to prevent dust from going home on street clothes, Training of workers about the health hazards to themselves and their families,
- Periodic medical examinations of workers,
- Periodic air monitoring of the work environment, with records retained for 30 years,
- Development of a work plan for demolition work, to protect workers and provide for proper waste disposal, and
- Protection from retaliatory and disciplinary measures of workers who remove themselves from work that they are justified in believing presents a serious danger to health.

Health Risks:

Health hazards from breathing asbestos dust include:

- Asbestosis – a lung scarring disease
- Form of cancer such as mesothelioma.

The main risks of exposure from asbestos is where fibers are easily made air borne under little pressure, such as cutting of A-C products that can release fibers. Risks are from construction materials that need to be altered, repaired and disposed of that may release particles into the air, and increase the risk of inhalation. Renovations, repairs and decommission of buildings containing A-C products such as roof sheets can pose a risk. However, in the case of Asbestos –Cement (AC) corrugated sheets, the fiber is present in the non- friable form which means that fiber is embedded in cement and cannot be easily air-borne. Such materials are known to have little health risk once (a) the roof has been completed and (b) given that material is in good condition and not disturbed[8]. Although IDA Group's Good Practice Note on Asbestos , and its Health and Safety Guidelines do not encourage the use of asbestos products in construction, in light of the practical uses for construction of school infrastructure, the costs, its availability in local markets and lack of feasible alternatives, the use of asbestos is the most feasible option. However, to minimize the health risks that asbestos products do pose, the following guidelines adapted from the World Bank's Health and Safety Guidelines and other sources are recommended to be followed. As Sri Lanka has no regulations regarding the use of Asbestos, the use of ILO convention guidelines as stated above are recommended as well.

Construction phase:

- To minimize the risk of damage of A-C sheets for roofing, transportation of material must be done with care. Where possible, sheets should be transported in airtight containers or with dust covers.
- During installation of sheets, ensure that damage is minimized. Use of power tools to drill holes that may release particles needs to be kept to the minimum.

- Use a protective sheet (i.e. insulation foil) between the A-C sheets and the classrooms to reduce the risk of minute particles entering the rooms.
- Workers who are involved in handling and installing A-C sheets should take precautions to minimize exposure by wearing protective masks and showering to minimize spread of dust. Work clothes used during the installation of sheets should be washed and workers change to clean clothes before leaving construction site.
- Workers should be made aware of the risks of A-C sheets, and how to minimize these risks.

Post Construction/De-Commissioning:

- Contractors should dispose of waste containing asbestos in a manner that does not pose a health risk to the workers concerned or the population in the vicinity. Disposal at approved landfills and prompt burial under various levels of material apply to friable asbestos waste. Contractors should consult the Local Authority and Central Environmental Authority to obtain guidance on proper disposal of material.
- Contractor should be encouraged to develop an asbestos management plan that identifies the content (whether it is in friable form and has potential to release fibers), and proper removal procedures.
- During the removal of A-C sheets, workers should wear proper protective gear such as masks and shower to prevent the spread of dust. Clothes worn during this process should be washed and workers should change into clean clothes prior to leaving construction site.
- Workers who are, or have been, exposed to asbestos in their occupational activities should be provided, in accordance with national laws and practices, with such medical examinations as are necessary to supervise their health in relation to the occupational hazard, and to diagnose occupational diseases caused by exposure to asbestos. For the prevention of disease and functional impairment related to exposure to asbestos, all workers assigned to work involving asbestos exposure should be provided with:

- a pre-assignment medical examination;
- periodic medical examinations at appropriate intervals (at least every 3 years);
- other tests and investigations, in particular chest radiographs and lung function test, which may be necessary to supervise their state of health in relation to the occupational hazard and to identify early indicators of disease caused by asbestos;
- a copy of their medical record.
- The above requirements will be based on the type of construction and its magnitude.

