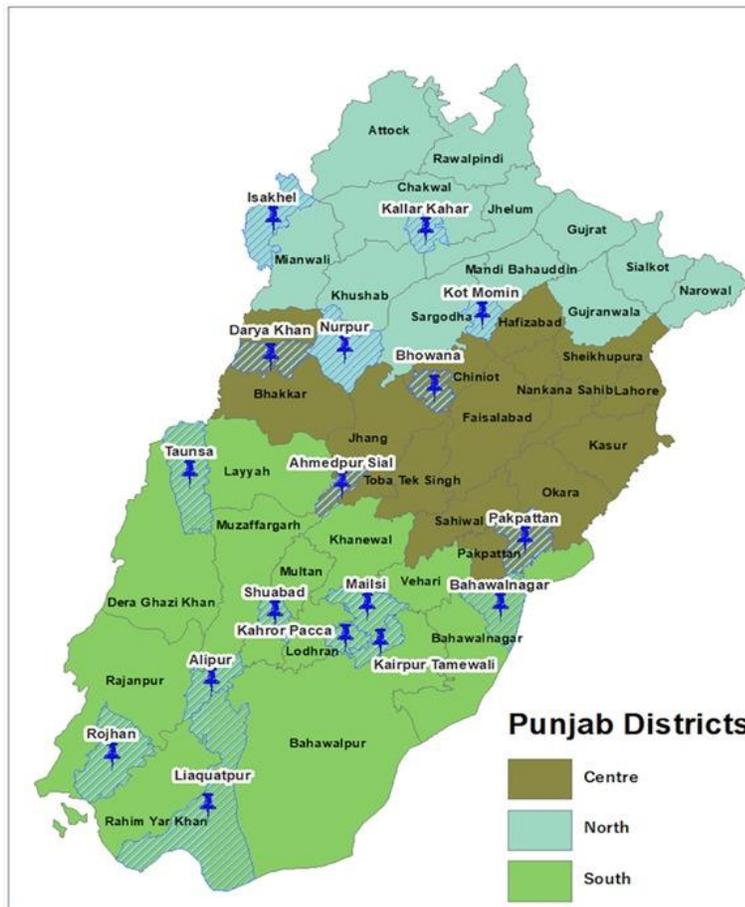




PUNJAB RURAL MUNICIPAL SERVICES COMPANY



ENVIRONMENT & SOCIAL MANAGEMENT PLAN (ESMP)



PUNJAB RURAL SUSTAINABLE WATER SUPPLY AND SANITATION PROJECT (PRSWSSP)





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LIST OF ABBREVIATION

ABR	Anaerobic Baffled Reactor
Aol	Area of influence
BDL	Below detection limit
BHU	Basic Health Unit
BMPs	Best Management Practices
BOD	Biochemical Oxygen Demand
BOQs	Bills of Quantities
BPs	Bank Procedures
CBD	Convention on the Biological Diversity
CBO	Community Based Organization
CC	Construction Contractor
CFT	Cubic foot
CO	Carbon Mono Oxide
COD	Chemical Oxygen Demand
DC	Design Consultant
DC	Design Consultant
DG	Directorate General
EA	Environmental Assessment
ECO	Economic Cooperation Organization
ECO	Economic Cooperation Organization
EDCS	Engineering, Design & Supervision Consultancy Services
EE	Environmental Engineer
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
ENE	East-Northeast
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
ERPs	Emergency Response Procedures
ESC	Environmental and Social Cell
ESMF	Environmental Social & Management Framework
ESMP	Environment and Social Management Plan
ESS	Environmental & Social Safeguard
GAP	Gender Action Plan
GBV	Gender Based Violence
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GPD	Gallons per Day
GRC	Grievance Redressal Committee
GRM	Grievance Redress Mechanisms
HDPE	High Density Polyethylene
HHs	Households



HSE	Health, Safety & Environment
IEE	Initial Environmental Examination
LG	Local Government
LPG	Liquefied Petroleum Gas
MGD	Million Gallon per Day
MS	Medical Superintendent
MSDS	Material Safety Data Sheets
NCS	National Conservation Strategy
NE	North East
NESPAK	National Engineering Services Pakistan
NGOs	Non-Governmental Organizations
NNE	North-Northeast
NNW	North-Northwest
NO	Nitrogen Oxide
NO ₂	Nitrogen Di Oxide
NOC	No Objection Certificate
NTU	Nephelometric Turbidity Unit
NW	North west
O&M	Operational and Maintenance
O ₃	Ozone
OHS	Occupational Health & Safety
OHWT	Overhead water Tank
OIC	Organization of the Islamic Conference
OP	Operational Policy
PATs	Pakistan Approaches to Total Sanitation
PCC	Public Complaints Center
PD	Project Director
PDWP	Provincial Development working party
PEPA	Punjab Environmental Protection Agency
PEQS	Punjab Environmental Quality Standards
PGA	Peak Ground Acceleration
PGA	Peak Ground Acceleration
PICs	Public Information Centers
PIMU	Project Implementation and monitoring unit
PIU	Programme implementation unit
PKR	Pakistan Rupees
PLGA	Punjab Local Government (Amendment)
PM	Particulate Matter
PPE	Personal Protective Equipment
PRMSC	Punjab Rural Municipal Services Company
PRSWSSP	Punjab Rural Sustainable Water Supply and Sanitation Project
PWA	Punjab Water Act
RCC	Reinforced Cement Concrete
ROW	Right of Way
SAARC	South Asian Association for Regional Cooperation
SBC	Seismic Building Code
SC	Supervision Consultant



SDS	Social Development Specialist
SDU	Service Delivery Unit
SEA	Sexual Exploitation and abuse
SH	Sexual Harassment
SO ₂	Sulfur Di Oxide
SOP	Standard Operating Procedures
SPM	Suspended particulate Matter
STDs	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TC	Total Coliforms
TCU	True Color Unit
TDS	Total Dissolve Solids
THQ	Tehsil Head quarter
TOR	Terms of Reference
TPV	Third Party Verification
TSS	Total Suspended Solid
UNCCD	United Nation Convention to Combat Desertification
UNESCO	United Nation Educational Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNO	United Nations Organization
WASH	Water, Sanitation and Hygiene
WB	World Bank
WBG	World Bank Guideline
WHO	World Health Organization
WNW	West-Northwest
WWTP	Wastewater Treatment Plant



Executive Summary

1. Introduction

The Local Government & Community Development Department (LG&CDD), Government of Punjab, through its Punjab Rural Municipal Services Company (PRMSC), a company registered under section 42 of “The Companies Act 2017”, is implementing Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP) in target area of 2000 villages in 16 tehsils of Punjab province; with the financial assistance of the World Bank. The current document is the consolidated “Environmental and Social Management Plan (ESMP)” prepared in line with World Bank Safeguard Policies; and as per guidance provided in the project’s Environmental Social & Management Framework (ESMF)”.

