Solid Waste Emergency and Efficiency Project (SWEEP)

Environmental and Social Management Framework

DRAFT

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Sindh Solid Waste Management Board
Government of Sindh

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ABBREVIATION & ACRONYMS

C&D	Construction and Demolition
CBOs	Community Based Organizations
CHS	Community Health and Safety
CLICK	Competitive and Livable City of Karachi
COVID-19	Corona Virus Disease of 2019
CPESMP	Construction Phase Environmental & Social Mitigation Plan
dBA	Decibel A-Weighted
DMCs	District Municipal Corporations
E&S	Environmental and Social
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
GBV	Gender Based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GoS	Government of Sindh
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
IBRD	The International Bank for Reconstruction and Development
IDA	International Development Association
IEE	Initial Environmental Examination
KMC	Karachi Metropolitan Corporation
KSDP	Karachi Strategic Development Plan
KWSB	Karachi Water and Sewerage Board
LGD	Local Government Department
LGHTPD	The Local Government Housing, and Town Planning Department
LMP	Labor Management Procedures
M&E	Monitoring and Evaluation
MGD	Million Gallons Per Day
MIS	Management Information system
MRF	Material Recovery Facility
MW	Mega Watt
NGOs	Non Governmental Organization
NOC	No Objection Certificate

O&M	Operation and Maintenance
OHS	Occupational Health and Safety
P&D	Planning and Development
PAPs	Project Affected Persons
PIU	Project Implementation Unit
PM	Particulate Matter
POM	Project Operational Manual
PPE	Personal Protection Equipment
RF	Resettlement Framework
RP	Resettlement Plan
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SEQS	Sindh Environmental Quality Standards
SITE	Sindh Industrial Trading Estate
SOPs	Standard Operating Procedures
SSWMB	Sindh Solid Waste Management Board
SWEEP	Solid Waste Emergency and Efficiency Project
SWM	Solid Waste Management
TMP	Traffic management Plan
TPV	Third Party Validation
UN	United Nations
VAC	Violence against Children
WB	World Bank
WHO	World Health Organization

Executive Summary

Background

The city of Karachi generates an estimated 12,000 to 16,000 metric tons of municipal solid waste every day. Only a fraction (60%) of this waste is collected, and none of it is disposed in sanitary engineered facilities. The collected waste is transported to two large unsanitary dumps, Jam Chakro and Gond Pass, located within 30-40 km from the city center. Neither facility meets international standards for waste disposal. The chronic backlog of uncollected waste has decreased the operating capacity of much of the urban infrastructure – i.e. the city's drainage system is clogged by waste, contributing to persistent flooding; movement along several secondary roads is impeded due to litter; water sources are contaminated, and public spaces are unattractive and unsanitary. The environmental and human health implications are severe: open burning of waste generates high levels of persistent and toxic chemicals that contribute to poor air quality and cause cardio-vascular diseases; inadequate solid waste management (SWM) has been identified as an important factor behind continued incidence of polio in Karachi; surface and groundwater pollution by inadequate disposal of waste is well documented, and a factor in the prevalence of water-borne diseases. The Government of Sindh (GoS) is cognizant of problems in the waste sector and has taken several steps to improve the situation in recent years. GoS set up a specialized agency in 2014, the Sindh Solid Waste Management Board (SSWMB), and has increased allocations and expenditure significantly to engage private sector contractors for front-end waste collection.

The COVID-19 emergency led to enforced lockdown and restrictions of operations across the city since early March 2020. This has further impacted the provision of SWM services, as workers involved with collection, transport, and disposal of waste have not been able to operate.

Project Overview

The proposed project will finance interventions that will be implemented over two phases: (a) in the immediate emergency response phase, activities will aim to mitigate (i) high flooding risks linked to the 2020 monsoon and caused by accumulation of solid waste in the city's natural drainage channels (nullahs), as well as (ii) public health risks caused by exposure to poorly managed COVID-19 contaminated waste; and (b) in the medium-to-long-term phase, the Project will improve backbone SWM infrastructure and service delivery to address the underlying risk factors leading to recurring emergency flooding situations.

Component 1 is intended to support immediate emergency response and will support:

a. Cleaning of nullahs and disposal of waste, including: (i) removing waste obstructing the flow of water and restoring the drainage capacity of the nullahs; and (ii) construction of a temporary storage cell for waste and sediments cleared from nullahs at the Jam Chakro dumpsite.
b. Development and implementation of a targeted communication and awareness campaign aimed at communities living around the nullahs.

Component 2 will support the medium-to-long-term SWM solutions with the following activities:

a. Provision of urgent collection equipment for under-served districts and improvement of Kachra Kundis,
b. Construction of a new sanitary disposal cell at Jam Chakro dumpsite
c. Construction and/or upgrading of transfer stations
d. Development of long-term waste solutions for Karachi, including: (i) planning, design and

construction of a new sanitary landfill with associated facilities; (ii) planning, carrying out of feasibility studies, engineering design, development of business and operating models, and provision of advisory services for the preparation of a large ecosystem of waste treatment solutions; (iii) design and construction of solutions to improve treatment of non-municipal waste streams such as medical waste and/or construction and demolition waste

The Proponent

The Local Government Housing, and Town Planning Department (LGHTPD) is the parent body for all local governments in Sindh, including Karachi Metropolitan Corporation (KMC) and District Municipal Corporations (DMCs) in Karachi. SSWMB is also established as an attached entity with LGHTPD. Therefore, LGHTPD represents an umbrella institution for all implementing agencies under the project. Sindh Solid Waste Management Board (SSWMB) through an independent PIU – SWEEP will implement the SWEEP Project. SSWMB will coordinate for all the activities with the Project Implementation Unit (PIU). The PIU will be headed by a Project Director (PD) and have technical staff for carrying out core functions of the project. The Competitive and Livable City of Karachi project's Project Implementation Unit established under the Local Government Department – the CLICK PIU (LGD) under an administrative arrangement will facilitate PIU-SWEEP for emergency nullah cleaning – with support from KMC – and for remaining activities under Component 1 until the approval of PC-1 and establishment of the proper PIU for SWEEP Project with dedicated staffing.

Objective and Scope of Environmental and Social Management Framework

ESMF is an instrument that examines the risks and impacts when a project consists of a program and/or series of subprojects, and the risks and impacts cannot be determined until the program or subproject details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social risks and impacts. It contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project risks and impacts, including on its capacity to manage environmental and social risks and impacts.

ESMF include the explanation on the methodology and procedure to carry out a third party Environmental and Social Audit (ESA) for Component 1 which would be supported through retroactive financing upon completion of corrective measures. ESMF also describes how to assess the sub-project specific environmental and social impacts and to prepare and implement sub-project specific mitigation plans including environmental and social screening and environmental and social assessment.

Potential Environmental and Social Impacts and Mitigation Measures

The SWEEP has been assessed to be a **High Risk project** due to 1) EHS risks related to collection, transportation, storage and disposal of potentially biologically and chemically contaminated waste materials through immediate response, 2) health and safety risks associated with safety improvement works and rehabilitation of an existing dump site, 3) E&S risks and impacts associated with construction of SWM facilities including a new sanitary landfill site, and 4) potential risks on community of waste-pickers and squatters on/near project areas through both immediate response and medium-long term intervention. ……Project activities will generate environmental and social (E&S) impacts during construction and operational phases of the project. The construction related E&S impacts include:

i) Clearing of topsoil, removal of vegetation and disturbance of natural habitats at campsite;
ii) Drainage clogging/wastewater ponding and air pollution due to dust and stack emissions;
iii) Noise pollution and soil and groundwater contamination due to improper storage and handling of fuel and chemicals;
iv) Occupational health hazards due to improper management of sanitary and hazardous waste, safety hazard due to the use of heavy machines and vehicles, and fire hazard;
v) Labor influx related social issues such as sexual exploitation and abuse/sexual harassment (SEA/SH) and violence against children (VAC);
vi) Risk of illicit activities e.g. drug use, and conflict between local communities and workforce;
vii) Disruption of utilities such as water, electricity, telephone cables etc.
viii) Child labor and weak enforcement of labor laws.

The operational phase E&S impacts include:

i) Nuisance to the nearby communities due to odoriferous emission, dust and vehicular and machinery noise
ii) Removal and disposal of solid wastes clogging waterways which will be done during the immediate response phase
iii) Spreading of germs and spillage of solid waste and sewage from vehicles around nullahs, along transfer routes, around transfer stations, kachra kundis,[1] sanitary landfill sites, sanitary landfill cell and temporary storage cell (immediate response phase)
iv) Traffic congestion
v) Soil, surface water and groundwater contamination due to leachate and improper storage and handling of fuel and chemicals
vi) Landfill gas impacts (health hazards, fire hazard)
vii) Health and safety impacts on workers and nearby communities, spontaneous fire hazard at sites
viii) Visual landscape impacts
ix) Safety hazards at site due to movement of vehicles and heavy machineries

x) Inadvertent damage to structures during removal of waste from the nullahs
xi) Exploitation of informal sector workers, many of whom are ethnic/religious minorities
xii) Spreading of disease to local residents from labor with different transmittable diseases
xiii) Potential exclusion of/lack of meaningful engagement with vulnerable groups
xiv) Resettlement/livelihood impacts on waste pickers living and working at Jam Chakro
xv) SEA/SH and Violence against Children (VAC) impacts
xvi) Resettlement of squatters (if any) from the proposed sites
xvii) Change in value of the property around the waste facilities, and additional squatting at sanitary landfill site.

The design phase environmental mitigation measures include:

i) Selection of location, bottom lining, capping, leachate collection and treatment system, landfill gas collection and treatment, berms for water flow control, and slope stability for sanitary landfill site and sanitary cell
ii) Design considerations for the kuchra kundis, transfer stations and MRF include selection of location, impermeability of the floors, aesthetic of the structure, capacity, drainage provision, and firefighting arrangements

[1] Kachra Kundis are designated waste collection points consisting of basic concrete slabs with minimal confinement, where waste accumulates awaiting collection

The implementation of construction phase mitigation measures will be the responsibility of the construction contractors. The contractors will follow the Construction Phase Environmental and Social Management Plan (CPESMP) to mitigate construction phase impacts. The CPESMP will include various plans to manage E&S impacts of construction activities.

The social impacts mitigation includes community engagement and stakeholder involvement in the project activities, establishing effective GRM, management of labor influx and other associated risks e.g. SEA/SH and VAC as per Labor Management Procedures (LMP).

The operational phase mitigation measures include:

i) Odor management (covered and sealed waste carrying vehicles, sprinkling of lime etc.)
ii) Spraying of disinfectants around nullahs
iii) Use of well-maintained vehicles and machineries to abate noise
iv) Following Traffic Management Plan (TMP) to avoid traffic congestion at transfer routes and nullah cleaning sites
v) Following OHS plan to protect workers from accidents and health hazards
vi) Adopting soil pollution control and surface runoff management measures
vii) Following Dredged Materials Collection, Transport, Disposal and Management Plan by the nullah cleaning contractors
vii) Leachate management and protection measures for groundwater, surface water and soil contamination at operational sites
viii) Landfill gas management at landfill site
ix) Implementing safety measures for the communities
x) Measures for suppression of odor and dust by regular sprinkling of water, proper coverage of solid water and plantation of trees along the periphery of waste sites
xi) Fire safety measures
xii) Soil erosion control measures such as vegetation and creating green patches
xiii) Providing PPE to the waste pickers.

Environmental and Social Management Framework Implementation

The methods and tools to be employed for environmental and social assessment of different project activities depend on the nature and scale and the level of the risks associated with the activities. For Component 1, a third party Environmental and Social Audit (ESA) will be carried out to review the compliance status of the emergency response activities with ESSs, identify any gaps between the policy requirement and actual execution, and propose any corrective measures to be implemented. The retroactive financing for Component 1 will be approved and made available upon implementation of the corrective action plan based on the ESA findings.

For Component 2, it is required to first conduct E&S screening of the project activities to ascertain their E&S risks and then on the basis of their levels, the type of method and tool to be employed for E&S assessment will be decided. E&S assessment including ESMF needs to be reviewed and cleared by the Bank before finalization, disclosure and use for bidding.

Generic Environmental and Social Mitigation Plan for avoiding or mitigating the potential environmental and social impacts is part of this ESMF. This plan will be followed by SWEEP PIU, the contractors and site in-charges to manage E&S impacts of project activities. Monitoring of the

Environmental and Social Mitigation Plan (ESMP) is required at construction and operational phases of the project components. The monitoring is the requisite for World Bank and Sindh Environmental Protection Agency (SEPA). This plan has also been prepared which mentions the key E&S parameters to be monitored and key implementation measures to be evaluated at required frequency with assigned responsibilities of the personnel.

Capacity building will be required for the stakeholders involved for the implementation, supervision, monitoring, evaluation, and reporting of the mitigation measures during construction and operational phases of the project components. To strengthen the E&S capacity of implementation agencies, one Environmental Specialist, one Health and Safety Specialist, one Resettlement Specialist, one Social Development Specialist (gender and inclusion) and one Communication Specialist will be recruited under the PIU.

The tentative budget for the environmental and social assessment of project activities and compliance of E&S mitigation plan during construction and operational phases of the project is Rs. 328.374 million.

PIU SWEEP will be responsible for the management of E&S safeguard requirements of the project under Component-2. CLICK PIU (LGD) will support PIU – SWEEP for managing the emergency pre-monsoon cleaning of nullahs, construction of the temporary storage and dewatering cell (Subcomponent 1.1) and the communication activities (Subcomponent 1.2) prior to, and during, the 2020 monsoon. The emergency pre-monsoon cleaning of nullahs will be supported by Karachi Metropolitan Corporation (KMC).

Third parties and E&S consultants will also be hired by the PIUs to perform E&S assessment, auditing and preparing plans and conducting monitoring and evaluation activities of the project components during design and implementation stages. These consultants will prepare safeguard documents and submit to the PIUs for further submission to World Bank and Sindh Environmental Protection Agency (SEPA). SEPA will be responsible for the environmental management of the projects in the Sindh district. SEPA will be required to review the environmental assessment documents submitted by the proponent of the projects and then issuing NOC after satisfactorily complying the requirements by the proponent. The World Bank requires from PIU-SWEEP in close coordination with SSWMB to conduct environmental and social screening and assessment of the projects proposed for Bank support in accordance with ESS1. The Bank requires from PIU to prepare and implement projects so that they meet the requirements of the ESSs in a manner and a timeframe acceptable to the Bank.

1.0 Introduction

This chapter provides background of the project and its components to be financed by the World Bank, profile of the proponent and the Environmental and Social Management Framework (ESMF) for the project. This framework will be applied to all the project components irrespective of whether financed by the World Bank or not, and its associated facilities[2], if any.

1.1 Background

In Pakistan, the cities and towns, where populations are concentrated, are struggling to manage solid waste**.** According to a 2017 estimate, Pakistan was estimated to produce around 31 million metric tons of waste annually.[3] Insufficient public spending on essential infrastructure, weak institutions, and low professionalization and skillsets within the sector constrain the adequate management of waste, leading to adverse outcomes such as reduced livability, environmental degradation, and high incidence of marine and plastic pollution. Waste collection remains low across the country and what waste is collected is generally disposed in uncontrolled dumps. There are no sanitary landfills or other adequate treatment facilities currently available to treat solid waste collected from any city in Pakistan.

Pakistan is also one of the most flood prone countries in South Asia and particularly vulnerable to climate change. Pakistan currently ranks 5th among countries most vulnerable to climate change[4], and is prone to extreme weather events, particularly heavy rainfall and subsequent flooding during the monsoon season. Pakistan also suffered US$18 billion in losses due to flooding between 2005 and 2014, equivalent to around 6 percent of the federal budget.[5] Coupled with rapid population growth and urbanization, hydrometeorological hazards have a disproportionate and growing impact on the urban poor in the country.

Karachi with an estimated population of 16 million[6], is Pakistan's largest city, economic and financial hub and main port. It contributes 15 percent of national GDP and the largest share of national tax revenues, industrial employment, manufacturing and high-end services.[7] The city dominates the economic landscape of Sindh, with nearly all of the province's industrial and service economy, and the majority of its labor force. It continues to be the engine of economic growth for the country, given its size, location, and industrial and human capital. In recent decades, however, the city's livability and competitiveness have declined. The Karachi City Diagnostic and Transformation Strategy identifies an infrastructure gap of over US$ 9 billion in public infrastructure. Karachi now ranks 137 out of 140 cities globally for livability. Nearly half of its residents live in informal settlements ('*katchi*

[2] Facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist. For facilities or activities to be Associated Facilities, they must meet all three criteria.
[3] Korai, Muhammad Safar, Rasool Bux Mahar, and Muhammad Aslam Uqaili. 2017. "The Feasibility of Municipal Solid Waste for Energy Generation and Its Existing Management Practices in Pakistan." *Renewable and Sustainable Energy Reviews* 72: 338–53.
[4] Germanwatch, 2019. Global Climate Change Risk Index 2020: Who suffers most from extreme weather events? Weather related loss events in 2018 from 1998 to 2018
[5] World Bank (2015), Fiscal Disaster Risk Assessment Options for Consideration: Pakistan.
[6] Population of Karachi Division (six districts of Karachi) per provisional summary of National Population and Housing Census 2017.
[7] World Bank (2018), Transforming Karachi into a Livable and Competitive Megacity: A City Diagnostic and Transformation Strategy.

abadis'), only half of the city's water demand is met; public transport has deteriorated; and the city has a chronic problem with inadequate solid waste management and pollution.

The city of Karachi generates an estimated 12,000 to 16,000 metric tons of municipal solid waste every day. Only a fraction of this waste (60%) is collected, and none of it is disposed in sanitary engineered facilities. Some of the waste (estimated around 60 percent)[8] is transported to two large unsanitary dumps, Jam Chakro and Gond Pass, located within 30-40 km from the city center. Neither facility meets international standards for waste disposal. The chronic backlog of uncollected waste has decreased the operating capacity of much of the urban infrastructure – i.e. the city's drainage system is clogged by waste, contributing to persistent flooding; movement along several secondary roads is impeded due to litter; water sources are contaminated, and public spaces are unattractive and unsanitary. The environmental and human health implications are severe: open burning of waste generates high levels of persistent and toxic chemicals that contribute to poor air quality and cause cardio-vascular diseases; inadequate solid waste management (SWM) has been identified as an important factor behind continued incidence of polio in Karachi[9]; surface and groundwater pollution by inadequate disposal of waste is well documented, and a factor in the prevalence of water-borne diseases. Pollution from plastics is of concern: plastics account for about 60 percent of waste found on Karachi's beaches by density.[10]

Karachi ranks below low-income country benchmarks in SWM on all parameters. Limited institutional capacity, a weak and fragmented governance structure and the lack of infrastructure along the entire value chain impact the sector's efficiency. This situation is not new. A diagnostic of the sector was completed in 2018[11], and two ongoing urban sector operations[12] are addressing some of the underpinning institutional and governance challenges that have hampered the efficacy of investments in the sector. A priority of the urban policy engagement with the Government of Sindh (GoS) is SWM, which is central to efforts to improve livability and competitiveness of Karachi. Ongoing policy efforts are focusing on improving the overall institutional environment (e.g. capacity, analytics, planning) in which future infrastructure investments can succeed. The Government of Sindh (GoS) is cognizant of problems in the waste sector and has taken several steps to improve the situation in recent years. GoS set up a specialized agency in 2014, the Sindh Solid Waste Management Board (SSWMB), and has increased allocations and expenditure significantly to engage private sector contractors for front-end waste collection.

The inadequacy of the existing system became evident in mid-2019, when an environmental and public health crisis was partly caused, and exacerbated, by poor management of municipal waste. Higher than average rain (over 250 mm) fell during the 2019 monsoon period (July-August 2019), overwhelming the drainage capacity of the city, leading to widespread flooding and to the temporary collapse of the city's infrastructure. Main transit corridors, streets, sidewalks and public areas were flooded, residential and commercial property was severely damaged across the city, and informal settlements located in low lying areas were ravaged. An official death toll is not available, but unofficial reports place the number of deaths at roughly two dozen, primarily caused by drowning, collapsing rooftops, and electrocution. Moreover, flooding subjected residents to sustained exposure to contaminated, stagnant waters, which resulted in highly elevated numbers of people affected by

[8]Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden. 2018. What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO

[9] Provincial Task Force for the eradication of polio.

[10] Waste distribution studies of four beaches in Karachi.

[11] World Bank (2018), "Transforming Karachi into a Livable and Competitive Megacity: A City Diagnostic and Transformation Strategy"

[12] Karachi Neighborhood Improvement Project (KNIP, FY17), and Competitive and Livable City of Karachi (CLICK, FY19).

water-borne diseases.[13] An infestation of flies and mosquitoes (caused by standing water, garbage and high heat) was documented by international media. The number of children who are the most vulnerable to fly-borne diseases reportedly increased by about 10 times during the worse period. There are multiple issues that contribute to flooding in Karachi. These include, inter alia, insufficient drainage infrastructure (primary, secondary, and tertiary storm water networks), reduced percolation due to paving and impermeabilization of surfaces, drains clogged by solid waste and/or by sewage, encroachment of natural drainage channels, inadequate land use and/or lack of enforcement of urban development, which have allowed the built up area to impinge on natural drainage systems without providing alternative conveyance capacity, etc. The result is insufficient ability of the system to drain water during rain events, and subsequently flooding. Specifically, poor solid waste management practices across the city exacerbate an already critical situation. Uncollected solid waste is dumped and accumulates on the streets and in the city's natural drains (nullahs[14]), clogging drainage channels and existing infrastructure, and reducing the conveyance capacity of the overall system.

In early 2020, the SSWMB cancelled the waste collection contract for District West[15] citing concerns with performance of the private sector operator**.** Adequate alternatives have not been found to provide collection services, and this has significantly impacted the amount of daily waste that remains uncollected in this district, with roughly 25 percent of the city's population. The COVID-19 emergency led to enforced lockdown and restrictions of operations across the city since early March 2020. This has further impacted the provision of SWM services, as workers involved with collection, transport, and disposal of waste have not been able to operate. Despite SSWMB's efforts to address the problem, through short-term emergency collection contracts, since early 2020 there has been a pronounced degradation of service and an increasing backlog of waste across the city.

The 2020 monsoon season had substantially greater impacts than that of 2019, both in terms of flooding and public health. In the month of August 2020, torrential monsoon rains resulted in urban flooding in the city. On Thursday (August 27, 2020), the city received more than 223 mm of rains in a 12 hour period, the highest seen in a single day since records began (Meteorological Department). More than 484 mm of rain was fallen in August, according to the data, more than 10 times the monthly average. At least 13 people killed in the city during this spell of torrential rains. Those killed include people who have killed drowned in their homes, been crushed under collapsing walls or electrocuted by short circuiting wires[16].

The COVID-19 pandemic has led, globally, to substantial increases in daily generation of municipal waste, and to higher generation of medical waste. There is insufficient capacity for treatment and disposal of healthcare waste in the Karachi, further aggravating the overall waste disposal situation and potentially generating increased transmission risks both to formal and informal workers engaged in the sector, as well as to the general public[17]. Moreover, COVID-19 related restrictions in Karachi

[13] More than 10,000 cases of diarrhea, gastroenteritis, hepatitis A and E, and cholera were reported during the monsoon, an increase of 300-fold. The number of children entering hospitals diagnosed with diarrhea or dysentery also jumped several-fold.

[14] 'Nullahs', or natural drainage streams, constitute the primary network of the urban stormwater drainage system in Karachi, feeding into the Lyari and Malir rivers, or into the sea via China or Korangi creeks. The nullahs were originally intended to drain stormwater only. They presently function as a 'mixed system' of stormwater and sewage from informal connections, and as local waste dumps.

[15] District West is the largest district in Karachi, and also has the biggest concentrations of *'katchi abadies'* (low-income neighborhoods and informal settlements) in the city.

[16] www.aljazeera.com/news/2020/08/flooding-woes-rains-lash-karachi-200828065619130.html

[17] The SWM sector is a significant employer of low-skilled workers in Karachi, both in the formal and informal sectors. Karachi's Districts alone employ around 11,400 sweepers and sanitary workers, while the SSWMB's private contractors also employ a large number of daily wage workers. A large informal workforce is engaged in door-to-door collection and in material recovery through scavenging. The COVID-19 situation has caused a disruption in livelihoods for many of these

have not allowed city agencies to carry out minimum maintenance to the drainage system and to remove waste from the most critical drains in preparation for the monsoon. The GoS is facing human and financial impacts from the COVID emergency, with rapidly increasing number of infections and deaths. The government will need to manage, in addition, the impacts of the upcoming flooding emergency. The cleaning of nullahs represents an immediate risk mitigation activity to restore the capacity of the existing system that has been compromised due to solid waste linked issues. Preliminary risk modelling shows that clearing of nullahs would result in significant reduction in damages. Also, heaping of waste on the banks of channels or in residential areas for drying during earlier years has proved inefficient and counterproductive as it fell back into drains or ended up polluting adjacent residential areas. Mitigation of flooding in Karachi is therefore contingent on timely cleaning of drains and adequate logistical arrangements for transfer and disposal of waste cleared from drains.

Preliminary risk modelling shows that clearing of nullahs ahead of the monsoon rains would result in greater than 30 percent reduction in annual average damages from flooding across the city**.** A risk model was run to assess the potential impact on flooding from cleaning up the main Karachi drains, and to demonstrate the need for rapid intervention to reduce possible damages and loss of lives. A city-scale hydraulic model[18] was developed using satellite derived digital terrain model. The model was run for (a) a situation where main nullahs are clear of blockages, and (b) a situation where nullahs are filled by waste, with bridges and culverts largely blocked. A risk assessment was subsequently carried out using Karachi building data. Potential benefits from nullah clearing were shown to be substantial, and support the need to undertake an emergency intervention to assist the GoS in the preventive cleanup of the Karachi drainage network.

Moreover, a rapid intervention in the SWM sector offers additional opportunities for the government to address the impacts from the ongoing COVID-19 crisis. First, project activities that support urgent maintenance of the nullahs to increase the conveyance capacity of the city's drainage system will require the mobilization of crews who will need to work throughout the monsoon season in the cleaning, removal and adequate disposal of waste. An emergency nullah cleanup campaign will generate labor intensive public works and will create employment opportunities for city residents. Drainage maintenance and cleaning jobs will primarily benefit low-skilled workers who are among the most vulnerable and most impacted by the disease and the economic ramifications of the city lockdowns. Second, the project will include activities that focus specifically on the management of healthcare waste, aiming at limiting potential spreading of the COVID-19 virus and further infections from poor handling of contaminated waste. This will include strengthening existing systems for collection, management and disposal of medical waste, increasing awareness to the risks of exposure to this waste, training of personnel dedicated to the management of medical waste and provision of protective equipment.

1.2 Project Overview

The proposed project will finance interventions that will be implemented over two phases: (a) in the immediate emergency response phase, activities will aim to mitigate (i) high flooding risks linked to the 2020 monsoon and caused by accumulation of solid waste in the city's natural drainage channels

workers.

[18] Results are the output from hydraulic modeling developed for Karachi using HEC-RAS. The model was developed using a free satellite derived digital terrain model (DTM) - JAXA Improved SRTM 30 meters.

(nullahs) (the first year), as well as (ii) public health risks caused by exposure to poorly managed COVID-19 contaminated waste; and (b) in the medium-to-long-term phase, the project will improve backbone SWM infrastructure and service delivery to address the underlying risk factors leading to recurring emergency flooding situations (over 5 years).

1.3 Project Components

There are three components of the project. The detail of these components is as under:

Component 1: Immediate Emergency Response Interventions (Total cost: US$ 11.0 million; WB financing: US$ 11.0 million)

Interventions under the emergency component will aim at mitigating high risks from flooding during the 2020 monsoon and the subsequent intervention under the same scope during the life of the project. The component will include financing for labor intensive emergency works, through which the GoS will generate employment opportunities that are a critical to the COVID-19 emergency economic recovery plan.

Subcomponent 1.1: Cleaning of nullahs and disposal of waste (US$ 10 million)

This subcomponent will support, inter alia:

(i) *Cleaning of nullahs by removing waste obstructing the flow of water and restoring their drainage capacity*. The primary drainage system of Karachi consists of around 38-40 nullahs, which are obstructed by the accumulation of sediments and waste, considerably reducing hydraulic capacity. The cleaning of nullahs will be managed by PIU – SWEEP in close coordination and initially with the administrative support of the Competitive and Livable City of Karachi project's Project Implementation Unit established under the Local Government Department – the CLICK PIU (LGD), financed by the World Bank. These activities will be executed by private contractors adequately trained and equipped for such work[19] and carried out according to strict technical protocols developed for this project, and adapted from procedures of the Karachi Metropolitan Corporation (KMC), the local council responsible for maintenance of the major nullahs in the city. Machinery will be used when possible, but in many places access to nullahs is hindered by dense construction or narrow structures, therefore requiring manual removal. By financing such labor-intensive public works, the proposed project will not only address the flooding risk, but it will also generate temporary jobs for skilled and low-skilled workers, which will support local COVID-19 economic recovery efforts of the GoS.

(ii) *Construction of a temporary storage cell for waste and sediments cleared from nullahs* at the Jam Chakro dumpsite[20], where waste cleared from nullahs will be temporarily stored for a period of around 12 months, before it is transferred to the new sanitary disposal cell constructed at Jam Chakro (Subcomponent 2.2). The temporary storage cell is required to be available prior to the nullah cleaning work, to ensure safe disposal of waste extracted from the nullahs[21] if not completed in the first financial

[19] Workers will be trained and adequately equipped to avoid additional risks resulting from exposure to COVID-19.
[20] A dedicated location separated from the day-to-day activities at Jam Chakro will be selected for the construction of the temporary storage and dewatering cell. Access to the cell will be controlled. The cell will be built following international standards, with appropriate lining and dewatering provisions.
[21] The cleaning of nullahs and transfer of waste will be performed in accordance with an Environment and Social Management Plan[21] (ESMP) including Operational Health and Safety (OHS), Community Health and Safety and Stakeholder Engagement Plans.

year the activity will be performed before the next monsoon. The SSWMB will provide space for the construction of Temporary cell by the PIU-SWEEP.

Subcomponent 1.2: Communication and Outreach Activities (US$ 1 million)

The proposed project will finance the development and implementation of a targeted communication and awareness campaign aimed at communities living around the nullahs. These activities are intended to promote better solid waste management practices, encourage residents to limit dumping of household waste into nullahs, and disseminate information about the nearest designated collection locations to communities in the project area. The campaign will also highlight efforts by the Government of Sindh to mitigate risks associated with the upcoming monsoon by cleaning of nullahs, restoring drainage capacity and ensuring waste disposal. This will contribute to building trust with the public in the service provision capacity of local agencies, and to creating ownership towards the project.

As agreed in principle with the Government of Sindh the activities under Component 1 will be initially financed by the GoS till the proper establishment of PIU-SWEEP and arrangement of WB finances. All the Project funds will be used to retroactively reimburse these expenditures after project effectiveness, subject to the post audit conducted of these activities, in accordance with the World Bank's fiduciary, environment, and social management requirements.

Component 2: Development of SWM Backbone Infrastructure (Total cost: US$ 84.0 million; WB financing: US$ 84.0 million)

SWEEP will finance core investments in infrastructure, along the SWM value chain, to provide end-to-end solutions to the management of solid waste in the short to medium term. The proposed project will build on institutional strengthening and technical assistance activities provided under CLICK to support the development of environmentally, socially and financially sustainable alternatives for Karachi, bringing in public and private sector stakeholders. The modernization of the SWM system will be achieved through a series of incremental improvements, as described below:

Subcomponent 2.1: Urgent Collection Equipment for Under-served Districts and Improvement of Kachra Kundis (WB financing: US$ 10 million)

Provision of Equipment: The proposed project will support the provision of critical equipment to improve occupational safety and collection efficiency, specifically to the three DMCs currently managing waste under public arrangement. Equipment will include, inter alia: (a) PPE and light equipment for workers; (b) collection trucks; and (c) bins and containers to improve collection efficiency and properly service the network of kachra kundis[22]. The equipment procurement will be complemented by a focus on: (a) assuring an operational model is in place to manage and maintain the equipment; and (b) assuring mechanisms are in place to fund the operation and servicing of the equipment. Equipment will also be acquired by the SSWMB to improve associated operations (such as transfer sites). Contracts for procurement of equipment will include a stock of spare parts, training of mechanics at each depot, and an adequate maintenance and service period.

Improvement of Kachra Kundis: The project will finance the upgrading of up to 30 existing kachra kundis, and the construction of approximately 50 new points at appropriate locations to improve waste collection services. The location of interventions will be planned based on need and consultations

[22] Kachra Kundis are designated waste collection points consisting of basic concrete slabs with minimal confinement, where waste accumulates awaiting collection

with nearby residents, particularly in underserviced and flood-prone areas, to prevent illegal dumping in the nullahs. The designs of kachra kundis will be customized to each location to maximize operability by private contractors or DMCs.

Subcomponent 2.2: Construction of new sanitary disposal cell at Jam Chakro Dumpsite (WB financing: US$ 20 million)

This subcomponent will support, inter alia, the construction of a new sanitary landfill cell within the Jam Chakro dumpsite, improved safety measures for the dumpsite, rehabilitation of areas that have reached capacity, and improved living conditions and livelihoods for the community of waste pickers residing within the dumpsite. Specifically, the subcomponent will finance the following:

(a) *Design and construction of a new landfill cell* on underutilized available land within the perimeter of the Jam Chakro dumpsite.[23] The new landfill cell will provide Karachi with modern disposal capacity for the next three to four years, based on current incoming volumes.
(b) *Design and construction of a manual Material Recovery Facility (MRF),* adjacent to the disposal cell, intended to provide safe working conditions and income to waste pickers working at the dumpsite.
(c) *Measures to improve safety and environmental performance of the dumpsite,* including, inter alia: (i) construction of a perimeter fence/wall to limit intrusion and restrict waste deposits within site limits; (ii) stabilization of areas at risk of collapse by unstable slopes; (iii) retrofitting access gate, weighbridge and offices for better control of incoming flows; (iv) construction of test wells to monitor potential groundwater contamination; and (v) fire extinction activities to stop constant burning and re-ignition through covering or cooling.
(d) *Progressive closure and rehabilitation*[24] *of areas that have reached capacity*, through standard methods to progressively reduce impacts associated with the operation of Jam Chakro.
(e) *Community Support Plan for waste pickers living at Jam Chakro.* There is a settlement of roughly four hundred households living within the dumpsite and earning livelihood from scavenging activities. In the immediate instance, the project will aim to improve occupational safety as well as living conditions, starting with safe and efficient sorting conditions, such as those that will be provided at the MRF. In the medium to long-term, a resettlement and/or livelihoods restoration plan for the community will be developed and implemented.

Subcomponent 2.3: Construction/ Upgrading of Transfer Stations (WB financing: US$ 20 million)

The proposed project will finance the construction or upgrading of up to three to four modern transfer stations. The SSWMB currently operates ten basic transfer sites. The current network of transfer sites is insufficient, entailing illegal dumping in the nullahs as well as large accumulations of waste across the city. The construction of additional transfer capacity is essential to improve the efficiency of the overall system including costs, environmental and social impacts, and general quality of service. The number and location of transfer stations will be determined based on the Integrated Karachi SWM Strategy and on land availability (a number of possible sites have already been identified by the SSWMB). The project will support the development and implementation of an appropriate operating model for the operation and maintenance of these sites, likely with private sector participation.

[23] The land where the Jam Chakro dumpsite is located is owned by the GoS How many acres? Used / available??
[24] Rehabilitation options for dumpsite areas will be evaluated and designed on a case by case basis, and will include measures ranging from stabilization and capping, to closure and long-term monitoring. Will it include leachate collection / treatment, groundwater rehabilitation, gas collection?? Potential disruption of livelihoods for active waste pickers will be considered when assessing feasibility of rehabilitation alternatives.

Subcomponent 2.4: Development of Long-Term Waste Solutions for Karachi (WB financing: US$ 34 million)

The project will support the development of long-term waste solutions for Karachi, which address the limited capacity remaining at existing disposal sites. The project may consider multiple operating models making use of project financing, private capital, or public private partnerships. A top priority will be the construction of a new sanitary landfill for Karachi. The GoS has designated a 3,000 acre site in Dhabeji, about 60 kilometers east of Karachi, for the development of an integrated waste treatment facility. The project will finance the planning, design and construction of a modern facility, co-located with adjacent activities to sort, process and extract value from the waste.

In addition to constructing the landfill, the project will provide support including planning, feasibility studies, engineering designs, development of business and operating models, and advisory services for the preparation of a larger ecosystem of waste treatment solutions. These solutions will aim to maximize waste volumes to be reused or recycled, generate energy from specific waste streams, while preparing the remaining fraction for final disposal at the landfill. The development of this ecosystem will require a combination of private and public investments. The project may support the design and construction of solutions to improve treatment of non-municipal waste streams such as medical waste and/or construction and demolition (C&D) waste by supporting, inter alia: (a) Assessment of existing systems for collection, transport and disposal of medical and C&D waste streams; (b) Identification of gaps to be addressed through investments in technologies and management modalities; (c) Development of service improvement plans needed to build end-to-end solutions for each stream, and policy recommendations on regulation and tariffs for generators; and (d) Identification of priority investments, including technical specifications for transport, treatment and disposal solutions, optimal locations for facilities, contractual arrangements, etc. Operating models for such investments will also include?? private sector participation for provision of services and operations & maintenance of assets.

Component 3: Project Management and Implementation Support (Total cost: US$ 10.0 million; WB financing: US$ 5.0 million)

This component will support implementing agencies, primarily the Project Implementation Unit (PIU) under the SSWMB, to manage and implement activities and investments under SWEEP. The component will support skillsets and resources to manage the PIU's workload and associated expenses related to managing procurements, contract supervision, and oversight of infrastructure investments. In particular, the component will finance consultancies for environment and social assessments and instruments, monitoring implementation of safeguards plans, and resettlement aspects. Other consultants for feasibility studies, engineering design and supervision, and contractors for infrastructure works will be financed under Component 2. In addition, the component will finance interventions such as trainings and skill development in the areas of monitoring and evaluation, communication, audits, social and environmental management, engineering, operations and maintenance, and project management. The component will cover costs related to skilling and capacity building requirements of SSWMB's staff and engineers, related to operations and maintenance of infrastructure commissioned under SWEEP, per international standards and design specifications. GoS' financing under the component will be used for salaries for civil servants posted in the PIU, and compensation for resettlement impacts related to civil works.

1.4 The Proponent

The project's implementation arrangements are based on institutional mandates of each relevant agency and enable the respective agencies to implement activities described under each component.

The Local Government Housing, and Town Planning Department (LGHTPD) is the parent body for all local governments in Sindh, including KMC and DMCs in Karachi. SSWMB is also established as an attached entity with LGHTPD. Therefore, LGHTPD represents an umbrella institution for all implementing agencies under the project.

1.4.1 Sindh Solid Waste Management Board

Sindh Solid Waste Management Board (SSWMB) will be the primary agency for all the activities undertaken in the SWEEP**.** SSWMB has the institutional mandate for transport and transfer of waste (the middle end) including operation of transfer facilities, disposal of solid waste and operation of disposal facilities, and manages collection of waste (the front-end) in three of the six districts in Karachi through private contractors. Under SWEEP, SSWMB will be closely looking after activities in Component 2, including construction and operation of infrastructure, as well as reimbursements under Component 1 in lieu of retroactive financing. In addition, SSWMB will also support SWEEP – PIU in procurement of equipment for DMCs, as needed, to carry out waste collection, routine cleanup and maintenance tasks. SWEEP will develop and adopt an Operations Manual for implementing the project for the SSWMB.

SSWMB will work in close liaison with Project Implementation Unit (PIU). The PIU will be headed by a Project Director (PD) and have technical staff for carrying out core functions of the project related to (i) SWM engineering, (ii) procurement and contract management, (iii) environment safeguards, climate change and disaster resilience, (iv) social development, gender, stakeholder engagement and communications, (v) financial management, and (vi) M&E, including MIS.

1.4.2 CLICK PIU (LGD) and KMC

CLICK PIU (LGD) is responsible to support PIU-SWEEP for all activities under emergency nullah cleaning – with support from KMC – and the remaining activities under Component 1. Also, while the SWEEP PIU is being set up, the CLICK PIU is mandated to provide backstopping support for initial activities during implementation.

1.5 Objective and Scope of Environmental and Social Management Framework

SWEEP project is supported by the World Bank through *Investment Project Financing* for which the compliance of Environmental and Social Standards (ESSs) is the responsibility of the PIU-SWEEP to screen, assess and manage project's environmental and social risks and impacts. As per ESS-1 (Assessment and Management of Environmental and Social Risks and Impacts), PIU-SWEEP is required to prepare Environmental and Social Management Framework (ESMF) for all activities under SWEEP.

ESMF is an instrument that examines the risks and impacts when a project consists of a program and/or series of subprojects, and the risks and impacts cannot be determined until the program or subproject details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social risks and impacts. It contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project risks and impacts, including on its capacity to manage environmental and social risks and impacts.

The purpose of the ESMF is to ensure compliance of environmental and social management requirements of the national and state laws and World Bank's environmental and social framework for those SWEEP's activities that are not yet defined and/or whose locations are unknown at the time the Bank appraises the project, i.e. Component 2. The ESMF describes the process of how environmental and social impacts will be assessed, addressed and managed during the project implementation, when the sub-projects will be identified in terms of technical aspects and location; as well as a set of measures for mitigation, monitoring and institutional responsibility that should be taken during the project implementation to eliminate adverse environmental and social impacts, their neutralization or reducing up to acceptable levels. The ESMF covers general mitigation measures for possible impacts of different proposed activities to be supported by the project; implementation arrangements for project environmental and social aspects, relevant capacity building activities, consultation process etc. In addition, as the project will retroactively reimburse the expenditure for Component 1, a third-party E&S audit will be carried out to check the compliance with the ~~Bank's~~ environmental and social standards. This ESMF describes the process and requirements of the E&S audit.

ESMF identifies the responsibilities of project stakeholders, procedures for environmental and social safeguards screening, review and approval, monitoring and reporting requirements, as well as plans to enhance institutional capacity through capacity building activities. It also offers sample terms of reference for carrying out E&S audits, preparation of ESMP and ESIA and checklists for E&S audit. Finally, this ESMF will be an integrated part of the Project Operation Manual (POM) and is applicable to all linked investments financed in the project areas regardless of their funding source or implementing agency.

SWEEP PIU in close coordination with SSWMB has prepared this ESMF by using primary and secondary information collected through literature review, reconnaissance survey, institutional and community stakeholder consultations, and consultation workshop. This framework will be followed by PIU-SWEEP, once the subprojects are identified during project implementation and their location, technical and engineering details are available. The ESMF also provides the stakeholder engagement and involvement guidelines throughout the project life cycle and mechanism to disclose project information to them and redress the grievances of the affected communities.

SWEEP-PIU will use this ESMF during the planning, designing, construction and operational phases of the project components to ensure safeguard compliance and to mitigate environmental and social impacts at all the stages of the project as per the environmental and social management plan provided in the framework.

1.6 Structure of the ESMF Report

The ESMF report consists of eight chapters. The brief of each chapter is given below:

	Executive Summary	*Provides summary of the ESMF contents, key processes and procedures and measures to manage E&S risks and impacts*
1	**Introduction**	*Background of the project, description of project and its components, information of the proponents, introduction of the ESMF, its objective and structure of the ESMF report*
2	**Environmental and Social Baseline**	*Description of environmental and social baseline of the entire area for the proposed project/subprojects including physical, biological, socioeconomic conditions and cultural aspects*

		relevant to project and its potential impacts including any changes anticipated before the project commencement
3	**Regulatory Review**	*Brief description of the national, provincial and World Bank laws, policies, strategies, guidelines, codes, standards and procedures for the categorization, screening, environmental and social assessment and compliance of the proposed project/subprojects. This chapter establishes that how the various requirements have been or will be complied with during the planning and implementation stages of the subprojects.*
4	**Potential Environmental and Social Impacts and Mitigation Measures**	*Description of potential generic environmental and social risks and impacts (direct, indirect/induced and cumulative) to be caused by the project's construction and operation phases on surrounding environment and community. Description of mitigation measures as per mitigation hierarchy (avoidance, minimization or reduction, mitigation, compensate/offset).*
5	**Stakeholder Consultation and Disclosure**	*Describes the objective, process, and outcome of the stakeholder consultations carried out during the ESMF preparation and its disclosure requirements.*
6	**Environmental and Social Management Framework Implementation**	*Description of institutional arrangements for environmental and social management, screening methodology, generic mitigation plan, monitoring framework, and capacity building of stakeholders involved in environmental and social assessment, monitoring and management, process and requirement for E&S audit. The guidelines for environmental and social compliance and occupational health and safety requirements have been described.*
7	**Grievance Redress Mechanism**	*Description of the Grievance Redress Mechanism to be adopted by the proponent to facilitate resolution of any community complaints and grievances about the project's environmental and social performance, in line with the requirements of* World Bank.
8	**Budget**	*Estimated budget for executing the ESMF, monitoring cost etc.*
	Annexes	*TORs for E&S audit, ESMP and ESIA and checklist for E&S screening*

2.0 Environmental and Social Baseline

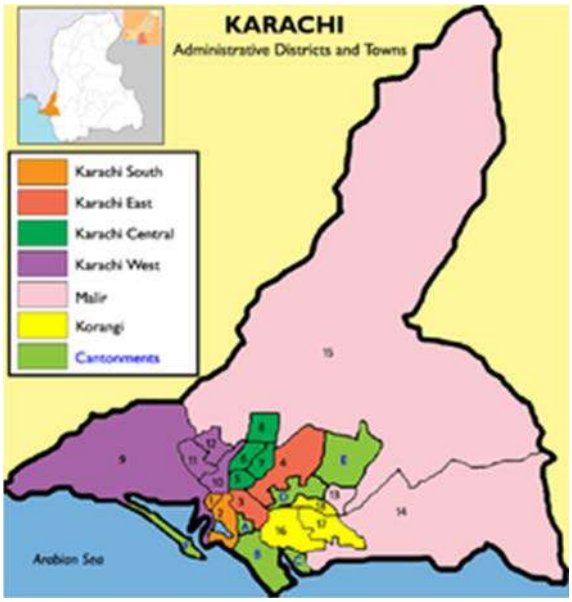
This chapter describes the environmental and social baseline of the entire area for the proposed project including physical, biological, socioeconomic conditions and cultural aspects relevant to SWEEP.

The project site specific baselines are being collected and will be incorporated in the final version of the ESMF and will also be collected in greater detail in subproject-specific assessments and plans.