Annexure 11. Chance Find Procedure

Chance Find Procedures

Chance find procedures which will be used during this Project are as follows:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Ministry in charge of Department of Archaeology take over;
- Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Ministry immediately (within 24 hours or less);
- Responsible local authorities and the Ministry in charge of Department of Archaeology would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of the Department of Archaeology and Museums (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- Decisions on how to handle the finding shall be taken by the responsible authorities and the Ministry in charge of Department of Archaeology. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Ministry in charge of Department of Archaeology; and
- Construction work could resume only after permission is given from the responsible local authorities and the Ministry in charge of Department of Archaeology concerning safeguard of the heritage.

These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered or observed.

Annexure 12. Sample Term of Reference

Environment Specialist will be based in Project Implementation Unit (PIU) SRP-PDMA Karachi.

Tasks: Environmental Specialist will be responsible for the following duties and responsibilities relevant to project environmental safeguards compliances and mitigation measures

Objective:

Provide expert support to executing agencies in the office and field, provide support to implement activities related to the project components to compliance the environmental safeguards and mitigation measures.

Main responsibilities are:

- Deal with environmental aspects of the project and provide feedback to the Project Director on implementation of environmental action plan under the activities of the project.
- Support in compliance of the credit conditions and covenants pertaining to Environmental Safeguards.
- Update in Implementation of Environmental aspects of the project.
- Oversee environmental monitoring of the ESMF and site specific ESMPs
- Provide technical support to works consultants in the development of site specific ESMPs
- Coordinate with implementing agencies and works contractors for onsite implementation of ESMPs.
- Organize and conduct the trainings on ESMF and ESMP compliances as proposed in mitigation plan.
- Prepare monthly, quarterly progress reports of Environment and Social Management Framework (ESMF / ESMP).
- Prepare final progress report of the ESMF / ESMP and submit to the World Bank.
- Ensure the HSE compliance onsite by the civil works consultants / contractor at project sites.
- Coordinate and conduct Environmental Field Monitoring visits of Project Areas.
- Review and revision of documents and ensuring timely delivery of outputs as agreed between The World Bank and PIU, SRP-PDMA Component.
- As and when required contribute to the ongoing activities of the safeguard unit.
- Assist the Project Director in routine office matter when require.
- Work as the focal point for World Bank to provide necessary requirements of environmental compliances within the project.

Academic Qualification:

Post Graduate degree in Environmental Sciences with 5-8 years of relevant work experience in dealing with Environmental management and implementation in development projects.

Salary and Benefits:

SRP-PDMA will decide as per their rules and regulations for the project

Duration: Till project duration

Social Safeguards Specialist

Social Safeguards Specialist will be based in Project Implementation Unit (PIU) SRP-PDMA Karachi.

Tasks: Social Safeguards Specialist will be responsible for the following duties and responsibilities relevant to project social safeguards compliances and mitigation measures

Objective:

Provide expert support to executing agencies in the office and field, provide support to implement activities related to the project components for compliance to social safeguards and mitigation measures.

Main responsibilities are:

- Deal with social aspects of the project and provide feedback to the Project Director on implementation of RPF, GRM and social safeguards under the activities of the project.
- Support in compliance of the conditions and covenants pertaining to Social Safeguards.
- Oversee social monitoring of ESMPs
- Provide technical support to works consultants in the development of site specific ESMPs
- Coordinate with implementing agencies and works contractors for onsite implementation of ESMPs.
- Organize and conduct the trainings on ESMF and ESMP compliances as proposed in mitigation plan.
- Prepare monthly, quarterly progress reports of ESMP
- Coordinate and conduct Social Field Monitoring visits of Project Areas.
- Review and revision of documents and ensuring timely delivery of outputs as agreed between The World Bank and PIU, SRP-PDMA.
- As and when required contribute to the ongoing activities of the safeguard unit.
- To carry out the screening of the sub-projects with respect to the social aspects as defined in the ESMF;
- Monitor and check the proper implementation of all social mitigation measures as suggested in ESMP;
- Monitoring and evaluation of social related matters of the project and maintain a social complaint register to document social issues;
- To supervise the Contractor's activities and make sure that all the contractual obligations related to the social compliance are met;
- Review of periodic environmental and social reports being prepared by the investor/contractor
- Ensure inclusion of ESMMP guidelines in project designs.