2. Background

The project development objective of PRSWSSP to provide equitable and sustainable access to safely managed water and sanitation and reduce child stunting¹. This will be achieved by improving sanitation conditions, providing clean drinking water, improving living conditions through solid waste management, behavior change, and capacity building activities in rural settlements of Punjab province.

To implement this project Punjab Rural Municipal Services Company (PRMSC) has divided the 16 tehsils into 6 clusters depending on geographical location and PRMSC has hired the services of 6 Engineering Design and Supervisory Consultants (EDCS), one for each cluster. The consultancy project is titled as “Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS)”. Consultancy Services (EDCS) under the pilot phase project in the revenue villages of Geographical based Cluster named “Central-I” of selected districts. The services will assist in; (i) design documentation, including Sub-scheme/Project Document (PC-I), Bill of Quantities, for water supply and sanitation services to achieve economies of scale and desired results, and (ii) resident supervision of infrastructure development.

In Consultation with PRMSC, the consultants have prioritized 26 villages of 8 relevant tehsils for the provision of Water Sanitation and Hygiene (WASH) facilities during first phase of the pilot villages. EDCS consultants are working on feasibility and engineering designs of the remaining villages of the pilot phase.

This Environmental and Social Management Plan (ESMP) covers various impacts of the design, construction, and operation of water supply, sewerage, and solid waste management facilities. The anticipated environmental and social impacts of the selected 26 are mostly localized, site-specific and temporary; few (if any) of them are irreversible and could be easily mitigated through appropriate measures. According to the findings of the Environmental and Social Screening study, this project falls in Category E2 and requires an ESMP.

3. Policy, Legal and Administrative Framework

The national and provincial Government has promulgated laws/acts, regulations, and standards for the protection, conservation, rehabilitation, and improvement of the

¹ PAD (PRSWSSP)



environment. The Punjab Environmental Protection Agency (PEPA) is the regulatory authority, which has provided guidelines for conducting Environmental Impact Assessment (EIA) studies and has the authority to issue regulatory clearance/ No Objection Certificates (NOCs) for various projects.

In addition to the laws of the land (Punjab Environmental Protection Act 1997, Review of IEE/EIA Act 2000), World Bank Operational Policies (OPs) are also applicable to the project including Environmental Assessment (OP 4.01), Natural Habitat (OP 4.04), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP 4.12), Gender policy (OP 4.20), and Access to information (BP 17.50).

4. Project Description

The villages selected for provision of Water Sanitation and Hygiene (WASH) facilities. The subproject involves provision of water supply, sewerage, overhead tanks & Pumping stations with sewage treatment.

The villages in the project area are facing grave issues related to water supply and sewerage.

The project is scheduled to be completed in 10 months. The estimated total cost for construction of proposed project is **3562.56** million PKR. This cost is tentative and will be finalized with the detailed technical design of the proposed project. Total man power required on site for proposed Project will be approximately 20-30 workers per day per village.

5. Baseline Profile

As per the environmental screening study conducted earlier, the project falls in “Category E2” which means that the impacts of the project activities are limited and within the boundary of project area. Therefore, the whole village has been considered Area of Influence (Aoi).

A. Physical Environment

The proposed project sites are rural settlements comprising residential and agriculture areas. The topography of the project area is predominantly flat except for Kallar Kahar that is hilly region. The ground elevations vary from 350 to 610 ft in flat areas where as 1920 – 2368 ft in Kallar kahar.

Punjab’s area mostly consists of an alluvial plain formed by the southward-flowing Indus River and its four major tributaries in Pakistan, the Jhelum, Chenab, Ravi, and Sutlej rivers. The general slope of the land is from northeast to southwest, but it rises in the areas between rivers. Approximately 70 percent land area of the province comprises flood plains of Indus basin. Geologically, lands in the flood plains are lightly mantled with alluvial deposits transported from the Himalaya foothills. The underlying bedrock is composed of Precambrian metamorphic and tertiary consolidated rocks. The overlying alluvium consists of Pleistocene to recent unconsolidated deposits of sand, clay and silt.

The project area has extreme climate. It has hot summer and cold winters. The summer starts from May and lasts till September. June is the hottest month. The mean maximum temperature varies from 37 – 46 °C for month of June in relevant tehsils. The winter seasons lasts from



November to February. January is the coldest month. The mean minimum temperature varies from 3 °C and 7 °C in January in relevant tehsils. Maximum precipitation days are observed during June. The dominant wind speed throughout the year is ranges between 10 -16 km/hr.

Groundwater investigation study reveals that the groundwater is abundantly available in the project area at depth of 30 to 60 ft, except for the villages of Liatpur and Kallar Kahar. Liatpur is water logged. Whereas Kallar kahar is hilly area and groundwater lies at the depth of more than 300 feet and still source is not promising.

The Project Area is located in Seismic Zone 2A except for Kallar Kahar that is located in Seismic Zone 2B. The Zone 2A has Peak Ground Acceleration (PGA) in the range of 0.08 g to 0.16 g and Zone 2b has PGA in range of 0.16 g to 0.24g.

B. Biological Environment

Project areas are rich in biodiversity because of its diverse landscape and geographical location. The variety of ecosystem is evident and is home to various species. The following section describes the biological environment of the project area.

Common animals found in the project area include dogs, cats, house rats and bats. Domestic livestock observed during field visits include buffaloes, cattle, goats, sheep, and donkeys that are used by the local residents for their livelihood.

Major crops ripen and cultivated are Wheat, Fodder, Rice, Sugarcane, Cotton, Maize and Barseen.

The major floral species found in the project area include Jand trees, Karir, Beri, Van, Kikar, Shisham, Aak and Kikar.

There are no endangered species of either flora or fauna in the project tehsils. Neither any wetlands nor any wildlife is present in and around the project area.