2.1 Physical Environment

The map of the Karachi is presented in Figure 1.

Figure 1: Map of Karachi



2.1.1 Climate

Karachi is located just above the tropical zone on the coast of the Arabian Sea at 24º45” to 25º15” north, and 66º37” to 67º37” east at about 20 m above sea level (airport weather station). Karachi is bounded by Hub-River (Balochistan Province) on West, Badin District on East, Dadu District on North and Arabian Sea on South. The climate of the Karachi can be characterized by dry, hot and humid conditions and in general terms it is moderate, sunny and humid. There is a minor seasonal intervention of a mild winter from mid-December to mid-February followed by a long hot and humid summer extending from April to September, with monsoon rains from July to mid- September. The level of precipitation is low for most of the year. Karachi also receives the monsoon rains from July to September. The humidity levels usually remain high from March to November, while very low in winter as the wind direction in winter is North Easterly.

2.1.2 Temperature

Table 1 and Figure 2 show the maximum, minimum and average monthly temperatures of the Karachi for the recent years (2016-2020). The maximum temperature range is 24 – 37 °C. The average temperature range is 21 - 34 °C. The minimum monthly temperature range is 17 – 30 °C.

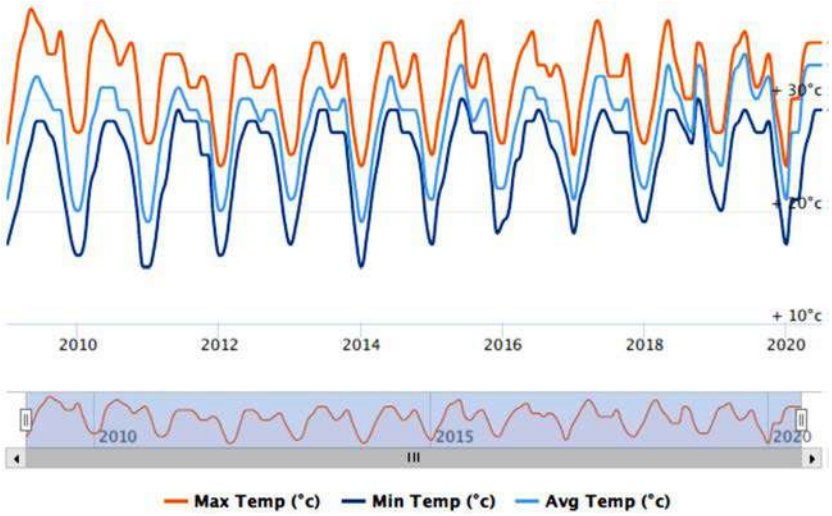
April to November are the hot months whereas cold months are December to March.

Table 1: Maximum, Minimum and Average Temperature (Karachi)

Year	Month's Temperature C°											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016												
Max	26	29	32	34	35	36	33	33	32	33	32	29
Avg	22	24	27	29	31	31	30	30	28	28	27	24
Min	19	20	24	25	28	28	29	28	26	25	23	21
2017												
Max	25	29	32	35	37	35	32	32	32	34	30	27
Avg	21	24	27	30	32	32	30	29	29	30	26	23
Min	18	21	23	26	28	29	28	27	27	27	23	20
2018												
Max	26	28	31	35	37	34	32	30	30	35	34	29
Avg	22	24	27	30	33	31	30	28	27	33	32	26
Min	19	21	24	26	29	29	28	27	26	30	28	23
2019												
Max	27	27	30	34	35	36	33	31	32	34	30	27
Avg	25	24	28	32	33	34	31	30	31	32	28	24
Min	21	20	23	27	28	29	28	27	27	28	24	20
2020												
Max	24	30	30	34	35	35	35	-	-	-	-	-
Avg	21	27	27	32	33	33	33	-	-	-	-	-
Min	17	21	21	25	27	29	29	-	-	-	-	-

Source: Extract from Temperature Graph (World Weather Online)

Figure 2: Maximum, Minimum and Average Temperature (Karachi)



Source: World Weather Online (https://www.worldweatheronline.com/karachi-weather-history/sindh/pk.aspx)

2.1.3 Rainfall

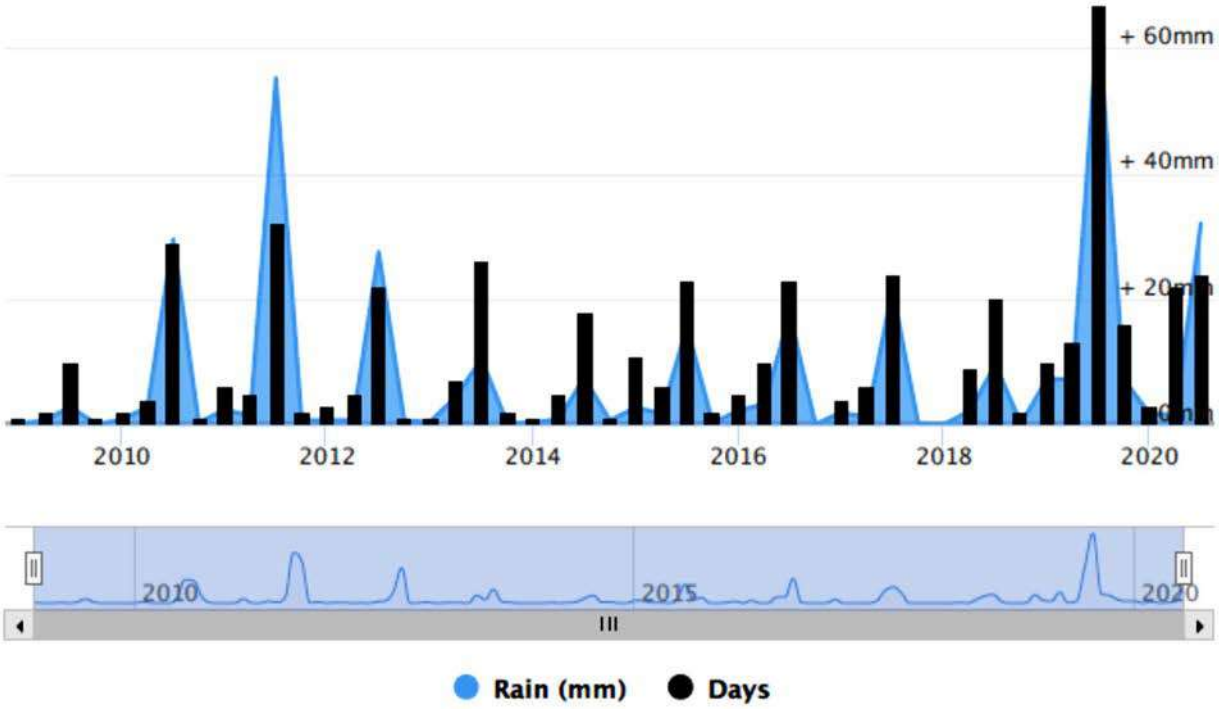
As this region falls in the semi-arid climatic zone, the rainfall in Karachi is extremely low and erratic. Table 2 and Figure 3 show the average monthly rainfall data of Karachi.

Table 2: Average Rainfall of Karachi (mm)

Year	Month's Average Rainfall (mm)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	2.63	0.0	3.9	0.11	0.09	9.71	10.23	41.09	1.2	0.01	0.0	0.1
2017	5.61	0.03	0.1	0.01	0.06	3.47	20.4	27.17	16.92	0.0	0.14	0.22
2018	0.01	0.0	0.04	0.53	0.0	5.92	11.86	14.31	2.53	0.0	0.0	0.4
2019	13.7	4.8	3.2	18	0.8	2.9	61	118.9	16.1	12.6	5.6	3.3
2020	3.0	0.0	2.1	0.1	0.7	3.9	32.1	-	-	-	-	-

Source: Extract from Rainfall Graph (World Weather Online)

Figure 3: Monthly Average Rainfall (mm) and Number of Rainy Days of Karachi



Source: World Weather Online (https://www.worldweatheronline.com/karachi-weather-history/sindh/pk.aspx)

2.1.4 Humidity

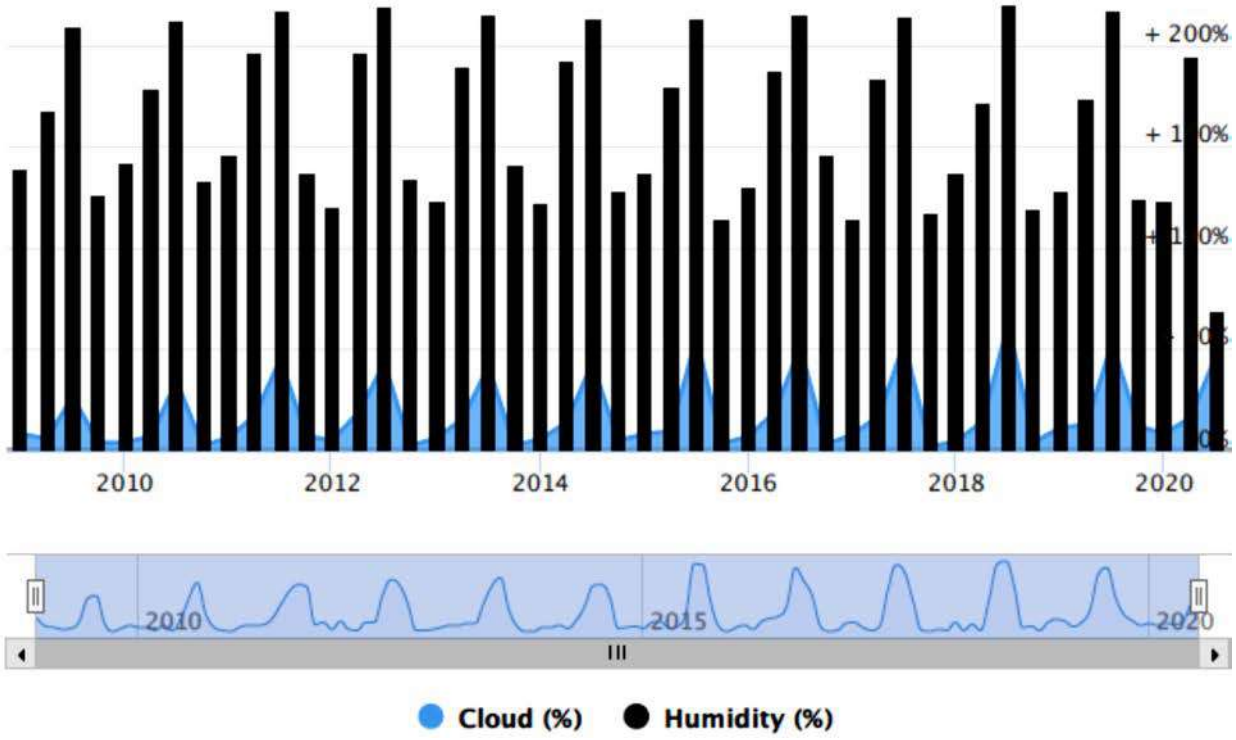
Despite arid conditions, humidity is relatively high throughout the year. Table 3 and Figure 4 present detail of the average monthly humidity of Karachi.

Table 3: Average Humidity (%) of Karachi (mm)

Year	Month's Average Humidity (%)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	48	33	49	54	66	67	72	73	71	63	39	44
2017	37	29	49	52	63	68	74	72	69	55	38	25
2018	42	45	50	51	52	69	73	75	72	47	37	35
2019	42	39	47	50	58	66	72	76	70	53	40	31
2020	38	37	48	58	67	70	69	-	-	-	-	-

Source: Extract from Humidity Graph (World Weather Online)

Figure 4: Average Humidity and Clouds (%) of Karachi



Source: World Weather Online (https://www.worldweatheronline.com/karachi-weather-history/sindh/pk.aspx)

2.1.5 Wind

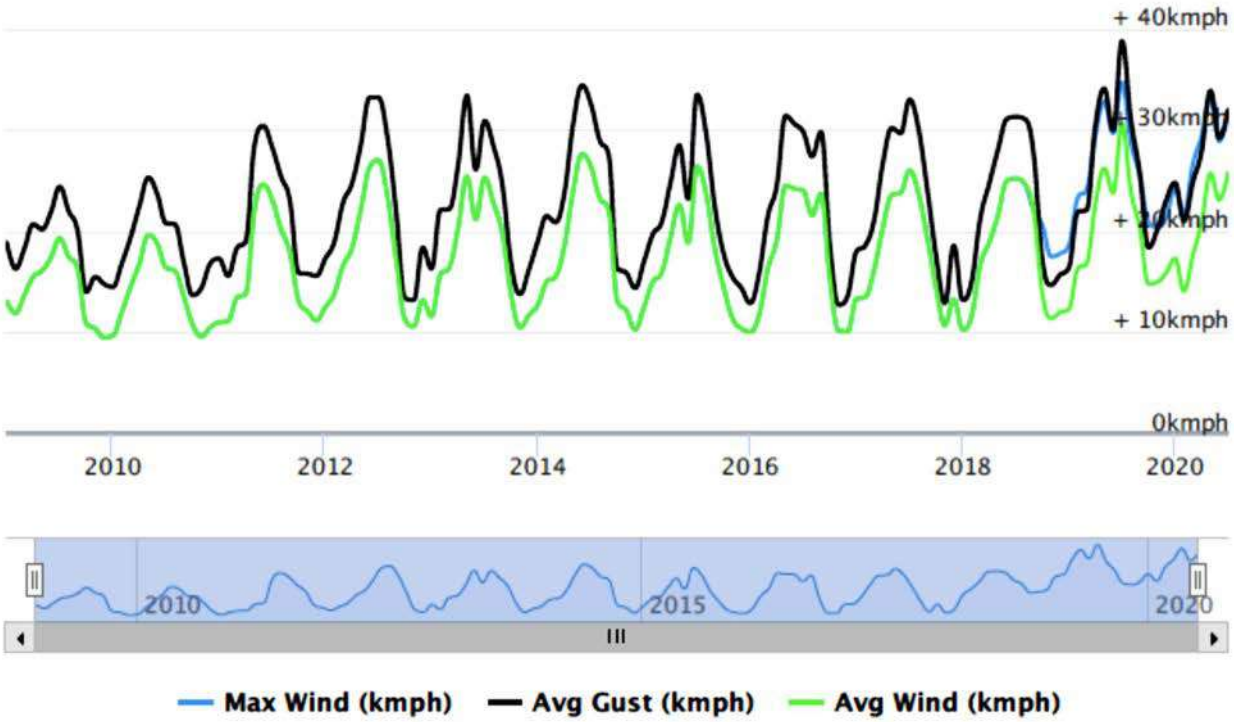
Karachi weather is considered pleasant and is famous for its breeze from the sea. The onshore winds from the Arabian Sea contribute to humid conditions. The wind speed has highest velocities during the summer months, when the direction is south-west to west. During winter, the wind blows from north to northeast, shifting southwest to west in the evening hours. The wind usually carries sand and salt resulting in severe wind erosion and corrosion. Tropical cyclones are formed in the Arabian Sea in the pre-monsoon season, mostly in the month of June. Table 4 and Figure 5 show the maximum and average monthly wind speed of Karachi. Figure 6 shows the wind rose for Karachi.

Table 4: Maximum and Average Wind Speed (kmph) of Karachi

Year	Month's Wind Speed (kmph)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016												
Max	10.1	11,7	16.3	19.1	24.5	24.2	24	21.6	23.7	15.3	10.2	10.1
Avg	10.1	11.7	16.3	19.1	24.5	24.2	24	21.6	23.7	15.3	10.2	10.1
2017												
Max	13.3	13.5	16.2	20.4	23.6	23.8	26	23.8	19.4	14.4	10.7	13.3
Avg	13.3	13.5	16.2	20.4	23.6	23.8	26	23.8	19.4	14.4	10.7	13.3
2018												
Max	10.3	11.6	16.7	18.9	21.6	25	25.2	24.7	22.1	20.6	17.5	17.8
Avg	10.3	11.6	16.7	18.9	21.6	25	25.2	24.7	22.1	13.9	11.4	12
2019												
Max	18.6	23.3	24.1	29.5	32.8	29.7	34.7	28.8	25.6	20.9	20.4	21.4
Avg	12.3	16.3	16.8	22.7	26.2	23.8	30.6	24	20.4	14.8	15	15.0
2020												
Max	24.2	21.7	26.6	29.4	33.3	28.9	31.9	-	-	-	-	-
Avg	17.3	14.1	17.6	20.9	25.7	23.1	25.8	-	-	-	-	-

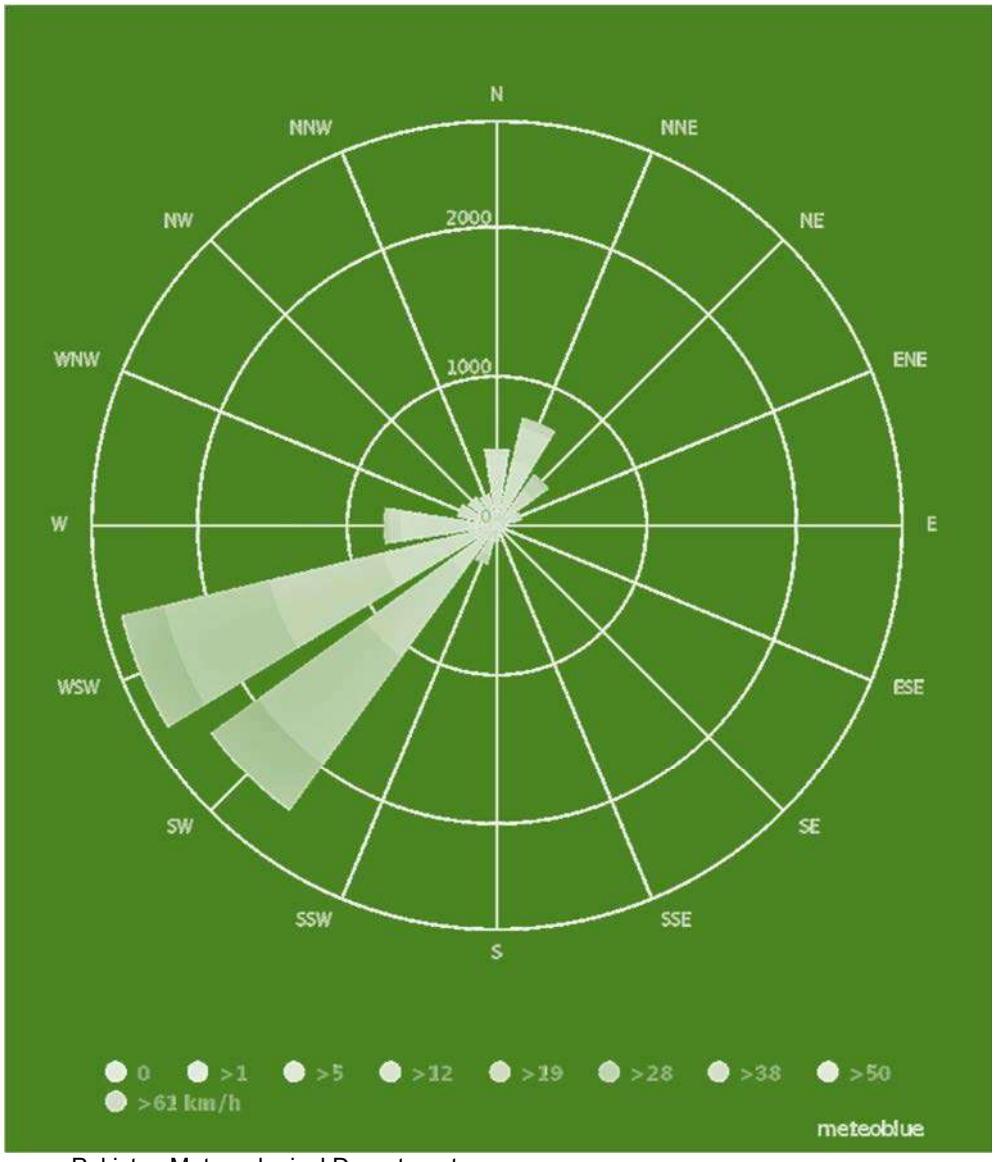
Source: Extract from Wind Graph (World Weather Online)

Figure 5: Monthly Average and Maximum Wind Speed and Gust (kmph) of Karachi



Source: World Weather Online (https://www.worldweatheronline.com/karachi-weather-history/sindh/pk.aspx)

Figure 6: Wind Rose of Karachi



Source: Pakistan Meteorological Department

2.1.6 Topography

Karachi is located in the south of Sindh, on the coast of the Arabian Sea. It covers an area of approximately 3,600 km^2, comprised largely of flat or rolling plains, with hills on the western and northern boundaries of the urban sprawl. The city represents quite a variety of habitats such as the sea coast, islands, sand dunes, swamps, semi-arid regions, cultivated fields, dry stream beds, sandy plains, hillocks. The hills in Karachi are the off-shoots of the Kirthar Range. All these hills are devoid of vegetation and have wide intervening plains, dry river beds and water channels.

Classified according to physiographic features, Karachi City District can be divided into three broad categories: Hilly Region (Mountain Highland), Alluvial Plain (Piedmont Plain) and Coastal Areas (Valley Floor). The greatest height of the region is 76 m that gradually decreases to 1.5 m above

mean sea level along the coastline. The Karachi Harbor is a sheltered bay to the south-west of the city, protected from storms by the Sandspit Beach, the Manora Island and the Oyster Rocks.

The Arabian Sea beach lines the southern coastline of Karachi. Dense mangroves and creeks of the Indus delta can be found towards the south east side of the city. Towards the west and the north is Cape Monze, an area marked with projecting sea cliffs and rocky sandstone promontories.

Karachi is the part of major synclinorium stretching from Ranpathani River in the east to Cape Monze in the west, Mehar and Mole Jabal (Mountains) in the north. Within the synclinorium, a number of structures such as Pipri, Gulistan-e-Jauhar, Pir Mango and Cape Monze are exposed. The presence of concealed structures under the Malir River valley, Gadap and Maripur plains can fairly be deduced. Rock aggregates, sand, limestone and clay are some of the potentials for gainful utilization. Gulistan-e-Jauhar, member of the Gaj formation, offers groundwater potential for limited use. The area is underlain by rocks of sedimentary origin ranging in age from Eocene to Recent.

A large portion of the Karachi area consists of vacant land including the area dedicated to the Kirther National Park. The vacant land accounts for only 7% of all land and housing is the biggest user of land (with about 37% of the total), while roads and open spaces are also significant. Most of the developed areas are concentrated in the inner ring towns of Saddar, Jamshed, Lyari, Liaquatabad, Gulshan-e-Iqbal and Gulberg. These towns contain the diverse mix of land uses and include most of the governmental and regional-scale industrial and commercial activities.

2.1.7 Solid Waste Management

The solid waste management (SWM) sector in Karachi is divided into three operational segments, namely front-end collection, middle-end services and back-end services, managing more than 12,000 metric tons of municipal solid waste every day. The sector's infrastructure consists of two dumpsites, Gond Pass and Jam Chakro located approximately 30 kilometers West and North-West from the city center, and ten transfer sites located around the city. The capacity of the existing infrastructure is insufficient to properly serve Karachi and over time alternative solutions need to be identified to enable the city to manage solid waste.

The institutional structure of the SWM sector is fragmented. Key institutions include the SSWMB as the primary service delivery agency within the sector, and DMCs which have a more limited role. SSWMB was formed in 2014 under an Act of the provincial assembly. The Board is empowered to manage solid waste issues for the province of Sindh as a whole, and has the right to recommend a cess, tariff or other charge to the government for the management of solid waste; to construct and manage sites and buildings for solid waste management and disposal; and to make rules and regulations for the same etc. The Board is also empowered to manage a Fund, known as the Sindh Solid Waste Management Fund, in which charges, rates and fees may be deposited; in addition to other grants and loans made to the Board.

Front-end collection services, which involve collection of solid waste from primary collection points (bins or kachra kundis) and moving it to designated transfer stations, are divided between the SSWMB which provides services in three of the six districts, and DMCs for the remaining three districts. SSWMB and DMCs are also using different operational models. DMCs provide these services using sanitary staff who are regular employees of the DMC, and equipment that is DMC-owned and operated. In contrast, the SSWMB uses a private sector led model through front-end collection contracts.
The SSWMB has sole responsibility for the remaining segments of the value chain till disposal for the entire city, and operation and maintenance (O&M) infrastructure such as transfer stations and the

disposal sites, and manages these functions through contracting arrangements with the private sector as well.

2.1.8 Water Resources

The map of water resources and bulk water supply system for Karachi is shown in Figure 7. The description of the water resources of Karachi is as under:

a) Surface Water

Indus River and Hub Dam on Hub River are the two major sources of surface water for Karachi.

1. Indus River

The Indus River, the main source of water for Karachi, is severely constrained by dry season demand, but has abundant wet season discharges. Except during the summer flood season, very little water escapes to the sea. Water from the Indus River is distributed over the Sindh Province through three barrage systems, namely, Guddu, Sukkur and Kotri. Urban and industrial water for Karachi is taken from the Kotri Barrage and discharged through the Kalri Baghar Feeder Upper (KB Feeder Upper) to Kinjhar Lake. Kotri Barrage is the lowest barrage on the River Indus. Kinjhar Lake is a natural reservoir, the storage of which has been increased by constructing nearly 20 km of embankments having a maximum height of 9 m. The lake has a catchment area of 910 km. The supply from the River Indus comes via canals from Kinjhar, Haleji, Gharo and through conduits to the Dhabeji pumping station. The water is then distributed via conduits and distribution mains.

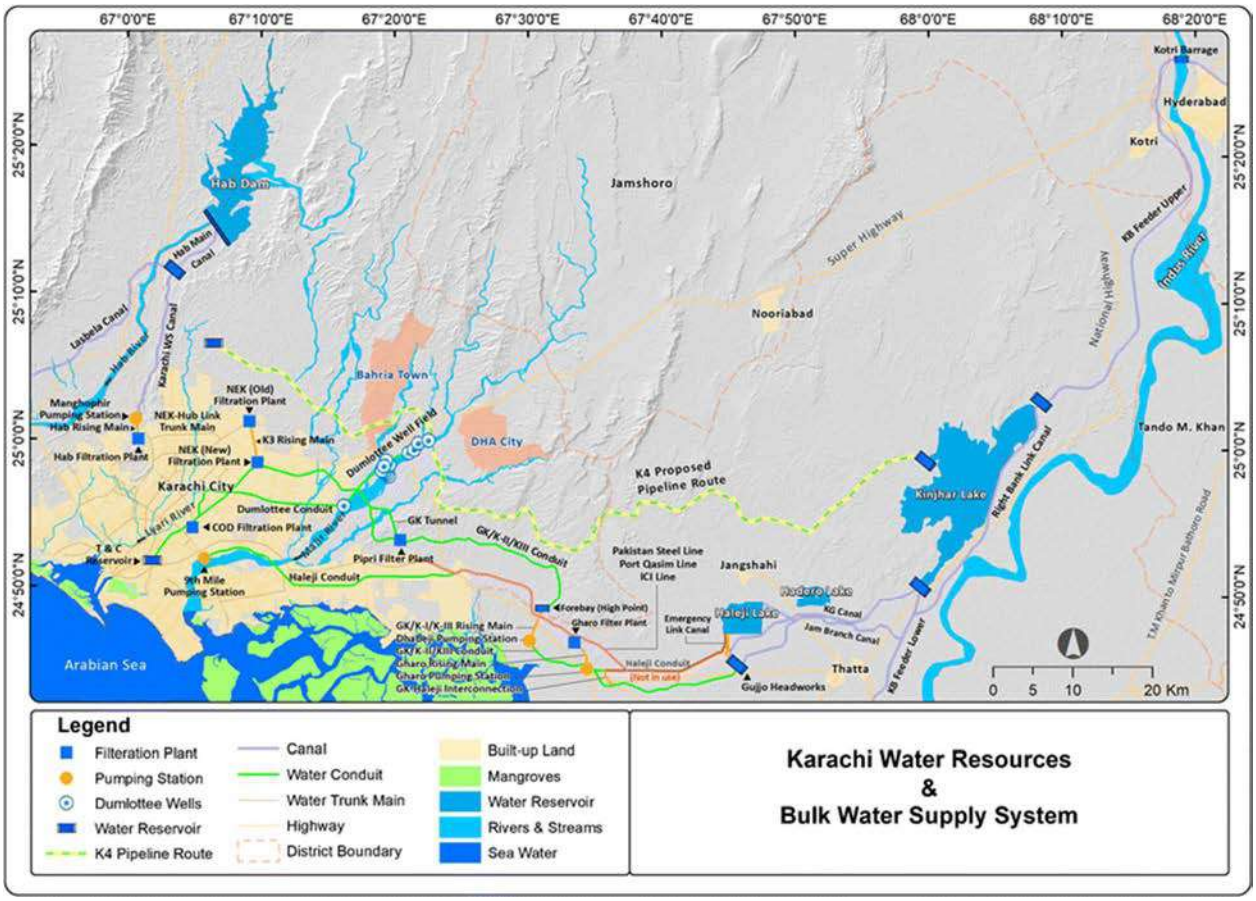
2. Hub Dam

The Hub Dam is a multi-purpose dam (municipal, industrial and irrigation purposes) constructed on the Hub River approximately 50 km to the north-west of Karachi city. The construction of the dam started in September 1963 and completed after 18 years in September 1981. The catchment area of the dam extends across two provinces namely Sindh and Balochistan, covering a total area of 8,730 km. There has been an agreement between the two provinces that, at the Regulator located at the end of the Hub Main Canal, 63.3% of the total flow from the dam will be diverted to the Karachi Water Supply Canal (Sindh) while 36.7% to the Lasbela Canal (Balochistan).

3. Groundwater

Ground water resources in Karachi are limited. Small amount of groundwater is extracted for private use in the Karachi area. The aquifers close to the coastal belt are mostly saline and unusable for domestic purposes. Aquifers near the Hub River are well developed and serve as sources of water for agriculture and domestic use. The aquifers are estimated to lie at depths of 50-100 m. Dumlottee Well Field, located on the banks of Malir River in the Dumlottee area about 30 km to the northeast of the city supplies water for few months after the rainy season. The system is almost dry in the rest of the year.

Figure 7: Water Resources & Bulk Water Supply System of Karachi



4. Groundwater Recharge Sources

Five possible water-sources are contributing to the groundwater recharge in Karachi. The first possible source is the rainfall. As the city of Karachi suffers from deficit of precipitation (only rainfall), the contribution to shallow groundwater storage from rain is very little. However, rainfall in the hinterlands and other areas surrounding Karachi may significantly contribute to the groundwater flow-system. The two freshwater sources are the Hub Lake/Hub Dam and the Indus River. Water from Hub Dam and the Indus River is piped to various residential zones in Karachi for drinking and irrigation purposes. The spring water discharges into Malir River and Layari River and the municipal/industrial waste effluents added to these rivers are also contributing to groundwater storage. Seawater intrusion along Karachi coast is another possible source.

During the past several years, a number of pumping wells has been installed to meet requirements for the irrigation-water supply (to serve vegetable and fruits cultivation, dairy and poultry) and drinking-water supply for Karachi. Excessive pumping of groundwater and continuous lowering of water-table is likely to result in intrusion of seawater into the Malir Basin under natural seepage conditions and under artificially induced conditions of recharge of saline seawater in the coastal aquifer(s) of Karachi.

5. Groundwater Quality[25]

Physico-chemical data of shallow groundwater (depth less than 30 meters) shows that the shallow wells, located in the vicinity of coast and in the proximity of polluted rivers, have relatively higher values of electrical conductivity, salinity and population of coliform bacteria. The shallow groundwater is moderately saline, representing electrical conductivity values in the range of 1.1 to 1.9 mS/cm and salinity in the range of 1 ppt. The pH of shallow groundwater varies from mildly acidic (~6.3) to mildly alkaline values (~7.9). Areas with quite poor sanitary conditions have relatively low values of pH (~6.3 to 6.8). Shallow groundwater below 20 meters is slightly reducing. The dissolved oxygen is in the range of 1.5 to 7.9 mg/l. Turbidity of shallow groundwater varies between 3.6 NTU and 95 NTU. The concentration of HCO3 - (356 – 514 ppm, n=4), Cl- (82 - 169 ppm, n=4) and SO4-2 (38-117 ppm, n=4) in shallow groundwater is very reasonable.

In general, deep groundwater is mostly saline and has high electrical conductivity (range: 1.9-19.1 mS/cm) and salinity (range: 1.7-7.4 ppt), as compared to shallow groundwater. Based on hydro-chemical data of water samples collected from pumping wells, it is assumed that the shallow mixed deep groundwater discharged by large-scale pumping wells mainly represents the deep groundwater from confined aquifer.

The hydro-chemical and stable isotope results indicate that the confined aquifer hosts a mixture of rainwater from hinterlands and surrounding regions around coastal Karachi, as well as sea trapped water / seawater, through intrusion under natural infiltration conditions or under induced recharge conditions.

b) Water Supply System

Over the last three decades, Karachi consistently lagged behind in the maintenance and expansion of water supply system, bulk conveyance system, and distribution network as compared to the city demands due to high population growth rate (4 to 5% per annum), low capacity of institutions, and low level of financing. The consequence is the rationing of water supply currently in practice in most of the areas of the city. Water is supplied only once in every two or three days and for the duration of two to three hours at a time. People are obliged to spend money on ground-level tanks, booster pumps, roof-top storage tanks and water filters and even then, all drinking water is boiled. Many households are compelled to use secondary sources of water such as shallow wells or tanker supplies just to meet their basic needs.

The water supply system of the KWSB supplies bulk water to the citizen of Karachi City from the Indus River, Hub Dam and Dumlottee Wells through the Greater Karachi Bulk Water Supply System, Karachi Water Supply Canal and Dumlottee Conduit respectively. About 33% of the total water supply is without filtration. From filtration plants and reservoirs, water is supplied through the water trunk mains and distribution pipelines.

The detail of the water filtration plants is given is Table 5.

[25] Information in this section is taken from: Geological Survey, Preparatory Survey (II) on Karachi Circular Railway Revival Project, Final Report, JICA, 2013

Table 5: Detail of Filtration Plants in Karachi

Location	Gharo		COD		Pipri			NEK Old	NEK New	Hub
Number of Plants	1	2	1	2	1	2	3	1	1	1
Year of Construction	1943	1953	1962	1971	1971	1978	2006	1978	1998	2006
Rated Capacity MGD	10	10	70	45	25	25	50	25	100	80

Source: KWSB

A total of 139 distribution pumping stations are being operated and managed by the KWSB. Some of the consumers install individual small suction pumps and suck water from distribution pipes forcibly. This is the one of reasons of serious water supply situation which makes low water pressure and water shortage, and also problems of water quality aggravation such as sewerage contamination caused by negative pressure in the pipes. There is no water meter on individual service connection. Consumers pay water tariff on the basis of plot size hence they pay no attention to any wastage. Awareness for the usage and storage of water is very less in many parts of Karachi. The areas which are not in the service area by any water supply or low service quality, water is supplied by Tank-Cars which belong to private sectors from 10 bases of Bowser Filling Stations in the city area.

2.1.9 Sewerage System

Four drainage systems are said to encompass Karachi city, the Lyari, the Malir, the Budnai, and small streams referred to collectively as the coastal basin. The Malir River Basin and the Lyari River Basin contribute about 80% of the surface runoff from the city. Thus, the natural drainage system of Karachi city includes mainly the tributaries of the Malir and Lyari Rivers. While these are perennial streams, in stream flow is intermittent, and fresh water inflow depends on rainfall and runoff; both rivers also intercept discharges from sewer lines and outfalls and carry sewage to the sea from all parts of the city. The Budnai Basin and the Coastal Basin are minor basins. The Malir River flows from the east towards the south and center, and the Lyari River stretches from north of the city to the southwest ending in the Arabian Sea.

Drainage channels collect surface runoff through hundreds of small/large side channels and lined nullahs (drains) that serve as important components of the drainage network. These are generally dry built channels and streambeds that flow into the main rivers described above. Whenever a heavy rain takes place, the huge amount of runoff that course through these channels may cause the rivers to overflow their banks and spread over adjacent floodplains. In any event, the drainage network of the city is severely stressed due to increased runoff from paved surfaces, and encroachment on drainage channels.

The Lyari River is an ephemeral stream having a substantial catchment area starting from as far back as the Badra range of hills, some 100 km north of the city. Its catchment covers an area of 700 km2, out of which, approximately 150 km2 is in the metropolitan area. The river is the main contributor to an estimated amount of 200 MGD of sewage that enters the Arabian Sea. A large number of industries including leather tanning units, pharmaceuticals, petrochemicals, refineries, chemical, textile, paper and pulp, engineering works and thermal power stations, located along the river, regularly discharge their untreated industrial waste, including the waste flows from the SITE industrial estate in Orangi that flows via the Orangi Nullah to the Lyari and thence to the ocean.

Malir River is shorter with a smaller drainage area. It is ephemeral and is constituted from two major tributaries, the Mol and Khadeji, as well as some minor tributaries. Khadeji is a perennial stream that originates at Khadeji falls and gains flow as it travels across the Malir Basin. The Malir and Khadeji River basins include dry hill torrents and flow depends upon precipitation during rains. Once the Malir enters urban space, it receives large amounts of industrial effluent from the Korangi industrial area, and discharges into the sea.

The wastewater quality of Malir and Lyari rivers is given in Table 6.

Table 6: Wastewater Quality of Malir and Lyari Rivers

Parameters (mg/l) except pH	**Malir**	**Lyari** (Mean Values)
pH	7.41 - 8.45	7.49
Temperature ºC	32 - 33	27
Total Dissolved Solids (TDS)	1,478 – 33,820	2,361
Biochemical Oxygen Demand (BOD)	180 – 320	343
Chemical Oxygen Demand (COD)	506 – 1,413	552
Zinc	0.6 – 1.39	0.32
Lead	2.19 – 6.77	0.23
Cadmium	1.71 – 2.6	0.12

Source: Physico-Chemical Profile of Malir River and Chinna Creek (Sadia Tariq et al.), Impact of Orangi Nala Industrial Effluents on Sewage Water of Lyari River, Karachi, Pakistan (Yasmin Nergis et al.), 2016

The existing coverage of the sewerage system is only about 30% for the Karachi. The existing sewerage system has a number of problems. These include low sewage flows received at existing sewage treatment plants, resulting from the inadequate provisions of sewer trunk mains and the malfunctioning of pumping facilities, deterioration of water quality in rivers and canals, and clogging of waterways caused by damping of massive rubbish. The detail of the sewage treatment plants is given in Table 7.

As per KSDP 2020, more than 380 MGD wastewater is discharged daily. Only 90 MGD is treated at existing wastewater treatment plants. According to KWSB sources, almost 441 MGD raw sewage gets into the sea without required level of treatment from Karachi via 11 drains. Existing sewerage facilities for sewage collection and its treatment are far from sufficient in quantity to serve the large population of Karachi city. Additional sewage collection system including branch sewers, trunk sewers and pumping stations need to be constructed to improve living environment of the citizen. In the same manner, existing sewage treatment plants need to be extended and new plant(s) has to be implemented to treat all the generated sewage to improve water qualities of public water bodies, especially of Arabian Sea.

Table 7: Summary of Sewage Treatment Plants of Karachi

	TP-1 (SITE)	TP-2 (Mahmoodabad)	TP-3 (Mauripur)
Drainage Area	F.B. Area, Liaquatabad, Nazimabad & North Nazimabad, Part of Orangi Town, Pak Colony etc.	Old City Areas, Clifton Societies, Mahmoodabad, Part of Azam Basti, Dada Bhai, Sadder, Malir	Old Lyari, Garden East and West, Gulshan-e-Iqbal, PIB Colony, Soldier Bazar, Baldia, Nazimabad, North Karachi
Site Area	120 acres (48.6 ha)	120 acres (48.6 ha)	545 acres (221 ha)
Year of Construction	1960/1995 (rehabilitated)	1960/1996 (rehabilitated)	1998
Treatment Process	Trickling Filter Process	Trickling Filter Process	Anaerobic + Facultative Pond
Capacity (MGD)	51	46	54
Present Flow Rate (MGD)	25	24	30-35
Effluent Quality	BOD 80.8 mg/l SS 76.4 mg/l	BOD 100 mg/l	BOD 75 mg/l SS 69 mg/l

Source: KWSB

a) Industrial Wastewater Pollution

Emission of untreated effluent from industries that do not meet the Sindh Environmental Quality Standards (SEQS) result in considerable environmental pollution and degradation. Untreated wastewater from most of the polluting industries does not comply with the SEQS. There are about 24 large and small industrial complexes in the province. The industrial estates of Karachi, namely Sindh Industrial Trading Estate (SITE), Landhi Industrial Trading Estate (LITE), Korangi Industrial Area (KIA), and West Wharf Industrial Area, among others, discharge effluents mainly into the Lyari and Malir rivers, which, passing through mangroves of Korangi Creek, finally drain into the Arabian Sea. SITE represents about 50% of the industrial discharges into sea.

Many of the above mentioned industrial estates intend to or are in the process of establishing large scale effluent treatment plants. The larger industrial zones include SITE (north), Landhi Industrial Estate (east), Korangi Industrial Area (south), Hub (west, between Karachi and Gadani, administratively outside Karachi). The other fast growing industrial areas include Port Qasim Industrial Area, North Karachi Industrial Area, FB Industrial Area, SITE Superhighway etc., besides a number of industrial units operating in residential areas. Due to paucity of land, capital and technical resources, very few industrial units have installed individual wastewater treatment plants. Therefore, almost all of the industrial effluent goes into the sea practically untreated.

The major sources of pollution in coastal waters are indiscriminate discharges of untreated industrial and domestic effluent, shipping traffic, mechanized fishing fleet and oil terminals at Karachi harbor. An estimated 90,000 tons of oily discharge is pumped out within port limits annually. Currently, almost 100% of the country's shipping cargo is handled at the two ports of Karachi. Eight heavy metals (As, Cd, Co, Cr, Cu, Hg, Ni, Pb, Zn) have been found to be accumulating in coastal fauna.

Untreated wastewater is one of the major source of surface and groundwater contamination. Major infectious diseases outbreaks were sourced by the contamination of fresh water resources. The

drains in Sindh are part of an irrigation system and were specifically constructed to drain subsoil water, control waterlogging and salinity, and carry the surface runoff from surrounding lands. They mostly discharge to the rivers and sea. Most sewage flows into the nullahs and rivers which run as open sewers through the urban area, causing highly obnoxious, insanitary conditions with serious health risks and unpleasant environment for the residents of adjoining neighborhoods.

There are numerous unauthorized settlements along most of the sewage channels where poor segments of society live. These are vulnerable to being exposed to water borne diseases, especially children. Besides causing health impacts, sewage overflow also damages already dilapidated infrastructure of Karachi, particularly roads.

Mangroves are under stress due to industrialization, decreased freshwater discharges, and urban sprawl. Major functions of mangroves are: protection of inland areas from the effects of climatic stress, breeding and spawning of marine fisheries, and livelihood to the coastal communities. Major issue is the depletion in mangrove cover, which is going down both in quantity and quality. The industrial units propping up along the coast, especially in the Port Qasim Industrial Area, often cut sizable numbers of mangroves. However, very low real effort is visible in alternative and compensatory plantation of mangroves, as promised by proponents during environmental approval process. Furthermore, with declining quality and quantity of fish catch, the fisher-folk is opting to other means of livelihood, thereby reducing their traditional economic reliance on mangroves. This results in cutting of mangroves by the local communities as well, especially during fuel shortage.

The heavy metal accumulation (especially Pb) in seafood is linked to anemia, kidney failure and brain damage in humans. Other major impacts of marine pollution as seen in Karachi include loss of biodiversity, dislocation of coastal communities, loss of livelihood, loss of fisheries, and degradation of beaches and recreational places.

2.1.10 Flooding

Climate of Karachi is semi-arid and rainfall is low and highly variable. Torrential rains and heavy rainfall mostly occur in the month of June under the effect of tropical storms. Torrential and heavy rains rarely affect coastal areas but cause flooding within the city. As the result of a tropical storm (6 June 2010) Karachi received 130 mm rain within a day which caused huge surface runoff. The heavy monsoon rain mostly occurs in July and August and is the main cause of flooding in the city. However, its reoccurrence is estimated to occur at between about 3 to 5-year intervals. Frequency of floods has increased in the recent past due to more frequent heavy monsoon rains stated to be linked with impacts of climate change. Flood affected areas of the city and areas susceptible to flooding include the old city areas such as Kharadar, Mithadar, Bunder Road, Ram-swami and Arambagh.

In the month of August 2020, torrential monsoon rains resulted in urban flooding in the city. On Thursday (August 27, 2020), the city received more than 223 mm of rains in a 12 hour period, the highest seen in a single day since records began (Meteorological Department). More than 484 mm of rain was fallen in August, according to the data, more than 10 times the monthly average. At least 13 people killed in the city during this spell of torrential rains. Those killed include people who have killed drowned in their homes, been crushed under collapsing walls or electrocuted by short circuiting wires[26].

[26] www.aljazeera.com/news/2020/08/flooding-woes-rains-lash-karachi-200828065619130.html

2.1.11 Seismology

Karachi is located in a moderate earthquake zone. Pakistan falls into three seismic zones. Zone-III is the most severe and Zone-I the least. The Karachi Building Control Authority has placed Karachi in Zone-II. Based on the actual events, past observations of fault movement and other geological activities, Karachi is situated in a region where moderate earthquakes may occur of magnitude 5.0 to 6.0 equivalent to intensity between VII and VIII on Modified Mercallis Scale (M).
On the basis of earthquakes experienced from 1970 to 2005, four seismically active zones have been identified in and around Karachi. One seismic zone lies to the west of Karachi, called Ornach Nal Fault merging into the regional Chaman Fault. The zone extends southwest into the Arabian Sea and is aligned with the submarine Murray Ridge; to the north it extends towards Uthal-Bela areas. No large earthquake is known historically on the Ornach Nal system.

The second seismic zone follows the south-eastern margin of Kirthar Range from the north to the south, swinging ultimately towards the southwest. This zone includes Thano Bula Khan, Lakhra, Jhimpir, Jungshahi, Thatta and areas further south. The third zone passes across the eastern vicinity of Badin in the northeast-southwest direction along the eastern margin of the Indus Delta. The fourth seismic zone straddles the Pakistan-India border. Earthquakes of low to moderate magnitudes — 3.1M to 4.0M and 4.1M to 5.0M — dominate in these zones. Earthquakes of higher magnitudes (above 5.0M) take place to the southeast in the Rann of Kutch, which is a known high-risk area. Records show that earthquakes of low to moderate magnitudes have occurred in the zones of Murray Ridge-Sonmiani-Uthal, south-eastern Kirthar, and Badin. Moderate magnitude earthquakes in Jangshahi, Thatta, Jhimpir and Thano Bula Khan Area produce low to moderate intensity shocks in Karachi, as experienced in 1985.