Academic Qualification:

Post Graduate degree in Social Sciences with 5-8 years of relevant work experience in dealing with Environmental management and implementation in development projects.

Salary and Benefits:

SRP-PDMA will decide as per their rules and regulations for the project

Duration: Till project duration

Annexure 13. ESMP Monitoring Check List

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
Design Phase							
Biodiversity and Natural Resources	The project sites WSR and AWS may require tree cutting for site clearing.	1. Incorporate technical design measures to minimize unnecessary removal of trees and vegetative cover; 2. Plan for compensatory planting of eight trees against each fallen tree of similar floral function; 3. Disallow introduction of invasive/ exotic species; and recommend native species for plantation.	Construction designs Tree count Compensatory Tree Plantation Plans Tree Species	At the time of design preparation At the time of design finalization			
Natural Disasters	The Sub-project site is in Zone 2- minor to moderate in case of earthquakes. There is also some seasonal flooding during Monsoor rains due to blocked drains	1. The building design will be earthquake resistant according to Building Codes of Pakistan with Seismic provision and international best practices to avoid damage caused by earthquake; 2. Variety of structural engineering measures or structural components like shear walls, braced frames, moment resisting frames, and diaphragms, base isolation, energy dissipating devices and bracing of non-structural components are proposed. Simpler techniques include avoiding soft stories and bolting the sill plate of houses to the foundation; 3. Primary focus of earthquake design is initial life safety and getting people out of the building safely, not necessarily the ability of a building to withstand the effects of an earthquake, or to ensure	Sub-project design maps with incorporation of building codes for Zone 2 Construction contractor ToRs	At the time of design			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		occupancy or functionality following an event. Therefore building design will include emergency exits and alarm system. 4. Planning, designing and constructing the building to minimize any potential flood damages using guidelines of **Annexure 10.** Following are proposed: ▪ elevating as much of the building as possible above the design flood level, ▪ designing the building foundation and any portions subject to flooding to withstand design flood conditions and loads, ▪ using flood-damage-resistant materials for any portions of the building below the design flood level ▪ where flood proofing is permitted, employing appropriate methods and materials to either dry-flood proof or wet-flood proof those portions of the building below the design flood level					
Water /Electricity/ Natural Gas/ Fuel Consumption	There will be an increase in infrastructure utilities/ resource consumption due to construction work.	1. Prepare an Energy and Water Conservation Plan for construction 2. Design of buildings will include installation of Solar Panels; 3. Provision of Low Voltage electrical appliances will be made in procurement procedures.	Design provision for water, electricity, natural gas and fuel conservation	At the time of design			
Air Quality and Noise Levels	Project activities associated with construction may increase the ambient air quality and noise levels of the at the sub-project sites. The impacts are likely to be moderate.	1. Air quality and noise level baselines will be established to enable monitoring during construction phase; 2. Provision of compliance to NEQS of vehicular emission will be made in the contract of construction contractor and SOP's of PMD vehicles;;	Preparation of Emissions Monitoring Plan, Traffic Management Plan and Site Management Plan	At the time of design			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		3. Locations of Batching Plant, concrete mixers and other noise generating equipment will be identified away from residents; 4. Contractor shall prepare an Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles with operations and maintenance plan for the same; 5. Traffic Management Plan for construction will be formulated during design phase that enable continuous traffic flow and avoid congestions which result in increased vehicle smoke density at a given area; 6. Plan to neutralize dust emissions from construction activity, such as regular watering of sub-project sites to settle dust; 7. Use of Hazardous material list will be strictly prohibited in construction and provision will be made part of the contract.	Construction contractor ToRs				
Solid Waste Management	Improper solid waste disposal can result in increased air pollution through burning of waste, vector borne diseases, contamination of water sources and ambient aesthetics for surrounding communities. The impacts are likely to be moderate.	1. Prepare a detailed **Solid Waste Management Plan** for construction site 146inimizing use of plastics and encourage recycling 2. Identify current municipal systems of waste management or private waste disposal services; 3. Placement of waste collection containers throughout the project area; 4. Disallow the burning of any of type of waste; 5. Prepare plans for the safe handling, storage and disposal of harmful materials and hazardous waste	Solid Waste Management Plan Contractual binding on prohibited use of Hazardous Material for construction contractor (CC) Construction contractor ToRs	At award of construction Contract			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