C. Social Environment

Socioeconomic baseline was established using primary and secondary data. Detailed site visits were conducted by Social Experts of consultants to appraise the prevailing socioeconomic conditions and to assess the socioeconomic impacts of the proposed project. During the field surveys, interviews and consultation meetings were held with the local representatives i.e., Numberdars, residents (Males & Females), shopkeepers, land owners, agriculturists, and their laborers, etc., in 26 priority villages.

Primary data was collected through a socioeconomic survey with the help of a structured and un-structured questionnaire. Random sample was conducted in all twenty-six (26) priority villages of eight (08) tehsils of Center, North and South. Secondary data was collected from the Pakistan Bureau of Statistics (Census 2017), established literature, and research.



6. Public Consultation and Information Disclosure

Engagement with stakeholders and disclosure is an integral part of the project's environmental and social assessment. The methods used for public consultation with project stakeholders in order to ascertain their stakes regarding project implementation were general/public meetings, rapid participatory appraisal, and on-site meetings.

Different categories of interested parties including project staff, government officials, and local communities were consulted to predict the nature and scale of risks, challenges, and impacts of the project perceived by them. Concerns raised by the locals are as followed. In **Table ES1**.

Table ES1: Concerns raised by locals and their response

Sr. No	Concerns Raised	Locations	Response
1	There is no public water supply and people rely on the conventional methods of water collection i.e. Boreholes etc.	All 26 villages	The objective of the proposed project is to provide clean drinking water to all the residents of the community at their doorsteps through a piped network.
2	There is no sewerage system and the sewage is being disposed of in open lands which create nuisance.	All 26 villages	The sewage will be connected through a piped network and will be disposed of after adequate treatment through a wastewater treatment plant.
3	There is no collection of solid waste and the waste is dumped directly in the open plots and streets which create nuisance	All 26 villages	A comprehensive solid waste collection system will be developed and waste containers shall be placed at appropriate locations in the villages. PRMSC will collect the solid waste through bins and will transport it to the designated disposal site.
4	The residents of the village are ready to pay the bills for the water supply services. But they have some concerns regarding the billing procedure. They want to know does billing based on household consumption, household size or lump sum amount has to be paid.	Kallar Kahar Kot Momin Pakpattan	Water meters are already in the plan as part of the project and will be provided soon to the community. The water meter will be installed at the household level whereas bulk water metering is installed on each network.
5	The construction activities will cause inconvenience to local residents due to hindrance in routine activities	All 26 villages	The contractor will ensure that construction work do not create disturbance for local people's access to the local route and their routine life activities.
6	Noise and dust will be generated from construction activities and may cause health issues.	All 26 villages	Regular sprinkling of water will be carried out to control the dust emissions at the construction



Sr. No	Concerns Raised	Locations	Response
			site, whereas construction activities will be avoided during night time.
7	Recreation facilities such as parks and playgrounds should be provided.	Kahrur Pakka Liaquatpur Bhawana	Provision of recreation facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
8	Solid waste produced during construction time is a major concern, should not be piled up in the project area;	Kallar Kahar Kot momin	The construction and other waste generated at the site shall be collected, stored and transported to the final disposal site by the contractor on daily basis.
9	The water is not drinkable and there are several waterborne diseases in the project area	All 26 villages	Waterborne diseases shall be reduced and there will be an improvement in public health with the provision of clean and healthy drinking water.
10	GST or OHR should be constructed as a part of this project.	Kot Momin, Kalar Kahar	An OHR will be constructed as a part of this sub-project.
11	Will there be tree cutting?	All 26 villages	Efforts will be made to protect as much trees / plants as possible. Where avoidance will not be possible, the trees will be offset to nearby locations.
12	Will employment opportunities be generated for locals during the construction phase?	All 26 villages	maximum workforce will be employed from the sub-project area.
13	How the land will be acquired? Will there be any compensation for the land.	All 26 villages	Primarily, the state land will be used for project interventions such as Sewerage Treatment Plant (STP), overhead reservoirs and water treatment systems. However, in case of unavailability of state land, private land through voluntary land donations – as an exception – will be obtained from the land holders having considerable landholdings. Moreover, if there are informal users/occupiers on the state land, they will be assisted to relocate and provided with livelihood assistance as required in (OP 4.12 requirements on non-title land owners/users) for their loss (structures and income).
14	People of nearby village asked, if the water supply and sewerage	Kallar Kahar	Other villages of the vicinity will be included in the next phase of the project.



Sr. No	Concerns Raised	Locations	Response
	network will be provided to other villages in the vicinity.		

7. Anticipated Environmental Impacts and Mitigation Measures

The construction activities would cause changes in topography, soil contamination, surface & groundwater pollution, air pollution, noise & vibration, solid waste generation, disturbance to flora and fauna, overburdening of resources, construction camps issues, health & safety issues, emergency situations, traffic disruption and social issues.

Anticipated impacts during operational stage will include water pollution, air pollution, soil contamination, ecological disturbance, solid waste generation, occupational health & safety issues and emergency situations.

The positive impacts of the project include, improved water supply system, improved sewerage system, improvement in public health, hygiene and sanitation, landscape, economic development, employment generation, development of deprived villages, formation of model villages, synergetic development with cooperation of NGOs, CBOs and other organizations.

8. Environmental and Social Management and Monitoring Plan

Recommended mitigation measures to control potential adverse impacts are described in this Environmental and Social and Management Plan (ESMP). ESMP shall become the part of construction contract agreement and shall be strictly enforced during the implementation of the proposed project.

The proponent PIMU-PRM&SC will be responsible for compliance of with environmental and social safeguard requirements of the proposed project.

The proposed project activities will be monitored and managed by the PIMU-PRM&SC. The Environmental and Social Cell (ESC) staffed by qualified environmental and social specialists has already been established under PRSWSSP. The ESC will be the custodian of the ESMP. ESC will support ensuring the compliance of ESMP. ESC will submit progress reports for the implementation of the ESMP to WB and PEPA as per environmental approval/ NOC conditions for the PRSWSSP.

9. Grievance Redress Mechanism (GRM)

The Grievance Redressal Mechanism (GRM) will be consistent with the requirements of the World Bank safeguard policies to ensure the mitigation of community concerns, risk management, and maximization of environmental and social benefits. The overall objective of the GRM is therefore to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the village level.

The PIMU at the Local Government & Community Development Department (LG&CDD) level will serve as the Secretariat for the Grievance Redressal Committee (GRC Directorate) that



will be responsible for providing oversight on the entire GRM process at a strategic level and monitoring complaints management.