The seismic zoning for Karachi was revised after the 2005 earthquake. Probabilistic Seismic Hazard Assessment (PSHA) carried out for revision of seismic provisions of the Building Code of Pakistan shows that Karachi falls in Zone 2B. The Zone 2B has Peak Ground Acceleration (PGA) in the range of 0.16 g to 0.24 g for a return period of 475 years and is considered to be at ‘Moderate’ risk of a major earthquake event.

2.1.12 Ambient Air Quality

World Health Organization (WHO) included Karachi amongst the top 20 polluted cities of the world with respect to outdoor ambient air pollution levels measured as PM_{10} and $PM_{2.5}$. Annual mean concentrations of PM_{10} and $PM_{2.5}$ in Karachi are 273 µg/m^3 and 117 µg/m^3, respectively.[27] WHO revised standard for safe concentration levels for PM_{10} is 20 µg/m^3 and for $PM_{2.5}$ is 10 µg/m^3. In Karachi, PM_{10} concentration level is about 14 times and $PM_{2.5}$ concentration level is about 12 times higher than the WHO standards. Highest level of $PM_{2.5}$ concentration happens during November to February due to reduced wind speed. During this period, $PM_{2.5}$ concentrations reach in the range of 120–180 µg/m^3 (12-18 times the WHO standards). In 2007, Encyclopedia of Earth, ranked Karachi as the most polluted city in terms of Total Suspended Particulates (TSP), and fourth most polluted mega city according to the multi-pollutant index ranking.[28] In Karachi, the concentration levels of carbon monoxide (CO), oxides of nitrogen (NOx), and sulfur dioxide (SO_2) are within the permissible limits established by US EPA. The concentrations of hydrocarbons (HC) are higher than the permissible limits (0.25-2.8 as compared to 0.24 permissible limits).[29] Higher level of air pollution has

[27] WHO, “Public Health, Environmental and Social Determinants of Health: Ambient (Outdoor) Air Pollution in Cities Database 2014”.
[28] Gurjar Bhola R., “Air Quality in Megacities”, The Encyclopedia of Earth”, September 2014
[3] ibid 1

resulted in substantial increase in respiratory tract infection. Major contributors towards air pollution in Karachi are vehicular traffic, industry and ambient dust.

2.2 Biological Environment

2.2.1 Flora

Karachi can be divided into following four sections with respect to flora and fauna of the area:

- Eastern Boundaries
- Southern Boundaries
- Northern Boundaries
- Western Boundaries

Figure 8 shows these boundaries.

Figure 8: Boundary Limits of Karachi

Eastern Boundaries: Malir river and its adjoining sites in the east are densely populated with wide variety of vegetation in the form of natural foliage consisting diversity bushes, shrubs, trees including agricultural products such as crops, vegetables, and fruits. This section is extended from Memon Goth till Shah Faisal Korangi vicinities besides Malir river. The wild Kekar, Neem and Oak trees are also found here.

Southern Boundaries: Southern boundaries of Karachi city are surrounded by rocky and barren mountains which are very hot in summer and are grown mostly by diversity vegetation characteristic of Sindh region including bushes, shrubs, and wild Kekar trees. Most vegetation are shade less trees which are selectively consumed by domesticated animals such as goats etc. At some areas, commercial vegetables are also grown but large areas are unproductive.

Northern Boundaries: Northern boundaries of Karachi city are surrounded by High Seas of Indian Ocean which starts from Bin Qasim area up to Manora, Keamari and consisting large variety of Mangrove vegetation in the coastal corridor. Mangroves are natural vegetation located usually besides shoreline in closed seas and are significant sanctuaries and breeding places for wide variety of aquatic organisms.

Western Boundaries: Western boundaries of Karachi city are surrounded also by High Seas of Indian ocean as well as stationery sea water referred to as closed sea. It virtually consisting of West Wharf and nearby coastal areas including Hawksbay and Mauripur sections. Most of this region consisting large variety of Mangrove vegetation in the coastal corridor.

Ecological risk of high order has been induced by land clearance and removal of natural vegetation from the plains during the urban sprawl to make room for agriculture and urbanization. These zones include extensive flat alluvial plains, covered by relatively similar vegetation, mostly small trees and dwarf shrubs. Tall, clump-forming desert grasses are common. Signs of extensive drought damages done by land clearing activities are apparent and hence the natural vegetation that has survived in these areas has adapted to harsh conditions.

2.2.2 Fauna

Eastern Boundaries: No endangered fauna exist in this section, however, some avian fauna, sparrows of diversity genera, crows, cuckoos, and wild and domesticated pigeons exist. Street cats are more abundant species growing their population un-hindered and un-attendant at rural places. Limited farming for cows, goats and poultry exists. Among creeping fauna, snakes of few types also exist.
Southern Boundaries: The soil is sandy and rocky in appearance grown by wild Kekar trees and bushes having no valuable significance except cattle grazing for domesticated animals such as goats and cows. Some camels are also encountered grazing on elevated wild bushes and trees. Snakes of some variety are encountered. There is no characteristic avian fauna except Collard Dove and Wild pigeon is reported. No significant faunal regime exists in this region.

Northern and Western Boundaries: The High and closed seas of Karachi in the northern and western corridors are enriched with large variation of aquatic organisms in the form of large variety of fishes, shrimps, prawns, lobsters, crabs, turtles etc. Sea snakes are also encountered in closed sea sections. Among avian fauna Egret, Seagulls, and White Storks are most common species. Migratory faunal regimes are encountered in winter in closed sea sections or in isolated islands that mainly consisting of Flying Ducks, Pelicans and Flamingos.

The impoverished as well as degraded environment resulting from non-availability of surface as well as groundwater and discharge of untreated wastewater into Lyari and Malir Rivers has irreversibly reduced the biodiversity of the indigenous as well as introduced vegetation and hence it offers very little chance for the survival/growth of fauna in Karachi.

Water availability is the main constraint for the distribution of many animal species. Large wild mammals are virtually absent in the areas within Karachi. There are a number of characteristic bird species that have adapted to the agricultural environment in the outskirts and suburban areas. These include Indian Roller, Common Mynah, Pigeon, and House Sparrow.

2.3 Overview of Socioeconomic Condition

The following sections provide a general overview of the existing socio-economic conditions of Karachi, as the project will serve, and will have its impacts on, the entire city. Site specific details of the socio-economic aspects will be included in the various instruments to be developed for individual interventions under this ESMF, e.g. ESIA and ESMPs (as required) – including a detailed social assessment focusing on the community of waste-pickers living on site – will be prepared for the development of the sanitary engineered landfill cell at Jam Chakro Dumpsite. The documents will be prepared, consulted on, cleared by the Bank and disclosed prior to issuing bid documents for the corresponding works.

The following sections help in identifying the issues and general mitigation actions for social impacts of the project. These actions will be tailored for individual interventions, based on specific site and sub-project design conditions. These sections will also inform other strategies and plans of the project, for example, the stand-alone Stakeholder Engagement Plan.

2.3.1 Population

As per the 2017 population census, the population of Karachi is around 16 million, including 14.9 million urban residents[30]. Karachi's 2020 population is now estimated at 16,093,786. Karachi has grown by 1,804,626 since 2015, which represents a 2.41% annual change.[31] These population estimates and projections come from the latest revision of the UN World Urbanization Prospects[32]. It should be noted that many other sources put the actual figure of Karachi residents to be much higher than reported in the census.

Considering that the census boundaries of the city have not been increased since 1998, the population density is around 4,536/sq. km. The density is much higher in the downtown and metropolitan areas, where some sources depict as high as 24,000 people / km^2. The City is comprised of six urban districts with varying population distribution across the 6 districts. The 2017 Census, indicates much lower populations in Malir and Karachi South as compared to other districts. Karachi West and Central have the highest residential population densities.

Table 8: Karachi Population Profile

Karachi	Population (Million)		Population % in Urban / Rural areas		Annual Growth Rate %	Sex Ratio
	1998	2017	1998	2017	1998-2017	2017
Urban	9.45	14.91	95.9	92.9	2.43	110.7
Rural	041	1.14	4.1	7.1	5.56	113.5
Overall	9.86	16.05			2.6	108.2

As Karachi is bounded on the south by the sea and to the west by Hub River and Balochistan, the urban sprawl is more towards the east and north. Some key factors contributing to this preference, especially towards east, include a suitable flat terrain, connectivity through the National Highway (N-5) and the Super Highway (M-9), and proximity to industrial zones such as Korangi, Landhi and Port Qasim.

The increase in population is putting heavy pressures on the physical, infrastructural, financial and

[30] http://www.pbs.gov.pk/sites/default/files/PAKISTAN%20TEHSIL%20WISE%20FOR%20WEB%20CENSUS_2017.pdf
[31] https://worldpopulationreview.com/world-cities/karachi-population
[32] https://worldpopulationreview.com/world-cities/karachi-population

institutional systems of the city. A large segment of Karachi's population, roughly 40%, is afflicted with poverty[33]. The living conditions of the deprived section and its economic wellbeing are major concerns.

2.3.2 Health

Large proportion of the city's population lives in *katchi abadis* or slums with very poor infrastructure and access to basic services. Due to high incidence of air, land, and water (including marine) pollution that results from inadequate management of solid and hazardous waste—including medical waste, raw sewage, industrial effluent, and vehicular pollution—a large proportion of Karachi residents are prone to diseases linked to environmental pollution. Health costs related to air pollution in Karachi are estimated in the range of Rs. 30 billion–40 billion every year. The presence of high concentrations of pollutants in the air of Karachi causes multiple types of respiratory diseases among its residents. Open burning of industrial solid waste and the discharge of untreated liquid waste are serious hazards in Karachi.[34]

It has been reported that 23% of the patients admitted in Civil Hospital were infected by respiratory tract infection.[35] Table 9 presents estimated annual cases of morbidity from PM ambient concentrations in Karachi in 2009.

Table 9: Estimated Annual Cases of Morbidity

Activity	Number of Incidences
Chronic Bronchitis	145,185
Hospital Admissions	26,686
Emergency Room Visits	523,498
Restricted Activity Days	81,838,293
Lower Respiratory Illness in Children	1,353,000
Respiratory Symptoms	260,459,264

Source: The World Bank, "Sustainability and Poverty Alleviation: Confronting Environmental Threats in Sindh, Pakistan", 2015

Drinking water appears to be a major source of lead exposure. A World Bank study looking at 18 towns of Karachi city revealed blood lead concentration exceeding the WHO guideline in 89 percent of the sampled sources (World Bank 2010).[36] Karachi also accounts for some 67.2% of all the registered HIV cases in Sindh (9,810 HIV patients in Karachi of the total 14,482 in Sindh)[37].

In terms of health infrastructure, the city is served by some 165 major health facilities with a total of 14,350 beds. This includes 134 private hospitals, accounting for half the beds. Population served per

[33] Salman Qureshi, "The fast growing megacity Karachi as a frontier of environmental challenges: Urbanization and contemporary urbanism issues", Journal of Geography and Regional Planning Vol. 3(11), pp. 306-321, November 2010
[34]World Bank Group, "Transforming Karachi into a Livable and Competitive Megacity - A City Diagnostic and Transformation Strategy", 2018
[35] IUCN-Pakistan, "Sindh Strategy for Sustainable Development", 2007
[36] World Bank Group, "Transforming Karachi into a Livable and Competitive Megacity - A City Diagnostic and Transformation Strategy", 2018
[37] https://thefrontierpost.com/karachi-worst-hit-by-hiv-in-sindh-with-67-2-cases

doctor is 3,029 persons; per nurse is 7,282; and per bed is 1291.[38] The presence of private sector health facilities has helped in improving health status of the city population. The infant mortality rate under 5 years [per 1,000 live births] has improved to 59 and the maternal mortality to 180.

2.3.3 Education

Karachi's literacy rate was 87 percent in 2017.[39] According to the Pakistan Bureau of Statistics (2010-11), the ratio of population of ten years and older that has ever attended school is 80% for Karachi – second highest in the country after Islamabad. The Pakistan Social & Living Standards Measurement Survey states that more than 74% children attend private schools.

However, literacy rate in *Katchi Abadis* exhibits a dismal picture. Overall literacy rate in *Katchi Abadis* is 71 % with a significant gender gap with 76 % for males and 66 % for females. The adult literacy rate in *Katchi Abadis* is low at 45 %, and ranges from 30 to 48 % in different areas with a primary enrollment rate at 54 %.[40]
According to the District Wise Rankings in 2016 by Sustainable Development Policy Institute (SDPI) and Alif Ailaan[41], Karachi is ranked 43rd at the national while still the best in Sindh. This ranking is based on a complex arrangement of indicators providing independent scores on education, retention, enrolment, gender parity, and learning. The same report ranks the city at the 57th place (2nd place in Sindh) in terms of school infrastructure facilities.[42]

2.3.4 Economy and Occupations

Karachi is the financial capital of Pakistan and plays a pivotal role in the nation's economic and industrial activities. Karachi Strategic Development Plan 2020 (KSDP-2020)[43] describes that Karachi generates about 20% of the national output, creates more than 30% of value added in manufacturing, and accounts for 25% of national tax revenues. More importantly, the city provides jobs for a large population – 40% of national employment in large-scale manufacturing is based in Karachi. One of the Karachi's key comparative advantages is the low cost of labor. The low wage work force lives primarily in *Katchi Abadis*. Many poor people work near where they live, which reduces commuting costs and helps keep wages low. Inflation in Karachi is the lowest among all of the large cities (population in excess of 500,000) in Pakistan with the exclusion of Faisalabad[44].

Karachi's economy has grown steadily in the past 18 years and per capita income has remained the highest in the country. Depending on the methodology used, Karachi's contribution to gross domestic product (GDP) is estimated to range from 11 to 20 percent. The city has a superior GDP per capita, higher per capita income and relatively high level of labor productivity.[45]

Karachi is home to Pakistan's premier port which handles almost 95% of all foreign trade - in 2001 alone the Karachi Port handled more than 29 million tons of cargo. Furthermore, being the financial

[38] Bureau of Statistics, P&D Department Government of Sindh, "District wise Health Profile of Sindh for the year 2016"
[39] Cited based on the PSLM Survey 2017 in the Social Management Framework of CLICK project, the World Bank
[40] https://www.adb.org/sites/default/files/project-document/69115/38405-pak-dpta.pdf
[41] Alif Ailaan is a nonprofit organization working in the field of education in Pakistan since 2013
[42] Alif Ailaan and SDPI. 2016. Alif Ailaan Pakistan District Education Rankings 2016.
[43] Karachi Strategic Development Plan 2020 (KSDP – 2020) issued in August 2007 was formulated by the now-defunct City District Government Karachi. The document could be downloaded from a number of web sources
[44] https://www.scribd.com/document/94646622/Karachi-Master-Plan
[45] World Bank Group, "Transforming Karachi into a Livable and Competitive Megacity - A City Diagnostic and Transformation Strategy", 2018

hub of the country, Karachi hosts the head offices of the majority of Pakistan's public and private banks.

The manufacturing and trade sectors dominate employment in Karachi. They account for 63 percent of overall employment in the city. Public administration, transport and telecommunications, and health and education also account for notable shares of local employment.[46] One sample study in 2005 estimated that 81% of the total population is employed, out of which 50% are self-employed. However, a large proportion of the city population, up to 75%, is employed by the informal sector comprising of small scale or cottage industry, trade and provision of services including water, waste disposal, health, education and housing.[47]

2.3.5 Land Ownership and Use Pattern

Table 10 below presents the land use in Karachi under various categories.

[46] World Bank Group, "Transforming Karachi into a Livable and Competitive Megacity - A City Diagnostic and Transformation Strategy", 2018

[47] Cited based on a study conducted by the Engineering Consultants International Limited (ECIL) in 2995 in the Social Management Framework of CLICK project, the World Bank

Table 10: Land Use of Karachi

Group*	Category	Area (Sq. km)	Percent
Economic	Industrial	67	7.42
	Agriculture	50.9	5.63
	New industry	48	5.31
	Commercial	10.7	1.18
	New commercial centres	4.9	0.54
Infrastructure	Recreational	14	1.55
	Transport facilities	13.5	1.49
	Utilities	8	0.89
	Education	7.7	0.85
	Burial grounds	3.2	0.35
Residential	Planned residential	163.7	18.12
	Schemes to infill	98.8	10.94
	Low income settlements	82.7	9.15
	Unplanned residential	70.1	7.76
	Densification areas	47.8	5.29
	Urban renewal	11.2	1.24
Special purpose	Military areas	121.3	13.43
	Vacancy undeveloped	16.7	1.85
	Buffer areas	14.3	1.58
	Vacancy developed	1.9	0.21
	Flood plain	47.1	5.22
Total		903.5	100

*Groups and categories as defined by KDA (Source: Arsalan et al., 2006).

As is evident from the table, a little more than half of the city space is used for residential purposes. The site percentages allocated by the KBCA for different activities are rational and do produce a livable physical and social environment. However, communities close to the downtown, and in the low income areas, have smaller plot / flat sizes and higher population densities than proposed by KBCA. This exacerbates the solid waste problem due to generation of higher quantum and lack of public space including that for amenities.

More than 50% of the city population lives in squatter settlements (GOP, 2000), which are locally called *Katchi Abadis* (English equivalent: unpaved settlements) or slums: two classified definitions by the local government based on the legal setting and physical characteristics. These settlements are one of the most important challenges for the authorities which are officially reported as 539 in number with approximately 415,000 housing units[48]. On November 05, 2019, the daily Dawn quoted the Sindh

[48] Perween Rehman, "Katchi Abadis of Karachi: A survey of 334 katchi abadis", Orangi Pilot Project 2003, cited based on SKAA Progress Report

Human Settlement Minister telling the provincial assembly that Karachi had 575 identified shantytowns and 469 of them had been notified[49]. Social settings appear to be quite identical in both types of squatter settlements allied to low-quality housing, poverty (mainly because of unemployment), disruption of community cohesion and other deteriorating urban conditions that led to the poor health standards of the people.

Karachi is a city of migrants, with insufficient urban planning to absorb the exponential flow of people into anything near an adequate formal structure of housing and other services. Within migrant groups, partition migrants are perceived to have been favored above other cohorts that existed before or arrived later. Urban planning initiatives in Karachi have been inadequate in providing formal housing for most residents, and in some cases have exacerbated the problem by displacing residents to build physical infrastructure.

People prefer a place that could grow incrementally to house some of their children after marriage since they are aware that finding separate accommodation for them is not an affordable option. However, in building their homes initially, residents generally had not considered the additions that they would incrementally make as their needs increased. As a result, the houses are badly planned and ventilated and many neighborhoods have problems of congestion and in certain areas there are also social problems.

In the case of plot townships of 15 acres (6.07 hectares) or more, core houses (which can be added to) or plots of land on which people can build, are normally provided. Such land is on the periphery of the city and developers accept these conditions. Space for facilities and amenities are set aside as per KBCA regulations and are built upon by the government, the developer or by NGOs inducted into the planning process. Plots for apartment blocks and complexes are usually part of a larger KDA sector plan. The sector and its different neighborhoods have spaces allocated for social amenities such as commercial, educational, health and recreation. As such, the developer does not have to provide for these in the apartment complex plan. In addition, land is expensive in these locations and the developer would lose financially if he were to plan for incremental growth.[50]

Karachi's unplanned areas can be divided into three main subcategories: (i) *katchi abadis* that have been regularized or are awaiting regularization; (ii) slums, which are very dense inner city areas with deficient infrastructure; and (iii) villages, or *goths*, which have become part of the urban sprawl. Often, these different types of unplanned areas are mixed together and recognized as *katchi abadis*. Only one-third of the 75,500 new housing units required in Karachi each year are provided by the formal private and public sectors. As a result, land agents have emerged as key players in Karachi's urban development[51]. As the demand for housing in Karachi has grown, informal land developers have become increasingly influential. Even though the informalization of formal processes has given low-income residents access to many affordable plots, these are usually far from their workplace or from the city center where better social facilities are available (Hasan et al. 2015).

2.3.6 Status of Civic Amenities

- **Water Supply**

The water demand of 820 MGD is inadequately met by a water supply of 650 MGD which is filtered at various water filtration plants including COD, Pipri, NEK, Hub and Gharo through an extensive

[49] https://www.dawn.com/news/1514900/govt-notified-1006-katchi-abadis-in-sindh-pa-told
[50] http://arifhasan.org/wp-content/uploads/2012/12/khi-Density-Study.pdf
[51] Gayer, Laurent (2014) *Karachi: Ordered Disorder and the Struggle for the City*, New Delhi: Hurst & Co. Publishers

generation, filtration, pumping/boosting and piping system. In informal settlements and industries, the most of the water demand is met through non-piped systems, including private water tankers. Almost 24 hydrants have been licensed to the private parties by KWSB. Out of these 24 hydrants, only 10 are operational while the rest were closed as per a recent Supreme Court Order. Unregulated hydrants are rampantly spread across the city.[52]

- **Solid Waste Management**

Public opinion and perception of solid waste management system is characterized by irregularity and inefficiency of the collection system as well as poor monitoring of the private waste service providers by the local authorities. Many residents pay for waste management services to private waste pickers[53]. Up to one-third of the city's solid waste is separated and recycled through informal processes[54]. Overall in Karachi, nearly 55,000 families are estimated as dependent on the informal solid waste recycling industry for their livelihood.[55]

- **Power Supply**

K-Electric has the monopoly to supply power to Karachi. The website of the privately-owned power utility says that it has its own generation units 'with installed capacity of 2,267 megawatts' and gets over 1,162 MW from external power producers - or IPPs as they are known, including 650 MW from the national grid, resulting in a total capacity of 3,479 MW. According to most estimates, Karachi's power demand is between 2,700 to 2,900 megawatt during the summer, which can jump to over 3,300 MW, especially during the heat wave. Power outages remain a common occurrence in Karachi. This indicates that there is a high percentage of electricity loss - this is primarily due to poor infrastructure but also collusion of KE's lower-tier employees with the consumers resulting in doctoring of electricity meters. According to one estimate, 45% of the electricity consumed in the city comes through illegal connections to the K-Electric network, provided by land agents or unofficial electricity suppliers to the city's vast informal settlements[56].

- **Transport**

The informal sector also provides most of the transport infrastructure used by Karachi's residents. Over 90% of the Karachi's public transportation is comprised of privately owned buses and mini-buses. The three major types of public transport include:

- Minibuses & Coaches
- Buses
- Taxis, Rickshaws & App-Based Ride-Sharing Services

Based on the vehicle registration data of 2011, the city has 15,807 mini buses (8,773 in 1998); 6,506 buses (14,854 in 1998); 47,165 Taxis (13,613 in 1998); and 105,684 rickshaw (29,337 in 1998)[57]. Given the always-increasing headcount in the city, and the need to commute swiftly and conveniently from one end of the city to another, the provincial government of Sindh and the federal government

[52] WWF Pakistan: "Situational Analysis of Water Resources of Karachi", 2019
[53] Social Management Framework, CLICK Project
[54] World Bank Group, "Transforming Karachi into a Livable and Competitive Megacity - A City Diagnostic and Transformation Strategy", 2018
[55] Urbanization, Gender & Violence in Millennial Karachi: SAIC Scoping Study
[56] Gayer, Laurent (2014) *Karachi: Ordered Disorder and the Struggle for the City*, New Delhi: Hurst & Co. Publishers
[57] http://www.urckarachi.org/downloads/Transport%20isues%20in%20Karachi%20Final%20Report.pdf

of Pakistan have initiated a mega transportation project named the Bus Rapid Transit (BRT). Currently, the BRT is under development, but once completed, it will have a significant impact on the overall condition of public transport in Karachi.

2.3.7 Ethnicities, Conflict and Vulnerabilities

Karachi is Pakistan's most diverse city in terms of ethnicity, linguistic identity, and religious affiliations. While most of the population belongs to Islamic sects, the city also houses a sizeable proportion of non-Muslim communities including Christians, Hindus, and Zoroastrians.

Karachi's population is a diverse mix of various ethnic groups. According to the 1998 Census, *Mohajirs* comprised of almost 48.5 % of the population of Karachi, followed by Punjabis (14%), Pakhtuns (11.42%), Sindhis (7.22 %) and Baloch (4.34%). Most of the Baloch in Karachi are third generation migrants and politically identify themselves with Sindhis. Others, comprising foreigners and illegal immigrants, constitute two percent of the population. Majority of *Mohajirs* live in planned areas, while over half of Punjabis, over twothirds of Pashtun and Sindhis, and three-fourths of Balochis live in *katchi-abadis*.

Ethnic identity has played an important role in shaping Karachi's geography and social fabric. It has also dominated political and economic activities as various ethnic groups compete for resources and power, with strong implications on social development and municipal service delivery.

Since the colonial era, and through partition to the present day, Karachi has dealt with a constant tension between formal and informal structures. As the demand for housing in Karachi has grown, informal land developers have become increasingly aggressive in their attempts to acquire land to be developed unofficially. The development of informal settlements has historically been linked to the city's informal economy, creating a political economy that has no incentives to address informality. The proliferation of informal settlements has also led to the growth of informal service-delivery channels.

According to estimates, over 50 percent of Karachiites live in informal settlements of various types. Urban poverty has become a concern in Karachi. In katchi abadis, most of the inhabitants lack sufficient income, permanent jobs, tenure security, and access to services and infrastructure. Furthermore, poor living conditions and unhygienic environments have exposed them to ill health and low productivity, limiting their capacity to generate income and avail proper livelihoods (Mahbub ul Haq Human Development Centre 2014). Qualitative research led by local researchers shows that residents of katchi abadis have often expressed a sense of self-deprivation where they are stripped of their "rights to the city" and stuck in a cyclical poverty trap[58].

2.3.8 Gender Issues

Women face various gender inequalities and disadvantages in the social context of Karachi which often affect their access to municipal services, water and participation in community-based initiatives. Women are important stakeholders in municipal services rehabilitation subprojects, falling among both the affected and the beneficiaries. It is important to understand the gender dimensions of the project and its differential impacts on women so as to maximize project benefits. Failure to recognize the importance of gender in subproject implementation will have negative social impacts on women.

[58] World Bank Group, "Transforming Karachi into a Livable and Competitive Megacity - A City Diagnostic and Transformation Strategy", 2018

3.0 Regulatory Overview

This chapter briefly describes the national and provincial laws, policies, strategies, guidelines, codes and procedures, and World Bank's Environmental and Social Standards (ESSs) for the categorization, screening, environmental and social assessment and environmental and social compliance of the proposed project. This chapter stipulates that how the various requirements have been or will be complied with during the planning and implementation stages of the project.

3.1 National Policies, Laws and Strategies

This section briefly describes different policies, laws, and strategies of the Government of Pakistan relevant for the proposed project mentioned in the previous chapters.

3.1.1 National Environmental Policy, 2005

The National Environmental Policy provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of freshwater bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters, and climate change. It also gives directions for addressing the cross sectoral issues as well as the underlying causes of environmental degradation and meeting international obligations.

Policy measures recommends to i) enact the National Clean Air Act, ii) ensure reduction and control of harmful emissions through regulatory programs, iii) promote cleaner production technologies, iv) introduce discharge licensing systems for industry, v) establish cleaner production centers and promote cleaner production techniques and practices, vi) encourage reduction, recycling and reuse of municipal and industrial solid and liquid wastes, and vii) provide financial and other incentives (reduction/elimination of tariffs, low interest loans, appreciation certificates and awards) for technology up-gradation, adoption of cleaner technology, implementation of pollution control measures and compliance with environmental standards.

3.1.2 Climate Change Policy of Pakistan 2012

Climate Change Policy (CCP) establishes that urban areas in Pakistan are already affected by short-term climate changes. In the long term, it is predicted that urban areas located in the irrigated plains and coastal areas will be significantly affected by climate changes. It is predicted that due to climate changes, changes in hydrological cycle (intensive and erratic monsoon rains, flash floods, increased availability of water due to increased melting of glaciers in the short term, and decrease in water availability in the long term due to decrease in glacier flows) and increase in temperature will affect urban areas. 50 cyclonic storms developed in the northern Arabia Sea during 1946-2004. Four storms hit the coast of Karachi resulted in heavy downpours, flashfloods, and loss of life and property.

CCP predicts that due to climate change, extreme weather events such as heat and cold waves, heavy or too little precipitation, and strong winds will occur more frequently and will cause health impacts in urban areas, for example, diarrheal diseases because of insufficient clean water availability for drinking and personal hygiene. It is predicted that vector-borne diseases such as malaria and dengue fever may increase. Similarly, extreme weather events will express themselves in the form of natural disasters such as floods, droughts, landslides, and urban flooding.

CCP recommends the following actions: develop city-specific strategic plans, prepare and enforce legislation for water resource management in industry and domestic sectors with special focus on groundwater, adopt water efficiency measures and technologies, adopt rain harvesting measures, avoid excessive groundwater pumping, reuse wastewater after treatment, take flood protection measures, assess the health vulnerabilities of communities and build their capacities, develop proper disaster management system, redesign and upgrade drainage capacity of cities, strengthen early warning systems, develop enabling mechanisms for the adoption of climate change adaptations and mitigation measures; and conduct awareness campaigns to underscore the importance of conservation and sustainable use of water resources. At present, most of these adaptations are not in practice in Karachi.

Regarding environmental management and climate change resilience of cities, CCP recommends that cities should update town planning design principles for lowering carbon footprints, ensure proper land use planning and encourage vertical instead of horizontal expansion, install wastewater treatment plants, segregate solid waste at source, develop municipal infrastructure in the periphery of urban areas, and conduct hazard mapping and zoning of areas before construction.

CCP recommends that Climate Change Units be established in all federal and provincial ministries, redesign administrative and procedures for federal and provincial environmental protection agencies (EPAs) and P&Ds to integrate climate change concerns into the EIA and ensure that these are strictly enforced particularly for infrastructure projects, and develop capacities of the relevant institutions to undertake appropriate mitigation actions to reduce GHG emissions.

Generally, the implementation of CCP is nominal due to limited interprovincial coordination; low capacity of the MCC, provincial departments, and city authorities; and low level of budgetary allocation for climate smart city development.

3.1.3 National Sanitation Policy 2006

The National Sanitation Policy aims at providing adequate sanitation coverage, an environment necessary for healthy life, and meeting the 2015 Millennium Development Goals (MDGs) targets. The primary focus of sanitation is on the safe containment of excreta away from dwellings and workplaces by use of sanitary latrines and the creation of an open defecation-free environment. It emphasizes safe disposal of liquid and solid wastes and promotes good health and hygiene practices in the country. The basic principles established by the policy are the following: sanitation should be a fundamental human right, schemes should be based on simple cost-effective technologies, and institutional coordination for the installation and O&M of schemes is required. The policy envisaged that sanitation, environment, housing, water, and city and regional planning should be evaluated under an effective institutional and financial framework. It recommends that sanitation schemes should be financed through local resources and implemented by strengthened local and community institutions with the involvement of the Government, private sector, and NGOs. It recommends that installation and O&M of sanitation schemes should be institutionally synchronized. The policy states that needs of women and children should be covered as priority.

3.1.4 Pakistan Climate Change Act 2016

The Prime Minister established Pakistan Climate Change Council which coordinates and supervises the enforcement of the provisions of the Act, monitor implementation of the international agreements relating to climate change, approve and monitor implementation of comprehensive adaptation and mitigation policies, strategies, plans, programs, projects and other measures formulated by the authority to meet Pakistan’s international obligations, monitor the implementation of National

Adaptation Plan and its constituent provincial and local adaptation action plans, approve guidelines for the protection and conservation of renewable and non- renewable resources, species, habitats and biodiversity adversely affected or threatened by climate change.

The Minister In-charge of the Federal Government shall establish the Pakistan Climate Change Authority to exercise the powers and perform the functions under the Act. The functions of the authority shall be to formulate comprehensive adaptation and mitigation policies, plans, programs, projects and measures designed to address the effects of climate change, establish institutional and policy mechanism for implementation of Federal and provincial adaptation and mitigation policies, plans, programs, projects and measures, prepare suitable adaptation and mitigation projects for submission to international and local institutions for funding, including Clean Development Mechanism (CDM), Global Environmental Facility (GEF), Green Climate Fund and Adaptation Fund, prepare National Adaptation Plan and its constituents provincial and local adaptation plans, carry out Technology Need Assessment and prepare Climate Change Technology Action Plan in accordance with international best practices, prepare projects for funding under the Reducing Emissions from Deforestation and Forest Degradation (REDD) Mechanism, prepare guidelines for the protection and conservation of renewable and non-renewable resources, species, habitats and biodiversity which are adversely affected or threatened by climate change, advise Government regarding appropriate legislative, policy and implementation measures and actions relating to disaster preparedness, capacity building, institutional strengthening and awareness raising in relevant sectors affected by climate change, advise the Government regarding implementation of international conventions, design, establish and maintain a national registry and database on greenhouse gas emissions etc.

Pakistan Climate Change Fund shall be established under the Act. The monies received in the form of donations, endowments, grants and gifts, and raised by the authority for the execution of programs and projects of the authority shall be paid into the fund. This fund shall be managed by the authority.

3.1.5 The Canal and Drainage Act 1873

The Canal and Drainage Act 1873 (CDA) focuses on construction and maintenance of drainage channels and defines powers to prohibit obstruction or order their removal. It also covers issues related to canal navigation. It briefly addresses issues relating to environmental pollution. Section 70(5) of the CDA clearly states that no one is allowed to “corrupt or foul the water of any canal so as to render it less fit for the purposes for which it is ordinarily used.” In addition, Section 73 of the CDA gives power to arrest without warrant or to be taken before the magistrate a person who has willfully damaged or obstructed the canal or “rendered it less useful.”

3.1.6 Pakistan Penal Code

The Penal Code discusses offences where public or private properties and/or human lives are affected due to intentional or accidental misconduct of an individual or body of people. The Code defines the penalties for violations concerning pollution of air, water bodies and land. In the context of this program, the Penal Code can provide a basis for the infrastructure projects to coordinate activities with the local authorities to ensure that construction and operation activities do not become a cause of public nuisance or inconvenience.

3.1.7 Land Acquisition Act, 1894

In Pakistan, the governing legislation for land acquisition and compensation is the Land Acquisition Act (LAA) of 1894 with successive amendments, which regulates the land acquisition process and enables the federal and provincial governments to acquire private land for public purposes. Land

acquisition is a provincial subject, and each province has its own interpretation of the Act, and some have their own province specific implementation rules.

The law deals with the matters related with acquisition of private land and other immovable properties existing on the land for the public purpose. The public purpose, *inter alia*, includes the construction of development projects of public interest. The LAA specifies a systematic approach for acquiring and compensation of land and other properties for development projects. It stipulates various sections pertaining to notifications, surveys, acquisition, compensation and apportionment awards and disputes resolution, penalties and exemptions.

The LAA prescribes provisions for fair and adequate compensation for land acquired involuntarily, however, its enforcement marred by many lacunas due to the bureaucratic ineptness and the whole process from notification to compensation and grievance resolution often encumbered with inordinate delays and under the guise of eminent domain the state coercively acquires the citizens property and agonizing and pushing them in impoverishment with a little recourse. In addition, the LAA procedures do not entail the consultation and participation of affected people but leave the entire process to the discretion of the revenue department and implementing agency.

The framework of the LAA is generally considered to be constricted in scope and inadequately take into account the rehabilitation and resettlement of displaced populations and restoration of their livelihoods. The LAA also does not specifically provide any assistance for the poor, vulnerable or severely PAPs, nor does it cover for livelihood losses or resettlement costs for rehabilitation. Generally, it is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as crops, trees, and infrastructure. Consequently, a National Resettlement Policy and Resettlement Ordinance in 2002 with a wider scope of eligibility and entitlements had been drafted. However, the national policy and ordinance have yet to be officially approved, notified and enacted. In order to fill the vacuum, currently some transient measure are taken to compensate adversely affected non-titled people, non-registered tenants, businesses and wage workers under project specific arrangements for their rehabilitation, payment of resettlement costs and assistance for livelihood restoration.

For different range of infrastructural and developmental functions, land acquisition laws are applied. Land Acquisition Act of 1894 allows the various government departments LCs authorities to apply to relevant Boards of Revenue or other authorities for acquisition of land for public interest projects.

3.1.8 The Antiquities Act, 1975

This Act defines how to repeal and reenact the law relating to the preservation and protection of antiquities. The federal government may, by notification in the official Gazette, declare any antiquity to be a protected antiquity for the purposes of this Act.

3.2 Provincial Policies and Strategies, and Laws

This section briefly describes different laws, policies and strategies of the Sindh province for the environmental and social compliance of proposed project mentioned in the previous chapters.

3.2.1 Sindh Environmental Protection Act 2014

Sindh Environmental Protection Act (SEPA 2014) is the overriding environmental legislation in the province of Sindh. SEPA 2014, Section 35 states that the provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law in force for the time being.

After the 18th Constitutional Amendment, environmental management has been delegated to the provincial governments. The environmental management of the province is mainly governed under the SEPA 2014, which is a replica of the Pakistan Environmental Protection Act of 1997 with some amendments. The law is comprehensive and provides the basic framework for environmental management of the province. The focus of the law is on sustainable development, protection, conservation, rehabilitation, and improvement of environment. It instructs the provincial government to establish the Sindh Environmental Protection Council. Under the law, Environmental Impact Assessment/Initial Environmental Examination (EIA/IEE) is essentially required for all the projects before commencing any construction activity. It prohibits specified discharges and emissions. Sindh Environmental Quality Standards are an essential part of the law. The SEPA empowers the provincial government to issue notices and to enforce the Act for the protection of the environment.

SEPA 2014 is comprehensive with respect to its legal coverage for ensuring environmental compliance by all types of interventions in rural and urban areas and economic development sectors. Provisions of Section 11 establish that the law is universal, and it is applied to all sources of pollution and threats to natural resources. The priority of SEPA is environmental compliance by industry, with more emphasis on industry located in urban setups. On the other hand, regulatory focus of SEPA on rehabilitation projects of water supply, sanitation, roads, and urban spaces, and small and medium enterprises (SMEs) is nominal.

SEPA 2014 has established the Sindh Environmental Quality Standards (SEQS). These are discharge standards and are applicable at the point of discharges of emissions. SEQS are relevant for wastewater treatment plants and landfills activities. SEPA 2014 states that noncompliance with SEQS and not paying pollution charges will invoke implementation of punitive sections of the Environmental Protection Order and penalties to every noncomplying person, corporate body, Government agency, local authority, or local councils. Cases challenged by the parties will be settled by the Environmental Magistrates and Tribunals, and if required, the cases can also be appealed in the higher courts. Standards for the following types of effluent and emissions are specified in the SEQS and may be relevant to the specified projects:

a) Municipal and liquid industrial effluent parameters (32) for discharge to inland waters, sewage treatment facilities, and the sea
b) Industrial gaseous emissions (16) into the atmosphere
c) Motor and vehicle exhaust and noise (3 to 5)
d) Ambient air quality (9)
e) Drinking water quality (33)
f) Noise standards for residential, commercial, industrial, and silence zones

SEPA 2014 instructs the proponents of projects to conduct and submit IEE or EIA study, according to the size and impacts of the projects. Section 17 of SEPA 2014 establishes that, “no proponent of a project shall commence construction or operation unless he has filed with the Agency an IEE or EIA and has obtained from the Agency approval in respect thereof.” Under SEPA 2014, public participation through public hearing is essential part of IEE reports approval. Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014, stipulate the complete approval system for IEEs.

Sindh Environmental Protection Agency (Review of IEE and EIA Assessment) Regulations, 2014

This document sets out the key procedural requirements for conducting an IEE and EIA. The document lists the responsibilities of proponents and duties of responsible authorities and provides schedules of proposals for determining whether the project requires IEE, EIA or screening under Schedules I, II, and III respectively and lays down the procedures for Environmental Approval and for filing the case with the SEPA to receive the NOC.

The Regulations also provide the necessary details on the preparation, submission, and review of IEEs and EIAs. The following is a brief step-by-step description of the approval process of an IEE:

1. To determine whether a sub-project is categorized as requiring an IEE based on the screening as per three schedules.
2. An IEE or screening is conducted according to the requirements outlined in the SEPA guidelines.
3. The fee (depending on the cost of the subproject and type of report) is submitted along with the IEE document.
4. IEE is also accompanied by an application in the format prescribed in Schedule V of the Regulations.
5. The SEPA conducts a preliminary review of the report and replies within 15 days of the submission. It either (i) confirms completeness; (ii) asks for additional information, if needed; or (iii) returns the report and asks for additional studies, if necessary.
6. The Agency shall make every effort to carry out its review of the environmental checklist within thirty days, and IEE within sixty days of issue of confirmation of completeness under regulation 9.
7. The SEPA accords its approval, subject to certain conditions:

    a. Before commencing construction of the subproject, the proponent is required to submit an undertaking accepting the conditions.
    b. Before commencing operation of the subproject, the proponent is required to obtain from the EPA a written confirmation of compliance with the approval conditions and requirements of IEE.

8. An EMP is to be submitted with a request for obtaining confirmation of compliance.
9. The EPA is required to issue confirmation of compliance within 20 days of receipt of the request and complete documentation.
10. IEE approval is valid for three years from the date of operational phase NOC.
11. After completion of construction, a monitoring report is to be submitted to the SEPA, followed by annual monitoring reports, during operations.

3.2.2 The Sindh Local Government Act 2013

Under the Sindh Local Government Act 2013 (SLGA), Chapter VI, land use planning; implementation of building by-laws; management of environmental and health hazards; food adulteration; provision and maintenance of water supply schemes and public sources of drinking water; and mobilization of communities for the upgrade of local infrastructure (transportation, landscaping, and removal of encroachments) are the responsibilities of municipal corporations/committees.

Under Chapter VI, the district council is responsible for the overall welfare of the population (health and safety); improvement and maintenance of district main transportation routes including removal of encroachments and other local infrastructure (such as open spaces, graveyards, public open spaces); assistance to relevant authorities in the provision of relief services in the case of natural calamities (fire, flood, hailstorm, earthquake, and epidemic); control over land use and spatial

planning (including agriculture, industry, commerce, residential, and so on); and enforcement of municipal laws.

Under the second and fourth Schedules, both municipal committees and union councils are responsible for the management of dangerous and offensive articles and their trade.

Under the Sixth Schedule Part-I and Part-II of the Act, it is an offence and the Local Government (LG) can take the offender to court for discharging of chemicals in any drain, public watercourse, and public land that is likely to cause public health hazards; industry and commercial concerns disposing affluent in the water supply and sewerage system; adulteration of eatables and drinkables items; cultivation of agriculture produce or crop by irrigating with sewer water or any such liquid; and dumping of solid waste and refuse in a place other than a landfill or dumping site, establishing a brick kiln, lime kiln, charcoal kiln, or pottery within such distance of the residential area as may be specified by the Council, dyeing or tanning skins within such distance of any commercial or residential areas as may be specified by the local government, and damaging or polluting physical environment, inside or outside private or public premises, in a manner to endanger public health.

3.2.3 The Sindh Wildlife Protection Ordinance, 1972

The ordinance requires the protection of wildlife species declared as protected and game animals. This ordinance restricts hunting of protected and game animals. Game animals can be hunted under permit from the wildlife department. Hunting is also prohibited by means of certain lethal weapons, mentioned in the ordinance. The import and export of wildlife, trophies and meat is also prohibited. Ordinance declares certain areas as national parks and game reserves where hunting and spoiling of its natural landscape and environment is prohibited.

3.2.4 Sindh Strategy for Sustainable Development, 2007

The Sindh Strategy for Sustainable Development (SSSD) proposed a ten year sustainable development agenda for Sindh. The focus of SSSD is to promote the sustainable use of natural resources. It targets to reduce poverty and enhance social development through the participation of the people of Sindh.

Planning and Development Department Government of Sindh is responsible for the overall coordination of SSSD. The SSSD recommends that the rehabilitation and extension of water supply and sanitation networks, effective water and wastewater quality monitoring and treatment to comply with SEQS, improved coordination among stakeholders (public agencies, private sector, and residents) for the effective management of air pollution, consultation based infrastructure planning and development with focus on minimizing traffic and pollution hazards, and conducting environmental impact assessment of all the major projects. In addition, the SEPA should be strengthened for effective monitoring of pollution, especially in the case of industries.

SSSD recommends for the sustainable development and environmentally complying operations of industries: incentive mechanisms for reducing pollution; awareness raising of industrialists and stakeholders; promote cleaner production; enforce pollution charges as per SEPA 2014; prepare baseline of all industrial estates and sites to establish the pollution levels, waste disposal practices, air emissions, generation of hazardous waste for the preparation of environmental management plans for complying SEPA 2014; preparation of EIAs for all industrial development and infrastructure projects.

3.2.5 Sindh Sanitation Policy 2017

The vision of the policy is to provide the population of Sindh the better sanitation service and to make sure that the entire population of Sindh has access to a safely managed sanitation service and sanitary environment that is also nutrition sensitive and hygienic.

The key targets of the policy are to eradicate open defecation from Sindh province by 2025, while 70% villages of 13 high priority districts achieve the status of open defecation free by 2020, 100% households in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020, to strengthen and implement liquid waste with sewer lanes and covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas, to create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% rural areas by 2025, to implement integrated solid waste management with 100% coverage in urban areas and 60% in rural areas by 2025.

The policy is built upon thirteen principles including i) alignment with the goals and targets of the Sindh Development Goals (SDGs) for sanitation, ii) adherence to the pursuit of total sanitation as outlined in Pakistan Approach to Total Sanitation (PATS), within the province, iii) safely managed sanitation services for all persons in Sindh province, iv) prioritize the areas that pose the greatest risk to human health namely hygiene awareness and excreta disposal, v) recognizing that inadequate and unsafe water supply and sanitation as major cause of diarrhea and nutritional deficiency in children, vi) increase access to high quality nutrition sensitive services, including access to water, sanitation facilities and hygiene, vii) integrating key hygiene actions (safe drinking water, hand washing with soap, safe disposal of excreta, and food hygiene) and essential components in all nutrition programs, viii) promoting community led approaches to strengthen the demand for safely managed improved sanitary conditions, ix) identification and marketing of affordable (in terms of designs as well as availability of water) and cost effective technical solutions, x) ensuring the sustainability of the services by mobilizing and engaging existing structures, xi) envision of component sharing model in the National Sanitation Policy, xii) the role of women as an integral component of behavioral change communication strategies and project planning, implementing and monitoring, xiii) establishing and maintaining an independent monitoring and evaluation system to track progress.