Workers Health and Safety	Use of heavy machinery and handling of chemicals by workers can result in health impacts and accidents. The impacts are likely to be moderate.	1. Prepare a **Worker Health and Safety Plan** for the construction phase	Worker Health and Safety Plan	At award of Construction Contract			
Operations Phase							
Landscape/Soil	Construction at sites is likely to carry out site clearance, vehicular, labour and machinery movement causing soil erosion and compaction. There is also a potential for contamination of soil via runoff from construction activities including oil spills, construction material, dredged / spoil materials and construction waste. Impact on soil quality is high in case of the spill.	1. Removal of vegetation and trees will be avoided to the extent possible; 2. Proper Safe drainage of run-off from construction activities will be ensured; 3. Removal of vegetation and trees will be avoided to the extent possible; 4. Water will be sprinkled during construction building of foundation to avoid soil erosion and dust pollution; 5. Construction materials will be stored in proper stores on impervious sheets to avoid any soil contamination; 6. Machinery and vehicles will be operated at designated routes to avoid erosion and compaction of un-impacted soils; 7. Visual Inspection will be carried out for land contamination and dust emissions; 8. The soil contaminated from minor and moderate spills will be removed and will be handed over to waste contractor for treatment at nearest incineration facility or waste disposal and treatment at Mehmood Boti; 9. Major spills may require specialized treatment such as incineration, bioremediation and biodegradation. The biological agents will be introduced to the spill to hasten biodegradation. Most of the	Visual inspections and photographic record of site clearing and oil spills. Water sprinkling	Daily			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		components of oil will be broken down by bacteria and other microorganisms into harmless substances such as fatty acids and carbon dioxide. To stimulate the growth of the microorganisms, fertilizing nutrients like nitrogen and phosphorous will be placed near the oil tanks..					
Ambient Air Quality and Climate	The construction activities at sub-project sites will cause impact on air quality, cement mixers (Batch Plant), movement of the machinery, generators soil excavation, construction vehicles, is likely to generate dust and exhaust emissions. Impact on local air quality is moderate	1. Contractor shall provide an **Emissions Monitoring Plan** to ensure constant checking of emissions by construction machinery and vehicles; Contractor should provide an operations and maintenance plan for the same; 2. Water will be sprinkled twice a day to avoid fugitive dust emissions; 3. Construction machinery and vehicles will be kept in good conditions to avoid vehicular emissions. Vehicular and generator exhaust emissions will be monitored to ensure compliance; 4. Unnecessary movement of vehicles will be avoided at the construction location; 5. Open burning of solid waste from the Contractor's camps should be strictly banned; 6. Wind breaks /barriers (either natural or constructed) will be deployed to reduce the possibility of suspended particles in air; 7. Raw materials such as cement, gravels and sand will be kept under sheet covers to prevent air flow; 8. In order to further reduce the environmental impact Cement Works (Concrete Batching Plant), the concrete batching plant will incorporate the following design and practices:	Ambient Air Quality monitoring for SOx, NOx and Particulate Matter PM2.5/10	Monthly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		▪ Cement will be transferred directly from barges to the plant. ▪ All mixing will be in the enclosed electric motor driven plant mixer, NOT in trucks. ▪ Truck loaded with concrete will be in wet form. ▪ All washing water used by the batch plant and storm water will be collected and stored and recycled for re-use. ▪ No water will be discharged outside the plant boundary. ▪ Concrete recycling machine be used to recycle waste material to slurry water and aggregates for reuse.					