The complaints may be lodged through:

- Tracking complainant(s) from subprojects sites (field and community level) to PIMU;
- Dedicated staff to update the database routinely;
- Promote transparency, publicize how complaints are being handled, and periodically evaluate the overall functioning of the mechanism;
- Processes for informing stakeholders about the status of a case; and
- Procedures to retrieve data for reporting purposes, including the periodic reports, from Village and Tehsil and document them into the monthly progress reports at PIMU.

GR (Village level) will be responsible to receive, log, and resolve complaints at the village level. The Grievance Redress Committee at the village Panchayats will review and identify actions to be taken to address the complaints at its weekly meeting. If not resolved timely then complaint would be referred to GRC-Tehsil Level (SDU-TO) within 3 days after receiving.

GRC-SDU-TO will try to resolve the complaints in a satisfactory manner anyhow, if not satisfactorily resolved by the village panchayats/councils and Tehsil level, then the grievance will be referred for consideration by GRC at the PIMU/LG&CDD level within one week.

Every effort will be made to address or resolve grievances within the following fixed timelines, which will be an indicator of the performance of the handling system. Acknowledgment of a written submission will be issued to the complainant within three working days.

If the complainant is not satisfied, the complaint will have the option to seek redress through the court of law.

10. Environmental Budget

The total estimated cost for the implementation of ESMP is worked out to be about **PKR 88.642 million**.



INTRODUCTION

1.1 General

The Local Government & Community Development Department (LG&CDD), Government of Punjab, through its Punjab Rural Municipal Services Company (PRMSC), a company registered under section 42 of “The Companies Act 2017”, is implementing Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP) in 2000 villages in 16 tehsils of Punjab with the proposed assistance of the World Bank. To implement this project, Executive Committee of National Economic Council (ECNEC) has authorized Punjab Rural Municipal Services Company (PRMSC) to initially implement this project in 200 villages as pilot phase (Annex-1) to understand feasibility and sustainability of the Project. For the purpose, PRMSC has divided the 16 tehsils into 6 clusters based on geographical location and hired the services of 6 Engineering Design and Supervisory Consultants (EDCS) for the proposed project titled “Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS). Moreover, to fast track the implementation of the project EDCS consultants were directed to prioritize villages in each cluster herein referred as “priority villages”. The feasibility and engineering design of other villages will be done as per the schedule defined in the terms of reference of the EDCS consultants. Table 1 indicates number of pilot villages and priority villages in selected tehsils:

Table 1 : Project Area Details

Cluster	Name of Consultant	Tehsil	Pilot Villages	Priority Villages
South-I	Asian Consulting Engineers	Bahawalnagar	22	2
		Khairpur Tamewali	12	2
South-II	JERS Consultancy Pvt. Ltd.	Alipur	10	-
		Karor Pacca	11	5
		Shuja Abad	12	-
South-III	NESPAK	Liaquatpur	19	6
		Rojhan	8	-
		Taunsa	13	-
Central-I	NESPAK	Ahmad Pur Sial	10	-
		Bhawana	13	5
		Darya Khan	9	-
Central-II	Osmani & Company Pvt. Ltd.	Pakpattan	24	3
North	Techno Consult International	Isa Khel	10	-
		Kalar Kahar	8	2
		Kot Momin	10	1
		Noorpur Thal	9	-
		Total	200	26

It should be noted that the term *priority village* only denotes that the project schemes have been designed for the particular village ahead of other villages. However, it should not be construed that such villages will be given preference over others in any way. As such, all the 200 identified villages for the project will have equal level of project support at the end.



The goal of PRSWSSP is to improve sanitation conditions, provide clean drinking water, improve living conditions through solid waste management, behavior change, and capacity building for the sustainability of the project in rural settlements of Punjab.

This Environmental and Social Management Plan (ESMP) has been prepared for the 26 priority villages of the proposed project in line with World Bank Operational Policies (OPs) and Environmental Social & Management Framework (ESMF) for PRSWSSP. The current study covers various impacts of the design, construction, and operation of water supply, sewerage, and solid waste management facilities.

1.2 Project Background

Punjab is the most populous province of Pakistan with 110 million inhabitants out of which 70 million population resides in rural areas². Despite being the largest province with reference to population, the people living in rural areas of Punjab have been deprived of improved water and sanitation facilities for so long which contribute to child stunting, malnutrition and water borne diseases.

Poverty and Shared Prosperity Report, 2020³ reveals that 4 out of 5 people live below the international poverty line in rural areas. Studies conducted in different periods of time have linked improved water and sanitation facilities with the alleviation of poverty and urged governments to provide high-quality water and sanitation facilities in order to uplift the people from the marshes of poverty and devastating socio-economic conditions.

Despite making significant efforts by the people at the helm of the affairs in Pakistan to improve the prevailing situation, 44% population of Punjab still does not have access to improved water and sanitation facilities as per globally established standards. Reports show that 3 in 5 households in Punjab use E-Coli contaminated water and every 25th household in Punjab lacks access to the improved sources of drinking water. Similarly, the situation of sanitation is also immensely deplorable.

Through various studies, it has been proven that poor condition of Water, Sanitation and Hygiene (WASH) not only affects the health of masses, but it also adversely affects the economic growth of the region. Recently, a number of mega initiatives have been launched by the Government, and international organizations in the urban areas of all provinces of Pakistan for the improvement of water and sanitation but the rural areas still remain neglected. Rural settlements of Punjab, which hold 73% of the province's population living in 23,000 revenue villages, are in dire need of investments to improve WASH.

Outcomes of various studies and sector assessments have identified requirements for improving climate resilience and planned economic growth of 2,000 villages that will be part of the project. Poverty, water contamination, stunting, and sanitation condition of the areas have been taken as basic parameters for the selection of project sites/tehsils.

² https://pwd.punjab.gov.pk/population_profile

³ <https://www.worldbank.org/en/publication/poverty-and-shared-prosperity-2020>



The Government of Punjab, with the assistance of the World Bank, will finance complete detailed engineering designs through Engineering, Design & Supervision Consultancy Services (EDCS) under the pilot phase project in the revenue villages of six (06) Geographical based Clusters of selected districts. The services will assist in; (i) design documentation, including Sub-scheme/Project Document (PC-I), Bill of Quantities, for water supply and sanitation services to achieve economies of scale and desired results, and (ii) resident supervision of infrastructure development.