3.2.6 Karachi Strategic Development Plan 2020

The vision of Karachi Strategic Development Plan 2020 (KSDP) is to “transforming Karachi into a world class city and attractive economic center with a decent life for Karachiites”. The objectives of KSDP-2020 are: (a) design future growth of Karachi based on its strengths and potential; (b) sustainable growth by integrating various development activities under holistic vision; (c) identification of social, economic, environment, and urban infrastructure issues; (d) development of strategic framework for city development; and (e) establish collaborative institutional arrangement with the participation of stakeholders and citizens.

Implementation of the KSDP-2020 is provided a legal coverage under Section 40 of the Sindh Local Government Ordinance 2001 (SLGO). SLGO makes it mandatory for all the development agencies in Karachi to follow the plan for planned and coordinated development of Karachi. KSDP proposes the establishment of new industrial parks or zones. KSDP recognizes that higher level of air pollution persists in the city due to automobile and industrial emissions, open burning of solid waste, and other domestic and commercial emissions. Hazardous industrial waste is burned in substandard incinerators resulting hazardous emissions.

KSDP recommends renewal and maintenance of current buildup areas rather than spatial expansion. KSDP recognizes the economic importance of SITE, Korangi Industrial Estate, Bin Qasim Zone, Export Processing Zone-Surjani, SITE-II, and Textile City for Karachi and country. Infrastructure development, enhanced connectivity, and modernization of these industrial estates is essentially required for optimizing the productivity. KSDP also proposed new industrial zones, these are, Dhabeji along the National Highway, in Deh Gondpass near intersection of RCD Highway and Northern Bypass, in Deh Mahyo north of Surjani Town.

3.2.7 The Karachi Water and Sewerage Board Act, 1996 (KWSB Act)

Under KWSB Act 1996, board was established for supply of water and disposal of sewerage in the Karachi Division.

Powers and Functions of the Board: The Board shall i) sanction the fees and levy for water connections, water supply to tankers and sewerage connections and collect the charges, ii) reduce, suspend or disconnect the water supply and impose surcharges, if dues are not paid within the due time, iii) make regulations with the approval of the Government, iv) undertake construction improvement, maintenance and operation of water works and sewerage works, v) assess the position of water supply from time to time and regulate water supply, vi) review the existing schemes or prepare new schemes relating to water works and sewerage work and undertake execution with the approval of Government, vii) regulate, control or inspect water connection, sewer lines and service lines, viii) produce and supply of potable water, ix) place, maintain aqueducts, conduits, sewers etc.

Supply of Water and Execution of Schemes: The Board shall i) be responsible for the bulk production of potable water and its distribution, ii) ensure that the water supplied by it is duly filtered, treated and tested and is fit for human consumption, iii) arrange retail distribution of water within its jurisdiction excluding the areas receiving water supply through constituent Bodies, iv) supply water to any person or authority in the area or areas notified under this Act (subject to availability), v) continue to make bulk water supply to the constituent Bodies (Karachi Port Trust, Cantonment Board of Karachi, Sindh Industrial & Trading Estate, Karachi Pakistan Steel Mills Corporation, Defense Service or any other body or organization notified by Government) at such rates and subject to such terms and conditions as may be determined by the Board, vi) continue to execute the Hub Dam Water Supply Stage I and Phase-IV of the Greater Karachi Bulk Water Supply Stage I and Sewerage Disposal Projects, vii) have right to place and maintain aqueducts, conduits and lines of mains, drains, sewers or pipes, over, under, along or across any immovable property without acquiring such property, and to enter on such property for the purpose of examining, repairing, altering or removing any aqueducts, conduits or lines of mains, sewers or pipes.

3.2.8 Sindh Solid Waste Management Board Act, 1996

Government of Sindh has established Sindh Solid Waste Management Board (SSWMB) under the Sindh Solid Waste Management Board Act 2014. SSWMB is responsible for the collection and disposal of solid and other wastes in the Province of Sindh.

Major functions of SSWMB are: (a) grant permissions to parties for composting, power generation from waste, recycling, treatment, sale and purchase of solid waste; (b) recommend to government a cess, tax or any other charges; (c) collect and recover cess, rates, charge fees or impose fines for collection and disposal of solid waste against the rules prescribed; (d) construct, improve, maintain the buildings, sites and machinery relating to the operation of solid waste management; (e) make rules and regulations for operational, administrative, human resource management and finance for regulating the operation of solid waste management from time to time; (f) review the existing schemes

or prepare new schemes relating to solid waste management and undertake execution thereof; (g) regulate control or inspect the source points of generation, accumulation, transfer, recycling, trading of the solid waste; (h) employ third party to take over management of solid waste on behalf of the Board; (i) the Board may support, promote, administer, execute and implement schemes for undertaking any commercial or business enterprise which may benefit the management of waste; and (m) the Board shall negotiate, review, and finalize the waste management projects with all commercial entities, agencies and foreign organizations in consultation with the Provincial Government.

3.2.9 The Sindh Occupational Safety and Health Act, 2017

Under the Sindh Occupational Safety and Health Act, 2017, the employer would be responsible to ensure the health and safety of the workers at workplaces (construction sites are also considered as workplace under the act). The act mentions health and safety requirements which need to be ensured to be complied by the employer/site in-charge and the workers. The Chief Inspector and the inspectors appointed under the act shall be responsible to enforce health and safety requirements prescribed by the act. Penalties shall be imposed in case of noncompliance of the requirements.

3.2.10 Sindh Transparency and Right to Information, 2016

The purpose of this Act is to provide transparency and freedom of information to ensure that all citizens have better access to public information, to make the government more accountable to citizens, to enforce the fundamental right to information in all matters of public importance, to ensure transparency in all Government matters. Transparency and access to information are essential principles of democracy which not only enable the citizens to hold the Government and their institutions accountable but also help in improving the system of governance.

3.2.11 Sindh Public Property Removal (Removal of Encroachment) Act, 2010

The Act has been passed by the Provincial Assembly to avoid encroachment and provides measures for removal of encroachment from public property. The law specifies: powers to intervene, grievance redress and review mechanisms, eviction and recovery of cost of eviction in case of non-compliance, punishment for aiding and abetting the act of encroachment, rewards for outstanding performance in removal of encroachment, and setting up of grievance redress tribunals. The City Government will provide continuous oversight and reinforcement to facilitate that public spaces remain free from illegal encroachments as outlined in the Sindh Public Property (Removal of Encroachment) Bill, enacted in 2010.

3.2.12 Sindh Katchi Abadis Act, 1987

Under the Sindh Katchi Abadi Act (SKAA) 1987, settlements can be declared as official *katchi abadis* and allows the right of urban squatters to rehabilitations. The SKAA envisages the regularization and provision of infrastructure to all squatter settlements on government land which were established before 23 March 1985. The SKAA was tasked to coordinate the process of awarding leases to the residents and to provide infrastructure and other basic services. It is a provincial wide agency that operates in other towns and cities as well as Karachi. The Act stipulates the transfer of government owned land to the urban squatters or allocates funds for cash assistance.

3.2.13 Sindh Minimum Wages Act, 2015

The laws relating to the minimum wages, i.e., the minimum Wages for Unskilled Workers Ordinance 1969, Minimum Wages Ordinance 1961, Cost of Living Allowance, and Sindh Employees Special

Allowance have been merged in the Sindh Minimum Wages Act 2015. The Act provides for the regulation of minimum rates of wages and various allowances for different categories of workers employed in certain industrial and commercial undertakings and establishments. In September 2019, under the provisions of Section 4 of the Act, the Sindh government set minimum wage for adult unskilled and juvenile workers at Rs. 17,500 per month.

3.2.14 Sindh Prohibition of Employment of Children Act (2017)

The Sindh Prohibition of Employment of Children Act 2017 provides rule and regulations to prohibit the employment of children and to regulate employment of adolescents in certain occupations and work. The Act defines “child” as a person who has not completed fourteen years of age and “adolescent” as a person who has completed fourteenth but has not completed eighteenth year of age. Section 3 of the Act prohibits the employment of adolescent to perform any hazardous work which includes, among others, “all scavenging, including hospital waste” (No.23).

3.3 EIA Approval Process

The Pak-EPA prepared regulations in 2000 for the “Review of IEE and EIA”. These regulations categorize development projects for IEE and EIA into Schedules I, II and III. Projects are classified on the basis of expected degree and magnitude of environmental impacts and are included in different schedules.

The projects listed in Schedule-I include those where the range of environmental issues is comparatively narrow and the issues can be understood and managed through less extensive analysis. Schedule-I projects require an IEE to be conducted, rather than a full-fledged EIA, provided that the project is not located in an environmentally sensitive area.

The projects listed in Schedule-II are generally major projects and have the potential to affect a large number of people in addition to significant adverse environmental impacts. The impacts of projects included in Schedule-II may be irreversible and could lead to significant changes in land use and the social, physical and biological environment.

Sindh Environmental Protection Act is approved in March 2014. Figure 9 provides an outline of the EIA process in Sindh. Those projects not included in schedule-I and II don’t require IEE or EIA. SSWMB is responsible for compliance with environmental commitments and mitigation measures proposed in this environmental report and in the subsequent review and approval conditions.

No construction, preliminary or otherwise, relating to the project shall be undertaken until and unless the EIA approval has been issued by the Sindh EPA. SSWMB shall submit the Environmental Report on a prescribed application along with a processing fee of Rs. 30,000 to Sindh-EPA. After submission of the EIA report, a thirty (30) day period for public comment shall be provided. The assessment will be completed within a period of ninety days from receipt of the complete documents, and earlier than this wherever practicable. Following the completion of public hearing, if required, and the provision of any further data from the proponent, the decision shall be made and conveyed thirty days thereafter.

3.3.1 Policy and Procedures for the Filing, Review and Approval of Environmental Assessments

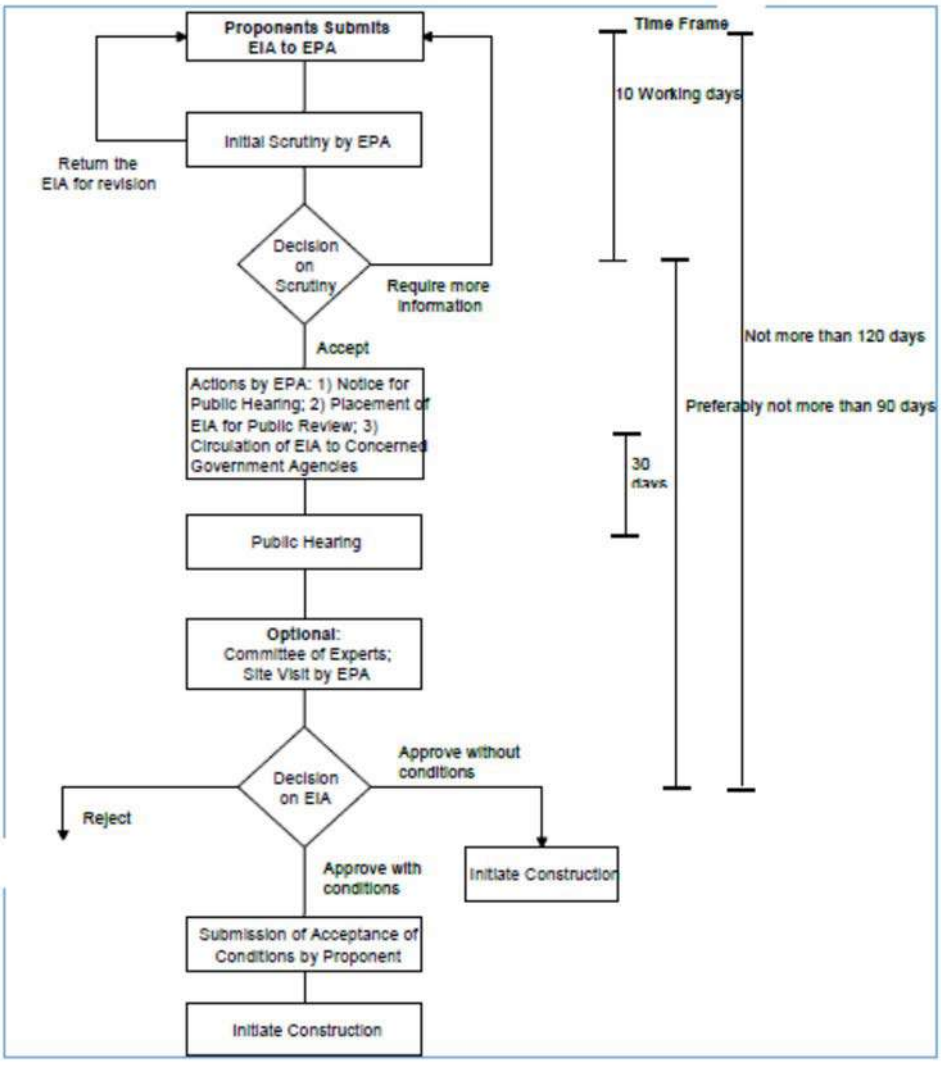
The Policy and Procedures for Filing, Review and Approval of Environmental Assessments, 2000, define the policy context and the administrative procedures that will govern the environmental assessment process, from the project pre-feasibility stage to the approval of the environmental report.

3.3.2 Guidelines for the Preparation and Review of Environmental Reports

The Guidelines for the Preparation and Review of Environmental Reports, address project proponents, and specify:

- The nature of the information to be included in environmental reports
- The minimum qualifications of the EIA consultant
- The need to incorporate suitable mitigation measures into every stage of project implementation
- The need to specify monitoring procedures.
- The terms of reference for the reports are to be prepared by the project proponents themselves.
- The reports must contain baseline data on the project area, a detailed assessment thereof, and mitigation measures.

Figure 9: EIA Approval Process in Sindh



3.4 Environmental Regulatory Authority

The Pakistan Environmental Protection Ordinance, 1983 was the first legislation in Pakistan designed specifically for the protection of the environment. The promulgation of this Ordinance was followed in 1984 by the creation of Pakistan Environmental Protection Council (PEPC).

3.4.1 Pakistan Environmental Protection Council

The PEPC is the highest inter-ministerial statutory body in the country headed by the Prime Minister and is responsible for:

- Formulating national environmental policy;
- Enforcing PEPA 1997;
- Approval of the NEQS;
- Incorporation of environmental considerations into national development plans and policies; and
- Provision of guidelines for the protection and conservation of biodiversity in general as well as conservation of renewable and non-renewable resources.

3.4.2 Climate Change Division

The Climate Change Division, which falls directly under the Prime Minister Secretariat, is the focal point for National Policy, Legislation, Plans, Strategies and programs with regard to Disaster Management, Climate Change including Environmental Protection and preservation. The Division also deals with other countries, international agencies and forums for coordination, monitoring and implementation of environmental agreements.

3.4.3 Pakistan Environmental Protection Agency (PAK-EPA)

The PAK-EPA is headed by a Director General and has wide ranging functions as set out in PEPA 1997. These include preparation and co-ordination of national environmental policy for approval by PEPC, administering and implementing PEPA 1997 and preparation, revision or establishment of NEQS. The PAK-EPA has issued regulations regarding the environmental assessment procedures known as Review of Initial Environmental Examination (IEE) and EIA Regulations, 2000; these provide a firm legal status to the IEEs and EIAs. The jurisdiction of the EPA is applicable to the following projects:

- On federal land;
- Military projects;
- Involving trans-country impacts; and
- Bearing trans-province impacts.

3.4.4 Sindh Environmental Protection Agency

Sindh Environmental Protection Agency (Sindh EPA) is a counterpart of the PAK-EPA at the province level. The Sindh EPA is established by the respective provincial/regional governments. They are headed by a Director General. The IEE and EIA reports pertaining to projects falling within the boundary of Sindh are to be submitted to the Sindh EPA for approval.

3.5 International Treaties and Conventions

Pakistan is a signatory to a number of Multilateral Environmental Agreements (MEAs). These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and institutional setup mostly non-existent. The following are the relevant international treaties and conventions that have been ratified by Pakistan, where relevant, these will be discussed in further detail within relevant chapters:

- RAMSAR Convention on Wetlands of International Importance
- Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal
- Convention concerning the Protection of World Culture and Natural Heritage
- Convention on the International Trade in Endangered Species
- International plant protection convention
- International Covenant on Economic, Social and Cultural Rights
- International Labour Organization's (ILO) Core Labour Standards on:

    - Freedom of association (convention 87)
    - Elimination of forced and compulsory labour (conventions 29 and 105)
    - Elimination of discrimination in respect of employment and occupation (conventions 100 and 111)
    - Abolition of child labour (conventions 138 and 182)
- Kyoto Protocol to the Convention United Nations Framework on Climate Change
- Stockholm Convention on Persistent Organic Pollutants
- United Nations Convention on Biological Diversity
- United Nations Convention on the Rights of the Child
- United Nations Framework Convention on Climate Change.

3.6 Relevant World Bank Environmental and Social Standards (ESSs)

Following Environmental and Social Standards (ESSs) of the World Bank are relevant with SWEEP:

- ESS-1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS-2: Labor and Working Conditions
- ESS-3: Resource Efficiency and Pollution Prevention
- ESS-4: Community Health and Safety
- ESS-5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS-6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS-10: Stakeholder Engagement and Information Disclosure

3.6.1 ESS-1: Assessment and Management of Environmental and Social Risks and Impacts

This standard sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

The objectives of this standard are to i) identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs, ii) adopt a mitigation hierarchy

approach to (a) Anticipate and avoid risks and impacts; (b) Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels; (c) Once risks and impacts have been minimized or reduced, mitigate; and (d) Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible, iii) adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project, iv) utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate, v) promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity.

3.6.2 ESS-2: Labor and Working Conditions

This standard recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.

The objectives of this standard are to i) promote safety and health at work, ii) promote the fair treatment, nondiscrimination and equal opportunity of project workers, iii) protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate, iv) prevent the use of all forms of forced labor and child labor, v) support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law, vi) provide project workers with accessible means to raise workplace concerns.

3.6.3 ESS-3: Resource Efficiency and Pollution Prevention

This standard sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle consistent with Good International Industry Practice (GIIP).

The objectives of this standard are to i) promote the sustainable use of resources, including energy, water and raw materials, ii) avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities, iii) avoid or minimize project-related emissions of short and long-lived climate pollutants, iv) avoid or minimize generation of hazardous and non-hazardous waste, and v) minimize and manage the risks and impacts associated with pesticide use.

3.6.4 ESS-4: Community Health and Safety

This standard recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities.

The objectives of this standard are to i) anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances, ii) promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams, iii) avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials, iv) have in place

effective measures to address emergency events, v) ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

3.6.5 ESS-5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both. The term “involuntary resettlement” refers to these impacts. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement.

The objectives of this standard are to i) avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives; ii) avoid forced eviction; iii) mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement cost, and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher; iv) improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure; v) conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant; and vi) ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected.

3.6.6 ESS-6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

This standard recognizes i) protecting and conserving biodiversity and sustainably managing living natural resources which are fundamental to sustainable development, ii) importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support, iii) sustainable management of primary production and harvesting of living natural resources, iv) the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project.

The objectives of this standard are to i) protect and conserve biodiversity and habitats, ii) apply the Chapter 3 of thmitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity, iii) promote the sustainable management of living natural resources, iv) support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities.

3.6.7 ESS-10: Stakeholder Engagement and Information Disclosure

This standard recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

The objectives of this standard are to i) establish a systematic approach to stakeholder engagement that will help borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties, ii) assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance, iii) promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them, iv) ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format, v) provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow borrowers to respond to and manage such grievances.

3.7 WBG Environment, Health and Safety Guidelines

The following WBG EHS guidelines also apply based on the typology of subprojects:

1. General EHS Guidelines[59]
2. EHS Guidelines for Waste Management Facilities[60]

3.8 Gaps between Environmental and Social Standards and National Laws

The gaps between Environmental and Social Standards (ESSs) and the national laws for E&S management and how these gaps are addressed in the ESMF are given below. Where gaps exist between national laws vis-à-vis ESF, the most stringent requirements will prevail and will be followed under the project:

[59] https://www.ifc.org/wps/wcm/connect/29f5137d-6e17-4660-b1f9-02bf561935e5/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES&CVID=jOWim3p
[60] https://www.ifc.org/wps/wcm/connect/5b05bf0e-1726-42b1-b7c9-33c7b46ddda8/Final%2B-%2BWaste%2BManagement%2BFacilities.pdf?MOD=AJPERES&CVID=jqeDbH3&id=1323162538174

Relevant ESS	Relevant National Law	Gaps	Gaps Addressed in ESMF
ESS-1: Assessment and Management of Environmental and Social Risks and Impacts	Sindh Environmental Protection Act (SEPA)/EIA Regulations	SEPA focus is mainly on environmental assessment and management whereas social assessment is cursory	Social assessment will be integrated in ESIA for the relevant sub-projects. Additional, mitigation measures for social impacts will be implemented as part of various plans such as CPESMP, LMP and GBV action plan based on further assessments
ESS-2: Labor and Working Conditions	Labor laws, Factories Act, Sindh Occupational Safety and Health Act 2017, Sindh Minimum Wage Act 2015, Sindh Prohibition of Employment of Children Act 2017	National laws address most of the requirements of the ESS-2. However, the implementation of these laws and the management of certain issues addressed under ESS2 – such as OHS, GBV/SEA and VAC, prohibition of children in hazardous work and child labor in general, protection against discrimination of religious minorities (many formal sector workers belong to religious minority groups), and grievance redress – is not done effectively.	A stand-alone project specific LMP will address such gaps, including specification of working conditions for children and adolescents under the age of 18 years. A GRM for project related labor issues will also be outlined in the LMP.
ESS-3: Resource Efficiency and Pollution Prevention	Sindh Environmental Protection Act and Local Government Act address the pollution aspect only. Local Government Act addresses the solid waste pollution issues.	There is no law on resource efficiency	Resource efficiency requirements will be incorporate in the ESMP. GHG emission estimates will be evaluated through sub-project specific EIAs where relevant.
ESS-4: Community Health and Safety	Local Government Act and Pakistan Penal Code	Local Government Act and Pakistan Penal Code address	Labor Influx Management Plan and LMP will address

	address the community health and safety aspects	most of the requirements of ESS-4 ESS4 recommends borrower to take measures to avoid or minimize the transmission of communicable diseases due to the influx of the temporary or permanent project labor	the transmission of communicable diseases
ESS-5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Land Acquisition Act 1894 (LAA) addresses the land acquisition and compensation by the Government. Sindh Katchi Abadis Act, 1987 allows the right of urban squatters to rehabilitations. Sindh Public Property Removal (Removal of Encroachment) Act, 2010 is to avoid encroachment and provides measures for removal of encroachment from public property.	The key difference in scope is that the absence of a formal legal title is no bar to WB policy entitlements. Scope of the LAA in comparison to the requirements of ESS-5 only partially takes into account the resettlement of displaced populations. Coverage of LAA also does not provide any assistance for the poor and vulnerable PAPs, livelihood losses or resettlement costs for rehabilitation. Generally, it covers cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as crops, trees, and infrastructure	The project does not involve any private land acquisition. However, there is a possibility of economic/ livelihood and physical displacement impacts, primarily on squatters settled on public land and/or encroachers who have extended onto rights of way. Sub-project specific social assessments will identify and quantify such impacts. Compensation and/or resettlement/livelihood restoration, if and as required, will be done in accordance with the project RF and site-specific RPs.
ESS-6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The Sindh Wildlife Protection Ordinance, 1972 is for the protection of wildlife species declared as protected and game animals. Ordinance declares certain areas as national parks and game reserves where hunting and spoiling of its natural	All aspects of ESS-6 are not covered under the Sindh Wildlife Protection Ordinance, 1972.	The project activities don't impact the natural habitats and natural resources. The project area is not biodiversity sensitive. However, measures are mentioned for the contractors to take precautionary measures to

	landscape and environment is prohibited.		protect the biodiversity and natural resources during construction activities. ESMF includes screening of sites for potential impacts on modified and natural habitats and living natural resources. Mitigation measures for biodiversity conservation will be formulated in the ESMP.
ESS-10: Stakeholder Engagement and Information Disclosure	Under Sindh Environmental Protection Act/EIA Regulations, the public hearing is conducted to inform public about those projects of higher environmental risks and get their feedback. Sindh Transparency and Right to Information, 2016 provides transparency and freedom of information to ensure that all citizens have better access to public information, to make the government more accountable to citizens, to enforce the fundamental right to information in all matters of public importance, to ensure transparency in all Government matters.	Stakeholder engagement in public sector development projects is not done effectively. It is also not carried out throughout project implementation.	The Project's Stakeholder Engagement Plan (SEP) covers the stakeholder engagement activities required for the project in accordance with ESS-10.

4.0 Potential Environmental and Social Impacts and Mitigation Measures

This chapter describes the preliminary assessment of potential generic environmental and social risks and impacts (direct, indirect/induced, and cumulative) to be caused by the construction and operational phases of the project activities on surrounding environment, workers and communities. It also describes mitigation measures as per mitigation hierarchy (avoidance, minimization or reduction, mitigation, compensate/offset. The potential environmental and social risks and impacts of each sub-project will be reviewed through environmental and social screening and the result of the screening will determine the type of environmental and social assessment which will assess the sub-project specific impact in greater detail. Through the E&S screening and assessment of sub-project, significant impacts can either be avoided through re-location of activities or in their design, or otherwise reduced to acceptable levels or reversed through the application of effective mitigation measures through application of mitigation hierarchy..

4.1 Project Activities

Table 11 describes type of project and associated activities which could result into potential environmental and social risks and impacts.

Table 11: Project Activities

#	Project/Component	Activities
	Component-1	
1	Cleaning of nullahs and disposal of waste	Removal of waste from 38-40 nullahs of the city using dredgers and manually
		Transportation of solid waste/sludge from 38-40 nullahs to the temporary storage cell at Jam Chakro and other designated dumpsites
2	Construction of temporary storage cell for waste and sediments	Construction of a temporary storage cell for waste and sediments cleared from 38-40 nullahs at the Jam Chakro dumpsite (temporary storage for about 12 months)
		Operation of temporary storage cell
3	Communication and outreach activities	Communication and awareness campaign for the communities living around the nullahs to promote better solid waste management practices, encourage residents to limit dumping of household waste into nullahs, and disseminate information about the nearest designated collection locations to communities in the project area

	Component-2	
4	Provision of equipment for under-served districts	Provision of critical equipment to three DMCs to improve occupational safety and collection efficiency including (a) PPE and light equipment for workers; (b) collection trucks; and (c) bins and containers to Local Councils and SSWMB. Rehabilitation of waste collection and transport equipment of KMC, DMC and SSWMB.
5	Improvement of *kachra kundis* (Waste collection points)	Retrofitting of existing and construction of new *kachra kundis*
		Construction of approximately 50 new points (*kachra kundis*) at appropriate locations
		Operation of *kachra kundis*
6	Construction of new sanitary disposal cell	Design of a new landfill cell
		Construction of new landfill cell on underutilized available land within the perimeter of the Jam Chakro dumpsite
		Operation of the landfill site
7	Construction of manual Material Recovery Facility (MRF)	Design of a manual Material Recovery Facility (MRF)
		Construction of a manual Material Recovery Facility (MRF), adjacent to the disposal cell
		Operation of MRF
8	Improve safety and environmental performance of the dumpsite	Construction of a perimeter fence/wall to limit intrusion and restrict waste deposits within site limits
		Stabilization of areas at risk of collapse by unstable slopes
		Retrofitting access gate, weighbridge, and offices for better control of incoming flows
		Construction of test wells to monitor potential groundwater contamination
		Fire extinction activities to stop constant burning and re-ignition through covering or cooling

9	Closure and rehabilitation of dumpsite areas	Progressive closure and rehabilitation of areas that have reached capacity, through standard methods to progressively reduce impacts associated with the operation of Jam Chakro
10	Community support plan for waste pickers	Improve occupational safety as well as living conditions, starting with safe and efficient sorting conditions, such as those that will be provided at the MRF
		In the medium to long-term, a resettlement and/or livelihoods restoration plan for the community will be developed and implemented
11	Construction/Upgrading of transfer stations	Construction or upgrading of up to three to four modern transfer stations
		Operation of transfer stations
12	Construction of new sanitary landfill site	Planning and design of modern new sanitary landfill site
		Construction of a modern new sanitary landfill site at Dhabeji
		Operation of sanitary landfill site
13	Support for the preparation of a larger ecosystem of waste treatment solutions	Support for the planning, feasibility studies, engineering designs, and development of business and operating models
		Advisory services for the preparation of a larger ecosystem of waste treatment solutions to maximize waste volumes to be reused or recycled, generate energy from specific waste streams, while preparing the remaining fraction for final disposal at the landfill
	Component-3	
14	Project management and implementation support	Provide consultancies for environment and social assessments and instruments, monitoring implementation of safeguards plans, and resettlement aspects, feasibility studies, engineering design and supervision, and contractors for infrastructure works
		Provide trainings and skill development in the areas of monitoring and evaluation, communication, audits, social and environmental

		management, engineering, operations and maintenance, and project management

4.2 Potential Environmental and Social Impacts

Table 12 presents the project activities which can cause potential environmental and social impacts.

Table 12: Environmental and Social Impacts

Activities	Potential Environmental Impacts	Potential Social Impacts
Component-1		
Removal of waste from 40 nullahs of the city through dredgers and manually	▪ Nuisance for the nearby community due to odoriferous emission around nullahs ▪ Spreading of disease, causing germs in the nearby communities ▪ Nuisance for the nearby community due to vehicular noise around nullahs ▪ Traffic congestion during operation of dredgers and piling of waste material besides nullahs ▪ Health and safety concerns for the workers involved in waste removal activities ▪ Soil contamination due to piling of waste along nullahs	▪ Inadvertent damage to structures during removal of waste ▪ Nuisance for the nearby community due to odoriferous emission around *nullahs* ▪ Nuisance for the nearby community due to vehicular noise around *nullahs* ▪ Traffic congestion during operation of dredgers and piling of waste material besides *nullahs* ▪ Deteriorating the existing condition of the roads during dredgers movement ▪ Increased probability of accidental injuries to workers and general public ▪ Exploitation of informal sector workers, many of whom are ethnic/religious minorities
Transportation of solid waste/sludge from 40 nullahs to the temporary storage cell at Jam Chakro dumpsite	▪ Nuisance due to odoriferous emission at transport routes of vehicles carrying solid waste from nullahs to the dumpsite ▪ Nuisance at transport routes due to spillage of solid waste and sewage from the vehicles ▪ Spreading of disease, causing germs at transport routes due to spillage of waste material	▪ Nuisance due to foul smell at transport routes of vehicles carrying solid waste from *nullahs* to the dumpsite ▪ Nuisance at transport routes due to spillage of solid waste and sewage sludge from the dumping vehicles
Construction of a temporary storage cell for waste and sediments cleared from 40	Construction related impacts include clearing of topsoil, removal of vegetation and disturbance of natural habitats at campsite, drainage	▪ Labor influx related sexual exploitation and abuse/sexual harassment (SEA/SH) and violence against children (VAC)

nullahs at the Jam Chakro dumpsite (temporary storage for about 12 months)	clogging/wastewater ponding, air pollution due to dust and stack emissions, noise pollution, soil and ground and surface water contamination due to improper storage and handling of fuel and chemicals, occupational health hazards due to improper management of sanitary and hazardous waste, safety hazard due to the use of heavy machines and vehicles, fire hazard	▪ Increased risk of illicit activity (e.g. proliferation of drug use) ▪ Occupational Health and safety (OHS) hazards and risks e.g. dust, noise, vibration, machinery hazards, ergonomics etc. ▪ Conflict/tension between local communities and workforce/labor ▪ Disruption of utilities such as water, electricity, telephone, cable, etc. ▪ Child labor and weak enforcement of labor laws
Operation of temporary storage cell	▪ Ground and surface water and soil contamination due to leachates and improper storage and handling of fuel and chemicals ▪ Landfill gas impacts (health hazards, fire hazard) ▪ Spreading of disease in the nearby community due to breeding of flies and mosquitoes at dumpsite ▪ Health and safety impacts on the workers ▪ Nuisance for nearby community due to odoriferous emission, dust, and vehicular and machinery noises ▪ Spontaneous fire hazard at the site ▪ Visual landscape impacts ▪ Safety hazard due to the use of vehicles and machines	▪ SEA/SH and VAC impacts ▪ Nuisance for nearby community due to odoriferous emission, dust and vehicular and machinery noises ▪ Spread of disease to local residents from labor with different transmittable diseases ▪ Exploitation of informal sector workers
Communication and awareness campaign for the communities living around the *nullahs* to promote better solid waste management practices, encourage residents to limit dumping of household waste into *nullahs*, and disseminate information about the nearest	No impacts	Potential exclusion of/lack of meaningful engagement with vulnerable groups

designated collection locations to communities in the project area		
Component-2		
Upgrading of up to 30 existing *kachra kundis*	▪ Minor construction related impacts ▪ Health impacts on the construction workers due to working at unhygienic place ▪ Nuisance for the construction workers due to odor, flies, and mosquitoes ▪ Soil and groundwater contamination due to improper storage and handling of fuel and chemicals ▪ Traffic disturbance due to the construction works	▪ Sanitation and aesthetic problems from uncollected waste in *kachra kundis* ▪ Occupational Health and Safety (OHS) hazards and risks e.g. dust, noise, vibration, machinery hazards, ergonomics etc. ▪ Traffic related hazards
Construction of approximately 50 new *kachra kundis* at appropriate locations	Construction related impacts as mentioned above	▪ Exclusion of different areas/marginalized communities especially living in low-income areas. ▪ Occupational Health and safety (OHS) hazards ▪ Conflict/tension between local communities and workforce ▪ Disruption of utilities such as water, electricity, telephone, cable, etc. ▪ Child labor and weak enforcement of labor laws ▪ Traffic related hazards
Operation of *kachra kundis*	▪ Nuisance for the nearby community due to odoriferous emission and piling of solid waste ▪ Spreading of disease, causing germs in the nearby communities ▪ Soil contamination due to surface runoff ▪ Health hazards for the waste pickers	▪ Nuisance for the nearby community due to odor and piling of solid waste ▪ Sanitation and aesthetic impacts
Design of a new landfill cell	In case of improper designing of the landfill cell regarding lining, leachate collection and treatment, slope stabilization, surface runoff management,	▪ Social conflict between waste pickers currently working in or around the proposed site and any new comers within

	and gas collection/treatment/flaring, there will be chances of groundwater and surface water, soil contamination, soil erosion and health and safety hazards for workers and communities.	unregulated/undocumented informal sector ▪ Sanitation and aesthetic impacts
Construction of new landfill cell on underutilized available land within the perimeter of the Jam Chakro dumpsite	Construction related impacts as mentioned above OHS risks in relation to the existing environmental, health and safety issues at the site including uncontrolled leachate, exposure to landfill gases, risk of fire, proliferation of disease-causing vectors and vermin	▪ Resettlement/livelihood impacts ▪ Construction related social impacts including labor issues and weak enforcement of labor laws ▪ SEA/SH and VAC impacts ▪ Spread of different transmittable diseases from imported labor to local residents and vice versa
Operation of the landfill cell	▪ Soil and ground and surface water contamination due to leachates and improper storage and handling of fuel and chemicals ▪ Landfill gas impacts (health hazards, fire hazard) ▪ Soil erosion ▪ Spreading of disease in the nearby community due to breeding of flies and mosquitoes at landfill site ▪ Health and safety impacts on the workers ▪ Nuisance for the nearby community due to odoriferous emission, dust, and vehicular and machinery noises ▪ Safety hazards for the nearby community ▪ Spontaneous fire hazard at the site ▪ Visual landscape impacts ▪ Increased traffic along the transportation route to the landfill and gaseous emission.	▪ Conflict of dominance within the informal recycling sector ▪ livelihood impacts ▪ Exploitation of informal sector workers ▪ Nuisance for the nearby community due to odor, dust and vehicular and machinery noises
Design of manual Material Recovery Facility (MRF)	In case of improper designing of facility regarding impermeable and covered storage of wastes, surface runoff management, and fire protection,	Social conflict between waste pickers currently working in or around the proposed site and any new comers within unregulated/undocumented informal sector

	there will be chances of soil and groundwater contamination and fire hazard.	
Construction of a manual Material Recovery Facility (MRF), adjacent to the disposal cell	Construction related impacts as mentioned above	▪ Inadvertent damage to structures and resettlement of squatters ▪ Construction related social impacts including labor issues and weak enforcement of labor laws ▪ Labor with different transmittable diseases may cause spread of those diseases in the local residents ▪ SEA/SH and VAC impacts ▪ Weak accountability and transparency in delivering services
Operation of MRF	▪ Health and safety hazards for the workers ▪ Soil contamination ▪ Fire hazard	▪ Social conflict between waste pickers currently working in or around the proposed site and any new comers within unregulated/ undocumented informal sector ▪ Exploitation of informal sector workers ▪ SEA/SH and VAC impacts
Improve safety and environmental performance of the dumpsite	Minor construction related impacts OHS risks in relation to the existing environmental, health and safety issues at the site including uncontrolled leachate, exposure to landfill gases, risk of fire, proliferation of disease-causing vectors and vermin	▪ Construction related social impacts including labor issues and weak enforcement of labor laws ▪ Accessibility issues and loss of livelihood for waste pickers ▪ Livelihood impacts on squatters collecting waste from existing landfill sites ▪ Lack of awareness among waste pickers regarding new regulations to control/prohibit burning
Progressive closure and rehabilitation of areas that have reached capacity, through standard methods to	Construction related impacts OHS risks in relation to the existing environmental, health and safety issues at the site including uncontrolled leachate, exposure to landfill gases,	▪ Livelihood impacts on waste pickers living and working at Jam Chakro ▪ Exploitation of informal sector workers ▪ General OHS hazards

progressively reduce impacts associated with the operation of Jam Chakro	risk of fire, proliferation of disease causing vectors and vermin	
In the medium to long-term, a resettlement and/or livelihoods restoration plan for the community will be developed and implemented	Disturbance to livelihood of waste-pickers, resettlement of waste-picker communities, and establishment of new illegal waste picker settlement at different locations.	▪ Issues of sustainability of livelihood restoration activities; ▪ Limited or unsuitable reskilling and/or livelihood restoration opportunities for vulnerable categories among waste pickers, e.g. women, young adults; ▪ Limited uptake of reskilling and livelihood restoration activities; ▪ Movement of waste-pickers to and illegal settling at another waste-picking site (e.g the new landfill developed at Dhabeji) ▪ Ineffective grievance redress and community engagement systems
Construction or upgrading of up to four modern transfer stations	Construction related impacts as mentioned above	Construction related social impacts including labor issues and weak enforcement of labor laws
Operation of transfer stations	▪ Nuisance for the nearby community due to odoriferous emission, dust during unloading/loading activities, and piling of solid waste ▪ Spreading of disease causing, germs in the nearby communities ▪ Soil and groundwater contamination due to improper storage and handling of fuel and chemicals ▪ Nuisance due to odoriferous emission at transport routes of vehicles carrying solid waste from transfer stations to the dumpsite	Livelihood impacts on and exploitation of informal sector workers

	▪ Nuisance at transport routes due to spillage of solid waste and sewage from the vehicles ▪ Spreading of disease, causing germs at transport routes ▪ Spontaneous fire hazard ▪ Increased traffic along the transportation route to the transfer stations and gaseous emission.	
Planning and design of modern new sanitary landfill site	In case of improper designing of the landfill site regarding lining, leachate collection and treatment, slope stabilization, surface runoff management, and gas collection/treatment/flaring, there will be chances of groundwater/surface water, soil contamination, soil erosion and health and safety hazards for workers and communities.	▪ Social conflict between waste pickers currently working in or around the proposed site and any new-entrants within unregulated/undocumented, informal sector ▪ Overall positive impact, as the social impacts related to solid waste management e.g. solid waste illegal dumping/ aesthetics and health issues in different areas of city will be mitigated.
Construction of a modern new sanitary landfill site at Dhabeji	Construction related impacts as mentioned above	▪ Resettlement of squatters (if any) from the proposed site ▪ Change in prices of land, accommodations, and rents ▪ Construction related social impacts including labor issues and weak enforcement of labor laws ▪ Labor with different transmittable diseases may cause spread of those diseases in the local residents ▪ SEA/SH and VAC impacts
Operation of sanitary landfill site	As mentioned above for landfill cell	▪ Exploitation of informal sector workers, ▪ Additional squatting at this site can also potentially be a problem. The government will need to protect the site

4.3 Environmental Impacts Mitigation Measures

Following sections describe details of the mitigation measures for the above identified potential environmental impacts in Table 12 for the design, construction and operation phases of the project activities.

4.3.1 Design Stage Mitigation Measures

Design phase environmental mitigation measures for new sanitary landfill site and landfill cell are given below:

a) New Sanitary Landfill Site

Following mitigation measures will be taken during design stage of the new sanitary landfill site:

Location: The location of the new sanitary landfill site must take into consideration the requirements relating to:

- The distance from the site boundaries to any residential and/or recreational areas, waterways, water bodies and other agricultural or urban sites including;
    - Residential development should be typically further than 250 meters from the perimeter of the proposed landfill cell development to minimize the potential for migration of underground gaseous emissions
    - Visual impacts should be minimized by evaluating locational alternatives
    - Siting should be further than 3 km of a turbojet airport and 1.6 km of a piston-type airport or as permitted by the aviation authority fully considering potential threats to air safety due to attraction and presence of birds
- The existence of groundwater, surface and coastal water or nature protection zones in the area;
- The geological and hydro geological conditions in the area;
- The risk of flooding, subsidence, landslides or avalanches on the site;
- Protection of the nature and/or cultural heritage in the area in case any unknown cultural heritages are identified.

The landfill site will be authorized only if the characteristics of the site with respect to the abovementioned requirements, or the corrective measures to be taken, indicate that the landfill site does not pose a serious environmental risk.

Water Control and Leachate Management: Design measures will consider following aspects for water control and leachate management:

- Prevent surface water and rainwater entering the landfill body by building suitable berms around the site;
- Collection and treatment of contaminated water and leachate
- The protection of the soil, groundwater and surface water is to be achieved by the combination of a geological barrier and a bottom liner during the operational/active phase and by the combination of a geological barrier and a top liner during the passive phase/post closure. The landfill base and sides shall consist of a mineral layer which satisfies the requirements of permeability and thickness. Where the geological barrier does not naturally meet the requirement, then it can be completed artificially and reinforced by other means giving equivalent protection

Stability: The emplacement of waste on the site shall take place in such a way as to ensure the stability of the mass of waste and associated structures, particularly with respect to the avoidance of land sliding. Where an artificial barrier is established it must be ascertained that its geological substratum, considering the morphology of the landfill, is sufficiently stable to prevent any settlement that may cause damage to the barrier.

Landfill Gas management: Appropriate measures shall be taken in order to control the accumulation and migration of landfill gases. Landfill gases shall be collected from all the cells receiving biodegradable waste and the landfill gas shall be treated and used. If the gas collected cannot be used to produce energy, it will be flared.

b) New Landfill Cell

As mentioned above, same design measures will be considered during the designing of new landfill cell.

c) Kachra Kundis

The *kachra kundis* are the temporary storage places for the municipal solid waste, collected from specific designated areas of the city. This waste is generally transferred to the transfer stations daily. Two aspects would be important to consider during design stage i.e. the location and the design of the *kachra kundis*. The location of the *kachra kundis* would be important to mitigate its odor, visual impacts and increased traffic to the nearby communities and the passersby. It will be emphasized that the new *kachra kundis* (50) are developed at locations where their impacts are minimum. The design of the *kachra kundis* will be important to improve visual aesthetic of the site. It should be aesthetically appealing, properly covered from the three sides, with sufficient capacity to cater for all the solid waste within its structure without allowing any spillage and scattering of the waste out of its boundary walls.

It will be ensured that the floors of the *kachra kundis* are perfectly impermeable, not allowing contaminated rainwater (percolating through the waste) to infiltrate the ground. The storm water drain will be made along the *kachra kundis* and connected to the sewerage or main storm water drains of the area, to properly dispose of the rainwater percolated through the waste to avoid soil contamination.

d) Transfer Stations

Transfer stations are the temporary solid waste material storage places where local waste collection vehicles deposit their waste. This waste is then loaded in the larger vehicles and transported to the dumpsite or the landfill site for final disposal. In case of constructing new transfer stations, the location of the transfer station will be important to mitigate its odor and visual impacts to the nearby communities and the passersby. It will be emphasized that the new transfer station is developed at location where their impacts are minimum. The design of the transfer station will be important to improve visual aesthetic of the site. It should be aesthetically appealing, properly covered from the three sides, with sufficient capacity to cater for all the solid waste within its structure without allowing any spillage and scattering of the waste out of its boundary walls. The green areas and tree plantation will also be carried out wherever possible to improve the aesthetic of the area.

It will be ensured that the floors of the transfer stations are perfectly impermeable, not allowing contaminated rainwater (percolating through the waste) to infiltrate the ground. The storm water drain

will be made along the transfer stations and connected to the sewerage or main storm water drains of the area, to properly dispose of the rainwater percolated through the waste to avoid soil contamination.

e) Material Recovery Facility (MRF)

The MRF facility will be designed and constructed in a way to protect soil contamination by permeable flooring, placing waste under shade and proper surface runoff management. The impermeable floors will not allow infiltration of the contaminant to the groundwater and rain protection through shades will not allow percolation of rainwater through the waste. The surface runoff from the facility will be properly disposed of through storm water drains at the facility. Firefighting system will be provided at the facility to protect property and workers in case of any fire incidence at the site.

4.3.2 Construction Phase Environmental Mitigation Measures

Construction activities will be carried out for temporary storage cell at Jam Chakro, upgrading and construction of 30 existing and 50 new *kachra kundis* respectively, new landfill cell at Jam Chakro, material recovery facility, improve safety of the dumpsite, four transfer stations, and new sanitary landfill site. These construction activities will cause environmental impacts.

Following are the construction phase mitigation measures for all the construction related project activities.

- Campsite management
- Avoidance of clearing vegetation and restoration of the site by planting trees/crops
- Protection of natural habitats
- Protection of Physical Cultural Resources (PCRs)
- Suppression of dust emission
- Control of stack and vehicular emissions
- Safe disposal of sanitary wastewater
- Safe disposal of domestic solid waste
- Safe disposal of hazardous and construction waste
- Soil pollution control
- Noise abatement
- Protection of workers from health and safety hazards
- Protection of community from accidents
- Traffic management
- Restoration of campsites

The main responsibilities for implementing mitigation measures during the construction phase rest with the contractors appointed to carry out the construction of above-mentioned projects. The CLICK PIU (LGD) and SSWMB will, however, be responsible for monitoring and supervising the implementation of mitigation measures by the contractors (the CLICK PIU for Nullah cleaning under Component-1 and SSWMB for other activities); therefore, the CLICK PIU and SSWMB will implement a system of internal checks to ensure that these actions are carried out to a satisfactory standard. In exceptional circumstances, if the contractors refuse to adhere to the requirements of the mitigation plan contained in the contract documents, then the CLICK PIU and SSWMB shall use their authority to call a halt to a particular construction activity.