Surface/Ground Water Resources	Drainage channel in close vicinity of project site is a Shadman nullah leading to River Ravi. Construction activities may encourage soil erosion and waste may increase the sediment loads into the city drainage, while accidental leaks/spills of oil/fuel from storage tanks or maintenance vehicles can also pollute surface waters. The impact is likely to be low as the construction site is 1km meters away from the drainage channel.	1. Contractor shall execute the Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles with operations and maintenance plan for the same; 2. Water will be sprinkled twice a day to avoid fugitive dust emissions; 3. Contractor shall execute the Traffic Management Plan to enable continuous traffic flow and avoid congestions which result in increased vehicle smoke density; 4. Construction machinery and vehicles will be kept in good conditions to avoid vehicular emissions. Vehicular and generator exhaust emissions will be monitored to ensure compliance; 5. Unnecessary movement of vehicles will be avoided at the construction location;	Surface Water Quality	Monthly Quarterly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		6. Open burning of solid waste from the Contractor's camps work areas should be strictly banned; 7. Wind breaks /barriers (either natural or constructed) will be deployed to reduce the possibility of suspended particles in air; 8. Raw materials such as cement, gravels and sand will be kept under sheet covers to prevent air flow; 9. In order to further reduce the environmental impact of Cement Works (Concrete Batching Plant), the concrete batching plant will incorporate the following design and practices: 10. Cement will be transferred directly from barges to the plant 11. All mixing will be in the enclosed electric motor driven plant mixer, NOT in trucks. 12. Truck loaded with concrete will be in wet form. 13. All washing water used by the batch plant and storm water will be collected and stored and recycled for re-use. 14. No water will be discharged outside the construction boundary. 15. Concrete recycling machine be used to recycle waste material to slurry water and aggregates for reuse.					
Water /Electricity/ Natural Gas	Construction activities require a large amount of water that may reduce the availability of water in residing area. It will add	1. Contractor will execute the Energy and Water Conservation Plan 2. Water meters will be installed at sub-project site to monitor water consumption;	Water, Electricity and Natural Gas Consumption	Monthly/ Quarterly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
and Fuel Consumption	load to the electricity, natural gas fuel consumption increasing GHG emissions. The impact is likely to be high.	3. Construction staff will be trained on water conservation practices to avoid excessive loss; 4. Water required for construction should be obtained in a way so that water availability and supply to residing area remains unaffected; 5. Approval will be attained from local authorities prior to construction work..	Energy Conservation Plan				
Solid Waste Generation	During construction phase, solid waste can be generated from discarded equipment parts, scrap metals, equipment boxes, wood parts, empty bags, and leftover construction debris. The construction material and waste may include toxic/hazardous chemical materials. If not contained the impact of solid waste is likely to be high.	1. Solid Waste Management Plan will be executed by Construction Contractor. In case of the occurrence of toxic/hazardous chemical materials, it will be handled according to hazardous waste management best international practices. The plan will be prepared with following provisions: 2. Solid waste collection, segregation, storage and disposal will be carried out for waste generated. For at source segregation separate waste bins will be placed at sub-project sites. Recyclable material will be segregated whereas non-hazardous waste will be disposed-off at approved disposal site; 3. Private contractors will be hired for responsible disposal of construction waste 4. Labeling of containers will be carried out including the identification and quantity of the contents, hazard information; 5. Marking of Hazardous/toxic waste 'if generated' separately and disposal using international best practices through registered contractor; 6. Used oil will be collected in separate containers stored on impervious platform	Solid Waste Management Plan Amount and type of solid waste generated from sub-project sites; List of hazardous chemical used for construction	Monthly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		with restricted access and must be sold to licensed contractor; 7. Burning of solid and waste oil should be strictly prohibited 8. Training of workers will be carried out in the storage and handling of materials and chemicals that can potentially cause soil contamination; 9. Emergency Response Plan will be prepared to address the accidental spillage of fuels and hazardous/toxic material, fire, vandalism and natural hazards; 10. On completion of the construction phase of the project, the contractor will be required to rehabilitate the site. Rehabilitation will include removal of all construction materials and wastes, and the grading and landscaping of all exposed sites that may be prone to erosion. Where natural erosion protection measures may not be possible or practical, suitable physical erosion protection methods will be used. The purposes of site rehabilitation will be to minimize the potential for soil erosion, enhance the aesthetic appearance of the site and restore safe public access to the surrounding area.					