The PRMSc has adopted the approach of prioritizing the design for few villages, to fast track the implementation of the project in each cluster. Names of the priority villages are listed in **table 2**.

Table 2: Location and Name of Priority Villages in Different Tehsils

Cluster	District	Tehsils	Priority Villages
Center-I	Pakpattan	Pakpattan	Arifabad
			Dhaku Chishti
			Sochan
Center-II	Chiniot	Bhawana	Chak 190
			Chak 192
			Chak 199
			Chak 221
			Chak 226
North	Chakwal	Kallar kahar	Makhyal
	Sargodha	Kot Momin	Gahi
			Naseerpur Khurd
South-I	Bahawalnagar	Bahawalnagar	Chak M Zaman
	Bhawalpur	Khairpur Tamewali	Chak Sadiq Nagar
			Sheikh Wahan
			ISA
South-II	Lodhran	Kahrer Pakka	Choki Rangu Khan
			Chowki Soba Khan
			Dhora Mahar
			Gulhar
			Muhammad Pur
South-III	Rahim Yar Khan	Liaqatpur	Chak 5
			Chak 17
			Chak 25
			Chak 26
			Chak 29
			Chak 30



The anticipated environmental and social impacts of the project in the selected twenty six (26) priority villages are mostly localized, site-specific and temporary; which could be easily mitigated through appropriate mitigation measures. According to the findings of the Environmental and Social Screening study, this project falls in Category E2 and requires an ESMP.

As per Punjab Environmental Protection Agency (PEPA), review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations 2022, Schedule-II, EIA is required for 'Water Supply, Sewerage System and Treatment (Category F). The EIA is being separately carried out, to be submitted to the PEPA. The pertinent approval from PEPA will be granted in due course.

1.3 Objective of ESMP

The objective of this ESMP is the identification of possible environmental and social impacts of the proposed project on both short and long-term bases. Based on the level and nature of these observations, the ESMP delineates proper mitigation measures. As a planning tool, the ESMP aims to ensure that environmental, socio-economic, and cultural issues throughout the entire project lifecycle are anticipated and considered by the project proponent. It also serves as a framework for establishing project controls to reduce or prevent adverse environmental or socio-economic impacts.

The specific objectives of this ESMP are:

- To assess the existing environmental and socioeconomic conditions of the project area;
- To identify potential impacts of the proposed interventions on the environmental, ecological, and social aspects of the project area, to predict and evaluate these impacts and determine their significance;
- To propose appropriate mitigation measures that should be incorporated in the design of the project to avoid or minimize (if cannot eliminate) the potentially adverse impacts;
- To assess the compliance status of the proposed activities with respect to the national and provincial environmental legislation and WB's OPs;
- To provide institutional, monitoring, reporting, and documentation measures for environmental safeguards compliance; and estimated costs for implementing these measures; and
- To aid decision-makers in taking informed decisions.

1.4 Scope of ESMP

The ESMP identifies the potentially significant impacts of the proposed project and suggests the applicable mitigation measures to avoid, minimize or reduce the magnitude of the impacts. It will also indicate the institutional and training requirements to implement mitigation measures during the construction and operation of the proposed project.

The current ESMP presents a preliminary roadmap for the environment and social management for the construction and operation of the water supply scheme, sewerage network and sewage treatment plant (STP) in all twenty-six (26) selected priority villages of 8 tehsils.



1.5 Contractual Requirements/ Obligations of ESMP

The impacts and their mitigation measures, summarized in ESMP, will be part of the Bidding Documents to ensure that Contractors implement ESMP recommendations at all project stages. The ESMP requirements will be part of the Contract and the details prescribed in the ESMP will be mandatory. The ESMP will be equally applicable to Subcontractors, including nominated Subcontractors (if any).

At the stage of the bidding process, the Contractor will be instructed to carefully consider the requirements for environmental and social management contained in this ESMP when preparing the bid and pricing the items of Work. The Contractor will need to accept that the prescriptions and clauses detailed in the ESMP are an integral part of the Contract for relevant items of Work; unless separate items are included in the Bill of Quantities (BoQs). The Contractor will need to accept that separate payment will not be made in respect to compliance with the ESMP. The Contractor should, therefore, be aware that in case the Contractor or Subcontractors fail to implement the ESMP recommendations, the Engineer shall take necessary action(s) to ensure that the ESMP is properly implemented and/or to rectify the damages caused by such negligence.

1.6 Approach & Methodology to Work

1.6.1 Approach

The study has been conducted in accordance World Bank Safeguards policies (OP 4.01, OP 4.04, OP 4.11, OP 4.12, OP 4.20 & BP 17.50) applicable to this project. Further, Punjab Environmental Protection Agency (PEPA) guidelines were also considered in preparation of this document. The study is based on both primary and secondary data and information. The primary data includes data collected from field i.e., information about existing conditions; environmental sampling and analyses for air, water and noise; environmental sensitive receptors, ecological survey; social survey including demographic characteristics, income dependency & quality of life, occupation, and social amenities etc. The secondary data includes a review of relevant information from literature and previous reports. Discussions were held with stakeholders including government officials, community representatives and a wide range of local communities. The main purpose of this approach was to obtain an impartial impression of the people's perceptions of the project and its environmental and social impacts.

The assessment remains subject to change with respect to the finalization of technical specifications and alignment of the proposed sewer, water supply lines & location of overhead tanks, pumping station, and STP.

1.6.2 Methodology

The following methodology was adopted to develop the ESMP of the proposed Project:



A. Orientation

Meetings and discussions were held among the members of the ESMP Consulting Team. This activity is aimed at achieving a common ground of understanding various issues of the Study.

B. Data Collection Planning

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the ESMP Consulting Team. The plan included; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection and the indication of the logistics and other supporting needs for the execution of the data acquisition plan. Field surveys were then conducted based on the data collection plan.

C. Detailed Field Survey

Detailed site visits and technical visits for environmental monitoring and social assessment for the collection of data were conducted in December, 2022. The data collected from the field include:

- Identification of environmentally sensitive receptors including air-sensitive receivers, noise-sensitive receivers, and water bodies expected to receive pollutant load;
- Sampling and analysis for air, noise wastewater, and groundwater;
- Ecological survey;
- Socioeconomic survey including public consultation;
- Stakeholders' consultations;

D. Sampling & Analysis of Physical Environmental Parameters

EPA Certified Laboratories (i.e. Pak Green, Green Environmental Monitoring and ASIAN Laboratories) were hired for environmental monitoring. The Laboratories were mobilized from December 2022 to January 2023 for collection of water and wastewater samples as well as air and noise monitoring.