To avoid any misunderstandings regarding who is responsible for any particular mitigation activities recommended for the construction phase, the Construction Phase Environmental & Social Mitigation

Plan (CPESMP) will be appended to the bidding documents. This will ensure that contractors include in their bids the cost of any mitigation actions and also a reliable mechanism for enforcement. In fact, most of the recommended actions involve little or no capital investment, but these also depend on whether the contractor's management adopts a responsible attitude toward environmental and social protection, thereby ensuring that the construction activity is properly planned and that mitigation measures are properly implemented. The recommended environmental mitigation actions for the construction phase are given under:

a) Campsite Management

The location and development of the contractor's facilities (this applies to all types of facilities, storage areas, workshops, and labor camps) will be approved by the CLICK PIU and SSWMB. Locations will be selected so that it does not interfere with the environment and social well-being of the surrounding communities in respect to noise, dust, vibration, and other physical impacts. The construction labor camps shall be located at least 500 m away from the nearest habitation. The size of contractor's facilities are limited to absolute minimum to reduce unnecessary clearing of vegetation.

Labor Influx Management and Construction Camp Management Plan will be prepared by the Contractor on the basis of Labor Management Procedures (LMP) to be prepared by SSWMP and the sub-project specific E&S management plans. The Plan will include the camp layout, details of various facilities including supplies, storage, and disposal. The Plan will be submitted to the PIU for review and approval before camp establishment.

b) Avoidance of Clearing Vegetation and Restoration of the Site by Planting Trees/Crops

Where grading or excavation occurs within farmland, topsoil will be separated and stockpiled during construction period. The topsoil stockpile will be secured with plastic. Following construction, the topsoil will be applied evenly to the site during the restoration process. The topsoil will be properly compacted and stabilized to prevent erosion and sediment transport.

During the design stage of the project and finalizing the project location, it would be the priority to avoid those areas where there are chances of cutting of significant trees and clearing of vegetation/crops. In case if it is not possible to avoid, then the project site would be restored to its original as much as possible by planting trees, vegetation, and crops at the cleared land. All works will be carried out in a fashion that ensures minimum damage or disruption to the flora. Compensatory plantation shall be planned to be undertaken at prescribed rates (at least 5 times of the number of trees cut). The contractor will be responsible for the restoration of the site and KMC/SSWMB will ensure restoration as per the requirements.

c) Protection of Natural Habitats

During project site selection and finalization, the protection of the natural habitats will be the high priority area. The natural habitats are defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the nonliving environment. Alternatives will be considered for site selection, in case of presence of natural habitats at the project areas to protect them at best.

During environmental assessment, surveys will be conducted for rare plants and priority or endemic wildlife species prior to civil work activities at all the sites. If any rare plants or sensitive wildlife species

occur at the construction sites, the sensitive resource will be fenced, and no activities will be allowed within 15 meters (50 feet) of the resource.

Prior to construction activities during the nesting season, a qualified biologist will survey potentially suitable nesting habitat for priority species birds. If active nests are identified, a qualified biologist will monitor the nesting birds' responses to the loudest level of construction noise for an appropriate duration. If the nesting birds show signs of disturbance that could result in nest failure, all work activities that disturb the birds will be temporarily halted and visual and acoustic barriers will be erected between the nesting location and work areas. Installation of any visual and acoustic barriers will be overseen and approved by the qualified biologist.

d) Protection of Physical Cultural Resources (PCRs)

Based on the assessment during project preparation, ESS8 is assessed as "not relevant". However, the following mitigation measures are proposed in case ESS8 becomes relevant during project implementation.

All necessary and adequate care will be taken to minimize impact on cultural properties which include cultural sites and remains, places of worship including mosques, churches, etc., graveyards, monuments and any other important structures as identified during design and all properties / sites / remains notified. No work will spill over to these properties, premises, and precincts. The design options for cultural property relocation and enhancement will be prepared. All conservation and protection measures will be taken up as per design.

During earth excavation, if any property is unearthed and seems to be culturally significant or likely to have archaeological significance, the same will be intimated to the KMC/SSWMB. Work will be suspended until further orders from the KMC/SSWMB. The Archaeological Department will be intimated of the chance find and the KMC/SSWMB will carry out a joint inspection with the department. Actions as appropriate will be intimated to the Contractor along with the probable date for resuming the work. The contractor workers will be sensitized and fully informed about the importance of PCRs before the commencement of the work as their negligence during excavation and construction activities could damage these resources. All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government, and will be dealt with as per provisions of the relevant legislation.

e) Suppression of Dust Emission

Regular water sprinkling will be the responsibility of the contractor at the dust generation points, during construction activities. The water will be also sprinkled at vehicular and machinery movement routes to avoid dust spreading to the nearby community. In addition, the provision of dust masks and ensuring their use by the workers will also be the responsibility of the contractor under CPESMP.

f) Control of Stack and Vehicular Emissions

The stack emissions from generators, if used as standby source of power supply and vehicular/machinery movement at the site can affect the ambient air quality at project site. It will be the responsibility of the contractor to use well maintained generators and vehicles/machines to keep ambient air quality within the desired level. The contractor will be obliged to provide fitness

certificate/maintenance records of the generators, vehicles, and machines before deploying them at the construction sites.

g) Safe Disposal of Sanitary Wastewater

Generally proper disposal of sanitary wastewater is not practiced during construction at construction camps. It will be the responsibility of the contractor to dispose sanitary wastewater in a nearby drain after passing it through septic tanks. The contractor can also plan to include temporary septic tanks for the construction team.

h) Safe Disposal of Domestic Solid Waste

Improper disposal of domestic solid waste from construction camps leads to air, water, and soil pollution, in case if it is burnt, thrown in the surface water drains or on open land. The solid waste dumping site becomes breeding place for mosquitos and flies which could be the source of outbreak of diseases. The construction contractors will implement a Waste Management Plan (mentioned in CPESMP). At a minimum, the plan will address the sources of waste; waste minimization, reuse, and recycling opportunities; and waste collection, storage, and disposal procedures. The Waste Management Plan would distinguish between solid and liquid waste, as applicable, and include procedures for addressing waste that may be hazardous to health and the environment. In addition, the Waste Management Plan will address the following:

- All food waste will be contained in covered bins and disposed of on a frequent basis to avoid attracting wildlife.
- Trash bins will be accessible at all locations where waste is generated.
- The project area will be kept clean and free of litter and no litter will be allowed to disperse to the surrounding area.
- Solid waste will be removed from the site and transported to a municipal landfill or disposal site.
- Waste will not be dumped or buried in unauthorized areas or burned.
- Human waste associated with the worker camp and latrines will be properly contained and disposed of.

The construction contractors will ensure all workers receive training on proper disposal of all waste prior to working on the project site.

i) Safe Disposal of Hazardous and Construction Waste

During construction activities different types of hazardous solid waste including empty containers of paint, lubricants, grease, fuel etc. oil filters, oily rags and construction waste are generated. The hazardous waste will be properly collected and stored at impervious surface under shade. This waste will be handed over to the authorized waste collectors so that these could be disposed of properly. The construction contractors will implement the Hazardous Solid Waste Management Plan (mentioned in CPESMP). The Hazardous Solid Waste Management will identify proper management procedures for all hazardous materials and wastes that may be encountered during construction, including handling, labeling, transporting, and storing procedures. In addition, the plan will address the following:

- Non-toxic and biodegradable produces will be used whenever possible.
- Hazardous materials will be transported and stored in appropriate containers with clearly visible labels. Hazardous materials will be stored at least 100 feet from any down gradient drainage or within secondary containment capable of containing its entire volume.

- Storm water flows will be directed away from hazardous material storage areas.
- Equipment and work areas will be regularly inspected for signs of leaks and spills. Spill containment and cleanup kits will be available wherever hazardous materials are being used or stored. Any incidental spills or leaks will be contained and cleaned up as soon as it is safe to do so. Any contaminated soil will be collected and disposed of in an appropriate land fill.
- Equipment refueling and maintenance will be limited to designated areas at least 30 meters (100 feet) from any down gradient drainage.

All workers will receive training on proper handling and storage of hazardous materials, as well as spill response and cleanup procedures, prior to working on the project site.

The debris produced during construction would preferably be dumped at nearby depressions rather than being thrown away and left unattended. Leftover material would not be dumped into storm water drains or watercourses, because such practices can clog these man-made and natural drainage systems and cause many other problems for the residents.

j) Soil Pollution Control

Soil pollution will be controlled by taking following measures:

- Storage of fuel, paint, and oil containers, oil filters, oily parts, and oily rags on impervious floor under shade or storing of fuel and lubricants on a sand flooring of at least 6 inches thick done on brick edge flooring lined with polyethylene sheet
- Placement of fuel containers under containment and proper decantation arrangement to avoid its spillage and leakage on floor
- Presence of spill kit to remove spills from the floor
- Avoidance of washing the contaminated floors rather dry cleaning the spills from the floor with saw dust and rags
- Location of fuel storage and refilling areas at least 500 m from all cross-drainage structures and important water bodies

k) Noise Abatement

To minimize noise impacts on workers and nearby communities, the following measures will be taken:

- Carrying out regular inspection and maintenance of the construction vehicles and equipment
- Replacement of worn and noise producing parts of construction machinery in a timely manner
- In case of severe noise, using sound barriers to avoid the dispersion of sound waves into the nearby community
- Workers will use noise protection equipment when working in a noisy area
- The noise level of 85 dBA for 8 hours working for the workers is considered safe. The contractors would ensure keeping noise levels within safe limits. In case of higher noise levels (more than 85 dBA), the workers will be rotated. The workers at higher noise level areas will not be allowed to work for more than two to three hours and shifted to calm places for rest of the hours
- Vehicular and machineries will not be allowed to operate at project site at night
- Noisy machines and vehicles will not be allowed to be used at the project site (noise level should not be more than 85 dBA at 7.5 m distance)

l) Protection of Workers from Health and Safety Hazards

The contractor will comply with all the precautions as required for the safety of the workforce as per the national/provincial and World Bank requirements. Contractor will ensure that all operators of heavy or dangerous machinery are trained, certified, and insured. The contractor will supply all

necessary safety appliances such as safety goggles, helmets, masks, safety shoes etc., to the workers and staff. The contractor will comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. Workers, who are engaged in welding works, would be provided with welder's protective eye-shields. Medical facilities will be provided to the labor at the construction camp. Suitable transport will be provided to take injured or ill person(s) to the nearest approachable hospital. First Aid Box will be provided at every construction campsite and under the charge of a responsible person who will always be readily available during working hours. The contractor will be responsible for providing safe drinking water and for implementing appropriate sanitation conditions, and for supplying hygienic food and a sewerage system for the construction team at the site.

The risk of fires will be evaluated for each project site based on the activities that would occur, environmental conditions, and presence of ignitable or combustible materials in the area. If the activities pose a risk of igniting a wildfire, appropriate fire prevention and response equipment will be available at each active site such as shovels, axes, fire extinguishers, and dedicated water tanks. All workers will be trained on proper fire prevention and response procedures prior to working on the site. Any smoking on site will be restricted to barren areas away from ignitable or combustible material. Smoking waste will be fully extinguished and disposed of appropriately.

Each contractor will be required to prepare, obtain approval of, and implement an occupational health and safety (OHS) plan. These plans will be prepared in compliance with the WB ESS requirements and World Bank Group's general and sector specific Environment, Health, and Safety (EHS) Guidelines, and should describe the tasks and procedures to be used by workers and state how potential hazards are identified and handled.

The construction workers will work under extreme unhygienic environment during upgrading existing 30 kachra kundis. These workers will be particularly be forced to wear PPE and follow COVID-19 SOPs. There will be regular sprays of anti-mosquitoes and insecticides at construction places.

m) Protection of Community from Accidents

The construction activities, particularly the excavation, will not be carried out during rainy season to avoid any accident. The excavated areas will be properly cordoned off, and warning and safety signs will be posted at accident prone areas to warn the passersby the potential danger at the construction site. The traffic will be diverted well before the construction area as per the traffic management plan. The construction contractors will install temporary signs and fences around all unsafe areas to prevent members of the public from entering the areas. If installing fences is not feasible, the area will be clearly identified as unsafe with signs and flagging.

Community Health and Safety Plan and Emergency Preparedness Plan will also be prepared by the Contractor after assessing potential risks and hazards that could be encountered during construction of individual sub-projects. The Plan will be submitted to the PIU for review and approval before contractor mobilization.

n) Preventing facilities for waste (temporary storage and sanitary landfill cell) becoming new waste picking sites

Waste pickers working informally at Jam Chakro Dumpsite may be attracted to the temporary storage facility and the new landfill cell to be constructed within the premise of Jam Chakro Dumpsite. They may, therefore, be exposed to health and safety risks including contaminated wastes, landfill gas,

untreated leachate from the waste piles and open burning. To mitigate these risks, the following measures should be undertaken:

- Restrict access to waste management facilities by implementing security procedures, such as perimeter fencing of adequate height and suitable material, installation of security camera and alarm with recording equipment, manned security, placement of signage and use of site registry.
- Community awareness raising to explain the health and safety risks associated with waste picking at the temporary storage facility and the new landfill cell at Jam Chakro. In addition, the Material Recovery Facility (MRF) to be constructed at Jam Chakro will provide safe working conditions and income generating opportunities to waste pickers working at Jam Chakro Dumpsite. Such opportunities will also reduce the risk of waste pickers moving to the sanitary landfill that will be created at Dhabeji. Site protection measures will also be put in place at Dhabeji in order to prevent encroachers from settling in the landfill site.

o) Traffic Management

At all times, the contractor will provide safe and convenient passage for vehicles, pedestrians and livestock. The contractor will comply the Traffic Management Plans (TMP) as provided in CPESMP. The Traffic Management Plans will contain details of temporary diversions at different locations. Temporary diversion for road traffic will be constructed with the approval of the KMC/SSWMB.

Special consideration will be given in the preparation of the Traffic Management Plan to the safety of pedestrians and workers at night. The temporary traffic detours in settlement areas will be kept free of dust by frequent application of water. The contractor will take all necessary measures for the safety of traffic during construction work and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required for the information and protection of traffic approaching or passing through the construction site. All signs, barricades, pavement markings will be as per road specification.

Informational signs will be posted where lane and road closures could substantially disrupt traffic circulation at least 7 days prior to the closure. Proper traffic controls will be in place during closures to minimize impacts on traffic circulation and for traffic safety. Appropriate safety precautions will be taken when transporting large equipment on public roadways.

p) Restoration of Campsites

After the completion of construction activities at each site, all construction camp facilities will be dismantled and removed from the site. The site will be restored to a condition in no way inferior to the condition prior to commencement of the works. Various activities to be carried out for site rehabilitation include:

- Oil and fuel contaminated soil will be removed and transported and buried in waste disposal areas
- Soak pits, septic tanks will be covered and effectively sealed off
- Debris (rejected material) will be disposed of suitably
- Underground water tank in a barren/non-agricultural land will be covered. However, in an agricultural land, the tank will be removed
- If the construction camp site is on an agricultural land, the topsoil will be preserved, and good earth will be spread back for a minimum 30 cm for faster rejuvenation of the land
- In cases, where the construction camps site is located on a private land holding, the contractor will still have to restore the campsite as per this specification. The rehabilitation will be mandatory

and will be included in the agreement with the landowner by the contractor. Also, the contractor would have to obtain a certificate for satisfaction from the landowner.

q) Addressing legacy contamination

Design and construction of a new landfill cell, measures to improve safety and environmental performance of the dump site and progressive closure and rehabilitation under Subcomponent 2.2 could be affected by and/or influence the existing EHS issues at the Jam Chakro Dumpsite. In order to address the legacy contamination at the site, the following measures should be carried out in addition to the relevant mitigation measures proposed in this chapter:

- Where economically and technically feasible, leachate pipes may be installed to collect the leachate for subsequent treatment
- Gas vents should be installed to allow release of landfill gas
- Fire control plan should be prepared to extinguish fire at the dump site.
- Drainage control system should be installed in and along the periphery of the dump site. Accordingly, the surface waters shall be diverted away from the dump site at the shortest distance possible to prevent the contact of waste pile with water thereby reducing the potential for leachate generation.
- Soil cover should be applied to reduce gas migration, prevent the emergence of insects and rodents, and minimize the escape of odor and support vegetation
- Water spray system should be introduced to suppress dust at the dump site.
- Vegetation and greening to prevent soil erosion and stabilize slope should be conducted where appropriate.
- Appropriate OHS procedure should be developed for the works and workers under Subcomponent 2.2 to be carried out at contaminated areas identified in Jam Chakro Dumpsite
- The comprehensive mitigation measures including the above should be developed based on the ESMPs/ESIAs prepared for Subcomponent 2.2.

4.3.3 Operational Phase Environmental Mitigation Measures

The operational phase environmental impacts will arise from project activities of cleaning of nullahs, transportation of waste from nullahs, operation of temporary storage cell, operation of *kachra kundis*, operation of new landfill cell, operation of MRF, operation of transfer stations, and operation of modern sanitary landfill site.

The following section describes environmental mitigation measures for each of the above-mentioned operational phase activities.

a) Removal of Waste from 40 Nullahs of the City

Following are the environmental mitigation measures during removal of waste from nullahs:

i) Odor Management: The contractor will take precautionary measures to transfer the dredged waste from nullahs to the dumpsite immediately ~~as early as possible~~ and avoid its piling along the nullahs while cleaning nullahs in proximity of the residential areas. The waste transfer vehicles will be fully covered from top and sealed from the bottom. The contractors will also be required to sprinkle lime around nullahs where dredged waste is placed. Lime treatment will reduce odors, particularly hydrogen sulfide, which is not only a nuisance odor, but also can be dangerous if there is a localized buildup of high concentrations. In addition to high pH, lime provides free calcium ions, which react

and form complexes with odorous sulfur species such as hydrogen sulfide and organic mercaptans and destroy the odor. These precautionary measures will avoid dispersion of odoriferous emission to the nearby communities.

ii) Control of Spreading of Germs: There are chances that the removal of waste from nullahs can result in spreading of disease, causing germs in the nearby communities. The contractors will be required to perform disinfectant sprays around nullahs after removal of waste, particularly at those places close to the residential areas.

iii) Control of Vehicular Noise: The contractors will ensure using well maintained vehicles and machines and carrying fitness certificates. The vehicles and machines will have to comply the noise limit of 85 dBA at 7 m distance. The vehicles and machines failing to comply the noise limit will not be allowed to be used. The noisy and misfit vehicles and machines will not be allowed to work at the sites.

iv) Traffic Management: The contractors will follow the Traffic Management Plan (TMP), available in the CPESMP, during cleaning of nullahs to avoid traffic congestion at main roads and along the nullahs, particularly at the densely populated areas.

v) Health and Safety of Workers: The contractor will have the obligation to protect the health and ensure safety of the workers involved in waste removal activities through preparation and implementation of OHS Plan. The contractor will supply PPE and ensure their use at the nullahs such as safety gloves, masks, face shields, goggles, safety shoes, and safety helmet during cleaning activities. First aid boxes will be available at each nullah site. The workers will also follow the COVID-19 SOPs during work.

vi) Control of Soil Contamination: The piling of waste near nullahs can lead to soil contamination. The contractor is required to place waste, if required, on impermeable sheets like high density polyethylene (HDPE) sheets. These sheets will be laid on the designated place before waste removal activity. The number of sheets will be as per the quantity of waste to be piled. Waste will be placed on these sheets. After removal of waste from these sheets and loading in the vehicles, the sheets will be washed and packed.

b) Transportation of Solid Waste/Sludge from Nullahs

The transportation of solid waste/sludge dredged from the nullahs can cause various environmental impacts. The transport vehicles will be fully covered from the top and sealed from the bottom to avoid spillage of waste and sewage and odoriferous emission from the vehicles at transport routes.

Standard ESMP will be prepared to ensure that all contractors employed for clearing nullahs and transferring waste comply ~~prepare~~ the Dredged Materials Collection, Transport, Disposal and Management Plan for the proper management of collected wastes.

c) Operation of New Landfill Site at Dhabeji

i) Leachate Management for Protection of Groundwater, Surface Water and Soil: The major impact on surface and groundwater quality can arise from mismanagement of leachate generation from the sanitary landfill site. Leachate is defined as liquid that percolates through solid waste and extracts dissolved or suspended materials. In most landfills, leachate is composed of the liquid that enters the landfill from external sources, such as surface drainage, rainfall, groundwater and water from underground springs and the liquid produced from the decomposition of the wastes, if any. The

principal sources include the water entering the landfill cell from rainfall, the moisture in the solid waste, the moisture in the cover material, and the moisture in the sludge, if the sludge disposal is allowed. When water percolates through solid wastes that are undergoing decomposition, both biological materials and chemical constituents are leached into solution. The principal sinks are the water leaving the landfill as part of the landfill gas (i.e. water used in the formation of the gas), as saturated water vapors in the landfill gas, and as a leachate.

As leachate can affect environmental conditions i.e. pollution of surface and groundwater resources and soil, therefore, its management will be essential at the landfill site. Leachate management includes its collection, storage, treatment, and safe disposal. Leachate management requires quantitative and qualitative analysis during design stage of the landfill site for designing its management system.

The proposed site designing will offer complete protection of both surface and ground waters in the Dhabeji area. The construction of bordering ditches will provide full protection of the landfill against storm waters. Technical solutions with insulators/composite liner (layers of clay, plastic) will enable the impermeability of the lower layer and the bank which will prevents the leakage and infiltration of leachate from the landfill into the natural recipient. Through a drainage system, the leachate will run in a controlled manner from the landfill to the storage pond, simple treatment plant and pumps for re-circulation. The leachate will be re-circulated to minimize the quantity that needs to be treated. The leachate quality will comply the Sindh Environmental Quality Standards (SEQS) for wastewater discharge after treatment.

The groundwater monitoring wells will be constructed during the initial site investigation phase and be used during the lifetime of the site for groundwater quality monitoring. The surface water quality of nearby canals and water courses, if exist close to the site, will also be monitored regularly.

ii) Landfill Gas Management: Methane is the final product of the organic decaying of the solid communal waste under anaerobic conditions. It is, as it is known, a gas with no color and odor. Methane is the simplest carbonate-hydrogen, with empiric formula CH_4. It is highly flammable. As methane is produced through decaying of organic materials of the waste, it is always present in landfills, beside wastewater (filtrate), and it is potentially highly dangerous, because of its flammability and explosiveness. The risk is the greatest where the gas is allowed to build-up in a confined space, such as within a building or in collapsed void spaces within the deposited waste.

To minimize the risks to human health from landfill gas, an active gas collection system will be proposed at the site. The collected gas will be flared if not used for energy production. The designed features will allow a sophisticated degree of control to be achieved. However, professional installation and maintenance of the gas collection system will be essential to proper control of landfill gas, and the related staff will need to be trained to carry out these duties. Monitoring of the occurrence of landfill gas at the margins of the site will determine the effectiveness of the proposed control measures.

iii) Health and Safety of the Workers and the Community: Following practices or occurrences can cause health and safety concerns for the workers and the local community:

a. Free movement of pedestrians into the site
b. Growth and spreading of mosquitoes, vermin, insects, and birds in the surrounding
c. No use of protective clothing and personal protective equipment by the workers working at site
d. Non availability of first aid facilities

e. No regular health checks of the workers

Following mitigation measures will be implemented during operation of the sanitary landfill site:

a. Strict control over entry and exit to the site. The site will be fenced, and only authorized persons can enter the site
b. Control of mosquitoes, vermin, insects, and birds by compaction of deposited waste and use of daily cover. Frequent spraying of anti-mosquito and insecticide sprays at the site. Control of birds through use of bird scaring methods
c. Ensure supply and strict enforcement of protective clothing and personal protective equipment to the workers.
d. Provision and maintenance of first aid facilities at site
e. Regular health checks of the workers
f. Preparation and implementation of Emergency Preparedness Plan by contractors
g. Preparation and implementation of Community Health and Safety Plan by contractors

The management of the site will maintain health monitoring program to ensure that an early warning is given to the presence of any infectious disease that may harm the staff, and that the operating practices are maintained at a high standard in order to minimize the health impacts. Provided that these standard operational procedures are complied with, the risk of disease transmission to the local community will be extremely low. Management will also ensure compliance of COVID-19 SOPs at the site.

iv) Suppression of Dust and Odoriferous Emissions: Odor at landfill site is generated from the movement, placement, and decomposition of waste. The waste transported to the landfill is likely to have already undergone some decomposition, and as a result, it will be odorous on arrival at the site. Odor will be nuisance to the workers and nearby community.

The main method of reducing the generation of odors from the site will be to fill the landfill site in small well-defined cells and to use daily cover to prevent prolonged exposure of vulnerable wastes to the atmosphere. Overall, with strict adherence to proper operational management procedures, it will be ensured that the odor impact from the development of the landfill site should be kept within acceptable limits.

Dust will be generated from onsite vehicle movements, and placement of waste and cover material. Dust impacts will be minimized through good site practices of sprinkling water at dust prone areas frequently. The vehicles will adhere to speed limits to avoid dispersion of dust to surrounding areas.

The trees will be planted at the boundary of the landfill site to improve aesthetic of the area and attenuate dispersion of dust and odor from the site to surrounding areas.

v) Noise Control: The noise will be generated from vehicular and machinery movement, deposition, leveling and compaction of waste and placement of daily cover material.

The landfill operation will only be carried out at daytime to avoid disturbance to nearby community. It is envisaged that due to strict monitoring, recording, implementing enclosures and following preventive maintenance schedule for the vehicles and machines, the vehicular noise levels will be maintained within 85 dBA (7 Meters from the vehicle). There will be no impact on nearby community due to limited and scattered settlements around the landfill site.

vi) Traffic Management: Traffic will be increased at those routes between different transfer stations and the landfill site. Traffic Management Plan will be prepared after conducting traffic surveys at waste vehicles routes. The site management will operate the vehicles as per the plan.

vii) Fire Hazard Management: There are chances of spontaneous fire hazard at the site during high temperature and heat wave scenario. The site will be equipped with proper fire extinguishing equipment, fire hydrants, and fire alarm. There will be a trained team of fire fighter at the site, responsible to manage fire hazards.

viii) Visual Landscape Impacts Mitigation: The sanitary landfill site causes negative visual landscape impacts to the nearby community and passersby. These impacts will be minimized by planting tall trees at the boundary of the site. Green patches will also be established at the site. The green areas will be developed at each cell after its completion.

ix) Soil Erosion Control: Waste decomposes over time, causing settlement of the landfill and subsidence. This subsidence can cause cracking and sinking of the cover, as well as the formation of potholes. This can result in leachate volume increases, gas leakage, erosion of the cover soil and landslides. The soil erosion will be controlled through vegetation and creating green patches at appropriate places of each cell.

x) Soil Pollution Control Due to Chemicals, Fuels and Lubricants: Different fuels, chemicals and lubricants will be used at the site. Improper storage and handling practices can pollute the soil. All the chemicals, fuel and lubricant containers will be stored at impermeable floors, under shade for rain protection. All the containers will be placed over secondary containment to avoid soil contamination during leakage and spillage. The site in-charge will maintain proper spill kit to clean the spills immediately. Proper dispensing devices will be used to use these chemicals.

d) Operation of Temporary Storage Cell at Jam Chakro

Most of the mitigation measures mentioned for the sanitary landfill site are also applicable to the operation of temporary storage cell at Jam Chakro.

e) Operation of a New Landfill Cell at Jam Chakro

Most of the mitigation measures mentioned for the sanitary landfill site are also applicable to the operation of landfill cell at Jam Chakro.

f) Operation of kachra kundis

i) Improvement of Aesthetic and the Odor Management: During operational phase, it will be ensured that the transfer of the waste from *kachra kundis* to the transfer stations should be at least two times a day to avoid its decaying and producing odor. The *kachra kundis* will be required to be completely emptied and cleaned properly every time the waste is picked to avoid any leftover material there. There should be sprinkling of lime at the floor of the *kachra kundis* to offset the odor issue. The frequency of picking waste and effective cleaning will minimize the chances of spreading of disease, causing germs to the communities and breeding of mosquitoes and flies (major source of spreading the germs) there.

ii) Soil Pollution and Surface Runoff Management: Soil pollution control and surface runoff will be managed through placement of waste on impermeable floors, not allowing contaminated rainwater

(percolating through the waste) to infiltrate the ground and proper functioning of the storm water drains along the kachra kundis and connected to the sewerage system.

iii) Protection of Health of the Waste Pickers: Waste pickers regularly pick recyclable waste components from the *kachra kundis* for their livelihood. The waste is scattered outside the enclosure during sorting and picking the valuable waste components. The waste picking activity is highly unhygienic and unhealthy. The waste pickers neither use any PPE such as gloves, safety shoes, masks etc. nor follow any OHS protocol.

Under the 'Community support plan for waste pickers' the waste pickers will be provided training on safe sorting and picking procedures for waste while following COVID-19 SOPs and use of PPE. The PPE will be provided to the waste pickers and encouraged to wear them during waste picking activities.

g) Operation of Material Recovery Facility (MRF)

i) Health and Safety of the Workers: It will be ensured at MRF that the workers are trained on occupational health and safety aspects related with MRF and follow OHS Plan and COVID-19 protocols. The management will ensure supply of PPE and ensure their use by the workers during working at MRF.

ii) Fire Hazard Management: There are chances of spontaneous fire hazard at MRF during high temperature and heat wave scenario. The site will be equipped with proper fire extinguishing equipment, fire hydrants, and fire alarm. There will be a trained team of fire fighter at the site, responsible to manage fire hazards.

iii) Control of Vermin and Fly: There will be frequent spraying of anti-mosquitoes/fly, and insecticides at the waste yard to minimize the chances of spreading of disease causing germs at the nearby communities and among the workers.

h) Operation of Transfer Station

i) Improvement of Aesthetic and the Odor Management: During operational phase, it will be ensured that the maximum quantity of the waste is transferred to the dumpsite daily to avoid developing large heaps of the waste at the site; otherwise decaying of waste will produce odor at the site. There will be regular practice of sprinkling lime at the decayed waste to offset the odor issue.

ii) Control of Disease Causing Germs: There will be frequent spraying of anti-mosquitoes/fly and insecticides at the transfer stations to minimize the chances of spreading of disease causing germs at the nearby communities and among the workers, as well as controlling vermin.

iii) Soil Pollution and Surface Runoff Management: Soil pollution control and surface runoff will be managed through placement of waste on impermeable floors, not allowing contaminated rainwater (percolating through the waste) to infiltrate the ground and proper functioning of the storm water drains along the transfer stations and connected to the sewerage system.

iv) Suppression of Dust Emission: Dust will be generated during waste unloading/loading activities. Dust can be nuisance and health hazards for the nearby communities. There will be regular practice of water sprinkling during loading/unloading activities and particularly when there will be strong breeze blowing at the site.

v) Waste Transfer Management: The transportation of solid waste from transfer stations to the dumpsite can cause various environmental impacts such as odoriferous emission, spillage of waste and sewage at the transfer routes to spread germs. The transport vehicles will be fully covered from the top and sealed from the bottom to avoid spillage of waste and sewage and odoriferous emission from the vehicles at transport routes.

vi) Fire Hazard Management: There are chances of spontaneous fire hazard at transfer stations during high temperature and heat wave scenario. The station site will be equipped with proper fire extinguishing equipment, fire hydrants, and fire alarm. There will be a trained team of fire fighter at the site, responsible to manage fire hazards.

vii) Health and Safety of the Workers: It will be ensured at transfer station that the workers are trained on occupational health and safety aspects related with waste unloading/loading and follow OHS Plan and COVID-19 protocols. The management will ensure supply of PPE and ensure their use by the workers during working.

4.4 Social Impacts Mitigation Measures

Following sections describe details of the mitigation measures for the above identified potential social impacts in Table 12 for the construction and operation phases of the project activities.

It is clear from the above table that the identified issues could be grouped into the following categories:

- Aesthetics, odor and noise nuisance
- Resettlement/livelihood issues
- SEA / SH and VAC
- Damage to amenities including roads
- Damage to private infrastructure
- OHS and CHS issues
- Labor influx issues
- Social conflict between workers and community
- Community engagement & inclusion (inclusivity, transparency, accountability, GRM)

The following sections describe the generic mitigation measures for the identified issues. As per the Environmental & Social Commitment Plan of the project, relevant studies (e.g. ESIA, ESMP, and RPs if required etc.) will be carried out for individual interventions. These studies will further assess and address the social impacts of various sub-projects under the different project components.

4.4.1 Design Phase Social Mitigation Measures

There are a couple of social issues that need to be addressed during the design phase so that construction and operations related social impacts can be addressed and mitigated adequately and efficiently. These pertain to both the overall design of the project, and the detailed technical design of individual interventions.

a) Community Engagement & Inclusion

Social exclusion is an over-arching risk, and this can occur due to lack of meaningful engagement with communities, particularly vulnerable groups such as women, ethnic and religious minorities, residents of low-income settlements such as *katchi abadis* etc. Without proper stakeholder and community engagement, low income neighborhoods and communities may be excluded from project

benefits. Waste pickers are a direct and important stakeholder group, and there is a risk that the group as a whole and their women and children in particular, who are also engaged in informal economic activity, might be left out from any consultations regarding the project.

Furthermore, social acceptability of the project might decrease if any of the stakeholders perceive that their concerns and complaints are not addressed properly and in a transparent manner.
These impacts would be mitigated starting from the design stage through the following:

- Engaging stakeholders, including vulnerable groups such as women, minorities, informal sector workers etc., at the start of the design process and obtaining their feedback about project interventions;
- Consulting affected communities regarding any design changes, prior to finalization;
- ***Siting:*** When finalizing the locations for new interventions who's locations are to be determined, e.g. *kachra kundis,* ensure the inclusion of all areas, especially marginalized and low-income areas.
- ***Design provision for vulnerable groups (e.g. women, differently-abled):*** During design phase, e.g. of *kachra kundis*, ensure that the needs of women and vulnerable groups such as the differently-abled are addressed.

In order to ensure that the stakeholders are consulted on the design and implementation of the project, a Stakeholder Engagement Plan (SEP) has been prepared and disclosed on the Sindh Local Government Department website[61] in accordance with ESS10. Briefly, the SEP identifies the stakeholders involved in the project. In addition to government implementing agencies and other concerned agencies, project affected parties include private contractors working with the SSWMB on solid waste collection and transport; waste pickers and recyclers in the informal economy; communities at landfill sites, labor engaged in sanitation services and labor unions, elected representatives and the citizens of Karachi in general; and other interested parties include civil society organizations (e.g. NGOs and CBOs focusing on urban development issues), academic departments and think tanks focusing on urban and informality issues, and the media (electronic and print). The project will also affect some vulnerable groups, including women from marginalized communities; low income communities living in polluted environments; minorities who are often employed as sanitation workers at the lowest levels; and economic migrants and refugees resident in the city many of whom are engaged in waste picking and sorting. Additional stakeholders may be identified during project implementation.

In addition to identifying stakeholders, the SEP will also help ensure that all stakeholders are engaged throughout the project. Given the continuing rise in Covid-19 cases in Karachi, consultations at the field level were not possible during the design phase; however, these will be completed when conditions allow. Hence, a preliminary SEP (including a project grievance redress mechanism (GRM)) has been prepared in accordance with the WB technical note on community consultations under conditions of restricted public gatherings, consulted on, and disclosed in-country and on the Bank's website. The SEP will be updated, as required, within 60 days of effectiveness and re-disclosed. The commitment to update and re-disclose the SEP is included in the ESCP.

The SEP will be a 'living' document and hence, may be updated periodically during project implementation. The SEP also outlines the mechanisms for information sharing and disclosure and for consultation, including with women and vulnerable/marginalized groups such as waste-pickers, the poor, residents of *katchi abadis* (low-income settlements), minorities, elderly etc. Stakeholders will be engaged through various modes of engagement (focus group discussion, through social and

[61] http://www.lgdsindh.gov.pk/upload/tender/SEP_SWEEP__Appraisal__document_01597301327.pdf

electronic media, community leaders and NGOs etc.) throughout the life of the project. During implementation, in case of Covid-19 lockdowns, grassroots level consultations will be conducted in small groups and in open air locations, with all participants following government mandated SOPs. An awareness campaign aimed at a larger audience will rely mainly on social media messaging through short videos and advertisements, memes, and jingles and songs which will be broadcast on electronic media or circulated through apps like WhatsApp, TikTok and Instagram. Consultations with experts will take place through meeting apps. Once lockdown opens, more face to face interactions, and community level meetings will be organized under the project. The ESCP also includes the condition for updating the SEP, as required, during project implementation. The project GRM will become operational no later than 30 days after the Effective date, as agreed in the ESCP, and commitment to maintain the GRM throughout the project is also reflected in the ESCP.

The project design ensures that an effective GRM is in place. This will ensure that project related complaints will be resolved efficiently and in a transparent manner. While the SEP outlines a project specific GRM, all effort will be made to use the existing complaints mechanism in place in KMC and SSWMB, to register, record and address any complaints and issues related to the project.

The project will also focus on effective communication with all stakeholders throughout the life of the project. For component-1, the project has already included communication and awareness campaigns for the communities living around the nullahs to promote better solid waste management practices, encourage residents to limit dumping of household waste into nullahs, and disseminate information about the nearest designated collection locations to communities in the project area. Similarly, for component-2, trainings and skill development in the areas of communication, social and environmental management have been included as important activities.

b) Siting related Social Issues

Envisaged impacts associated with the project interventions include odor and other nuisance, and damage to infrastructure and amenities. Social issues associated with the location of project investments might also include livelihood related impacts (e.g. locating a *kachra kundi* at the entrance of a market, or in front of a shop, will hinder the costumer flow). It might also negatively affect the market prices and rental values of nearby property. These impacts will be addressed and mitigated to a large extent at the design stage. All project feasibility studies and technical designs, will also take social aspects into consideration. In particular, while determining locations for investments, e.g. *kachra kundis* and transfer stations, it will be ensured that those locations are selected which do not cause any disturbance for pedestrians, vehicular traffic, and adverse impacts of the livelihood and living environment/conditions of communities living and working in the select areas. Similarly, in accordance with the SEP, communities, particularly vulnerable groups, will be meaningfully consulted and engaged during the siting process so that their needs are prioritized and addressed.

4.4.2 Construction Phase Social Mitigation Measures

The construction phase impacts mostly relate to labor influx issues, potential damage to infrastructure and amenities, and occupational and community health and safety.

a) Managing Labor Influx Issues

This can be particularly acute in smaller communities hosting a largely male workforce (a potential scenario during the construction of landfill sites), and/or a workforce from other regions which may result in conflicts between locals and non-locals concerning employment opportunities, wages, and

use of public services. Mobile workers may also contribute significantly to gender-based social impacts and risks.

Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Tensions may also arise between different groups within the labor force, and pre-existing conflicts in the local community may be exacerbated. Ethnic and regional conflicts may be aggravated if workers from one group are moving into the territory of the other.

Increased risk of crime: The influx of workers and service providers into communities may increase the rate of crimes and/or a perception of insecurity by the local community. This may can include theft, physical assaults, substance abuse, prostitution and human trafficking.

Increased burden on and competition for public service provision: Presence of construction workers and service providers (and in some cases family members of either or both) can generate additional demand for the provision of public services, such as water, electricity, medical services, transport, etc.

Increased risk of communicable diseases: The influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. Local health and rescue facilities may also be overwhelmed and/or ill- equipped to address the industrial accidents that can occur in a large construction site.

Camp related land use, access roads, noise and lights: The camp use can result in increase in noise and light pollution especially at night.

To mitigate the above-mentioned impacts, stand-alone Labor Management Procedures (LMP) (in accordance with ESS2) will be prepared within 60 days after project effectiveness, and a commitment in this regard is included in the ESCP. For the activities under component 1 that have already taken place, the E&S Audit scope will include an assessment of the performance against the above mentioned impacts. Besides the 60-days timeline, it will also be ensured that the LMP is in place before the commencement of any works on ground. The LMP will be applicable for all type of workers likely to be involved in the project. The LMP will also include measures to address Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Violence Against Children (VAC) related issues (in line with the SEA/SH and VAC Action Plan under ESS1). Labor management requirements will be included in bidding and contract documents for all contractors and supervising firms to implement. The LMP provisions in the bidding and contracting documents will include, among others, the following measures:

- Local population will be given preference in construction related jobs. Most unskilled workers will be hired from local communities, while for skilled manpower also, first choice will be given to local area residents.
- The Contractor will prepare the construction camp management plan which, in addition to other components, will include the labour influx management plan. This will be reviewed and approved by SSWMB.
- The Contractor will select the specific timings for the construction activities particularly near the settlements, so as to cause least disturbance to the local population, particularly women.

- Contractor will take due care of the local community and observe sanctity of local customs and traditions by his staff. Contractor will warn the staff strictly not to involve in any unethical activities and to obey the local norms and cultural restrictions.
- During construction activities, if privacy of the nearby households is affected, the Contractor will inform the house owner to make some arrangements. Similarly, Contractor will take care as much as possible that the construction activities should not affect the privacy.
- The contract will explore alternative water sources and ensure that water usage by the project does not affect or compete with water requirements of the local community.
- The Contractor will also ensure that noise and light pollution from the labour camp is kept at minimal levels especially at night.

b) Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and violence against children (VAC)

There is a significant risk of sexual exploitation and abuse/sexual harassment (SEA/SH) and violence against children (VAC) from labor for the women waste-pickers and children living at Jam Chakro. These are poor and marginalized communities who already face a significant level of exploitation (e.g. from within their communities, private contractors) and have poor protection mechanisms, and any survivors of SEA/SH among them would have reduced access to requisite support mechanisms. The construction activities e.g. for transfer stations will take place in the city, and while the risk of SEA/SH and VAC can be comparatively reduced in dense settings, this risk may be moderate to significant for women sanitary workers and informal sector women and children waste-pickers working around potential project locations because of their existing vulnerabilities, and lack access to GBV support systems for survivors. Hence, on this basis at appraisal stage the risk of SEA/SH and VAC is assessed as substantial.

In view of the above, a separate SEA/SH and VAC action plan for the project will be prepared within 60 days of project effectiveness. This Action Plan will be applicable for all phases of the project. The Action Plan will also inform the measures to be incorporated in the stand-alone LMP.

Among other provisions, the Action Plan will include the following:

- Labor camp(s) to be established away from residential populations.
- Preference to be given to local communities by the contractor.
- Persons below the age of 18 years will not be employed and there will be no forced labor.
- Raise awareness among the communities of the potential risks of SEA/SH and VAC, and establish links with support services that can respond to instances of SEA/SH and VAC
- Awareness should be created among the work force to ensure respect for local communities and customs.
- Awareness should be created among the local community including females and children about the construction activity;
- Workers should not be allowed to crowd in the residential communities within the site.
- Alternative routes for pedestrian should be provided to avoid interaction with construction labor;
- Contractor should take proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women.
- The Contractor must include measures to prevent SEA/SH and VAC and sexual harassment in the workers' code of conduct.

c) Safeguarding Infrastructure & Amenities

During component-1 while *nullah* cleaning is undertaken, heavy machinery and equipment e.g. dredgers might cause inadvertent damage to private property along the bank of these *nullahs*. This will be mitigated through careful planning of cleaning operations and allowing only the skilled operators to run the equipment and machinery.

The project will not include removal of encroachments along *nullahs*. *Nullahs* will be accessed from points that do not have encroachment issues. In case some locations cannot be accessed and are critical for effective cleaning, manual cleaning will be done at such points. In the event of any inadvertent damage to structures during the cleaning works; or if manual cleaning is not an option and a certain structures need to be unavoidably removed in order to access a critical location for cleaning, the implementing agency will make and maintain a complete record of such cases/impacts. Most importantly, the location, details of the damage/loss of structures/assets, the identification and contact details of the affected person(s), and photographic/video evidence will be recorded. Such cases will also be recorded by the independent third-party monitoring agency overseeing the emergency works along the *nullahs*. If any such damage is categorized as an impact on livelihood and/or physical displacement (in keeping with ESS5) in the E&S Audit to be done for purposes of retroactive financing for Component 1, compensation for the affected person(s), in accordance with the Resettlement Framework (RF), will be included in the Corrective Action Plan based on the E&S audit findings. The retroactive financing for Component 1 will be approved and made available upon implementation of the E&S Audit Corrective Action Plan. A commitment in this regard has also been recorded in the Environmental and Social Commitment Plan (ESCP) for the project.

Similarly, in component-2 use of heavy machinery and significant level of construction activities will be involved. There is also potential of damage to amenities and associated infrastructure e.g. water supply pipelines due to heavy machinery. This will be mitigated by:

- Preparation of utility shifting or safeguarding plans where necessary
- Getting appropriate approvals / permissions in advance
- Provide all utilities to workers as per contract conditions near the construction site.
- Intervention sites to be selected so as to avoid disruption to any utilities to the maximum possible extent.
- If any utilities need to be shifted, prior approval of relevant agencies will be obtained. Utility relocation shall be carried out in shortest possible time to reduce inconvenience to public and in consultation with public.

d) Managing Health & Safety Issues

Construction work, especially under Component-2, may involve health and safety related concerns for both the construction workers, waste pickers working at Jam Chakro dumpsite and the nearby communities. Similarly, during Component-1, especially where manual cleaning of *nullah*s is necessitated, health and safety related concerns will become important. Mitigation measures for protecting the workers from OHS hazards, preventing waste pickers working at Jam Chakro Dumpsite from accessing the temporary storage facility and the new sanitary landfill cell at Jam Chakro, protecting communities from accidents, traffic management etc. have been given in **Section 4.3.1** under the environmental impacts and mitigations. The same measures will ensure that any social aspects are addressed and mitigated effectively.

e) Resettlement/livelihood impacts

Under Component 2, a major risk exists of potential resettlement of, and/or livelihood impacts on, waste-pickers settled at the Jam Chakro dumpsite, a community of around four hundred households

(HHs). There may be additional risks of resettlement (generally estimated to be of a smaller scale compared to Jam Chakro) in case squatters are settled on and/or encroachers have extended onto the land for transfer stations, new landfill (e.g. at Dhabeji), or treatment infrastructure for non-municipal waste streams. Component 2 also includes the construction of modern transfer station, development of treatment infrastructure for non-municipal waste streams, upgrading of existing *kachra kundis* (communal waste collection points) and the construction of some new points at appropriate locations. The locations of these interventions have not yet been finalized. These interventions may have limited resettlement impacts and, if so, would be covered under RPs in accordance with the project RF.