Noise Levels	The construction activities are likely to generate high noise levels. The sources of noise in construction include Asphalt Plant excavation work, heavy earth moving equipment/ machinery, pilling work, welding, cuttings, drilling, grinding and material	1. The location for stationary noise sources like asphalt plant, grinding, drilling and welding machinery will be selected at a reasonable distance from residing population. The cement tankers will be working inside enclosure with cladding to reduce noise;; 2. The construction material loaders will only operate during night time as per	Noise Monitoring Residing Areas and Construction Site	Monthly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
	loading/offloading vehicles. Impact is likely to be high.	rules of traffic police in Islamabad. Working hours will be allocated for the use of batching plant, equipment and other machinery; 3. School time and late night construction activities will be avoided; 4. Use of noise barriers in locations next to schools; 5. Blowing of horn will be strictly prohibited; 6. Noise monitoring will be carried out at various locations using noise meters. Site labour working in high noise areas including asphalt plant, grinding and welding machinery, where noise level exceeds 85 dB (A), will wear earplugs and ear muffs; 7. Measures will be taken to maintain noise level of 55 dB at day and 45 dB at night time will be maintained.					
Biodiversity and ecological resources (Flora and Fauna)	The impacts on ecology are negligible entirely build up and there are very few trees. However, if the construction requires cutting of trees and clearing of vegetation.	1. Eight trees will be planted for every tree cut during construction; 2. Invasive or exotic species will not be introduced through plantation.	Tree count Tree Plantation in designated area and count eight for one cut	Prior /Start/ Post construction			
Public Health and Safety	Construction activities and movement of heavy vehicles may impact public safety. Similarly emissions and noise from the site may impact the	1. Use signage to inform general public of construction area and its limits; 2. Train drivers operating heavy vehicles in road and pedestrian safety; 3. Set appropriate speed limits to avoid accidents;	Traffic Management Plan Public Safety Plan Complaint/	Monthly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
	health of residing communities	4. Use of heavy vehicles on public roads will be avoided during hours when students are coming to school or leaving school; 5. Placement of construction and diversion signage, particularly at urban areas and at sensitive/accident-prone spots, in accordance to a Public Safety Plan; 6. Provision of alternate routes for use by the public will be planned	Accident Register				
Workers Health and Safety	Use of heavy machinery and handling of hazardous waste and chemicals may result in health impacts for workers on the construction site.	In accordance to the **Solid Waste Management** and **Workers Health and Safety Plan**, ensure: 1. The workers have full access to health facilities and emergency response centers (fire, earthquake and floods) and police station. In case of emergency, the injured will be taken to the nearest medical facility. 2. Provision of clean drinking water will be ensured for the construction crew; 3. Hygiene inspections will be carried out to avoid disease epidemic; 4. In case of unlikely incidents (fire, vandalism) the workers will be evacuated and emergency response and law enforcement agencies will be engaged; 5. Fire safety alarms will be installed at various locations; 6. Fire extinguishers will be placed at various locations including a water hose installation at ground level; 7. Fire safety and emergency response trainings will be conducted;	Workers Health and Safety Plan and trainings Medical record of workers	Monthly			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		8. Hazards indicator signs and firefighting equipment will be installed; 9. The construction crew will be trained on important aspects of workplace safety; 10. Construction machinery operators and drivers will be trained to avoid associated accidents using machines and vehicles; 11. Flammables and other toxic materials will be marked and stored at secured sites; 12. Onsite first aid kits will be kept at construction sites and randomly moving vehicles\machinery. 13. Do not allow workers with inadequate training to operate heavy machinery; 14. Provision of appropriate and high quality Personal Protective Equipment (PPE) to workers such as gloves, vests, hard-hats, masks etc.; 15. Train workers in the use of PPE and safety measures while using heavy machinery and handling chemicals. 16. Follow guidelines for Asbestos and Asbestos based product use in construction (Annexure 11)					
Physical /Cultural/ Archeological Resources	The sub-project area has religiously and culturally important sites at a reasonable distance. Excavation work during construction may result in the uncovering of ancient	Construction staff will be trained and informed on identifying the evidence of archaeological/historic remains. In case evidence of archaeological remains is found during construction activities, the actions listed below will be undertaken.	Consultation with the relevant departments Preparation of PCR Plan, if needed.	At the start of construction			