E. Review of Secondary Data

Previous environmental and social soundness assessment for 16 tehsils was collected in order to gain a complete understanding of existing environmental conditions of the area including:

- **Physical environment:** topography, geology, soils, surface and groundwater resources, and climate;
- **Biological environment:** flora and fauna (particularly rare or endangered species), critical habitats/zones, and vegetation communities within the project area;
- **Socio-economic environment:** settlements, socio-economic conditions, infrastructure, and land use.
- **Heritage aspects:** sites of cultural, archaeological, or historical significance.



F. Review of Environmental and Social Laws and Institutional Requirements

The project needs to comply with all the applicable national and provincial environmental and social policies, laws, guidelines, acts, and legislations and World Bank's Operational Policies (OPs) requirements. All these requirements and policies were reviewed.

G. Area of influence (Aoi)

Considering the project interventions simultaneously in primary settlement as well as number of secondary settlements of revenue village, the whole revenue village is demarcated as area of influence of the sub project.

H. Environmental and Social Baseline Survey of the Project

Environmental and social surveys were carried out within the Aoi to establish the baseline of the project area from December 2022 to January 2023. Prior to the start of field activities, comprehensive checklists, proformas, and maps were developed to gather the following information:

(i) Physical Environment

The following information was acquired for the establishment of the physical environment baseline:

- Topography;
- Water resources (including available surface and groundwater resources and natural streams, hydrology, water supply, water contamination etc.);
- Climate data (including temperature, precipitation, humidity, wind speed, direction etc.);
- Water, surface water, ambient air quality and noise level monitoring data;
- Existing water supply and sewerage systems;
- Seismology;
- Geology
- Environmental Sensitive Receptors.

(ii) Ecological Environment

- Flora (trees, herbs, shrubs, grasses, and overall vegetation including valuable or rare trees and their loss due to implementation of the Project, etc.);
- Fauna/ Wildlife (Mammals, reptiles, amphibians, and avifauna.);
- Reserved forests, Guzara forests, Community forests/ Private forests, and wildlife sensitive or notified areas in Aoi;
- Migratory birds' corridors; and
- Endangered species (both flora and fauna).

(iii) Socio-Economic Environment

Analysis is carried out on the basis of secondary data within the Aoi in order to develop the socio-economic baseline information of the general settled population. Data and analyses of



pertinent socio-economic parameters were revalidated in the socio-economic baseline survey of the sample population settled within the AoI. These aspects include the following:

- Demographic characteristics;
- Nature of business/occupation;
- Livelihood/income;
- Living standard of the population;
- Community Institution available;
- Gender issues;
- Housing construction patterns;
- Mode of transport;
- Basic amenities of the project area;
- Health facilities/ Educational facilities.

I. Stakeholder Consultations

There are two categories of stakeholders in the project:

- Community stakeholder
- Institutional stakeholder

For the current study, community stakeholder consultations were carried out through following techniques:

- Formal/ informal meetings (through village numberdars, politically influential, community resource persons)
- Individual interviews
- Group Discussions

The institutional stakeholder consultation session was carried out by holding meetings at the offices of relevant government functionaries. The study teams met with the institutional stakeholders, affected persons and local communities in and around the project area. The objective of the consultation was to disseminate information on the project and its expected impact, long-term as well as short-term, among primary and secondary stakeholders and to gather information on relevant issues so that the feedback received could be used to address these issues at an early stage. Stakeholder consultation is discussed in detail in chapter 5.

J. Impact Assessment and Mitigation Measures

A logical and systematic approach was adopted for impact identification and assessment. The process began during the screening and continued through scoping which identified the key issues and classified them into different categories. The tools were used for impact assessment, through environmental and social screening checklists for impact assessment of construction and operational phase.

Identification of potential environmental and social impacts in terms of their nature, magnitude, extent, location, timing, and duration was carried out. The impacts were correlated to the Project location, design stage, construction as well as operation stage. Based on the impacts prediction methods and as a result of public/stakeholder consultations, ESMP team screened



the adverse environmental and social impacts for inclusion in the mitigation measures and environmental and social management plan.

ESMP team proposed practicable, economically feasible and socially acceptable mitigation measures for the significant adverse environmental and social impacts. Details of mitigation measures are provided in chapter 6.

1.7 Structure of ESMP

The structure of this ESMP is listed below:

Section 1: Introduction briefly presents the project background, objectives, methodology and need of the study.

Section 2: Legal and Administrative Framework Lists national as well as provincial laws, regulations and procedures and applicable World Bank Operational Policies (OPs).

Section 3: Project Description provides an overall description of the project including proposed networks, design considerations and concepts, manpower requirement, waste generation, machinery and material requirements.

Section 4: Baseline Profile gives a description of baseline physical, biological and socio-economic conditions of the project area.

Section 5: Public Consultation and Information Disclosure identify the main stakeholders and their concerns raised during scoping sessions and deal with the measures to mitigate the social impacts.

Section 6: Anticipated Environmental and Social Impacts and their Mitigations Measures identify, predict, and evaluate the impacts of the project activities during the construction and operation stages and deal with the measures proposed to mitigate potential environmental impacts of the proposed project.

Section 7: Environmental and Social Management & Monitoring Plan This section outlines the organizational framework, mitigation, and monitoring plans, and training requirements, defines roles and responsibilities and estimates budget requirements for satisfactory implementation.



LEGAL AND ADMINISTRATION FRAMEWORK

2.1 General

This section deals with the current environmental policy as well as legal and administrative framework required to develop Environmental & Social Management Plan (ESMP) for the proposed interventions in selected priority villages of 16 tehsils. All relevant provisions of environmental policies laid down by the Government of Pakistan, Government of Punjab along with applicable World Bank Policies have been duly discussed and the project proponent will be required to adhere to these regulations throughout the course of the project. The institutional arrangement for compliance to these laws has been described in ESMP (Section 7).