Under Component 2 the project will also support the design and development of waste treatment facilities, likely within a site designated by the GoS in Dhabeji. Subproject area of impact will depend on the design of the facility, and is expected to be much smaller than the overall government land holding of around 3,000 acres, which is reported to be free from all encumbrances. A due diligence of the proposed site will be carried at the detailed design stage before implementation, and if required, RP will be prepared in accordance with the project RF.

The resettlement impacts will be avoided or minimized as far as possible through the selection of design alternatives. Detailed scoping activities will be conducted to avoid all potential resettlement impacts of the subprojects at critical locations.

For the resettlement/livelihood related issues, a separate Resettlement Framework (RF) has been prepared under the project and disclosed on the Sindh Local Government website[62]. The RF, among other details, includes measures to address encroachment impacts and to ensure that the sub-project sites for transfer stations, landfills, or treatment infrastructure for non-municipal waste streams follow ESS5. The RF provides details of anticipated impacts and associated mitigation measures.

The RF will be updated and re-disclosed within 60 days of project effectiveness. The updated RF will make a further assessment of potential project impacts and provide measures for addressing the same. Site specific RPs will be prepared, in accordance with the project RF, if any resettlement/livelihood issues are involved.

4.4.3 Operation Phase Social Mitigation Measures

a) Avoiding Nuisance (Odor, Noise, Aesthetics etc.)

Operations of project facilities under both components will create localized nuisance of odor for households located near the intervention sites and on the transportation corridors, noise issues specially during loading and unloading of waste, and aesthetic issues in and around *kachra kundis* and waste transfer stations. Most of these impacts will be mitigated through careful planning and choosing the most socially appropriate site for each individual intervention. Besides that, the engineering and work practices related measures suggested under the environmental mitigation section would also mitigate the social aspects of odor and noise generation. Finally, the workers will be provided adequate training to carry out the waste loading, transportation and unloading exercise in an efficient manner so as to avoid unnecessary nuisance.

b) Managing OHS and CHS

[62] http://www.lgdsindh.gov.pk/upload/tender/Resettlement_Framework_SWEEP__Appraisal_Document__document_01597301128.pdf

During operation of the project, use of heavy machinery poses a safety risk. Poor management of traffic transporting waste may also lead to safety issues for people residing in the nearby vicinity, waste management workers and waste-pickers. The decomposition of the biodegradable organic fraction of the municipal solid waste generates gases that have potential for fire hazards, mainly due to the presence of methane in the gas. Various activities under the project have the potential to cause infections, chronic diseases, and might also result in accidents. Mitigation measures for protecting community and workers from health and safety related issues have been given in Section **4.3.2** under the environmental impacts and mitigations. The same measures will ensure that any social aspects are addressed and mitigated effectively.

c) Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and violence against children (VAC)

As mentioned above under the construction phase social mitigation measures, a stand-alone SEA/SH and VAC action plan will be prepared under ESS1. This plan will remain applicable throughout the life of the project.

d) Labor Management

Stand-alone Labor Management Procedures (LMP) will be prepared under the project. The LMP will include an assessment of potential labor related risks (e.g. handling of waste material, construction related risks etc.); an overview of labor regulations, policies and procedures; contract terms and conditions; working age regulations; mechanism for redressal of labor related grievances. The LMP will be prepared within 60 days of the Effective date and prior to issue of first bid for contract, and implemented throughout Project implementation.

5.0 Stakeholder Consultation and Disclosure

5.1 Introduction

Preliminary stakeholder consultations were conducted at the design stage of the Component-1 of project. Accordingly, Stakeholder Engagement Plan (SEP) was prepared. This chapter provides a brief account of the SEP so that the activities under ESMF remain aligned with the SEP. The SEP

will be periodically revised and updated as necessary during the course of project implementation. Any major changes to the project related activities and to its schedule will be duly reflected in the SEP.

5.2 Potential Social and Environmental Risks

The potential occupational and community health and safety and environmental risks and impacts are associated with cleaning of waste from *nullahs*, transport and temporary storage of potentially contaminated waste materials, and development of landfill cells and transfer stations. Major social risks are also due to encroachment issues (primarily along *nullahs* and on the Jam Chakro site); possible resettlement at project sites; significant role of the informal sector in waste-picking and recycling and the control of powerful groups; widespread involvement of migrants, children and minors in waste recovery at primary, secondary and tertiary waste disposal sites; exploitation of informal sector workers by middlemen and contractors managing dumpsites; and general issues related to vulnerability and exclusion.

5.3 Stakeholder Identification and Analysis

Stakeholders include both those who are directly affected by the project and those who do not experience direct impacts, but who have an interest in how the project proceeds. The key stakeholders are listed as follows:

Government Agencies

- Sindh Solid Waste Management Board (SSWMB)
- Karachi Metropolitan Corporation (KMC)
- Local Government (LG) Department, GOS
- District Municipal Corporations (DMCs)
- Land Owning Entities including Karachi Port Trust (KPT), Cantonment Boards, the Defense Housing Authority (DHA), the Karachi Fisheries Harbor Authority (KFHA) and SITE industrial estate, etc.
- Sindh Environmental Protection Agency (SEPA)
- Planning and Development Department (P&DD), GOS
- Finance Department (FD), GOS
- Industries and Commerce Department, GOS

Project Affected Parties

- Solid Waste Management Companies
- Waste Pickers and Contractors Engaged in Recycling
- Labor
- Citizens
- Community at Jam Chakro

Other Interested Parties

- Civil Society
- Media
- Law Enforcement Agencies

- Elected Representatives

Disadvantaged / Vulnerable Groups

- Women from Marginalized Groups
- Households/Communities at or Below the Poverty Line
- Minorities
- Stateless Citizens and *Refugees*

5.4 Phases of Stakeholder Engagement

Stakeholder engagement will take place in three phases:

- Project preparation phase
- Project implementation phase
- In the first few months after project activities have been wrapped up.

5.4.1 Consultations during Preparation Phase

In the first set of consultations, which took place in mid of June 2020, following groups were consulted:

- A community living near Gujjar Nullah;
- A community living at Jam Chakro;
- Communities living near the proposed site at Dhabeji;
- Some selected waste vendors and recyclers
- Community workers engaged in grassroots development work in Machar Colony

In the preparation stage, given time constraints, engagement has been limited to interactions with program affected parties. The purpose of engagement at this stage was to apprise the stakeholder groups of planned activities, and to ensure that valid concerns of stakeholders and useful suggestions are taken on board and addressed before program activities are finalized.

COVID-19 has necessitated a new approach to consultation. Focus groups were restricted in size, and not more than ten persons (and generally five or six) participated where group discussions were held (in Dhabeji, Jam Chakro and in the Gujjar Nullah community). In densely populated communities where following the SOPs may have been problematic, FGDs were discarded in favor of key informant interviews. Experts were consulted mainly through phone interviews.

5.4.2 Consultations during Implementation Phase

In the program implementation stage, consultations will be planned monthly or quarterly, depending on the stakeholder group, and the activities to be discussed. The consultations will be carried out with affected parties, vulnerable groups and other interested parties. In this phase, the emphasis will be on disseminating information on how activities are proceeding, getting feedback on impacts, and consultations on how activities can be carried out such that any negative effects (if any) are mitigated. As the project proceeds and if COVID restrictions continue, the reliance on communication through meeting apps, and the dissemination of information through electronic and social media will continue. As COVID restrictions are relaxed, some forms of electronic communication will be replaced in communities with face to face contact through social organizers or community-based workers, and workshops or roundtables/people's assemblies will be organized.

5.4.3 Consultations post Completion

In the post program implementation phase, a fixed number of consultations will be carried out. Engagement after program conclusion will focus on all identified stakeholder groups. At this stage of the process, the emphasis will be on understanding whether the project has achieved its objectives.

5.5 Strategy for Information Disclosure

SWEEP is likely to have widespread impacts across a range of stakeholders covering almost all income groups, having access to vastly different recreational and residential facilities. Hence, it is vital that accurate information is disseminated to the relevant stakeholders and the affected parties at the beginning, and updates are provided at regular intervals as the project proceeds. It is also necessary to give stakeholders ample time to formulate their response and provide feedback during the engagement process. For this purpose, a separate Stakeholder Engagement Plan (SEP) has been developed for the project. The SEP establishes that various modes of communication would be used to disseminate the necessary information to the relevant stakeholders as given in the table below. Key messages will be conveyed in the national as well as relevant regional languages to facilitate a broader audience. There is a variety of information that is to be disclosed to stakeholders over the course of project preparation and implementation. The information will be disseminated using relevant strategies depending on the stakeholder group and the program stage. Stakeholders will be provided draft documents in advance of consultations.

Table 13: Information Disclosure Strategy

Project activities	*List of Information to be disclosed*	*Timelines*	*Target stakeholders*
Cleaning of waste from *nullahs* obstructing the flow of water	List of *Nullahs* and localities where these activities would take place.	At project design phase.	Project Affected parties
Construction of temporary storage and dewatering facility for waste cleared from *nullahs* at Jam Chakro, before its final disposal in the new sanitary disposal cell to be constructed at Jam Chakro	The plan of shifting the waste taken out of *Nullahs* – transport routes, new location etc.		Vulnerable Groups Experts
Communication and outreach activities aimed at communities living around the *nullahs* to encourage residents to limit dumping of household waste into *nullahs*.	Communication strategy for the campaign and key messages.	At Project implementation stage, prior to the initiation of the cleaning of *Nullahs*	Communities living next to *Nullahs*
Construction of new sanitary disposal cell at Jam Chakro	Plan for construction of the new cell at Jam Chakro. Plans for all the associated activities planned under this activity.	During the preparation stage of the sub-component	Relevant Government Departments and experts Community living on Jam Chakro site.

Project activities	*List of Information to be disclosed*	*Timelines*	*Target stakeholders*
Construction/ Upgrading of Transfer Stations in the City.	Location of planned transfer stations	At design stage of the sub-component	KMC, DMCs, SSWMB and Community living close to the proposed sites
Retrofitting of Existing and Construction of New *Kachra kundis* at appropriate locations.	The plan on upgradation of the existing *Kachra kundis* and the location of the new points.	Should be completed at the planning stage of the process.	Relevant Government Departments and local communities.
Development of Advanced Waste Treatment Solutions, including modern landfilling capacity at Dhabeji, and treatment of non-municipal waste streams	Plan for the new site and its PC1	As soon as the design is finalized	Civil society, NGOs, local community and Ministry of Industries.
Provision of Equipment and Machinery to Local Councils and SSWMB	Details of all the equipment being provided and the relevant procurement material	Program Implementation phase	KMC, DMCs, SSWMB.
Project Management and Implementation Support	Project Documents with details of various activities	Program planning phase	KMC, DMCs, SSWMB, Local Communities, NGOs, EPA, Relevant Line Departments

5.6 Proposed strategy for consultation

As given in the table above, there is a variety of information that is to be disclosed to stakeholders over the course of project preparation and implementation. The information will be disseminated using relevant strategies depending on the stakeholder group and the program stage. Stakeholders will be provided draft documents in advance of consultations. This is summarized in the table below.

Table 14: Strategy for Stakeholder Consultation

Activities	*Target stakeholders*	*Topic of engagement*	*Method used*	*Location/ Frequency*	*Responsibilities*
Cleaning of waste from *nullahs* obstructing the flow of water Construction of temporary storage and dewatering facility for waste cleared from *nullahs* at Jam Chakro before its final disposal in	KMC, DMC, SSWMB, Community at Jam Chakro	Key activities and logistics associated with this activity. Potential impact of establishing temporary storage cell at Jam Chakro	Consultative workshops. Focus group discussions In COVID days, an extensive advertising campaign based on social media	One consultative workshop to be carried out during the preparation phase, and another when the process gets underway, for better coordination and course correction. Electronic messages to be disseminated	KMC and CLICK PIU. NGOs

Activities	*Target stakeholders*	*Topic of engagement*	*Method used*	*Location/ Frequency*	*Responsibilities*
the new sanitary disposal cell to be constructed at Jam Chakro			and electronic media In COVID days, experts to be reached through electronic meeting software Using NGOs to contact community leaders to spread the message	throughout the period of activity	
Communication and outreach activities aimed at communities living around the *nullahs* to encourage residents to limit dumping of household waste into *nullahs*.	Local Community living along *Nullahs*.	Proper methods of garbage disposal and civic awareness.	Corner Meetings In COVID days, an extensive advertising campaign based on social media and electronic media, including jingles/songs In COVID days, experts to be reached through meeting software Using NGOs to contact community leaders to spread the message	To be carried out in the identified locations and through an advertising/social media campaign To be conducted before the initiation of cleaning of waste from *nullahs*.	KMC, DMC, SSWMB, CLICK PIU, NGOs

Activities	*Target stakeholders*	*Topic of engagement*	*Method used*	*Location/ Frequency*	*Responsibilities*
Construction of new sanitary disposal cell at Jam Chakro	Community at Jam Chakro, KMC and SSWMB	The proposed new site plan and execution of the project. Impact these activities would have on the local community at Jam Chakro.	Consultative Workshop with Government Departments. In COVID days, an extensive advertising campaign based on social media and electronic media FGDs with local community at Jam Chakro through local NGOs, using small groups following SOPs. NGOs to reinforce messages by remote meetings with community leaders	PIUs office and should be carried out at the design phase of the project. Community consultations should be carried at Jam Chakro during the design phase of the project, and also when the upgradation process gets underway.	PIU, NGOs
Construction/ Upgrading of Transfer Stations in the City.	KMC, DMC, SSWMB and Local Communities where new transfer stations would be established	Location of the sites, design and work schedule Impact on local community	Consultative Workshop with Government Departments. In COVID days, an extensive advertising campaign based on social media and electronic media In COVID days, experts to be contacted using meeting software Using NGOs to contact community leaders to spread the message and get feedback	At PIU office At local communities, and one meeting should be conducted before the project is designed and one when the implementation starts on the ground. Advertising campaign and electronic/social media-based outreach to continue through design and implementation phase	PIU, NGOs

Activities	*Target stakeholders*	*Topic of engagement*	*Method used*	*Location/ Frequency*	*Responsibilities*
Retrofitting of Existing and Construction of New *Kachra kundis* at appropriate locations.	KMC, DMCs, and SSWMB, Communities	Location of the nee sites. Plan for upgradation Potential Environmental Impact Impact on the local community	Consultative workshops with various Government departments. FGDs through NGOs with communities where new *Kachra kundis* would be made. In COVID days, an extensive advertising campaign based on social media and electronic media In COVID days, experts to be contacted using meeting software Using NGOs to contact community leaders to spread the message and get feedback	These consultations should be done at the design phase of the project, and new locations should be marked after these meetings.	PIU, NGOs
Development of Advanced Waste Treatment Solutions, including modern landfilling capacity at Dhabeji, and treatment of non-municipal waste streams	KMC, SSWMB, Department of Industries, Environmental Protection Agency and Community at Jam Chakro	Plans for the new site.	Consultative Workshop FGDs with Community at Jam Chakro using local NGOs In COVID days, FGDs with local community at Jam Chakro through local NGOs, using small groups following SOPs.	PIU to hold these consultations before the finalization of the design. At Jam Chakro during the implementation phase of the project. This would help understand the impact of potential loss of livelihood due to a new site.	SSWMB and PIU, NGOs
Provision of Equipment and Machinery to Local	KMC and DMCs	Needs Assessment	Consultative session.	During the design phase of the project.	PIU

Activities	*Target stakeholders*	*Topic of engagement*	*Method used*	*Location/ Frequency*	*Responsibilities*
Councils and SSWMB					
Project Management and Implementation Support	KMC, DMCs, SSWMB, Environment Protection Agency, Department of Industries	Project Components and streamlining its implementation	Working Group	All stages of the project and should meet monthly to review the progress of the project.	PIU

5.7 Summary of Community Consultations (design phase)

The consultations show that communities are largely dissatisfied with waste management services, and have in many cases, resorted to finding solutions in the informal sector, for example through the network of waste pickers and recycling agents. Restoring trust in public waste management services is crucial, and this can only be done by a significant improvement in service quality, which is partly to be achieved through this project. It is also important to ensure that the views of citizens in general, and vulnerable communities in particular, be reflected in project design. The project preparation phase consultations have served to highlight some important issues as follows. These ideas are being incorporated into project design and will be given a more concrete form during implementation:

- Communities are willing to pay to have solid waste picked up door to door, whether it is by waste pickers, or sanitation workers already employed by the municipality. Communities living on the banks of the nullahs deposit waste in the nullah since they perceive it as a de facto waste dumpsite, largely due to the state of the nullahs at present.
- Women are as aware as men of the need to keep residential areas, commercial spaces and public spaces clean, and are particularly concerned for the health of their children who utilize these spaces. They are also the ones who typically deal with waste collectors and municipal sanitation staff, and can rate services well. The project will continue to elicit their feedback through different phases of implementation.
- Improving the work conditions of sanitation staff can yield dividends in terms of work performance and efficiency. SSWMB is working to institute operational health and safety standards for all workers, in addition to adherence to minimum wage statutes, with the expectation that these initiatives will lead to a significant improvement in performance of the staff.
- Low income communities are less likely to resort to government complaint registering mechanisms and prefer to approach the problem through local representatives and community leaders. Strengthening of grievance redress systems through the project will be aimed at gaining the trust of the citizens in general.
- Communities are familiar with the concept of rudimentary recycling, and are well acquainted with the kabari system. Some of them carry out recycling themselves by saving waste materials and selling to kabaris. In essence, bringing the waste sorting and recycling operations into the mainstream and integrating them into the larger SWM systems in the city will serve to encourage recycling, prevent pollution along roadsides and near garbage dumpsites in the city.
- Most citizens of Karachi have some years of education, and are highly aware of civic and health issues. For instance, communities living near nullahs are themselves aware that nullah

cleaning cannot be done at key points, but has to be carried out all along the length of the nullah system. This presents an opportunity to get their cooperation.

- COVID-19 has provided an opportunity in terms of higher health related awareness in communities. During consultations, people were vocal about the need for a safe, clean environment even after the crisis is over. This sentiment can and will be respected, and will form the basis for securing community cooperation in the different works to be carried out under SWEEP.

A virtual stakeholder consultation meeting was organized by the Managing Director, SSWMB, and Project Director, SWEEP on October 21, 2020. Participants were invited to share suggestions, feedback, and concerns (if any) on draft ESF instruments (ESMF, Resettlement Framework and SEP) developed by the SSWMB to ensure adequate social and environmental performance of the project. The draft documents are available on the SSWM website (http://sswmb.gos.pk/cms/?page_id=1719) and hard copies were also disseminated with the invitations.

In view of COVID-19 transmission risks, consultations had to be organized virtually. Invitees included key officials from institutional stakeholders, notable academics and practitioners, professional groups, relevant NGOs and civil society members (see Annex 5). Invitees were requested to review each document and share feedback in person or in writing. The list of invitees and participants in the meeting is attached in the Annex. Feedback recorded form the meeting and responses by the project team are presented in Table.

The virtual meeting format caused a few issues. The turnout in the meeting was limited, with some invitees reporting unfamiliarity with the virtual meeting format, preference for traditional meeting formats, or connection problems as the reasons for their inability to attend the meeting. The Project Director SWEEP will continue to reach out to further invitees directly via phone and individual meetings to collect more feedback, suggestions, and concerns. Further feedback from the participants, collected through these interactions and written correspondence will be added to findings included below. The participants in the virtual consultation included: Dr. Noman Ahmad (Professor and Dean Department of Architecture and Planning, NED University of Engineering and Technology Karachi), Jawed Ali Khan (Program Manager, UN Habitat Pakistan), Zofeen T. Ebrahim (journalist), Farhan Anwar (urban planner/SHEHRI), Dr. M. Mansha (Environmental Monitoring and Modeling Division, Space and Upper Atmosphere Research Commission (SUPARCO)), and Shujauddin Qureshi (Manager, Advocacy and Networking (PILER)).

Table 15: Stakeholder Feedback and Suggestions

No.	Stakeholders' Queries, Comments & Concerns	Response from Project Team
1.	What may be a role for UN Habitat in the project	The project encourages and welcomes involvement of UN Habitat and will schedule further interaction with the agency to understand what lessons, experience and or information UN Habitat can share with the Project. The team also looks forward to discussions on UN-Habitat's experience with waste management elsewhere in Pakistan (Refer item # 8 below).
2.	There was a mention of complaint lodging portals with various agencies. The performance was found below the	When the ESF documents were being prepared, the complaint system was not functional properly. However, now the

No.	Stakeholders' Queries, Comments & Concerns	Response from Project Team
	desirable level. May be a capacity building input may be useful to lift up the performance.	system has been substantially improved. The Sindh SWM Board has launched mobile apps in three districts – Malir, South, and East. District West is the next in line, as the waste collection contractor resume work there. Further improvements in the system will be implemented during project implementation. Other Bank projects, such as CLICK, are also going to bring in improvements in the complaints systems of KMC and the DMCs.
3.	The presentation focused more on the disposal of solid waste. However, since this is the age of circular economy, how do we intend to close the loop?	Agree that waste is not *waste* anymore! KMC conducted a study in 2016 in 4 zones of Karachi to confirm the reuse potential of solid waste in various modes, i.e. recycling, waste-to-energy etc. It was found that 28% waste at the doorstep had recycling or reuse potential but only 7-8 % waste that reaches the dumping site has this potential. This indicates that most *good* material is taken out on the way. This has informed the plan to assess waste composition and place facilities such as Material Recovery Facility (MRF) appropriately within the value chain, at the transfer stations or further downstream. This will be assessed comprehensively under design studies for infrastructure under SWEEP, as well as potential engagement of informal workers in material recovery initiatives. Hence, subsequent contracts will take this aspect into account.
4.	Project implementation will be done by SSWMB. What roles will the other agencies have? E.g. KMC, DMCs etc.	KMC and DMCs are both key implementing agencies under CLICK. KMC also played a significant role in the emergency component of SWEEP and remains a key agency for issues related to maintenance of drains. However, for the long-term infrastructure component of SWEEP that deals with developing the backbone infrastructure for solid waste management in the city, DMCs will be more relevant. For districts where DMCs have handed over the waste collection function to SSWMB, there exists a disconnect. The SSWMB is trying to improve the arrangement and remove this disconnect

No.	Stakeholders' Queries, Comments & Concerns	Response from Project Team
		through establishing effective interfaces between SSWMB and DMCs. DMCs will monitor waste collection operations, identify service gaps, and provide feedback from residents within their respective jurisdiction.
5.	Some previous studies found Karachi Circular Railway (KCR) to be an optimal medium to transport waste to the dumpsite, especially Dhabeji. Is the project considering using KCR, with or without truck transportation?	Route optimization for waste transfer and appropriate reconfiguration of the system for hauling waste to disposal facilities is a key activity under CLICK and will inform the Karachi SWM strategy. Backbone infrastructure developed under SWEEP will be in line with the strategy. The KCR, when operational, may not be suitable due to the route alignment. However, Pakistan Railways still maintains the line – from Wazir Mansion to Dhabeji –that was used for the 'garbage train' two decades ago for transporting waste to the Dhabeji site for a few months before the train operation and site use were discontinued. The line is being considered for configuring the waste transfer and transport networks from city center to Dhabeji site, which is around 60 kilometers from the city center.
6.	What will be the project strategy for engaging waste pickers? concern that would account to endorsing child labor	Under the RF, it has been suggested that the project will provide employment opportunities to the waste pickers in the sanitary land fill site, transfer stations and waste treatment plant at Dhabeji. Waste pickers will constitute the primary pool of workers for manual MRFs introduced at appropriate infrastructure developed under SWEEP. Also, appropriate site-specific solutions for specific groups, such as children that were working as waste pickers, will be designed and implemented in partnership with NGOs that are active in the sector or area. These may, inter alia, comprise improving education opportunities and appropriate incentives for attending schools. Stand-alone Labour Management Procedures will also be prepared for the project which, among other factors, will address concerns regarding children working in the sector.
7.	What would be mechanism to collect waste from illegal *kachra kundis?*	Informal waste dumps basically pop up due to the current gaps in SWM services.

No.	Stakeholders' Queries, Comments & Concerns	Response from Project Team
		Improved performance through strengthening of collection network – improved kachra kundis and collection equipment supported under SWEEP and performance management system for collection introduced under CLICK – will contribute to better designation and operation of collection points, and regular clearance of waste across residential areas. However, this also remains a responsibility of all citizens to keep the city clean and behave responsibly while managing their own solid waste. The sustained behavior change effort that is part of the CLICK and SWEEP projects will also help in this respect. In addition, recently launched mobile phone apps are also proving very useful in this regard. In only three days, the SSWMB has addressed 100 such complaints.
8.	UN Habitat has a Waste Management Technology based on Circular Economy, working on the ground for 5 years. We can share the write up on IRRC. It is successfully implemented in Islamabad, Mardan etc. and other South Asian countries by UN Habitat.	It will be very helpful if the write-up could be shared. The SSWMB and SWEEP team look forward to such further knowledge sharing discussions.
9.	The project may consider promoting the incentives for segregating waste at source by various categories of users, particularly when it comes to running the waste management functions post implementation	A sustained citizen awareness and behavior change campaign will be supported under CLICK (city-wide) and SWEEP (for specific areas) will be supported with encouraging and incentivizing at-source segregation a key aim. Other related interventions include geographic targeting where areas generating, for instance high organic/ food waste, will be identified and SWM solutions customized to local waste characteristics. Improving material recovery is a key objective when designing Garbage Transfer Stations (GTS) and disposal facilities planned under SWEEP. Appropriately sited manual MRFs will aim to increase material recovery, and higher segregation is a key driver to maximize gains in this area.

No.	Stakeholders' Queries, Comments & Concerns	Response from Project Team
10.	What would be the mechanism of real time monitoring of waste at kuchra kundis, transfer stations, landfill site and transportation vehicle tracking?	Every vehicle will be fitted with a tracking device to monitor its movement. The waste bins are also fitted with sims that indicate whether the bin is empty or full. However, there is a trend that people do not throw their trash inside the bin, rather they through it close to it. This limits the usefulness of the technology. As mentioned above, the latest App is helping in this aspect, as citizens lodge their complaints.
11.	How impact of odour pollution has been estimated from kuchra kundis on population living around these?	Preparatory activities for designing the improved kachra kundis involves baselines studies, engaging with residents, and post-completion satisfactions surveys. These activities will allow collection of baseline information and customization of physical design/ specifications of kachra kundis and clearance schedules based on the baseline information and citizen feedback collected. Similarly, satisfaction surveys will allow an evaluation of performance and identification of any gaps in the system that need addressing concerning design and operation of kachra kundis.
12.	What would be the long-term future of the initiative – post PIU? This should be taken up at the SC level?	Improving SSWMB as an institution is a key aim under CLICK, with interventions such as organizational reviews, hands-on training on improved systems, and strengthening performance and contract management systems and capabilities are supported. Under SWEEP, additional support will be provided to improve human resource and skillsets in areas such as infrastructure delivery, operations and maintenance (O&M), and management of facilities through private sector O&M contracts.

6.0 Environmental and Social Management Framework Implementation

This chapter describes institutional arrangements for environmental and social management, the procedures and tools to assess environmental and social risks and impacts, generic environmental and social mitigation plan, monitoring framework, and capacity building of stakeholders involved in environmental and social assessment, monitoring and management.

6.1 Institutional Arrangement

The institutional arrangement for the implementation of the SWEEP project activities and the environmental and social management framework is shown in Figure 10. Following is the description of institutional arrangement.

6.1.1 Local Government Housing and Town Planning Department

The Local Government Housing and Town Planning Department (LGHTPD) is the parent body for all local governments in Sindh, including Karachi Metropolitan Corporation (KMC) and District Municipal Committees (DMCs) in Karachi. SSWMB is also established as an attached entity with LGHTPD. Therefore, LGHTPD represents an umbrella institution for all implementing agencies under the project.

6.1.2 Steering Committee

An inter-agency Steering Committee will provide overall strategic oversight of the project and review implementation progress on a regular basis. It will be headed by the Planning and Development (P&D) Board, with representation from relevant Government of Sindh agencies. This Committee will facilitate inter-agency coordination to ensure adherence to project objectives; resolve inter-agency disputes related to the project, if any; and timely approvals for project-related matters for agencies included in the committee, where relevant. Steering Committee will be formed by XXX.

6.1.3 Sindh Solid Waste Management Board

Sindh Solid Waste Management Board (SSWMB) will be the primary implementing agency for SWEEP. SSWMB has the institutional mandate for transport and transfer of waste (the middle end) including operation of transfer facilities, disposal of solid waste and operation of disposal facilities, and manages collection of waste (the front-end) in three of the six districts in Karachi through private contractors. Under SWEEP, SSWMB will be responsible for Component 2, including construction and operation of infrastructure, as well as reimbursements under Component 1 in lieu of retroactive financing. In addition, SSWMB will also procure equipment for DMCs, as needed, to carry out waste collection, routine cleanup, and maintenance tasks. SSWMB will develop and adopt an Operations Manual for implementing the project. SSSWMB is responsible for preparation and implementation of ESMF and linked ESMP

6.1.4 Project Implementation Unit under SWEEP

SSWMB will operate a Project Implementation Unit (PIU) to implement SWEEP activities. The PIU will be headed by a Project Director (PD) and have technical staff for carrying out core functions of the project related to (i) SWM engineering, (ii) procurement and contract management, (iii) environment safeguards, climate change and disaster resilience, (iv) social development, gender,

stakeholder engagement and communications, (v) financial management, and (vi) M&E, including MIS.

To strengthen the E&S capacity of implementation agencies, one Environmental Specialist, one Health and Safety Specialist, one Resettlement Specialist, one Social Development Specialist (gender and inclusion) and one Communication Specialist will be recruited under PIU. PIU SWEEP will be responsible for the management of E&S safeguard requirements of the project under Component-2. These specialists will be hired within 60 days of the Effective Date.

6.1.5 Project Implementation Unit under CLICK

GoS has tasked the PIU established under LGHTPD for CLICK to support project preparation, and to manage immediate emergency activities under SWEEP, on a job-share basis. This PIU will be responsible for managing the emergency nullah cleaning operations (Subcomponent 1.1), the construction of the temporary storage and dewatering cell (Subcomponent 1.1) and the communication activities (Subcomponent 1.2) prior to, and during, the 2020 monsoon. The PIU will continue to be responsible for implementation of CLICK components aimed at: a) managing Performance Grants and providing technical assistance to local councils; and b) providing institutional strengthening support and technical assistance to SSWMB. Under the latter component, CLICK PIU will provide technical resources to the SSWMB, including: (i) Technical Specialist for SWM Front End Waste Collection Services; (ii) Performance Management Specialist; and (iii) Legal Specialist. Also, the CLICK PIU will continue to provide backstopping support to the SSWMB PIU during the first year of the project while the SSWMB PIU is getting established.

PIU under CLICK has recruited an Environmental Specialist and a Social Specialist and they are supporting the implementation of environmental and social protocols for emergency activities under Component 1. PIU CLICK will be responsible for the management of E&S safeguard requirements of the project under Component-1.

6.1.6 Karachi Metropolitan Corporation

The emergency pre-monsoon cleaning of nullahs will be undertaken by Karachi Metropolitan Corporation (KMC). KMC has the institutional mandate for the management (including cleanup and maintenance) of around 40 major nullahs in Karachi. Accordingly, KMC has engineering and associated staff experienced in the implementation of nullah cleaning initiatives. KMC will nominate dedicated officials to support the emergency nullah cleaning operations (Subcomponent 1.1). KMC will work in coordination with the CLICK PIU (under LGHTPD).

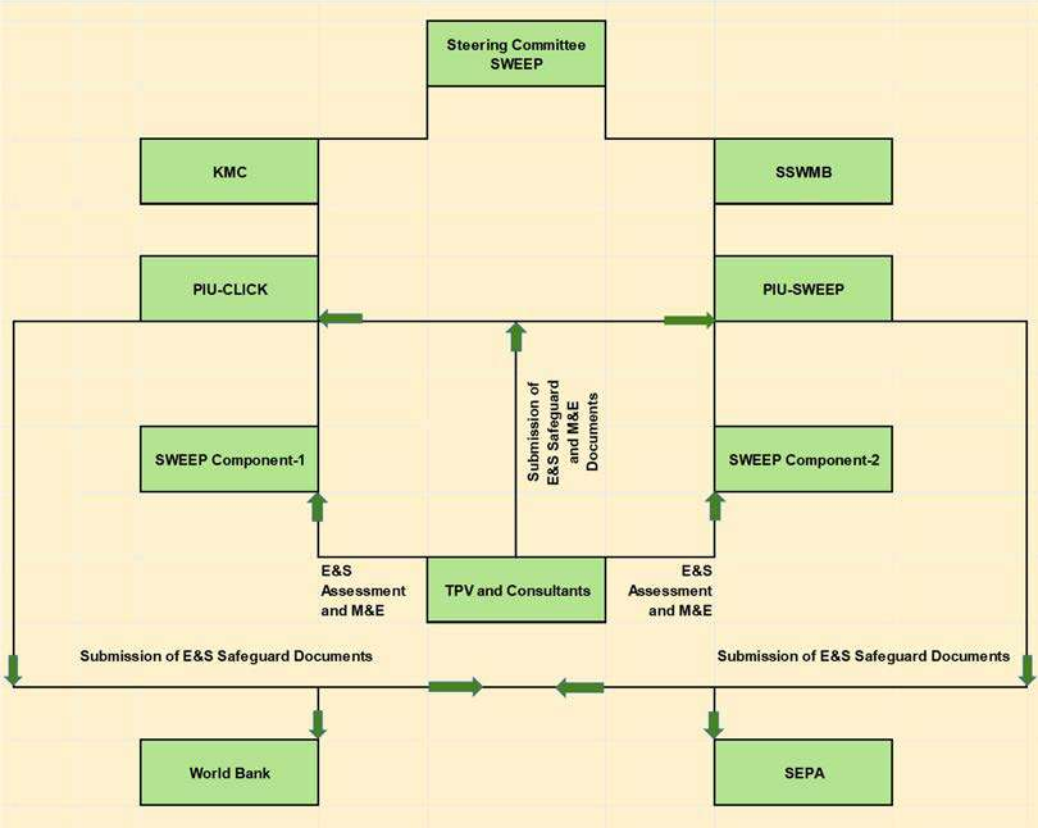
6.1.7 Third Parties and Consultants

Third parties and E&S consultants will also be hired by the PIUs to perform E&S assessment, auditing and preparing plans and conducting monitoring and evaluation activities of the project components during design and implementation stages. These consultants will prepare safeguard documents and submit to the PIUs for further submission to World Bank and SEPA.

6.1.8 Sindh Environmental Protection Agency

The Sindh environmental Protection Agency (SEPA) will be responsible for the environmental management of the projects in the Sindh district. SEPA will be required to review the environmental assessment documents submitted by the proponent of the projects and then issuing NOC after satisfactorily complying the requirements by the proponent.

Figure 10: Institutional Arrangement for SWEEP and ESMF



6.2 World Bank Requirements for Environmental and Social Management

The World Bank requires from SSWMB to conduct environmental and social assessment of projects proposed for Bank support in accordance with ESS1. For the sub-projects that are classified as High and Substantial risk, an independent assessment will be required as per ESS1 paragraph 25. The Bank requires from SSWMB to prepare and implement projects so that they meet the requirements of the ESSs in a manner and a timeframe acceptable to the Bank. In establishing the manner and an acceptable timeframe, the Bank takes into account the nature and significance of the potential environmental and social risks and impacts, the timing for development and implementation of the project, the capacity of the SSWMB in developing and implementing the project, and the specific measures and actions to be put in place or taken by the SSWMB to address such risks and impacts.

6.3 Environmental and Social Assessment of the Project

6.3.1 Environmental and Social Risks and Impacts Screening

a) Environmental and Social Screening

The methods and tools to be employed for environmental and social assessment of different project activities depend on the nature and scale and the level of the risks associated with the activities. It is required to first conduct E&S screening of the project activities to ascertain their E&S risks and then

on the basis of their levels, the type of method and tool to be employed for E&S assessment will be decided. E&S screening will be carried out by environmental and social specialists of the PIU after the identification of sub-project activities and location. The E&S Screening Checklist is given as Annexure-1 which will be used by E&S specialists of PIU and decide to employ method and tool as per the category of the E&S risk of the specific project activity. PIU, in consultation with the Bank, will decide the risk category and the tools to be used for each project activity.

b) Environmental and Social Risk Classification

The Bank classifies all projects into one of four classifications: *High Risk*, *Substantial Risk*, *Moderate Risk* or *Low Risk.* In determining the appropriate risk classification, the Bank takes into account relevant issues, such as the type, location, sensitivity, and scale of the project; the nature and magnitude of the potential environmental and social risks and impacts; and the capacity and commitment of the borrower to manage the environmental and social risks and impacts in a manner consistent with the ESSs.

The Bank has classified SWEEP as High Risk project due to its high environmental and social risks. There are various environmental and social issues related to project activities that will be financed under the project, such as remediation of historical pollution at Jam Chakro dump site, handling, transport and disposal of potentially contaminated waste, OHS/CHS risks, construction of large scale waste management facilities, waste pickers in the Jam Chakro dump site, risks of SEA/SH, and, encroachment issues along nullahs. The project has been designed to deal with these issues following relevant national and international standards and various environmental and social instruments will be prepared for each investment to mitigate all potential risk and impacts.

The Bank requires the borrower to carry out appropriate environmental and social assessment of subprojects, and prepare and implement such subprojects, as follows:

(a) *High and Substantial Risk* subprojects, ESIAs and ESMPs will be prepared by independent specialist in accordance with the ESSs;

(b) *Moderate Risk* and *Low Risk* subprojects, Screening Reports and ESMPs will be prepared respectively in accordance with ESSs.

6.3.2 Environmental and Social Assessment Methods and Tools

In the project, the following different methods and tools can be used to carry out the environmental and social assessment and to document the results of such assessment, including the mitigation measures to be implemented, as per the nature of the project. SSWMB will decide to use the methods of tools in consultation with the Bank.

- Environmental and Social Impact Assessment (ESIA) including Cumulative Impacts Assessment (CIA)
- Environmental and Social Audit (ESA)
- Environmental and Social Management Plan (ESMP)
- Environmental and Social Management Framework (ESMF)

Table 16 shows the preliminary assessment of various E&S assessment methods and tools required to be used for different project activities. E&S assessment including ESMF needs to be reviewed and cleared by the Bank before finalization, disclosure and use for bidding. If any changes are made in

these instruments during project implementation by the implementation agencies, the revised documents will be reviewed by the Bank and redisclosed in country and in the external website of the World Bank. Such changes will also be agreed with the relevant contractors and reflected in the respective contract for implementation.

Table 16: Environmental and Social Assessment Methods and Tools for SWEEP

#	Project/Component	E&S Assessment Methods and Tools	E&S Assessment Preparation Timing
	Component-1		
1	Cleaning of nullahs and disposal of waste	ESA (including corrective measures)	Within 60 days of the Project Effective Date and implement the remedial measures, if any, prior to submission of retroactive claim
2	Construction and operation of temporary storage cell for waste and sediments	ESA (including corrective measures)	
3	Communication and outreach activities	E&S assessment not required	NA
	Component-2		
4	Provision of equipment for under-served districts	E&S assessment not required	NA
5	Improvement of Kachra Kundis (Waste collection points)	ESMPs	Before issuing the bidding documents
6	Construction and operation of new sanitary disposal cell	ESIA/ESMP	
7	Construction and Operation of manual Material Recovery Facility (MRF)	ESIA/ESMP	
8	Improve safety and environmental performance of the dumpsite	ESIA/ESMP	
9	Closure and rehabilitation of dumpsite areas	ESIA/ESMP	
10	Community support plan for waste pickers	ESMP	
11	Construction/Upgrading of transfer stations	ESIA and ESMP (In case of construction) ESMP (In case of upgrading)	
12	Construction and operation of new sanitary landfill site	ESIA and ESMP	

6.3.3 Environmental and Social Management of Activities Carried out Prior to Board Approval of the Project.

For Component-1, project will retroactively reimburse the expenditure for emergency response intervention after ensuring its effectiveness. A third party Environmental and Social Audit (ESA) will be carried out for Component-1 to review the compliance status of the emergency response activities with ESSs, identify any gaps between the policy requirement and actual execution, and propose any

corrective measures to be implemented. The ESA report also needs to be reviewed and approved by the Bank. In this context, retroactive financing will be approved and made available upon implementation of the corrective action plan based on the ESA findings, and the commitment to complete the ESA and timeframe have been recorded in the ESCP. KMC has environmental and social protocols to be applied for temporary storage construction and operation and for nullah cleaning. These protocols are prepared in accordance with national regulations but the Bank has advised to incorporate ESSs requirements and KMC has agreed so that the gaps to be identified through ESA will be minimized and easier to comply. ESA TORs will be reviewed by the Bank.

The aim of the ESA is to identify significant environmental and social issues in the existing component-1 project, and assess their current status, specifically in terms of meeting the requirements of World Bank's Environmental and Social Standards (ESSs) and ESMP. Following is the scope of the ESA:

- *Analysis of the legal and institutional framework*: analyzes the legal and institutional framework applied for Component 1, including the country's applicable policy framework, national laws and regulations, and institutional capabilities (including implementation); variations in country conditions and project context; and obligations of the country directly applicable to the project under relevant international treaties and agreements.

- *Defining the existing activities*: Describe the existing project or activities, and the geographic, environmental, social, and temporal context and any Associated Facilities. Reviews the ESMPs and other E&S plans already developed to address specific environmental and social risks and impacts, includes a map of sufficient detail, showing the site of the existing project or activities and the proposed site for the proposed project.

- *Review of key risks and impacts*: Review the key risks and impacts relating to the existing project or activities. This will cover the risks and impacts identified in ESSs1–10 and ESMP, as relevant to the existing project or activities. The ESA will also review issues not covered by the ESSs, to the extent that they represent key risks and impacts in the circumstances of the project.

- *Assessment of E&S implication to the proposed operation:* The ESA will also assess (i) the potential impacts of the proposed project (taking into account the findings of the ESA with regard to the existing project or activities); and (ii) the ability and performance of the proposed project to meet the requirements of the ESSs and ESMP including implementation status of environmental and social mitigation measures, implementation arrangement for implementation and monitoring and community engagement.

- *The proposal of corrective measures*: Based on the findings of the ESA, suggest corrective measures to address findings. These measures will be included in the Environmental and Social Commitment Plan (ESCP) for the proposed project. These measures will include i) specific actions required to meet the requirements of the ESSs and ESMP, ii) corrective measures and actions to mitigate potentially significant environmental and/or social risks and impacts associated with the existing project or activities, iii) measures to avoid or mitigate any potential adverse environmental and social risks or impacts associated with the proposed project.

The Terms of References (TORs) of ES audit, ESIA and ESMP are given as Annexure-2.

6.4 Generic Environmental Mitigation Plan

Table 17 presents generic environmental mitigation plan for the avoiding or mitigating the potential environmental impacts identified above.