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
	sites or artifacts. Impact is likely to be low.	1. Excavation work in the vicinity of the find will be stopped; 2. Assistance will be sought from the nearest office of the Department of Archaeology and Museums to identify the remains; 3. If the department decides to salvage the find, PMD will provide assistance. 4. Detailed procedure for Archaeological Chance Finds included in Annexure 12.					
Traffic Management	The sub-project site is in an urban area close to social sensitive receptors like houses, schools, colleges and offices. The construction work may highly impact the traffic flow.	1. Contractor will execute the Traffic Management Plan. 2. Vehicles will be inspected prior to start of construction work. 3. Alternate routes will be created to avoid disturbance to schools and hospital; 4. Movement of construction equipment will be limited to specific duration when there is least disturbance to the residing offices and nearby schools; 5. Adequate road signs will be erected to warn general public; 6. The contractor will be advised to follow vehicular maintenance to reduce engine noise; 7. Drivers will be trained to follow the designated routes and avoid honking; 8. The construction trucks will be adequately covered with tarpaulin covers to avoid flow into air.	Traffic Management PLan Construction vehicles trimmings Accident register	Continuous			

Operations Phase							

Aspects	Environmental and Social Impacts	Proposed Mitigation Measures	Monitoring Parameter(s)	Frequency	Yes	No	Comments
		6. Radar will be installed at a specified height.					
Air Quality and Climate	An increase in number of vehicles entering the offices may pose moderate negative impacts on the air quality of the area.	1. The project staff will be advised to car pool and use and local transport; 2. Provision of pick and drop for staff to avoid additional load on air quality; 3. Vehicles with excessive smoke emissions should not be allowed to enter the sub-project locations.	Vehicular Emissions	Quarterly			
Solid Waste Generation	There will be an increase in solid waste generation due to additional staff and building maintenance. In the presence of waste disposal system in the area impact is Moderate Hazardous waste will include rechargeable batteries from the AWS and solar panels.	1. Decrease solid waste going to landfills by segregating at source with labeled dust bins for biodegradable, non-biodegradable and recyclable products; 2. Disposal of biodegradable to the municipality for treatment; 3. Clearance of reusable and recyclable waste to certified recycling companies; 4. Recycle rechargeable batteries through certified companies	Weight of waste generated and disposal	Monthly			

Annexure 14. Quarterly Progress Report

1. Project Description

2. Internal Monitoring

1. ESSMP Monitoring Checklist
2. Monitoring Reports

3. ESMMP Reporting

1. Construction site monitoring report
2. Traffic management monitoring report
3. Time table of works
4. Construction waste monitoring report
5. Noise, air and vehicular emission monitoring report
6. Water quality monitoring report
7. Labour health and safety monitoring report
8. Labour training Monitoring report
9. Hazardous waste handling Monitoring report
10. Energy and water conservation Monitoring report
11. Site restoration monitoring report
12. Sampling, testing and monitoring Report

4. External Monitoring/Third Party Validation

Third Party Evaluation Report

5. Corrective Action Plan

6. Photographic Evidence