Table 17: Generic Environmental Mitigation Plan

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
COMPONENT-1 ***Removal of waste from 40 nullahs of the city through dredgers and manually***			
Nuisance for community (odor, germs, noise)	Prepare and follow Dredged Materials Collection, Transport, Disposal and Management Plan which includes measures to protect nearby communities from odor, spreading of diseases and noise control	Contractors for nullahs cleaning and material disposal, CLICK PIU	Operational (preparation before issuing the bidding documents)
Traffic congestion	Following the Traffic Management Plan (TMP)		Operational (Before the carrying out of the relevant Project activities)
Health and safety of the workers	Prepare and follow Dredged Materials Collection, Transport, Disposal and Management Plan which includes occupational health and safety plan for the workers		Operational (preparation Prior to contract mobilization)
Soil contamination	Follow the plan which includes soil protection measures		
Transportation of solid waste/sludge from 40 nullahs to the temporary storage cell at Jam Chakro dumpsite			
Nuisance at transport routes (odor, spillage of waste & sewage, germs)	Use of covered and sealed waste collection and transport vehicles	Contractors, CLICK PIU	Operational
Construction of a temporary storage cell for waste and sediments cleared from 40 nullahs at the Jam Chakro dumpsite			

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
Construction impacts (clearing of topsoil & vegetation, disturbance to natural habitats, wastewater, solid waste, air emission, noise, soil and groundwater contamination due to improper storage and handling of fuel and chemicals, occupational health hazards due to improper management of sanitary and hazardous waste, safety hazards due to use of heavy machines and vehicles, fire hazard, traffic congestion	Following Construction Phase Environmental and Social Management Plan (CPESMP). After the ESA, the corrective measures will be carried out.	Construction Contractors, CLICK PIU	Construction (Construction to be completed before receiving wastes collected from nullahs)
Operation of temporary storage cell			
Groundwater & soil contamination due to leachate and improper storage and handling of fuel and chemicals, landfill gas impacts, soil erosion, nuisance for community (odor, disease, dust, noise), OHS impacts, fire hazard, visual landscape impacts, traffic congestion, safety hazards due to the use of vehicles and machines	Installation of raised berms to form a waterproof lagoon-like structure, synthetic lining system	SSWMB	Design
	prevention of leachate seepage by lining system, proper storage of chemicals, fuel and lubricants, landfill gas management, following OHS practices for protection of workers and community, suppression of dust and odor, noise control, improving aesthetic of the site, erosion control, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	Site In-charge	Operation
	Preparation and implementation of rehabilitation/closure plan of temporary storage cell	SSWMB	Operation
	After the ESA, the gap filling measures will be carried out.	SSWMB	Operation
COMPONENT-2			

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
Upgrading of up to 30 existing Kachra Kundis			
Minor construction impact, health impacts on workers, nuisance for workers (odor, flies/mosquitoes)	Following CPESMP and COVID-19 SOPs	Construction Contractors	Construction
Construction of approximately 50 new Kachra Kundi points at appropriate locations			
Construction related impacts	Following CPESMP prepared according to ESMP	Construction Contractors, SSWMB	Construction (ESMP to be prepared before issuing the bidding documents)
Operation of Kachra Kundis			
Nuisance for community (odor, pilling of waste, disease), health hazards for waste pickers, soil contamination	Improving aesthetic and odor management, proper cleaning and sprinkling of lime, soil pollution control, protection of health of the waste pickers	SSWMB	Operational
Construction of new landfill cell on underutilized available land within the perimeter of the Jam Chakro dumpsite			
Construction related impacts	Following CPESMP prepared according to ESIA and ESMP	Construction contractors, SSWMB	Construction (ESIA and ESMP to be prepared before issuing the bidding documents)
OHS risks in relation to the existing environmental, health and safety issues at the site including uncontrolled leachate, exposure	Following CPESMP prepared according to ESIA and ESMP which includes but not limited to: installation of leachate collection systems for subsequent treatment, landfill gas venting, fire control, drainage control, application of soil	Construction contractors, SSWMB	Construction (ESIA and ESMP to be prepared before issuing

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
to landfill gases, risk of fire, proliferation of disease causing vectors and vermin	cover, water spray system, vegetative cover, preparation of OHS procedure.		the bidding documents)
Operation of the landfill cell			
Groundwater & soil contamination due to leachate and improper storage and handling of fuel and chemicals, landfill gas impacts, soil erosion, nuisance for community (odor, disease, dust, noise), safety hazards for community, OHS impacts on workers, fire hazard, visual landscape impacts, increased traffic along the transportation routes and vehicular emission	Incorporate design measures such as installation of lining system, landfill gas collection, leachate collection and treatment system etc., following the ESIA and ESMP for the new sanitary landfill site.	SSWMB	Design
	Leachate collection and treatment, proper storage of chemicals, fuel and lubricants, landfill gas management, following OHS practices for protection of workers and community, suppression of dust and odor, noise control, improving aesthetic of the site, erosion control, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	Site In-charge	Operation
	Preparation and implementation of landfill closure and rehabilitation plan	SSWMB	Design and Operation
Construction of a manual Material Recovery Facility (MRF), adjacent to the disposal cell			
Construction related impacts	Following CPESMP according to ESIA/ESMP	Construction Contractor, SSWMB	Construction (ESIA/ESMP to be prepared before issuing the bidding documents)
Operation of MRF			

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
OHS impacts on workers, soil contamination, fire hazard	Following OHS practices, soil pollution control, fire protection	Site In-charge	Operation
Improve safety and environmental performance of the dumpsite			
Minor construction related impacts	Following CPESMP prepared according to ESIA/ESMP	Construction contractors, SSWMB	Construction (ESIA/ESMP to be prepared before issuing the bidding documents)
OHS risks in relation to the existing environmental, health and safety issues at the site including uncontrolled leachate, exposure to landfill gases, risk of fire, proliferation of disease causing vectors and vermin	Following CPESMP prepared according to ESIA and ESMP which includes but not limited to: installation of leachate collection systems for subsequent treatment, landfill gas venting, fire control, drainage control, application of soil cover, water spray system, vegetative cover, preparation of OHS procedure.	Construction contractors, SSWMB	Construction (ESIA and ESMP to be prepared before issuing the bidding documents)
Progressive closure and rehabilitation of areas that have reached capacity, through standard methods to progressively reduce impacts associated with the operation of Jam Chakro			
Minor construction related impacts	Following CPESMP prepared according to ESIA/ESMP	Construction contractors, SSWMB	Construction (ESIA/ESMP to be prepared before issuing the bidding documents)
OHS risks in relation to the existing environmental, health and safety issues at the site including uncontrolled leachate, exposure	Following CPESMP prepared according to ESIA and ESMP which includes but not limited to: installation of leachate collection systems for subsequent treatment, landfill gas venting, fire control, drainage control, application of soil	Construction contractors, SSWMB	Construction (ESIA and ESMP to be prepared before

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
to landfill gases, risk of fire, proliferation of disease causing vectors and vermin	cover, water spray system, vegetative cover, preparation of OHS procedure.		issuing the bidding documents)
Construction or upgrading of up to four modern transfer stations			
Construction related impacts	Following CPESMP prepared according to ESIA/ESMP	Construction contractors	Construction
Operation of transfer stations			
Nuisance for community and at transfer routes (odor, dust, pilling of waste, disease, spillage of waste/sewage), soil and groundwater contamination due to improper storage and handling of fuel and chemicals, OHS impacts on workers, fire hazard, increased traffic along the transportation routes and vehicular emission	Aesthetic and odor management, control of disease, causing germs, soil pollution control and surface runoff management, proper storage of chemicals, fuel and lubricants, suppression of dust, waste transfer management, fire protection, protection of health and safety of the workers, following COVID-19 SOPs, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	SSWMB	Operation
Construction of a modern new sanitary landfill site at Dhabeji			
Construction related impacts	Following CPESMP according to ESIA and ESMP	Construction contractors	Construction (ESIA and ESMP to be prepared before issuing the bidding documents)
Operation of sanitary landfill site			

Potential Environmental Impacts	Environmental Mitigation Measures	Responsibility	Implementation Stage
Groundwater & soil contamination due to leachate and improper storage and handling of fuel and chemicals, landfill gas impacts, soil erosion, nuisance for community (odor, disease, dust, noise), safety hazards for community, OHS impacts on workers, fire hazard, visual landscape impacts, increased traffic along the transportation routes and vehicular emission	Incorporate design measures such as installation of lining system, landfill gas collection, leachate collection and treatment system etc., following the ESIA and ESMP for the new sanitary landfill site.	SSWMB	Design
	Leachate collection and treatment, proper storage of chemicals, fuel and lubricants, landfill gas management, following best practices for protection of workers and community, suppression of dust and odor, noise control, improving aesthetic of the site, erosion control, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	Site In-charge	Operation
	Preparation and implementation of landfill closure and rehabilitation plan	SSWMB	Design and Operation

6.5 Generic Social Mitigation Plan

Table 18 presents generic social mitigation plan for the avoiding or mitigating the potential social impacts identified above.

Table 18: Generic Social Mitigation Plan

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
COMPONENT-1 ***Removal of waste from 40 nullahs of the city through dredgers and manually***			
Inadvertent damage to structures during removal of waste	Prepare and follow Dredged Materials Collection, Transport, Disposal and Management Plan.	Contractors for nullahs cleaning	Operational

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
Nuisance for the nearby community due to odoriferous emission and vehicular noise etc. around nullahs	Follow the E&S Audit Corrective Action Plan in case any structure is inadvertently damaged.	and material disposal	
Increased probability of accidental injuries to workers and general public	Prepare and follow Community Health &Safety Plan, Emergency Preparedness Plan, and Labor Management Procedures (LMP).		
Deterioration in the existing condition of the roads and traffic congestion during dredgers movement and operation and piling of waste material	Following the Traffic Management Plan (TMP)		
Exploitation of informal sector workers, many of whom are ethnic/religious minorities	Following Construction Phase Environmental and Social Management Plan (CPESMP)		
Transportation of solid waste/sludge from 40 nullahs to the temporary storage cell at Jam Chakro dumpsite			
Nuisance due to foul smell, spillage of solid waste and sewage sludge along the transport routes of vehicles carrying solid waste from *nullahs* to the dumpsite	Use of covered and sealed waste collection and transport vehicles	Contractors	Operational
Construction of a temporary storage cell for waste and sediments cleared from 40 nullahs at the Jam Chakro dumpsite			
Labor influx related issues	Following Labor Management Procedures (LMP), LMP will also include measures to address Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Violence Against Children (VAC) related issues	Construction Contractors	Construction
Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and violence against children (VAC)	Develop and follow SEA/SH and VAC Action Plan.		
Occupational Health and safety (OHS) hazards and risks e.g. dust, noise, vibration, machinery hazards, ergonomics etc.	Develop and follow OHS Plan		

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
Conflict between local communities and labor, disruption of utilities etc.	Following Construction Phase Environmental and Social Management Plan (CPESMP)		
Child labor and weak enforcement of labor laws	Following Labor Management Procedures (LMP)		
Operation of temporary storage cell			
Livelihood impacts on squatters	Follow Livelihood Restoration Plan aligned with RPF	SSWMB PIU	Design/ Planning
SEA/SH and VAC impacts	Following SEA/SH and VAC Action Plan.	Site In-charge	Operation
Nuisance for nearby community due to odoriferous emission, dust and vehicular and machinery noises	Prepare and follow Community Health &Safety Plan.		
Spread of disease to local residents from labor with different transmittable diseases	Following Labor Management Procedures (LMP), LMP will also include measures to address Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Violence Against Children (VAC) related issues		
Exploitation of informal sector workers	Follow Stakeholder Engagement Plan (SEP), take their views and resolve issues.	Site In-charge	Operation
COMPONENT-2 ***Upgrading of up to 30 existing Kachra Kundis***			
Sanitation and aesthetic problems from uncollected waste in kachra kundis	Improving aesthetic, sanitation, odor management, and proper cleaning.	Construction Contractors	Construction
Occupational Health and Safety (OHS) hazards and risks e.g. dust, noise, vibration, machinery hazards, ergonomics etc.	Following OHS Plan		
Traffic related hazards	Following the Traffic Management Plan (TMP)		
Construction of approximately 50 new Kachra Kundi points at appropriate locations			

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
Exclusion of different areas/marginalized communities especially living in low-income areas.	Follow Stakeholder Engagement Plan (SEP), include all areas/marginalized communities take their views and resolve issues.	SSWMB PIU	Design/ Planning
Siting related social issues	Follow SEP for meaningful engagement of community and account for their feedback in the design	SSWMB PIU	Design / Planning
Occupational Health and Safety (OHS) hazards	Following OHS Plan	Construction Contractors	Construction
Conflict/tension between local communities and workforce	Following Construction Phase Environmental and Social Management Plan (CPESMP)		
Disruption of utilities such as water, electricity, telephone, cable, etc.			
Child labor and weak enforcement of labor laws	Following Labor Management Procedures (LMP).		
Traffic related hazards	Following the Traffic Management Plan (TMP)		
Operation of Kachra Kundis			
Nuisance for the nearby community due to odor and piling of solid waste	Improving aesthetic, sanitation and odor management, proper cleaning and sprinkling of lime.	Site In-charge	Operation
Sanitation and aesthetic impacts			
Construction of new landfill cell on underutilized available land within the perimeter of the Jam Chakro dumpsite			
Resettlement/livelihood impacts on waste pickers living and working at Jam Chakro	Follow Resettlement Plan (RP).	SSWMB	Design/Planning
Construction related social impacts including labor issues and weak enforcement of labor laws	Following Construction Phase Environmental and Social Management Plan (CPESMP), and Labor Management Procedures (LMP).	Construction contractors	Construction
SEA/SH and VAC impacts	Following SEA/SH and VAC Action Plan.		

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
Spread of different transmittable diseases from imported labor to local residents and vice versa	Following Labor Management Procedures (LMP), and COVID-19 SOPs.		
Operation of the landfill cell			
Conflicts between existing and new workers, and / or between workers and community	Follow Stakeholder Engagement Plan (SEP), include all informal recycling sector, take their views and resolve issues.	SSWMB PIU/ SSWMB	Operation
livelihood impacts on waste pickers	Follow RP and Stakeholder Engagement Plan (SEP).		
Exploitation of informal sector workers	Follow Stakeholder Engagement Plan (SEP), and Labor Management Procedures (LMP).	Site In-charge	Operation
Nuisance for the nearby community due to odor, dust and vehicular and machinery noises	Improving aesthetic, sanitation and odor management, proper cleaning and sprinkling of lime.		
Construction of a manual Material Recovery Facility (MRF), adjacent to the disposal cell			
Inadvertent damage to structures and resettlement of squatters	Follow Resettlement Plan (RP).	SSWMB PIU	Design/ Planning
Construction related social impacts including labor issues and weak enforcement of labor laws	Following Construction Phase Environmental and Social Management Plan (CPESMP), and Labor Management Procedures (LMP).	Construction contractors	Construction
Labor with different transmittable diseases may cause spread of those diseases in the local residents	Following Labor Management Procedures (LMP), LMP will also include measures to address Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Violence Against Children (VAC) related issues		
SEA/SH and VAC impacts	Following SEA/SH and VAC Action Plan.		
Weak accountability and transparency in delivering services	Develop and implement a robust GRM.	SSWMB PIU/ SSWMB	All
Operation of MRF			

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
Social conflict between waste pickers currently working in or around the proposed site and any new-comers within unregulated/ undocumented informal sector	Follow Stakeholder Engagement Plan (SEP)	SSWMB PIU/ SSWMB	Operation
Exploitation of informal sector workers	Follow Stakeholder Engagement Plan (SEP)	Site In-charge	Operation
SEA/SH and VAC impacts	Following SEA/SH and VAC Action Plan.		
Improve safety and environmental performance of the dumpsite			
Impact is positive, no negative social impact is envisaged.	-	-	-
Construction or upgrading of up to four modern transfer stations			
Construction related social impacts including labor issues and weak enforcement of labor laws	Following Construction Phase Environmental and Social Management Plan (CPESMP), and Labor Management Procedures (LMP).	Construction contractors	Construction
Operation of transfer stations			
Livelihood impacts on and exploitation of informal sector workers	Follow Stakeholder Engagement Plan (SEP).	SSWMB PIU/ SSWMB/ Site In-charge	Operation
Construction of a modern new sanitary landfill site at Dhabeji			
Resettlement of squatters (if any) from the proposed site	Prepare and follow Resettlement Plan (RP).	SSWMB PIU	Design/ Planning
Change in prices of land, accommodations, and rents	Prepare and follow Resettlement Plan (RP).	SSWMB PIU	Construction
Construction related social impacts including labor issues and weak enforcement of labor laws	Following Construction Phase Environmental and Social Management Plan (CPESMP), and Labor Management Procedures (LMP).	Construction contractors	Construction

Potential Social Impacts	Social Mitigation Measures	Responsibility	Implementation Stage
Labor with different transmittable diseases may cause spread of those diseases in the local residents	Following Labor Management Procedures (LMP), and COVID-19 SOPs.		
SEA/SH and VAC impacts	Following SEA/SH and VAC Action Plan.		
Operation of sanitary landfill site			
Exploitation of informal sector workers,	Follow Stakeholder Engagement Plan (SEP)	SSWMB PIU	Operation
Additional squatting at this site can also potentially be a problem. The government will need to protect the site	Follow Resettlement Plan (RP).	SSWMB PIU	Operation

6.6 Monitoring Framework

Monitoring of the environmental and social Mitigation Plan (MP) is required at construction and operational phases of the project components. The monitoring is the requisite for World Bank and Sindh Environmental Protection Agency (SEPA).

6.6.1 Construction Phase Monitoring

There are monitoring requirements for the MP under environmental and social assessment for World Bank and SEPA for construction phases of the projects.

a) Project Implementation Units

The overall responsibility of compliance of MP and compliance reporting to World Bank and SEPA will be with SSWMB. The Project Implementation Unit (PIU), established under SSWMB for the management of SWEEP project activities, will overall supervise the monitoring and compliance of MP. PIU CLICK and PIU SWEEP will be responsible for Component-1 and Component-2, respectively.

The Environment and Social professionals under PIUs will take care of environmental and social aspects of the project activities. PIUs will arrange environmental and social monitoring and prepare compliance reports and submit to the World Bank and SEPA, to fulfill their monitoring, reporting and compliance requirements of environmental and social safeguard.

The Construction Phase Environmental and Social Management Plan (CPESMP) will be prepared and appended with the tender document for the contractors. It will be a standard document. The contractors will be required to prepare their own site specific ESMPs. These ESMPs will contain following plans to eliminate, offset or reduce environmental, social and health and safety impacts during construction phase:

- Sanitation plan
- Soil pollution control plan
- Dust control plan
- Waste management plan
- Occupational health and safety plan
- Noise abatement plan
- Traffic management plan
- Construction camps management plan
- Campsite restoration plan
- Tree plantation plan
- Social management plan
- Labor influx management plan
- Community health and safety plan
- Emergency preparedness plan

The compliance of CPESMP will be the responsibility of the contractor and compliance cost will be added in the bidding documents. The PIUs will be responsible to ensure compliance of CPESMP during construction phase through contractors. The compliance will require measurements of environmental and social parameters and observations at the construction sites to evaluate compliance. The PIUs will hire the services of independent environmental and social consultancy firm as Third Party for Third Party Validation (TPV).

b) Third Party Validation

The Third Party Validation will be carried out through independent environmental and social consultancy firm. The consultant firm will monitor the environmental and social parameters and conduct field surveys at the construction sites to evaluate compliance level by the contractors. The consultant firm will prepare monthly monitoring and evaluation report for each site and submit to PIUs. The PIUs will review the report, discuss with the consultant firm, and finalize the findings. In case of noncompliance from the contractors, the PIUs will have the authority to halt the construction activities or impose penalties as per the contract conditions. The PIUs will submit the final version of monitoring and evaluation reports to World Bank for their review and further action. These reports will be submitted to SEPA as per the frequency to be mentioned in the construction phase 'No Objection Certificate (NOC)' requirements (Quarterly and yearly).

6.6.2 Operation Phase Monitoring

The overall responsibility of compliance of operational phase MP will be with SSWMB.

a) Sindh Solid Waste Management Board

In the organizational hierarchy of SSWMB, the three Directors i.e. Director Front End Collection, Director Garbage Transfer Station (GTS) and Director Waste to Energy, working under Executive Director Operations Karachi Division are overall responsible for the operation of waste collection, transfer, and disposal. These Directors will be overall responsible for the monitoring of the E&S safeguard requirements for World Bank and SEPA. The PIUs will manage and coordinate monitoring activities through approval of these Directors. The E&S safeguard M&E reports will be submitted to World Bank and SEPA through approval of respective Director.

b) Environmental Laboratory

The site in-charges of waste collection, transfer and disposal facilities, working under SSWMB, will have the leverage to hire the services of competent environmental laboratory to monitor environmental parameters during operational phases to comply World Bank and SEPA compliance requirements, whatever be the case. The compliance reports will be submitted by the respective site in-charges to the PIUs at set frequency (fortnightly). The laboratory reports will be the part of these compliance reports. Third party validation will also be carried out through third party wherever required.

The respective site in-charge will take corrective actions and preventive measures in case of any nonconformity against the MP. These corrective and preventive measures and rectification will also be the part of the compliance reports.

The PIUs will submit the operational phase MP compliance reports to the respective Director and then to the World Bank and SEPA after their approval.

The monitoring plan is presented in Table 19.

Table 19: Environmental and Social Mitigation and Monitoring Plan

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
COMPONENT-1 ***Removal of waste from 40 nullahs of the city through dredgers and manually***			
Prepare and follow Dredged Materials Collection, Transport, Disposal and Management Plan which includes measures to protect nearby communities from odor, spreading of diseases and noise control	Third Party Validation	▪ Evaluation for the compliance of Dredged Materials Collection, Transport, Disposal and Management Plan ▪ Noise measurement at site, 7 m from vehicles, at nearby communities	Daily at each site
Following the Traffic Management Plan (TMP)		▪ Evaluation for the compliance of TMP	
Prepare and follow Dredged Materials Collection, Transport, Disposal and Management Plan which includes occupational health and safety (OHS) plan for the workers		▪ Evaluation for the compliance of OHS plan by the contractor	
Follow the plan which includes soil protection measures		▪ Evaluation for the soil protection	
Following Construction Phase Environmental and Social Management Plan (CPESMP)	CLICK PIU, Third Party Validation	▪ Evaluation for the compliance of CPESMP	Weekly at site
Follow the E&S Audit Corrective Action Plan in case any structure is inadvertently damaged.	Third Party Validation	▪ Evaluation of corrective actions undertaken and compensations made.	Once at the conclusion of activity
Transportation of solid waste/sludge from 40 nullahs to the temporary storage cell at Jam Chakro dumpsite			
Use of covered and sealed waste collection and transport vehicles	PIU	Evaluation for the use of covered and sealed waste	Daily at each site

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
		collection and transport vehicles by the contractors	
Construction of a temporary storage cell for waste and sediments cleared from 40 nullahs at the Jam Chakro dumpsite			
Following Construction Phase Environmental and Social Management Plan (CPESMP)	CLICK PIU, Third Party Validation	▪ Evaluation for the compliance of CPESMP ▪ Monitoring of noise at site and nearby communities, PM_{10} and $PM_{2.5}$ at site, ambient air quality	Weekly at site
Following Labor Management Procedures (LMP), LMP will also include measures to address Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Violence Against Children (VAC) related issues		▪ Evaluation for the compliance of LMP.	
Develop and follow SEA/SH and VAC Action Plan.		▪ Evaluation for the compliance of SEA/SH and VAC Action Plan.	
Develop and follow OHS Plan		▪ Evaluation for the compliance of OHS Plan by the contractor	
Operation of temporary storage cell			
Leachate management, proper storage of chemicals, fuel and lubricants, landfill gas management, following OHS practices for protection of workers and community, suppression of dust and odor, noise control, improving aesthetic of the site, erosion control, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	Site In-charge, Environmental Laboratory Third Party Validation	▪ Leachate quality, groundwater quality, CH_4 gas detection, noise, PM_{10} and $PM_{2.5}$ ▪ Evaluation for workers OHS, soil protection, traffic management, odor and aesthetic management	Monthly

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
Follow Livelihood Restoration Plan aligned with RPF	SSWMB PIU, Third Party Validation	▪ Evaluation for the compliance of RPF	Quarterly
Following SEA/SH and VAC Action Plan.		▪ Evaluation for the compliance of SEA/SH and VAC Action Plan	
Prepare and follow Community Health &Safety Plan.		▪ Evaluation for the compliance of CHS plan.	
Following Labor Management Procedures (LMP), LMP will also include measures to address Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Violence Against Children (VAC) related issues		▪ Evaluation for the compliance of LMP	
Follow Stakeholder Engagement Plan (SEP)		▪ Evaluation for the compliance of SEP	
COMPONENT-2 ***Upgrading of up to 30 existing Kachra Kundis***			
Following CPESMP and COVID-19 SOPs	SSWMB PIU	▪ Evaluation for the compliance of CPESMP ▪ Evaluation for compliance of COVID-19 SOPs	Daily at each site
Improving aesthetic, sanitation, odor management, and proper cleaning.		▪ Evaluation for aesthetic, sanitation and odor management, proper cleaning and sprinkling of lime, and protection of health of waste pickers	
Following OHS Plan		▪ Evaluation for the compliance of OHS Plan by the contractor ▪ Evaluation of incident/ accident log register.	

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
Following the Traffic Management Plan (TMP)		▪ Evaluation for the compliance of TMP	
Construction of approximately 50 new Kachra Kundi points at appropriate locations			
Following CPESMP	SSWMB PIU	Evaluation for the compliance of CPESMP	Daily at each site
Follow Stakeholder Engagement Plan (SEP), include all areas/marginalized communities take their views and resolve issues.		Evaluation for the compliance of SEP	weekly
Follow SEP for meaningful engagement of community and account for their feedback in the design		Evaluation for the compliance of SEP	
Following OHS Plan		▪ Evaluation for the compliance of OHS Plan by the contractor ▪ Evaluation of incident/ accident log register.	
Following Labor Management Procedures (LMP).		Evaluation for the compliance of LMP	
Following the Traffic Management Plan (TMP)		Evaluation for the compliance of TMP	
Operation of Kachra Kundis			
Improving aesthetic, sanitation and odor management, proper cleaning and sprinkling of lime, soil pollution control, protection of health of the waste pickers	SSWMB PIU	Evaluation for aesthetic, sanitation and odor management, proper cleaning and sprinkling of lime, and protection of health of waste pickers	Monthly
Construction of new landfill cell on underutilized available land within the perimeter of the Jam Chakro dumpsite			

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
Following CPESMP (including OHS measures to address legacy pollution)	SSWMB PIU, Environmental Laboratory	▪ Evaluation for the compliance of CPESMP ▪ Monitoring of noise at site and nearby communities, PM_{10} and $PM_{2.5}$ at site, ambient air quality	Weekly
Develop and follow Resettlement Plan (RP) for waste pickers.	SSWMB PIU	Evaluation for the compliance of RP	Fortnightly
Following SEA/SH and VAC Action Plan.		Evaluation for the compliance of GBV.SEA and VAC Action Plan.	
Following Labor Management Procedures (LMP), and COVID-19 SOPs.		Evaluation for the compliance of LMP and COVID-19 SOPs	
Operation of the landfill cell			
Leachate management, proper storage of chemicals, fuel and lubricants, landfill gas management, following OHS practices for protection of workers and community, suppression of dust and odor, noise control, improving aesthetic of the site, erosion control, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	Site In-charge, Environmental Laboratory	▪ Leachate quality (pre and post treatment), groundwater quality, CH_4 gas detection, noise, PM_{10} and $PM_{2.5}$ ▪ Evaluation for workers OHS, soil protection, traffic management, odor and aesthetic management	Monthly
Follow Stakeholder Engagement Plan (SEP), RP and LMP.	SSWMB PIU	Evaluation for the compliance of SEP, RP and LMP	Quarterly
Construction of a manual Material Recovery Facility (MRF), adjacent to the disposal cell			
Following CPESMP, and Labor Management Procedures (LMP).	SSWMB PIU	Evaluation for the compliance of CPESMP, and LMP	Daily

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
Follow Resettlement Plan (RP).	SSWMB PIU	Evaluation for the compliance of RP	Fortnightly
Following SEA/SH and VAC Action Plan.		Evaluation for the compliance of SEA/SH and VAC	
Develop and implement a robust GRM.		Evaluation for the compliance of GRM	
Operation of MRF			
Following OHS practices, soil pollution control, fire protection	SSWMB PIU	Evaluation for OHS practices, soil pollution control and fire protection measures	Monthly
Follow Stakeholder Engagement Plan (SEP)		Evaluation for the compliance of SEP	
Following SEA/SH and VAC Action Plan.		Evaluation for the compliance of SEA/SH and VAC Action Plan	
Progressive closure and rehabilitation of areas that have reached capacity, through standard methods to progressively reduce impacts associated with the operation of Jam Chakro			
Following CPESMP (including OHS measures to address legacy pollution)	SSWMB PIU	Evaluation for the compliance of CPESMP	Daily
Improve safety and environmental performance of the dumpsite			
Following CPESMP (including OHS measures to address legacy pollution)	SSWMB PIU	Evaluation for the compliance of CPESMP	Daily
Construction or upgrading of up to four modern transfer stations			
Following CPESMP, and LMP	SSWMB PIU, Environmental Laboratory	▪ Evaluation for the compliance of CPESMP, and LMP	Weekly at each site

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
		▪ Noise monitoring at site and nearby community, PM_{10} and $PM_{2.5}$, ambient air quality	
Operation of transfer stations			
Aesthetic and odor management, control of disease, causing germs, soil pollution control and surface runoff management, proper storage of chemicals, fuel and lubricants, suppression of dust, waste transfer management, fire protection, protection of health and safety of the workers, following COVID-19 SOPs, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	SSWMB PIU	Evaluation for aesthetic and odor management, hygienic conditions, soil pollution control measures, dust suppression measures, waste transfer management, traffic management, fire protection, OHS measures for workers, following COVID-19 SOPs	Fortnightly
Following SEP	SSWMB PIU	Evaluation for the compliance of SEP	Quarterly
Construction of a modern new sanitary landfill site at Dhabeji			
Following CPESMP	Third Party Validation, Environmental Laboratory	▪ Evaluation for the compliance of CPESMP ▪ Noise monitoring at site and nearby community, PM_{10} and $PM_{2.5}$, ambient air quality	Weekly
Prepare and follow Resettlement Plan (RP).	SSWMB PIU	Evaluation for the compliance of RP	Fortnightly
Following Labor Management Procedures (LMP), and COVID-19 SOPs.		Evaluation for the compliance of LMP, and COVID-19 SOPs	

Environmental and Social Mitigation Measures	Monitoring Responsibility	Monitoring Requirements/Parameters	Monitoring Frequency
Following SEA/SH and VAC Action Plan.		Evaluation for the compliance of SEA/SH and VAC Action Plan	
Operation of sanitary landfill site			
Leachate management, proper storage of chemicals, fuel and lubricants, landfill gas management, following best practices for protection of workers and community, suppression of dust and odor, noise control, improving aesthetic of the site, erosion control, traffic management (vehicles management to avoid traffic congestion at transport routes i.e. timing, frequency), marking of transport routes for vehicles and machineries and restricting speed to avoid accidents at site	Site In-charge, Environmental Laboratory	▪ Evaluation for OHS measures, odor management, traffic management, erosion control and aesthetic, soil pollution control, traffic management ▪ Leachate quality (pre and post treatment), groundwater quality, CH_4 gas detection, noise, PM_{10} and $PM_{2.5}$	Monthly
Follow Stakeholder Engagement Plan (SEP)	SSWMB PIU	Evaluation for the compliance of SEP	Quarterly
Follow Resettlement Plan (RP).		Evaluation for the compliance of RP	

6.7 Capacity Building

Capacity building will be required for the stakeholders involved for the implementation, supervision, monitoring, evaluation, and reporting of the mitigation measures during construction and operational phases of the project components. This section describes the capacity building requirements for the stakeholders involved.

Following are the key stakeholders involved for the accomplishment of the environmental and social safeguard requirements of the SWEEP project:

- SSWMB Directors (DTS)
- PIU Environmental and Social Professionals (PIU) – One Environmental Specialist, One Health and Safety Specialist, One Resettlement Specialist and One Social Development Specialist (for gender, community engagement, SEP, GRM)
- Environmental and Social Consultant (ESC)
- Environmental Laboratory (EL)
- Contractors (CONTs)

Table 20 presents detail of trainings required for the capacity building of above-mentioned key stakeholders on environmental and social safeguard requirements.

Table 20: Training Requirements

#	**Trainings** *(Resource Person)*	**Key Stakeholders** *(Frequency)*				
		DTS	**PIU**	**ESC**	**EL**	**CONTs**
1	Overview of Project and Subprojects and their Environmental and Social Impacts and Mitigation Measures	▪	▪	▪		▪
	(Environmentalist/Sociologist)	*Once at start* *Once for every contractor*				
2	Construction Phase Environmental and Social Management Plan (CPESMP)	▪	▪	▪		▪
	(Environmentalist and Sociologist)	*Once at start* *Once for every contractor*				
3	Environmental Monitoring and Evaluation/Social Assessment Requirements during Construction and Operational Phases	▪	▪	▪	▪	
	(Environmentalist and Sociologist)	*Once at start*				

4	Environmental and Social Assessment of the Projects		▪			
	Environmentalist/EIA Expert and Sociologist		*Once at Start*			
5	Environmental and Social Monitoring, Evaluation and Compliance Reporting Requirements	▪	▪	▪		
	(Environmental Safeguard Specialist/ Social Safeguard Specialist)	*Once at Start*				

7.0 Grievance Redress Mechanism

This section lays out the existing grievance redress mechanisms (GRM) currently in place in the two key institutions responsible for project implementation, in addition to delineating proposed GRM procedures for the project itself. As per World Bank requirements, GRM systems are an integral component of the project administration. Paragraph 26 of ESS 10 says that, "the Borrower will respond to concerns and grievances of project-affected parties related to the environmental and social performance of the project in a timely manner. For this purpose, the Borrower will propose and implement a grievance mechanism to receive and facilitate resolution of such concerns and grievances."

7.1 Existing Mechanisms

SSWMB: In case of SSWMB, the Board operates a Citizens Portal where citizens can log in suggestions and complaints on all SWM related issues.[63] Complaints are automatically forwarded to the concerned Deputy Director for appropriate remedial actions. Citizens can upload pictures/videos/audio files or even handwritten text files in support of their complaints. The portal also enables the SSWMB to communicate directly with citizens to make routine and urgent announcements. The Board also maintains a Facebook page which is updated regularly, and which allows FB users to send messages directly, or use an email address displayed on the page to file complaints or give suggestions.
KMC: KMC also has an online complaint system through its website.[64] Overall, KMC has set up a system called Citizen Complaint and Information System (CCIS), through which complaints of the citizens are registered and managed. Citizens can lodge a complaint under this system either through:

- Citizen's Call Center which is functional 24/7 and can be accessed on their dedicated number,
- Facilitation centers that are spread across 21 locations throughout the city, or
- Online portal, where basic information like nature of complaints, departments, CNICs and phone number is required to lodge a complaint.

Once a complaint is recorded in the system, they are all logged into a CCIS central database. The complaints from the central database are then sent to the relevant departments and officials, and the status of the complaint is monitored through the system. Once the relevant official marks the complaint as resolved, the Quality Control Section of CCIS confirms with the complainant whether their complaint was resolved or not. If the complaint is still unresolved, it's redirected to higher officials of the relevant department for resolution. The entire complaint management system can also be viewed in real time by the relevant officials, such as the Mayor and Deputy Mayor.

While the SSWMB and KMC have made an effort to design and operationalize GRM systems as detailed above, consultations with communities carried out at the design stage of this project show that communities are not familiar with, and not convinced of the efficacy of these systems. They prefer to approach government service providers through informal, roundabout means, generally through their elected representatives (local councilors or sometimes the MNA or MPA). The service providers are working hard to encourage the use of institutional GRM systems, so that they can effectively monitor the quality of services, and are in touch with their consumers/clients.

[63] See: http://sswmb.gos.pk/cms/?page_id=1534
[64] See: http://complaint.kmc.gos.pk/ccis/General/Complaint/LogNew.aspx

As such, the SSWMB and KMC will use SWEEP as a vehicle to enhance existing GRM systems and work with greater focus on systems that close the feedback loop. Until project GRM systems are in place, the existing GRM systems, mainly KMC's CCIS, will be utilized during the implementation of Component 1.

7.2 GRM Systems for the Project

The project will have its own GRM system as delineated below. A GRM will be in place 30 days after effectiveness and/or before implementation commences. The proposed design of the GRM will be finalized in light of the feedback provided during the stakeholder consultation. Until this is in place, queries and complaints related to the project can either be directed through existing GRM systems (described in Section 6.1), or can be routed to the following:

Mr. Zubair Ahmed Channa, Managing Director, SSWMB/ Project Director, SWEEP
Tel: 021-99333701, Email: md@sswmb.gos.pk

Syed Muhammad Afzal Zaidi, Metropolitan Commissioner, KMC
Tel: (021)99216095, Email: commissioner@kmc.gos.pk

A Grievance Redress Committee (GRC) will be constituted at the PIU, managed by the Social Development Specialist (SDS). Other than SDS, the Committee will draw on existing resources at the SSWMB and will comprise of four additional members as follows. In order to avoid any conflict of interest, members of the SSWMB who are actively engaged with project implementation will not be included in the GRC.

Table 21: Constitution of the Grievance Redress Committee

Designation	Parent Department
Head of the GRC	SSWMB
Director GRC	SSWMB/PIU
Social Development Specialist (SDS)/Secretary to GRC	PIU
Administrator and Investigation	PIU
Nominee from KMC	KMC
Nominees (including one woman) of Affected Persons (Aps)	Communities

A designated officer from the SSWMB will serve as Head of the GRC. The Head of the GRC, Director GRC, and the nominee from KMC will work at their parent agencies, but will be available to the GRC to decide on complaints that need responses from senior officials or inter-departmental cooperation, or which are otherwise complex in some way.
Day to day issues will be handled by the SDS, with assistance from the Resettlement Specialist, an Administrator and support staff who will handle the GRM system. An officer with experience of working in the CCIS of the KMC will be nominated by KMC over the initial months of the project to address any complaints concerning cleaning of nullahs.

The proposed composition of the GRM will be discussed during stakeholder consultations, and their suggestions and feedback will be taken into account while finalizing the design of the GRM and the composition of the GRC and will be reflected in the final version

7.3 GRM System

As a first step, an online complaint registration system will be set up for the project, which will also link with the SSWMB's Citizen's Portal. Thus, it will pick up relevant complaints from the Portal, as well as complaints registered on it directly. Complaint registration will be structured such that complaints can be entered directly on the website (in English or Urdu); can be posted to a designated address as letters or written messages; or can be narrated to operators on a helpline. All complaints, however made, will be consolidated into a database on a daily basis, and separated by location as well as subject.

As a second step, grievances/complaints will be screened and classified into three categories by order of priority, with those requiring instant action being classified as high priority. A set of criteria will be made to determine what sort of grievances/complaints fall into which category. All registered grievances/complaints will be acknowledged through a text message or phone call. If no telephone number is supplied by the complainant, he or she will be asked through a letter to check back with the PIU. This acknowledgement will be issued within one day of receipt of the grievance/complaint. Each complainant will be given an estimated timeframe for resolution of the grievance/complaint.

Grievances will be investigated and resolved within the timeframe specified, which will not be longer than ten days. If resolution demands longer than this timeframe, the complainant will be informed, and will be contacted by staff from the PIU to explain details of the issue. Grievances which require cooperation of a number of departments, or which are otherwise complicated, will be referred to the GRC who will specify how resolution is to take place.

Records of all grievances/complaints will be maintained in a database, including details of actions taken to resolve the issue, and dates on which resolution was effected. At the conclusion of action to solve grievances, the complainants will be informed of the outcome. Two days after action is closed and complainants informed, they will be contacted again to ensure that they are satisfied with the work done. The system will include a system for Appeals. If a complainant remains unsatisfied, he/she will be able to lodge an appeal, which will be escalated to the Head of the GRC or the Director.

7.3.1 Handling Gender Based Violence (GBV) and Violence and Against Children (VAC) issues

The project will be particularly sensitive to GBV and VAC issues given that its key stakeholders include marginalized communities, whose women and children are particularly vulnerable to abuse. Grievances related to GBV will be handled as a separate, category within the GRM system. The PIU staff responsible for receiving complaints, the SDS and Resettlement Specialist will receive training on receiving complaints regarding GBV and VAC from a certified and reputable organization/NGO focusing on issues of GBV and VAC. The organization will also draw up a list of established service providers who can provide support to GBV and VAC survivors and all relevant cases will be referred accordingly. This element of the GRM will be further refined in light of the GBV Action Plan that will be prepared for the project.

8.0 Budget

This chapter describes the tentative budget for the environmental and social assessment of project activities and compliance of E&S mitigation plan during construction and operational phases of the project.

8.1 Tentative Budget

The tentative budget under different cost head is mentioned in Table 22. Total tentative budget for the compliance of environmental and social safeguard requirements is about Rs.328.37 million.

Table 22: Tentative Budget for Environmental & Social Assessment and Compliance

All Costs are in Pak Rupee (PKR)

#	Cost Head	Unit Cost	No. of Units	Total Amount
	A- Environmental & Social Assessment (Lump Sum Unit Cost)			
1	Cleaning of nullahs and disposal of waste (ESMP, ESA)	6,400,000	1	6,400,000
2	Construction and operation of temporary storage cell (ESMP, ESA, ESIA)	7,900,000	1	7,900,000
3	Construction and operation of new sanitary landfill cell (ESMP, ESIA)	8,000,000	1	8,000,000
4	Construction and operation of manual Material Recovery Facility (ESMP, ESIA)	8,000,000	1	8,000,000
5	Community support plan for waste pickers (ESMP)	2,900,000	1	2,900,000
6	Construction of transfer stations (ESIA, ESMP)	6,000,000	1	6,000,000
7	Construction and operation of new sanitary landfill site at Dhabeji (ESIA, EIA)	21,000,000	1	21,000,000
8	Construction/ Upgrading of Transfer Stations (IEE/EIA, ESMP)	19,000,000	1	19,000,000
	Total-A			***79,200,000***
	B- Construction Phase CPESMP Implementation *(PPE, fire safety equipment, septic tanks, noise barriers, monitoring, first aid, solid waste management, water sprinkling, camps restoration)*			
9	Temporary storage cell	1,945,000	1	1,945,000
10	Landfill cell	1,900,000	1	1,900,000
11	Kachra Kunidis	955,000	1	955,000
12	Transfer stations	1,820,000	1	1,820,000
13	Sanitary landfill site	2,390,000	1	2,390,000
14	Improved safety of the sites	910,000	1	910,000
15	MRF	910,000	1	910,000
16	Progressive closure & rehabilitation of areas at Jam Chakro dumpsite	1,500,000	1	1,500,000

	Total-B			***12,330,000***
	C-Operational Phase E&S MP Implementation (for 1 Year) *(PPE, fire safety equipment, septic tanks, monitoring, first aid, solid waste management, water sprinkling)*			
17	Cleaning of nullahs	1,990,000	1	1,990,000
18	Temporary storage cell	2,720,000	1	2,720,000
19	Landfill cell	2,720,000	1	2,720,000
20	Kachra Kunidis	530,000	1	530,000
21	Transfer stations	1,540,000	1	1,540,000
22	Sanitary landfill site	4,250,000	1	4,250,000
23	MRF	1,710,000	1	1,710,000
	Total-C			***15,460,000***
	D-Training			
24	Training cost for 5 trainings	500,000	5	2,500,000
	Total-D			***2,500,000***
	E- Third Party Monitoring (Every Six Months=10 Monitoring each)			
25.1	Consultancy for the monitoring of Environmental and Social Impact Assessments, Environmental and Social Management Plans	4,600,000	10	46,000,000
25.2	Consultancy for Monitoring Gender Impacts and Developing Gender Inclusion Plans	2,250,000	10	22,500,000
	Total-E			***91,000,000***
	F- Operation of PIU for E&S Management (for 5 Year)			
26	PIU cost for E&S management (Salary of Environmental Specialist, Health & safety Specialist, Social Development Specialist (Gender and Inclusion), Communication Specialist, and operational expenses of the PIU)	30,961,400	5	127,884,000
	Total-F			***127,884,000***
	Grand Total			**328,374,000**

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4. Government of Sindh, “Karachi Strategic Development Plan 2020, Master Plan Group of Offices, City District Government Karachi, December 2007
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12. Karachi Electric Supply Company, “Flora/fauna Karachi, General Characteristics, KESC Environmental Monitoring, 2nd Quarter, SGS, 2009
13. JICA (2013), “Geological Survey, Preparatory Survey (II) on Karachi Circular Railway Revival Project, Final Report”.
14. World Bank, “Environmental and Social Framework”, Washington, DC, 2017
15. Republic of Kosovo, Ministry of Infrastructure and Environment, Greening Land, Environmental and Social Management Framework, March 2020

ANNEXURE-1: Environmental and Social Screening Checklist

Checklist to be followed for Environmental and Social Screening during the sub-project screening has been provided below. Environmental and social specialists of PIU must complete the screening for each sub-project by filling out the checklist below.

Name of the Project:	
Sub-Project:	
Sub-Project location:	
Implementing Agency:	
Contact:	
ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST QUESTIONNAIRE (must be filled out for every sub-project)	

Sub-project description

No	Project Overview Questions	
1	Details of the proposed sub-project activities (Provide information on type of activities/facilities to be implemented/constructed, capacity, main facilities/equipment to be installed/used. Please also attach schematic diagram if available)	
2	Location of the Project Sites, Current Land Use (Provide information for all sites involved in the sub-project; including for Linked activities / associated facilities), any historic land use (related to heritage, or contamination), sensitive habitats and receptors. Please also explain alternative locations considered. Site Survey No:/s (attach map) with ownership details, Geographical co-ordinates of the site location [including any off-site sub-components (attach map) Also, mention disaster zones? (Earthquake, Cyclone, etc.)	
3	Land Area proposed to be used	
4	Quantity of Water Required for Construction and Annual Operations with Details of Source/s	
5	Power Required and Source of Power	
6	Construction/implementation period	
7	Number of workers to be employed (including potential to mobilize workers from other countries)	

Environmental and Social Conditions and Risks

No	Environmental and Social Risk Questions	YES / NO	Unknown	Notes
1	Does the proposed activity include new construction and extension of activity?			
2	Does the proposed activity include rehabilitation activities?			

No	Environmental and Social Risk Questions	YES / NO	Unknown	Notes
3	Does the proposed activity require NOC from the environmental authorities?			
4	What type of E&S assessment required for the proposed activity under National legislation?			
5	Does the proposed activity require specific public consultations under the national legislation?			
6	Will the project contribute to any long term significant adverse (negative), large scale, irreversible, sensitive impact at a regional scale or area broader than the project sites?			
7	Will the project use natural resources such as land, water, materials, or energy, particularly any resources which are non-renewable or in short supply?			
8	Will the project activities be performed in or potentially affects archaeological or cultural heritage site?			
9	Will the project activities be source of dust, pollutants or some hazardous, toxic, or harmful substances in the air?			
10	Will the project be source of greenhouse gases or ozone depletion substances?			
11	May the project cause microclimate changes?			
12	Will the project be source of noise and vibration?			
13	Will the project generate significant quantities of waste (hazardous, nonhazardous, inert waste)?			
14	Total extent of land where the waste will be dumped openly / or expected to get contaminated by waste or leachate/material storage			
15	Will the Project involve the use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?			
16	Will the project generate additional releases of wastewater?			
17	Are there any risks of contamination of surface waters due to the proposed sub-project?			
18	Are there any risks of contamination of ground waters due to the proposed sub-project?			
19	Are there any activities which will lead to physical changes of the water body?			

No	Environmental and Social Risk Questions	YES / NO	Unknown	Notes
20	Will the project contribute to pollution of international waters?			
21	Are there any risks of physical changes of the terrain, soil pollution, sediment loads, erosion, etc.?			
22	Does the project involve cutting and filling/ blasting etc.?			
23	Will the project involve any quarrying/ mining etc?			
24	Will the project involves use of pesticides or fertilizers?			
25	Are there any areas on or around the location that are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the Project?			
26	Will the project be located in or near some sensitive or protected area?			
27	Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the Project?			
28	Will this project affect some critical habitats (forest, wetlands, marshlands, aquatic ecosystems)?			
29	Will this project affect some endangered plant/s?			
30	Will this project affect some endangered animal species?			
31	Will the project require cutting of Trees / Loss of Vegetation? If yes, please provide the expected numbers/areas.			
32	Is there a right to way issue or need for land acquisition?			
33	Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the Project?			
34	Are there any transport routes on or around the location that are susceptible to congestion or which cause environmental problems, which could be affected by the project?			
35	Does the project location cover a previously undeveloped area where there will be loss of green field land?			

No	Environmental and Social Risk Questions	YES / NO	Unknown	Notes
36	Are there existing land uses within or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying that could be affected by the Project?			
37	Are there areas within or around the location which are densely populated or built up, that could be affected by the Project?			
38	Will the implementation of project may cause physically displacement of individuals, families, or businesses?			
39	Will the project need temporary or permanent land acquisition?			
40	Will the project involve temporary or permanent impacts on livelihood?			
41	Does project involve vulnerable and disadvantaged groups of the society?			
42	Does the project cause impact on community assets?			
43	Does the project cause impact on community health and safety?			
44	Does project involve workers?			
45	Does construction workers include women and children?			
46	Does project may cause health and safety impacts on workers?			
47	Does project pose safety risks to the public?			

Project Categorization prepared by ES Specialist: _____

Name and signature of person(s) prepared: _____

Date: _____

	☐ **Low Risk**	☐ **Moderate Risk**	☐ **Substantial Risk**	☐ **High Risk**
Categorization of the Risk	The Applicant need to prepare:	The Applicant need to prepare:	The Applicant need to prepare:	The Applicant need to prepare:
	ESMP	ESMP or ESIA	ESIA	ESIA
Approval				

Project Categorization issued World Bank E&S Specialist: _____

Signature of responsible person: _____
Date: _____

ANNEXURE-2: Terms of Reference for Environmental and Social Audit

Terms of Reference
Solid Waste Emergency and Efficiency Project (SWEEP)
Environmental and Social Audit

1.0 Background

The city of Karachi generates an estimated 12,000 to 16,000 metric tons of municipal solid waste every day. Only a fraction of this waste is collected, and none of it is disposed in sanitary engineered facilities. Some of the waste (estimated around 60 percent) is transported to two large unsanitary dumps, Jam Chakro and Gond Pass, located within 30-40 km from the city center. Neither facility meets international standards for waste disposal. The chronic backlog of uncollected waste has decreased the operating capacity of much of the urban infrastructure – i.e. the city's drainage system is clogged by waste, contributing to persistent flooding; movement along several secondary roads is impeded due to litter; water sources are contaminated, and public spaces are unattractive and unsanitary. The environmental and human health implications are severe: open burning of waste generates high levels of persistent and toxic chemicals that contribute to poor air quality and cause cardio-vascular diseases; inadequate solid waste management (SWM) has been identified as an important factor behind continued incidence of polio in Karachi; surface and groundwater pollution by inadequate disposal of waste is well documented, and a factor in the prevalence of water-borne diseases. The Government of Sindh (GoS) is cognizant of problems in the waste sector and has taken several steps to improve the situation in recent years. GoS set up a specialized agency in 2014, the Sindh Solid Waste Management Board (SSWMB), and has increased allocations and expenditure significantly to engage private sector contractors for front-end waste collection.

The government has since been unable to find adequate alternatives to provide collection services, and this has significantly impacted the amount of daily waste that remains uncollected in this district, with roughly 25 percent of the city's population. The COVID-19 emergency led to enforced lockdown and restrictions of operations across the city since early March 2020. This has further impacted the provision of SWM services, as workers involved with collection, transport, and disposal of waste have not been able to operate.

Moreover, a rapid intervention in the SWM sector offers additional opportunities for the government to address the impacts from the ongoing COVID-19 crisis. First, project activities that support urgent maintenance of the nullahs to increase the conveyance capacity of the city's drainage system will require the mobilization of crews who will need to work throughout the monsoon season in the cleaning, removal and adequate disposal of waste.

2.0 The Project

The proposed project will finance interventions that will be implemented over two phases: (a) in the immediate emergency response phase, activities will aim to mitigate (i) high flooding risks linked to the 2020 monsoon and caused by accumulation of solid waste in the city's natural drainage channels (nullahs), as well as (ii) public health risks caused by exposure to poorly managed COVID-19 contaminated waste; and (b) in the medium-to-long-term phase, the Project will improve backbone SWM infrastructure and service delivery to address the underlying risk factors leading to recurring emergency flooding situations.

Component 1: Immediate Emergency Response Interventions

The Component will support:

a. Cleaning of nullahs and disposal of waste, including: (i) removing waste obstructing the flow of water and restoring the drainage capacity of the nullahs; and (ii) construction of a temporary storage cell for waste and sediments cleared from nullahs at the Jam Chakro dumpsite.
b. Development and implementation of a targeted communication and awareness campaign aimed at communities living around the nullahs.

Component 2: Development of SWM Backbone Infrastructure

Component 2 will support:

c. Provision of urgent collection equipment for under-served districts and improvement of Kachra Kundis, including: (i) provision of critical equipment to improve occupational safety and collection efficiency, such as personal protective equipment for workers, collection trucks, bins, and containers; and (ii) upgrading of up to thirty existing kachra kundis and the construction of approximately fifty kachra kundis.
d. Construction of a new sanitary disposal cell at Jam Chakro dumpsite, including: (i) design and construction of a new landfill cell; (ii) design and construction of a manual material recovery facility adjacent to the disposal cell; (iii) implementation of measures to improve safety and environmental performance of the dumpsite; (iv) progressive closure and rehabilitation of areas that have reached capacity; and (v) development and implementation of community support plan for waste pickers living at Jam Chakro.
e. Construction and/or upgrading of transfer stations, including the development and implementation of an appropriate operating model for the operation and maintenance of the transfer stations.
f. Development of long-term waste solutions for Karachi, including: (i) planning, design and construction of a new sanitary landfill with associated facilities; (ii) planning, carrying out of feasibility studies, engineering design, development of business and operating models, and provision of advisory services for the preparation of a large ecosystem of waste treatment solutions; (iii) design and construction of solutions to improve treatment of non-municipal waste streams such as medical waste and/or construction and demolition waste, including: assessment of existing systems for collection, transport and disposal of such waste streams; identification of gaps to be addressed through processes, investments and technologies; development of service improvement plans needed to build end-to-end solutions for each stream, as well as policy recommendations on regulation and tariffs for producers; and, identification of priority investments.

Component 3: Project Management and Implementation Support

Component 3 will provide support for implementing agencies to manage, implement, and supervise Project activities and investments and training and skill development in the areas of monitoring and evaluation, communication, audits, social and environmental management, engineering, operations and maintenance, and Project management.

3.0 Background of the Assignment

The project is planning to retroactively reimburse the expenditure for emergency response intervention under component 1 after ensuring its effectiveness. A third party Environmental and

Social Audit (ESA) audit is required to be carried out for component-1 (removal of waste from 40 nullahs and transport to temporary storage facility and construction and operation of temporary waste disposal facility at Jam Chakro) to review the compliance status of the emergency response activities with World Bank's Environmental and Social Framework (ESF) and ESMP, identify any gaps between the policy requirement and actual execution, and propose any gap filling measures to be implemented. In this context, retroactive financing will be approved and made available upon implementation of the corrective action plan developed based on the ESA findings, and the commitment to complete the ESA and timeframe are recorded in the ESCP. A third party i.e. a consulting firm, is required to conduct ESA of the component-1.

4.0 Scope of ES Audit

The aim of the ESA is to identify significant environmental and social issues in the existing component-1 project, and assess their current status, specifically in terms of meeting the requirements of World Bank's Environmental and Social Standards (ESSs) and ESMP. Following is the scope of the ESA:

- Analyzes the legal and institutional framework for the existing project or activities, including (a) the country's applicable policy framework, national laws and regulations, and institutional capabilities (including implementation) relating to environment and social issues; variations in country conditions and project context; country environmental or social studies; national environmental or social action plans; and obligations of the country directly applicable to the project under relevant international treaties and agreements.

- Concisely describes the existing project or activities, and the geographic, environmental, social, and temporal context and any Associated Facilities. Reviews the ESMPs already developed to address specific environmental and social risks and impacts, includes a map of sufficient detail, showing the site of the existing project or activities and the proposed site for the proposed project.

- Review the key risks and impacts relating to the existing project or activities. This will cover the risks and impacts identified in ESSs1–10 and ESMP, as relevant to the existing project or activities. The ESA will also review issues not covered by the ESSs, to the extent that they represent key risks and impacts in the circumstances of the project.

- The ESA will also assess (i) the potential impacts of the proposed project (taking into account the findings of the ESA with regard to the existing project or activities); and (ii) the ability and performance of the proposed project to meet the requirements of the ESSs and ESMP including implementation status of environmental and social mitigation measures, implementation arrangement for implementation and monitoring and community engagement.

- Based on the findings of the ESA, suggest measures to address findings. These measures will be included in the Environmental and Social Commitment Plan (ESCP) for the proposed project. These measures will include i) specific actions required to meet the requirements of the ESSs and ESMP, ii) corrective measures and actions to mitigate potentially significant environmental and/or social risks and impacts associated with the existing project or activities, iii) measures to avoid or mitigate any potential adverse environmental and social risks or impacts associated with the proposed project.

4.1 ESMP Compliance Assessment

As per ESMP prepared for Component-1, the contractors and the site in-charges have to follow certain requirements for environmental and social management of the project during construction and operational phase respectively. The consultancy firm is required to assess the compliance of ESMP under followings:

- Construction phase impacts mitigation as per the ESMP. Ensuring compliance through verifying records (monitoring, inventory etc.), site visits and interviews with the communities.
- Restoration of the campsites. Ensuring compliance through site visits.
- Contractors are required to prepare and follow construction related mitigation and monitoring plans i.e. Labor Management Plan (LMP), Emergency Response Plan (ERP), OHS plan etc. Review of these plans and ensure their compliance through interviews, records, and other tools etc.
- For the nullahs cleaning, preparation and implementation of Dredged Materials Collection, Transport, Disposal and Management Plan are required.
- Operational phases require improved aesthetic of the area, odor management, dust and noise control, soil protection, leachate and landfill gas management, vehicular emission control, waste management, and traffic management. Ensure these compliances through site visits, observations, interviews with the nearby communities, monitoring records etc.
- Protection of health and safety of the workers and community. Ensure compliance of health and safety plans, use of PPE by workers, fire safety measures, safety measures taken for the community protection, safety measures taken to avoid accidents at site from heavy vehicles and machineries.

5.0 Tasks

The consultancy firm will carry out following tasks to accomplish the audit:

- Desk review of project documents e.g. ESMPs, ESMF, E&S monitoring reports
- Desk review for the secondary baseline data, legal requirements, ESF and other relevant literature about the assignment
- Meeting with the project stakeholders including SSWMB, KMC, site in-charges and World Bank staff, to discuss the activities of the component-1, their progress, achievements and the bottlenecks and collection of relevant project information and documents
- Field surveys of the sites to collect primary data, and environmental monitoring
- Field surveys of the nearby communities to collect their feedback
- Conduct interviews with the workers, contractors and site in-charges
- Compile the field data, draw the conclusions and drafting ESA report including findings and the recommendations

6.0 Indicative Outline of the ES Audit Report

The indicative outline of the ES audit report is as under:

1.0 Executive Summary
2.0 Legal and Institutional Framework
3.0 Project Description
4.0 Environmental and Social Issues Associated with the Existing Project or Activities
5.0 Environmental and Social Analysis
6.0 Proposed Environmental and Social Measures

7.0 Deliverables

- Presentation to the stakeholders regarding findings and recommendations of the ESA
- Draft and Final ES audit report

8.0 Timeframe

The assignment will be started in September 2020. This assignment will be required to be completed within two months till November 2020. The contract will be signed with the consultancy firm prior to the commencement of the work.

9.0 Qualification and Skills Required

The consultancy firm needs to demonstrate that the proposed ESA preparation team has the expertise required to fully appreciate the requirements of all the ESF standards to be addressed in the ES audit, and to complete all required sections of the ESA report. The team should include necessary specialists from different disciplines as indicated in the table below. The team should have complete understanding of the national legislative requirements as well as World Bank' ESF.

Position	**Qualification and Tasks**
Team Leader	The Team Leader should have a M.Sc degree in environment engineering, environmental science, civil engineering and other relevant field and preferably a postgraduate degree in related field. The Team Leader should have at least 20 yrs experience in environmental and social impact assessment and management in solid waste management projects. He/she should have working experience as Team Leader/Deputy Team Leader in minimum 3 similar projects. Team Leader (TL) shall be responsible for overall activities of the consulting team. The TL will also be responsible for but not limited to the following: • Full responsibility for overall activities of the team including all relevant aspects of technical, financial, legal/statutory, environmental/social, etc. • Provide advice and direction to the multi-disciplinary team of the Consultant to perform the duties in an efficient manner to meet the requirement of the employer as per ToR. • Orient the work plan in consultation with Project Director. • Maintaining liaison with the client to achieve the ultimate goal of the assignment • Reviewing of previous relevant studies and data • Taking part in all relevant meetings with stakeholders concerned • Reporting.
Solid Waste Management Specialist	He/She should have a postgraduate degree in Civil Engineering or related field. He/She should have at least 10 years of experience in urban

	planning, civil engineering, and SWM projects with at least 5 years experience in SWM projects. His/her major responsibilities shall include but not necessarily be limited to the following: • Design and Supervise solid waste assessment survey and prepare report of the key findings. • Assess waste management practices applied for emergency operation • Actively participate in stakeholder engagement activities • Assist the Team Leader in preparation of ESA Report • Any other relevant duties
Environmental Specialist	The Environmental Specialist should have at least M.Sc. in Civil/Environmental Engineering/Science with 10 yrs experience in the field of environmental assessment and preparation of environmental management plans for urban services and SWM projects. This key staff shall be responsible for but not limited to: • Reviewing of all relevant data and studies. • Assess environmental compliance status of emergency works • Propose corrective measures to address the finding • Actively participate in stakeholder engagement activities • Provide the necessary environmental inputs to ESA report • Assisting the TL • Any other relevant duties
Social Safeguard Specialist and Community Engagement Specialist	He/She should have a Master's/Doctoral degree in Social Scienc/Sociology or other relevant field. He/She should have at least 15 years of experience in demonstrated experience in designing and implementing social assessment programs in large scale urban infrastructure projects involving SWM. The specialist should have working experience on issues on vulnerable communities and gender. Shall have wide experience in handling consultations with multiple stakeholders. His/her major responsibilities shall include but not necessarily be limited to the following: • Reviewing of all relevant data and studies. • Assess social compliance status of emergency works • Propose corrective measures to address the finding • Plan and carry out the field surveys of the nearby communities • Plan and carry out the interviews with workers, contractors and site in-charges • Actively participate in stakeholder engagement activities • Provide the necessary social inputs to ESA report • Assisting the TL • Any other relevant duties

Survey Specialist (4)	Minimum B. Sc. degree in Civil/ Environmental Engineering/Social Science. He/she should have 10 years experience in state-of-the-art Survey Techniques. His/her major responsibilities shall include but not necessarily be limited to the following: • Formulate realistic field data collection plan & schedule; • Lead and supervise the field data collection team with necessary safety measures; • Conduct pollution outfall survey, industry survey and discharge measurements as required; • Field surveys of the nearby communities to collect their feedback • Conduct interviews with the workers, contractors and site in-charges • Maintain close and intensive co-ordination with the field officials of SSWMB, key stakeholders and the local people; • Participate in the survey work to be conducted for field data collection; • Inform the status and progress of the data collection activities regularly to the SSWMB and others concerned; • Responsible for timely completion of data acquisition in accordance with the requirements of the ToR; • Assist in the preparation of ESA Reports • Any other relevant duties

ANNEXURE-3: Terms of Reference for Environmental and Social Impact Assessment

Terms of Reference
Solid Waste Emergency and Efficiency Project (SWEEP)
Environmental and Social Impact Assessment

1.0 Background

The city of Karachi generates an estimated 12,000 to 16,000 metric tons of municipal solid waste every day. Only a fraction of this waste is collected, and none of it is disposed in sanitary engineered facilities. Some of the waste (estimated around 60 percent) is transported to two large unsanitary dumps, Jam Chakro and Gond Pass, located within 30-40 km from the city center. Neither facility meets international standards for waste disposal. The chronic backlog of uncollected waste has decreased the operating capacity of much of the urban infrastructure – i.e. the city's drainage system is clogged by waste, contributing to persistent flooding; movement along several secondary roads is impeded due to litter; water sources are contaminated, and public spaces are unattractive and unsanitary. The environmental and human health implications are severe: open burning of waste generates high levels of persistent and toxic chemicals that contribute to poor air quality and cause cardio-vascular diseases; inadequate solid waste management (SWM) has been identified as an important factor behind continued incidence of polio in Karachi; surface and groundwater pollution by inadequate disposal of waste is well documented, and a factor in the prevalence of water-borne diseases. The Government of Sindh (GoS) is cognizant of problems in the waste sector and has taken several steps to improve the situation in recent years. GoS set up a specialized agency in 2014, the Sindh Solid Waste Management Board (SSWMB), and has increased allocations and expenditure significantly to engage private sector contractors for front-end waste collection.

The government has since been unable to find adequate alternatives to provide collection services, and this has significantly impacted the amount of daily waste that remains uncollected in this district, with roughly 25 percent of the city's population. The COVID-19 emergency led to enforced lockdown and restrictions of operations across the city since early March 2020. This has further impacted the provision of SWM services, as workers involved with collection, transport, and disposal of waste have not been able to operate.

Moreover, a rapid intervention in the SWM sector offers additional opportunities for the government to address the impacts from the ongoing COVID-19 crisis. First, project activities that support urgent maintenance of the nullahs to increase the conveyance capacity of the city's drainage system will require the mobilization of crews who will need to work throughout the monsoon season in the cleaning, removal and adequate disposal of waste.

2.0 The Project

The proposed project will finance interventions that will be implemented over two phases: (a) in the immediate emergency response phase, activities will aim to mitigate (i) high flooding risks linked to the 2020 monsoon and caused by accumulation of solid waste in the city's natural drainage channels (nullahs), as well as (ii) public health risks caused by exposure to poorly managed COVID-19 contaminated waste; and (b) in the medium-to-long-term phase, the Project will improve backbone SWM infrastructure and service delivery to address the underlying risk

factors leading to recurring emergency flooding situations.

Component 1: Immediate Emergency Response Interventions

The Component will support:

g. Cleaning of nullahs and disposal of waste, including: (i) removing waste obstructing the flow of water and restoring the drainage capacity of the nullahs; and (ii) construction of a temporary storage cell for waste and sediments cleared from nullahs at the Jam Chakro dumpsite.
h. Development and implementation of a targeted communication and awareness campaign aimed at communities living around the nullahs.

Component 2: Development of SWM Backbone Infrastructure

Component 2 will support:

i. Provision of urgent collection equipment for under-served districts and improvement of *kachra kundis*, including: (i) provision of critical equipment to improve occupational safety and collection efficiency, such as personal protective equipment for workers, collection trucks, bins, and containers; and (ii) upgrading of up to thirty existing *kachra kundis* and the construction of approximately fifty *kachra kundis*.
j. Construction of a new sanitary disposal cell at Jam Chakro dumpsite, including: (i) design and construction of a new landfill cell; (ii) design and construction of a manual material recovery facility adjacent to the disposal cell; (iii) implementation of measures to improve safety and environmental performance of the dumpsite; (iv) progressive closure and rehabilitation of areas that have reached capacity; and (v) development and implementation of community support plan for waste pickers living at Jam Chakro.
k. Construction and/or upgrading of transfer stations, including the development and implementation of an appropriate operating model for the operation and maintenance of the transfer stations.
l. Development of long-term waste solutions for Karachi, including: (i) planning, design and construction of a new sanitary landfill with associated facilities; (ii) planning, carrying out of feasibility studies, engineering design, development of business and operating models, and provision of advisory services for the preparation of a large ecosystem of waste treatment solutions; (iii) design and construction of solutions to improve treatment of non-municipal waste streams such as medical waste and/or construction and demolition waste, including: assessment of existing systems for collection, transport and disposal of such waste streams; identification of gaps to be addressed through processes, investments and technologies; development of service improvement plans needed to build end-to-end solutions for each stream, as well as policy recommendations on regulation and tariffs for producers; and, identification of priority investments.

Component 3: Project Management and Implementation Support

Component 3 will provide support for implementing agencies to manage, implement, and supervise Project activities and investments and training and skill development in the areas of monitoring and evaluation, communication, audits, social and environmental management, engineering, operations and maintenance, and Project management.

3.0 Background of the Assignment

The Environmental and Social Impact Assessment (ESIA) of the projects is the perquisite for the compliance of World Bank's Environmental and Social Framework (ESF) before its inception to identify and mitigate its environmental and social impacts at designing stage so that mitigation could be part of the project design. It is also the perquisite for the Sindh Environmental Protection Agency (SEPA) to conduct ESIA, submit and acquire 'No Objection Certificate' prior to its construction. There are different tools used for environmental and social assessment of the project activities. ESIA is one of the tools used for the assessment of High Risk projects under ESF. The sanitary landfill at Dhabeji is categorized as High Risk project, requiring ESIA. Similarly the landfill site falls under Schedule II of Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014, requiring EIA.

4.0 Scope of ESIA

The aim of the ESIA is to identify and assess the potential environmental and social impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures. ESIA needs to be conducted in accordance with ESS1. Following is the scope of the ESIA:

- Analyzes the legal and institutional framework for the project, within which the environmental and social assessment is carried out, including the issues set out in ESS1 and (a) the country's applicable policy framework, national laws and regulations, and institutional capabilities (including implementation) relating to environment and social issues; variations in country conditions and project context; country environmental or social studies; national environmental or social action plans; and obligations of the country directly applicable to the project under relevant international treaties and agreements, compares the borrower's existing environmental and social framework and the ESSs and identifies the gaps between them, identifies and assesses the environmental and social requirements of any co-financiers.

- Concisely describes the proposed project and its geographic, environmental, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power supply, water supply, housing, and raw material and product storage facilities), as well as the project's primary suppliers. Through consideration of the details of the project, indicates the need for any plan to meet the requirements of ESS1 through 10, includes a map of sufficient detail, showing the project site and the area that may be affected by the project's direct, indirect, and, cumulative impacts.

- Sets out in detail the baseline data that is relevant to decisions about project location, design, operation, or mitigation measures. This should include a discussion of the accuracy, reliability, and sources of the data as well as information about dates surrounding project identification, planning and implementation. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions. Based on current information, assesses the scope of the area to be studied and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Takes into account current and proposed development activities within the project area but not directly connected to the project.

- Takes into account all relevant environmental and social risks and impacts of the project. This will include the environmental and social risks and impacts specifically identified in ESS2–8, and any other environmental and social risks and impacts arising as a consequence of the specific nature and context of the project, including the risks and impacts identified in ESS1.

  ESIAs of i) design and construction of a new landfill cell, ii) measures to improve safety and environmental performance of the dump site and progressive closure and iii) rehabilitation under Subcomponent 2.2 should include the detailed risk assessment of existing dumpsite contamination, and comprehensive mitigation measures to address the identified risks should be proposed.
- Identifies mitigation measures and significant residual negative impacts that cannot be mitigated, and to the extent possible, assesses the acceptability of those residual negative impacts. Identifies differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable. Assesses the feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of proposed mitigation measures, and their suitability under local conditions; and the institutional, training, and monitoring requirements for the proposed mitigation measures. Specifies issues that do not require further attention, providing the basis for this determination.

- Systematically compares feasible alternatives to the proposed project site, technology, design, and operation—including the "without project" situation—in terms of their potential environmental and social impacts. Assesses the alternatives' feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of alternative mitigation measures, and their suitability under local conditions; and the institutional, training, and monitoring requirements for the alternative mitigation measures. For each of the alternatives, quantifies the environmental and social impacts to the extent possible, and attaches economic values where feasible.

- Sets out the basis for selecting the particular project design proposed and specifies the applicable WBG EHSGs or if the WBG ESHGs are determined to be inapplicable, justifies recommended emission levels and approaches to pollution prevention and abatement that are consistent with GIIP.

- Summarizes key measures and actions and the timeframe required for the project to meet the requirements of the ESSs. This will be used in developing the Environmental and Social Commitment Plan (ESCP).

5.0 Tasks

The consultancy firm will carry out following tasks to accomplish the audit:

- Desk review of project documents i.e. ESMF, F/S, engineering design and other project related documents.
- Desk review for the secondary baseline data, legal requirements, ESF and other relevant literature about the assignment
- Meeting with the project stakeholders including SSWMB, and World Bank staff, to discuss the detail of the proposed landfill site
- Meeting with the design team of the landfill site and discuss various design aspects of the site.

- Field surveys of the sites to collect primary data, for baseline environmental monitoring and for risk assessment of existing dumpsite contamination
- Field surveys of the nearby communities to conduct baseline socioeconomic survey
- Conduct stakeholder consultation in accordance with Stakeholder Engagement Plan and ESS10 including interviews with the various project stakeholders and affected communities
- Compile all the primary and secondary data, assess the potential E&S impacts and develop ESMP, draw the conclusions and drafting ESIA report including findings and the recommendations

6.0 Indicative Outline of the ESIA Report

The indicative outline of the ESIA report is as under:

1.0 Executive Summary
2.0 Legal and Institutional Framework
3.0 Project Description
4.0 Baseline Data
5.0 Environmental and Social Risks and Impacts
6.0 Mitigation Measures and ESMP
7.0 Analysis of Alternatives
8.0 Stakeholder Consultation
9.0 Institutional arrangement
10.0 Grievance Redress Mechanism
11.0 Design Measures
12.0 Key Measures and Actions for the Environmental and Social Commitment Plan (ESCP)
13.0 Appendices
    - *List of the individuals or organizations that prepared or contributed to the environmental and social assessment.*
    - *References—setting out the written materials both published and unpublished, that have been used.*
    - *Record of meetings, consultations, and surveys with stakeholders, including those with affected people and other interested parties. The record specifies the means of such stakeholder engagement that were used to obtain the views of affected people and other interested parties.*
    - *Tables presenting the relevant data referred to or summarized in the main text.*
    - *List of associated reports or plans.*

7.0 Deliverables

- Scoping Report
- Presentation to the stakeholders regarding findings and recommendations of the ESIA report
- Draft and Final ESIA report

8.0 Timeframe

ESIAs of Component-2 should be commenced when the F/S of the sub-project is available and be completed in 4-6 months.

9.0 Qualification and Skills Required

The consultancy firm/s need to demonstrate that the proposed EA and ESIA preparation team has the expertise required to fully appreciate the requirements of all the ESF standards to be addressed in the EA and ESIA, and to complete all required sections of the EA and ESIA report. The team should include necessary specialists from different disciplines as indicated in the table below. The team/s should have complete understanding of the national legislative requirements as well as World Bank' ESF.

Position	**Qualification and Tasks**
Team Leader	The Team Leader should have a M.Sc degree in environment engineering, environmental science, civil engineering and other relevant field and preferably a postgraduate degree in related field. The Team Leader should have at least 20 yrs experience in environmental and social impact assessment and management in solid waste management projects. He/she should have working experience as Team Leader/Deputy Team Leader in minimum 3 similar projects. Team Leader (TL) shall be responsible for overall activities of the consulting team. The TL will also be responsible for but not limited to the following: • Full responsibility for overall activities of the team including all relevant aspects of technical, financial, legal/statutory, environmental/social, etc. • Provide advice and direction to the multi-disciplinary team of the Consultant to perform the duties in an efficient manner to meet the requirement of the employer as per ToR. • Orient the work plan in consultation with Project Director. • Maintaining liaison with the client to achieve the ultimate goal of the assignment • Reviewing of previous relevant studies and data • Taking part in all relevant meetings with stakeholders concerned • Reporting.
Solid Waste Management Specialist	He/She should have a postgraduate degree in Civil Engineering or related field. He/She should have at least 10 years of experience in urban planning, civil engineering, and SWM projects with at least 5 years experience in SWM projects. His/her major responsibilities shall include but not necessarily be limited to the following: • Design and Supervise solid waste assessment survey and prepare report of the key findings. • Assess viability of solid waste management options and prepare report • Actively participate in stakeholder engagement activities Assist the Team Leader in preparation of Final Report

Environmental Specialist	The Environmental Specialist should have at least M.Sc. in Civil/Environmental Engineering/Science with 10 yrs experience in the field of environmental assessment and preparation of environmental management plans for urban services and SWM projects. This key staff shall be responsible for but not limited to: • Reviewing of all relevant data and studies. • Actively participate in stakeholder engagement activities • Assess all environmental aspects relating to the assignment • Assisting the TL Any other relevant duties
Ecologist	The key staff should have an postgraduate degree in Environmental Science / Biology/ Ecology or related field with 10 yrs experience in the field of ecological survey and assessments. This key staff shall be responsible for but not limited to: • Design and supervision of Ecological Survey • Actively participate in stakeholder engagement activities • Evaluate ecological issues related to pollution abatement options • Preparation of reports • Assisting the TL • Any other relevant duties
Social Safeguard Specialist and Community Engagement Specialist	He/She should have a Master's/Doctoral degree in Social Scienc/Sociology or other relevant field. He/She should have at least 15 years of experience in demonstrated experience in designing and implementing social assessment programs in large scale urban infrastructure projects involving SWM. The specialist should have working experience on issues on vulnerable communities and gender. Shall have wide experience in handling consultations with multiple stakeholders. His/her major responsibilities shall include but not necessarily be limited to the following: • Responsible for socio-economic analysis of project affected communities including waste pickers • Assess socio-economic viability of SWM facilities and the Action Plan as a whole. • Design and Supervise socio-economic survey and prepare report on socio-economic implications of activities in the proposed Action Plan. • Lead stakeholder engagement, especially engagement of vulnerable communities including informal settlers and waste pickers.

	Assist the Team Leader in preparation of Final Report containing all the requirements of SSWMB
Survey Specialist (4)	Minimum B. Sc. degree in Civil/ Environmental Engineering/Social Science. He/she should have 10 years experience in state-of-the-art Survey Techniques. His/her major responsibilities shall include but not necessarily be limited to the following: • Formulate realistic field data collection plan & schedule; • Lead and supervise the field data collection team with necessary safety measures; • Conduct pollution outfall survey, industry survey and discharge measurements as required; • Field surveys of the nearby communities to collect their feedback • Conduct interviews with the workers, contractors and site in-charges • Maintain close and intensive co-ordination with the field officials of SSWMB, key stakeholders and the local people; • Participate in the survey work to be conducted for field data collection; • Inform the status and progress of the data collection activities regularly to the SSWMB and others concerned; • Responsible for timely completion of data acquisition in accordance with the requirements of the ToR; • Assist in the preparation of ESIA report • Any other relevant duties
Legal Expert	He/She should have a Masters degree in Law or related field. He/She should have at least 10 years of experience in relevant field. His/her major responsibilities shall include but not necessarily be limited to the following: • Review relevant study reports, plans, strategies, laws, ordinances, regulations and policies. • Assess legality of solid waste management and pollution abatement options from legal perspective. • Identify and recommend necessary regulatory changes to implement Action Plan and prepare report • Actively participate in stakeholder engagement activities • Assist the Team Leader in preparation of Final Report
Urban Planner	Should have Master's degree in Urban and Regional Planning with minimum 8 years experience in urban planning particularly in similar projects.

	His/her major responsibilities shall include but not necessarily be limited to the following : • Review various policy and plans for Karachi city. • Contribute in the development and analysis of various SWM options. • Actively participate in stakeholder engagement activities. • Integrate the development plans and strategies in a unified manner to support the Action Plan preparation.
Institutional Expert	He/She should have a Masters in Economics/Engineering/ Management or related field. He/She should have at least 15 years of experience in relevant field with at least 5 years experience in institutional analysis of urban local government institutions. His/her major responsibilities shall include but not necessarily be limited to the following: • Responsible for Institutional Assessment of key stakeholder agencies. • Identify and recommend necessary institutional changes (including capacity building requirements) to implement Action Plan and prepare report • Actively participate in stakeholder engagement activities • Assist the Team Leader in preparation of Final Report containing all the requirements of SSWMB

ANNEXURE-4: Terms of Reference for Environmental and Social Management Plan

Terms of Reference
Solid Waste Emergency and Efficiency Project (SWEEP)
Environmental and Social Management Plan

1.0 Background

The city of Karachi generates an estimated 12,000 to 16,000 metric tons of municipal solid waste every day. Only a fraction of this waste is collected, and none of it is disposed in sanitary engineered facilities. Some of the waste (estimated around 60 percent) is transported to two large unsanitary dumps, Jam Chakro and Gond Pass, located within 30-40 km from the city center. Neither facility meets international standards for waste disposal. The chronic backlog of uncollected waste has decreased the operating capacity of much of the urban infrastructure – i.e. the city's drainage system is clogged by waste, contributing to persistent flooding; movement along several secondary roads is impeded due to litter; water sources are contaminated, and public spaces are unattractive and unsanitary. The environmental and human health implications are severe: open burning of waste generates high levels of persistent and toxic chemicals that contribute to poor air quality and cause cardio-vascular diseases; inadequate solid waste management (SWM) has been identified as an important factor behind continued incidence of polio in Karachi; surface and groundwater pollution by inadequate disposal of waste is well documented, and a factor in the prevalence of water-borne diseases. The Government of Sindh (GoS) is cognizant of problems in the waste sector and has taken several steps to improve the situation in recent years. GoS set up a specialized agency in 2014, the Sindh Solid Waste Management Board (SSWMB), and has increased allocations and expenditure significantly to engage private sector contractors for front-end waste collection.

The government has since been unable to find adequate alternatives to provide collection services, and this has significantly impacted the amount of daily waste that remains uncollected in this district, with roughly 25 percent of the city's population. The COVID-19 emergency led to enforced lockdown and restrictions of operations across the city since early March 2020. This has further impacted the provision of SWM services, as workers involved with collection, transport, and disposal of waste have not been able to operate.

Moreover, a rapid intervention in the SWM sector offers additional opportunities for the government to address the impacts from the ongoing COVID-19 crisis. First, project activities that support urgent maintenance of the nullahs to increase the conveyance capacity of the city's drainage system will require the mobilization of crews who will need to work throughout the monsoon season in the cleaning, removal and adequate disposal of waste.

2.0 The Project

The proposed project will finance interventions that will be implemented over two phases: (a) in the immediate emergency response phase, activities will aim to mitigate (i) high flooding risks linked to the 2020 monsoon and caused by accumulation of solid waste in the city's natural drainage channels (nullahs), as well as (ii) public health risks caused by exposure to poorly managed COVID-19 contaminated waste; and (b) in the medium-to-long-term phase, the Project will improve backbone SWM infrastructure and service delivery to address the underlying risk

factors leading to recurring emergency flooding situations.

Component 1: Immediate Emergency Response Interventions

The Component will support:

m. Cleaning of nullahs and disposal of waste, including: (i) removing waste obstructing the flow of water and restoring the drainage capacity of the nullahs; and (ii) construction of a temporary storage cell for waste and sediments cleared from nullahs at the Jam Chakro dumpsite.
n. Development and implementation of a targeted communication and awareness campaign aimed at communities living around the nullahs.

Component 2: Development of SWM Backbone Infrastructure

Component 2 will support:

o. Provision of urgent collection equipment for under-served districts and improvement of Kachra Kundis, including: (i) provision of critical equipment to improve occupational safety and collection efficiency, such as personal protective equipment for workers, collection trucks, bins, and containers; and (ii) upgrading of up to thirty existing kachra kundis and the construction of approximately fifty kachra kundis.
p. Construction of a new sanitary disposal cell at Jam Chakro dumpsite, including: (i) design and construction of a new landfill cell; (ii) design and construction of a manual material recovery facility adjacent to the disposal cell; (iii) implementation of measures to improve safety and environmental performance of the dumpsite; (iv) progressive closure and rehabilitation of areas that have reached capacity; and (v) development and implementation of community support plan for waste pickers living at Jam Chakro.
q. Construction and/or upgrading of transfer stations, including the development and implementation of an appropriate operating model for the operation and maintenance of the transfer stations.
r. Development of long-term waste solutions for Karachi, including: (i) planning, design and construction of a new sanitary landfill with associated facilities; (ii) planning, carrying out of feasibility studies, engineering design, development of business and operating models, and provision of advisory services for the preparation of a large ecosystem of waste treatment solutions; (iii) design and construction of solutions to improve treatment of non-municipal waste streams such as medical waste and/or construction and demolition waste, including: assessment of existing systems for collection, transport and disposal of such waste streams; identification of gaps to be addressed through processes, investments and technologies; development of service improvement plans needed to build end-to-end solutions for each stream, as well as policy recommendations on regulation and tariffs for producers; and, identification of priority investments.

Component 3: Project Management and Implementation Support

Component 3 will provide support for implementing agencies to manage, implement, and supervise Project activities and investments and training and skill development in the areas of monitoring and evaluation, communication, audits, social and environmental management, engineering, operations and maintenance, and Project management.

3.0 Background of the Assignment

There are different methods and tools used by the borrower, as per the nature and scale of the project, to carry out the environmental and social assessment and to document the results of such assessment, including the mitigation measures to be implemented. The Environmental and Social Management Plan (ESMP) is one of the methods and tools for the assessment and management of environmental and social impacts and ensure compliance of World Bank's Environmental and Social Framework (ESF) during project implementation.

4.0 Scope of ESMP

The aim of the ESMP is to provide detail of the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental and social impacts, or to reduce them to acceptable levels; and the actions needed to implement these measures. Following is the scope of the ESMP:

- An ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation of a project to eliminate adverse environmental and social risks and impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the measures and actions needed to implement these measures. The borrower will (a) identify the set of responses to potentially adverse impacts; (b) determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.

- The ESMP identifies measures and actions in accordance with the mitigation hierarchy that reduce potentially adverse environmental and social impacts to acceptable levels. The plan will include compensatory measures, if applicable. Specifically, the ESMP: (i) identifies and summarizes all anticipated adverse environmental and social impacts (including those involving indigenous people or involuntary resettlement); (ii) describes—with technical details—each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; estimates any potential environmental and social impacts of these measures; and (iv) takes into account, and is consistent with, other mitigation plans required for the project (e.g., for involuntary resettlement, indigenous peoples, or cultural heritage).

- The ESMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the environmental and social assessment and the mitigation measures described in the ESMP. Specifically, the monitoring section of the ESMP provides (a) a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

- ESMPs of i) design and construction of a new landfill cell, ii) measures to improve safety and environmental performance of the dump site and progressive closure and iii) rehabilitation under Subcomponent 2.2 should include the detailed risk assessment of existing dumpsite contamination, and comprehensive mitigation measures to address the identified risks should be proposed.

- To support timely and effective implementation of environmental and social project components and mitigation measures, the ESMP draws on the environmental and social assessment of the existence, role, and capability of responsible parties on site or at the agency and ministry level. Specifically, the ESMP provides a specific description of institutional arrangements, identifying which party is responsible for carrying out the mitigation and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training). To strengthen environmental and social management capability in the agencies responsible for implementation, the ESMP recommends the establishment or expansion of the parties responsible, the training of staff and any additional measures that may be necessary to support implementation of mitigation measures and any other recommendations of the environmental and social assessment.

- For all three aspects (mitigation, monitoring, and capacity development), the ESMP provides (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the ESMP. These figures are also integrated into the total project cost tables.

- The borrower's decision to proceed with a project, and the Bank's decision to support it, are predicated in part on the expectation that the ESMP (either stand alone or as incorporated into the ESCP) will be executed effectively. Consequently, each of the measures and actions to be implemented will be clearly specified, including the individual mitigation and monitoring measures and actions and the institutional responsibilities relating to each, and the costs of so doing will be integrated into the project's overall planning, design, budget, and implementation.

5.0 Tasks

The consultancy firm will carry out following tasks to accomplish the audit:

- Desk review of project documents i.e. ESMF
- Desk review for the secondary baseline data, legal requirements, ESF and other relevant literature about the assignment
- Meeting with the project stakeholders including SSWMB, and World Bank staff, to discuss the detail of the proposed project
- Meeting with the design team of the project and discuss various design aspects of the project.
- Field surveys of the sites to collect primary data, and baseline environmental monitoring
- Field surveys of the nearby communities to conduct baseline socioeconomic survey
- Conduct stakeholder consultation in accordance with Stakeholder Engagement Plan including interviews with the various project stakeholders and affected communities
- Compile all the primary and secondary data, assess the potential E&S impacts, draw the conclusions and drafting ESMP including findings and the recommendations

6.0 Indicative Outline of the ESMP Report

The indicative outline of the ESIA report is as under:

Executive Summary
1.0 Introduction

2.0 Project Description
3.0 Regulatory and Policy Framework
4.0 Environmental Baseline of Project Area
5.0 Socioeconomic Profile of the Project Area
6.0 Stakeholder Consultation and Information Disclosure
7.0 Anticipated Project Impacts and Mitigation Measures
8.0 Environmental and Social Management and Monitoring Plan
9.0 Institutional Arrangement
10.0 Grievance Redress Mechanism
11.0 ESMP Implementation Budget
Annexes

7.0 Deliverables

- Presentation to the stakeholders regarding findings and recommendations of the ESMP
- Draft and Final ESMP reports

8.0 Timeframe

The assignment will be started in the first week of March 2021. This assignment will be required to be completed within two months till May 7, 2021. The contract will be signed with the consultancy firm in the last week of February 2021.

9.0 Qualification and Skills Required

The consultancy firm needs to demonstrate that the proposed ESMP preparation team has the expertise required to fully appreciate the requirements of all the ESF standards to be addressed in the ESMP, and to complete all required sections of the ESMP report. The team should include necessary specialists from different disciplines as indicated in the table below. The team should have complete understanding of the national legislative requirements as well as World Bank' ESF.

Position	Qualification and Tasks
Team Leader	The Team Leader should have a M.Sc degree in environment engineering, environmental science, civil engineering and other relevant field and preferably a postgraduate degree in related field. The Team Leader should have at least 20 yrs experience in environmental and social impact assessment and management in solid waste management projects. He/she should have working experience as Team Leader/Deputy Team Leader in minimum 3 similar projects. Team Leader (TL) shall be responsible for overall activities of the consulting team. The TL will also be responsible for but not limited to the following: • Full responsibility for overall activities of the team including all relevant aspects of technical, financial, legal/statutory, environmental/social, etc. • Provide advice and direction to the multi-disciplinary team of the Consultant to perform the duties in an efficient manner to meet the requirement of the employer as per ToR. • Orient the work plan in consultation with Project Director. • Maintaining liaison with the client to achieve the ultimate goal of the assignment • Reviewing of previous relevant studies and data • Taking part in all relevant meetings with stakeholders concerned • Reporting.
Solid Waste Management Specialist	He/She should have a postgraduate degree in Civil Engineering or related field. He/She should have at least 10 years of experience in urban planning, civil engineering, and SWM projects with at least 5 years experience in SWM projects. His/her major responsibilities shall include but not necessarily be limited to the following: • Design and Supervise solid waste assessment survey and prepare report of the key findings. • Assess viability of solid waste management options and prepare report • Actively participate in stakeholder engagement activities Assist the Team Leader in preparation of Final Report
Environmental Specialist	The Environmental Specialist should have at least M.Sc. in Civil/Environmental Engineering/Science with 10 yrs experience in the field of environmental assessment and preparation of environmental management plans for urban services and SWM projects. This key staff shall be responsible for but not limited to: • Reviewing of all relevant data and studies.

	• Actively participate in stakeholder engagement activities • Assess all environmental aspects relating to the assignment • Assisting the TL Any other relevant duties
Ecologist	The key staff should have an postgraduate degree in Environmental Science / Biology/ Ecology or related field with 10 yrs experience in the field of ecological survey and assessments. This key staff shall be responsible for but not limited to: • Design and supervision of Ecological Survey • Actively participate in stakeholder engagement activities • Evaluate ecological issues related to pollution abatement options • Preparation of reports • Assisting the TL • Any other relevant duties
Social Safeguard Specialist and Community Engagement Specialist	He/She should have a Master's/Doctoral degree in Social Scienc/Sociology or other relevant field. He/She should have at least 15 years of experience in demonstrated experience in designing and implementing social assessment programs in large scale urban infrastructure projects involving SWM. The specialist should have working experience on issues on vulnerable communities and gender. Shall have wide experience in handling consultations with multiple stakeholders. His/her major responsibilities shall include but not necessarily be limited to the following: • Responsible for socio-economic analysis of project affected communities including waste pickers • Assess socio-economic viability of SWM facilities and the Action Plan as a whole. • Design and Supervise socio-economic survey and prepare report on socio-economic implications of activities in the proposed Action Plan. • Lead stakeholder engagement, especially engagement of vulnerable communities including informal settlers and waste pickers. Assist the Team Leader in preparation of Final Report containing all the requirements of SSWMB
Survey Specialist (4)	Minimum B. Sc. degree in Civil/ Environmental Engineering/Social Science. He/she should have 10 years experience in state-of-the-art Survey Techniques. His/her major responsibilities shall include but not necessarily be limited to the following:

	• Formulate realistic field data collection plan & schedule; • Lead and supervise the field data collection team with necessary safety measures; • Conduct pollution outfall survey, industry survey and discharge measurements as required; • Field surveys of the nearby communities to collect their feedback • Conduct interviews with the workers, contractors and site in-charges • Maintain close and intensive co-ordination with the field officials of SSWMB, key stakeholders and the local people; • Participate in the survey work to be conducted for field data collection; • Inform the status and progress of the data collection activities regularly to the SSWMB and others concerned; • Responsible for timely completion of data acquisition in accordance with the requirements of the ToR; • Assist in the preparation of ESMP report • Any other relevant duties
Legal Expert	He/She should have a Masters degree in Law or related field. He/She should have at least 10 years of experience in relevant field. His/her major responsibilities shall include but not necessarily be limited to the following: • Review relevant study reports, plans, strategies, laws, ordinances, regulations and policies. • Assess legality of solid waste management and pollution abatement options from legal perspective. • Identify and recommend necessary regulatory changes to implement Action Plan and prepare report • Actively participate in stakeholder engagement activities • Assist the Team Leader in preparation of Final Report
Urban Planner	Should have Master's degree in Urban and Regional Planning with minimum 8 years experience in urban planning particularly in similar projects. His/her major responsibilities shall include but not necessarily be limited to the following : • Review various policy and plans for Karachi city. • Contribute in the development and analysis of various SWM options. • Actively participate in stakeholder engagement activities. • Integrate the development plans and strategies in a unified manner to support the Action Plan preparation.
Institutional Expert	He/She should have a Masters in Economics/Engineering/ Management or related field. He/She should have at least 15 years of experience in

	relevant field with at least 5 years experience in institutional analysis of urban local government institutions. His/her major responsibilities shall include but not necessarily be limited to the following: • Responsible for Institutional Assessment of key stakeholder agencies. • Identify and recommend necessary institutional changes (including capacity building requirements) to implement Action Plan and prepare report • Actively participate in stakeholder engagement activities • Assist the Team Leader in preparation of Final Report containing all the requirements of SSWMB

ANNEXTURE 5: LIST OF INVITEES FOR STAKEHOLDER CONSULTATION

1. Local Councils in Karachi – Karachi Metropolitan Corporation and six District Municipal Corporations
2. Urban Resource Centre (URC)
3. UNESCAP – Subregional Office for South and South-West Asia
4. UN Habitat, Pakistan
5. Federation of Pakistan Chambers of Commerce and Industry (FPCCI), Standing Committee on Environment
6. Korangi Association of Trade and Industry (KATI)
7. SHEHRI – Citizens for a Better Environment
8. The Pakistan Institute of Labour Education and Research (PILER)
9. Gul Bahao – Karachi based organization:
10. Aurat Foundation
11. Zofeen T. Ebrahim, Journalist
12. Dr Noman Ahmed, NED University of Engineering and Technology, Department of Architecture and Planning
13. Mr. Mansoor Raza, NED University of Engineering and Technology, Department of Development Studies
14. Dr. Saeeduddin, NED University of Engineering and Technology, Department of Development Studies: saeed.ned@neduet.edu.pk
15. NED University, Environment Department
16. Karachi University, Environment Department