2.2 Summary of Key National Strategies, Policies, Acts and Legislation

The summary of key national strategies, policies, acts and legislation from environmental perspective are briefly described in **Table 3** below:

Table 3: Key National Strategies / Policies, Legislation / Acts, Laws and Regulations and Their Relevance to the Project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
1	Fatal Accidents Act 1855	An act to provide compensation to family's loss occasioned by the death of a person caused by actionable wrong. It is enacted as follows: <ul style="list-style-type: none">• Suit for compensation to the family of a person for loss occasioned to it by his death by actionable wrong• Not more than one suit to be brought• Plaintiff shall deliver particulars etc.• Interpretation clause	The provisions of this act would be applicable if any fatal accident occurs during the execution of construction works for the proposed Project.
2	Pakistan Penal Code 1860	It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.	The provisions of the Penal Code are applicable to the project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions, and effluent disposal.
3	Land Acquisition Act, 1894 (Including Later Amendments)	The primary law for acquisition of land for public purposes in Pakistan is the "Land Acquisition Act, 1894". The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes.	No land acquisition will be carried out through the provisions of this Act under the project. State owned land will be preferred and used for the construction of overhead tanks, pumping stations & STP. Private land will be obtained through VLD, if required.
4	Protection of Trees and Brushwood Act, 1949	This Act prohibits cutting or lopping of trees and brushwood without permission of the Forest Department.	This act will be applicable to the proposed project in term of Tree Cutting which lies in jurisdiction of Forest Department.
5	Pakistan Antiquities Act 1975	The protection of cultural resources in Pakistan is ensured by the Antiquities Act of 1975, which provides a comprehensive definition of Antiquities. The law prohibits new construction in the proximity of a	The provisions of this act would be applicable if any accidental archaeological discoveries occur during the excavation



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		protected antiquity and empowers the Government to prohibit excavation in any area which may contain articles of archaeological significance.	works for the construction of proposed Project.
6	National Conservation Strategy 1992	Pakistan National Conservation Strategy (NCS) is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core areas that are relevant in the context of the proposed project are pollution prevention during construction, conserving, biodiversity and supporting forestry and plantation.
7	Guidelines for Public Consultation, 1997	<p>The Pakistan Environmental Protection Ordinance 1997 requires public participation during the review of an EIA (Section 12(3)). The "Policy and procedures for the filing, review and approval of environmental assessments" requires proponents to consult with the affected community and relevant NGO's during the preparation of an environmental report.</p> <p>The objectives of public involvement include:</p> <ul style="list-style-type: none"> • 	<p>These guidelines are applicable for the preparation of the EIA / ESMP. During the preparation of the ESMP, public consultations were carried out for:</p> <ul style="list-style-type: none"> • informing the stakeholders about what is proposed; • providing an opportunity for those otherwise unrepresented to present their views and values, therefore allowing more sensitive consideration of mitigation measures and tradeoffs
8	Guidelines for Review and Preparation of Environmental Reports, 1997	<p>These guidelines describe the format and content of IEE/EIA reports to be submitted to Provincial EPA/EPD for obtaining NOC.</p> <p>The guidelines present:</p> <ul style="list-style-type: none"> • The environmental assessment report format; • Assessing impacts; • Mitigation and impact management and preparing an environmental management plan; • Reporting; • Review and decision making; 	These guidelines are applicable for the preparation of the EIA.



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		<ul style="list-style-type: none">Monitoring and auditing; and Project Management.	
9	National Sanitation Policy, 2006	The National Sanitation Policy of Pakistan, 2006, stresses on the safe disposal of excreta away from the dwellings, creation of an open defecation-free environment and, promotion of health and hygienic practices in the country.	This policy is applicable to the project for the efficient management of solid waste or wastewater during construction or operation phase of the project. This project primarily focused on provision of improve sanitation services in target areas.
10	Protection Against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act refers to sexual harassment at the workplace.	This Act will be applicable to the project if women are employed for the construction of the proposed Project or women living in near vicinity of the project area.
11	Canal and Drainage Act 1873 and Amendment Act, 2016	This Act prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.	This act is applicable to the project for the efficient management of wastewater disposal during the construction or operation phase of the project.
12	Punjab Local Government (Amendment) Ordinance 2021	The Ordinance establishes a new tier of local government at the village level called Village Councils, which incorporated the main functions of village panchayats prescribed in the Panchayats and Neighborhoods Councils Act, 2019 (PVPNCA 2019) with regards to water, sanitation, and waste management.	This act is applicable to the proposed project, village councils is informed about the project and will remain in contact during the construction or operation phase of the project.



2.3 Key Provincial Strategies / Policies, Legislation / Acts, Laws and Regulations

The provincial policies, strategies, acts and laws relevant for the environmental safeguard of the project activities are given below in **Table 4**.

After the 18th amendment to the constitution of Pakistan, many subjects, including environmental protection and pollution prevention, have been devolved to the provincial jurisdiction. Therefore, the apex environmental statute governing the proposed project will be the Punjab Environmental Protection Act 1997. However, detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation are still in various stages of formulation and discussion. The following description presents a brief overview of the relevance of various existing provincial policies, legislation and guidelines.



Table 4: Key Provincial strategies / policies, legislation / Acts, Laws and Regulations and Their Relevance to the Project

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
1	Punjab Land Revenue Act, 1967	WHEREAS it is expedient to consolidate and amend the law relating to the making and maintenance of records-of-rights, the assessment and collection of land-revenue, the appointment and functions of Revenue Officers and other matters connected with the Land Revenue Administration in the Province of the Punjab, or incidental thereto	All the land required for the project, be it public or private, will be transferred in the name of PRMSC under the provisions of this Act
2	Punjab Plantation and Maintenance of Trees Act, 1974	The Punjab Plantation and Maintenance of Trees Act, (1974) regulates tree plantations and enforces measures for their protection. The requirements of this act are applicable in terms of planting new trees and their maintenance by the owner of the proposed Project land who would have the physical possession.	This act would be implemented if any tree cutting activity involved during construction.
3	The Punjab Wildlife (Protection, reservation, Conservation & Management) Act, 1974	This act provides for the protection, preservation, conservation and management of wildlife in the Province of Punjab. This act defines the wildlife sanctuary, game reserves, protected areas, and national parks. It also defines the rules and responsibilities of the relevant authorities and the relevant personnel to protect ecological resources. It also describes the penalties and punishments on offenses against the sections given in the act.	This policy is to avoid any disturbance to ecological system near project area due to construction activities.
4	Punjab Land Acquisition Rules, 1983	This Law provides for the acquisition of land needed for public purposes and for Companies, and determines the amount of compensation to be made on account of such acquisition. It also establishes the due process for land acquisition.	State land will be preferred and used for the construction of overhead tanks, pumping stations & STP. However, Private land if required will be acquired through VLD in this project.
5	The Motor Vehicles Rules, 2000	Subject to the provisions of this Act, and the rules and regulations, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards customary under clause (g) of sub-section (l) of section 6.	During Construction all these rules will be followed to avoid emission of air pollutant from vehicles.
6	Guidelines and Checklists adopted by	Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. The Punjab Environmental Protection	All projects to be implemented in Punjab must comply with PEQS



Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
	Government of Punjab after 18 th Amendment	Act, 1997 (as Amended upto 2022) is comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment. The „environment“ has been defined in the Act as: (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the interrelationships between any of the factors specified in sub-clauses „a“ to „f“.	during all the phases i.e., construction and operation. No Objection Certificate (NOC) shall be required from Punjab Environmental Protection Agency (PEPA) before commencement of construction.
7	Punjab Drinking Water Policy 2011	The overall objective of Punjab's Water Policy is to provide clear policy directions to the Government of Punjab on the sustainable management and development of water from all sources of water (surface water, groundwater and rainwater), for all sub-sectors of water use (domestic, stock water, agriculture, industry).	This policy is applicable and drinking water supply will be designed according to this policy guidelines.
8	Punjab Environmental Tribunal Rules, 2012	According to Section-31 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Tribunal shall make every effort to dispose of a complaint or an appeal or other proceedings regarding environmental problems associated with the construction and development of any project within sixty days from the date of filing of the complaint, appeal or other proceedings but any decision of the Tribunal shall not be rendered invalid by reason of any delay in the disposal of complaint, appeal or other proceedings.	This is applicable to dispose of a complaint or an appeal or other proceedings regarding environmental problems associated with the construction and development of any project within sixty days from the date of filing of the complaint, appeal or other proceedings.
11	Punjab Antiquities Amendment Act, 2012	The Punjab Antiquities Amendment Act, 2012 is adopted from the Pakistan Antiquities Act of 1975 with a few minor changes.	The law will be applicable to the proposed project mainly due to its provision that „any construction activity within 61 meter or 200 ft. of protected antiquities, are prohibited“. The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the



Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
			excavation works for the construction of proposed Project.
12	Punjab Local Government Musalihat Anjuman (Constitution and Functions) Rules, 2016	The dispute may be brought to the Musalihat Anjuman. The Musaliheen shall make every reasonable effort in encouraging and assisting the parties in arriving at an amicable settlement but for this purpose shall not impose, coerce or try to dictate terms for any specific resolution of the dispute.	The provisions of this rule would be applicable, if any dispute occur during the execution of proposed Project. The GRM under the project will also be aligned accordingly.
13	Punjab Environmental Quality Standards (PEQS), 2016	In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the Punjab Environmental Quality Standards (PEQS), 2016. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. Results of environmental monitoring (ambient air, water and noise) conceded out at different locations in study area are compared with PEQS values and are conversed in later chapter of the report.	These standards are applicable in compliance with all the Punjab Environmental Quality standards of different Environmental Parameters during Construction and operational phase.
14	The Punjab Flood Plain Regulation Act, 2016	This act regulates construction in the flood plains in the Punjab. According to this act, no construction can be carried out in flood plains without prior approval in writing from canal officer.	Construction work will be carried out in underground for installing of water supply lines and sewerage lines.
15	Punjab Restriction on Employment of Children Act, 2016	According to the sub-section 11(a) of this act, an occupier who employs or permits a child (person under the age of 15 years) to work in an establishment shall be liable to punishment with imprisonment for a term which may extend to six months, but which shall not be less than seven days, and a mandatory fine between 10,000 and 50,000 rupees.	This act will trigger if any contractor hires skilled and unskilled labor under the age of 15. This would be prohibited in the project
16	Punjab Protection of Women against Violence Act, 2016	This act counters gender-based discrimination, violence against women, and economic and social empowerment of women. This act will entail if gender-based violence observed in the project area during construction phase.	This Act will be applicable to the project if women are employed for the construction of the proposed Project or women living in near vicinity of the project area.



Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
17	Punjab Tehsil / Town municipal Administration (Works) rules, 2003 (amendments, 2016)	According to Chapter VIII-A Occupational Safety & Hazard Clause 50 A Workplace Safety and clause 50 B pertains to responsibilities of the Local Government Engineer related to health and safety.	All the mentioned clauses will be applicable on construction labor/workers/ and sewer men/sanitary workers during execution of subprojects.
18	Punjab Environmental Protection Act 1997 (Amended 2022)	Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. The Punjab Environmental Protection Act, 1997 (as Amended up to 2022) is comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment. The „environment“ has been defined in the Act as: (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the interrelationships between any of the factors specified in sub-clauses „a“ to „f“.	All projects to be implemented in Punjab must comply with PEQS during all the phases i.e., construction and operation. No Objection Certificate (NOC) shall be required from Punjab Environmental Protection Agency (PEPA) before commencement of construction.
19	Punjab Policy on Controlling Smog, 2017	The Punjab Environmental Protection Department issued this policy on controlling smog in 2017 It imposed a complete ban on open burning of rice stubble, solid waste and other hazardous materials. It focuses the reasons behind the formation of dense smog in the Punjab, especially in Lahore and its environs, on the onset of winters each year and provide a short and medium to long term plan, including measure for protection of school going children; minimizing road accidents and creating mass awareness on precautionary measures for citizens at large.	During construction and operational phases all PEQS will be followed in accordance with to compliance and to minimize pollution load to control smog.
20	Punjab Labor Policy, 2018	The Punjab Labor Policy, 2018 intends to guide and support the Government and the stakeholders in developing strategies, plans and programs for the protection and promotion of the rights and benefits of working community without jeopardizing the genuine concerns of the employers.	The labor policy will be relevant as it will deal with the protection of labor. Mitigation and enhancement measures have been proposed in this ESMP to ensure proper working conditions for project labor.



Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
21	Punjab Growth Strategy 2018	The document endorses Punjab's health sector vision and strategy, which emphasizes improvement of water, sanitation and hygiene services to prevent communicable diseases.	This strategy will be adopted in design of proposed project.
22	Punjab Occupational Safety and Health Act, 2019	This law was enacted to ensure occupational safety and health of the persons at workplace. It aims at protection of workers against risks arising out of the occupational hazards and to promote safe and healthy working environment catering to the physiological and psychological needs of the employees at workplace.	This act will be applicable to the proposed project in term of the health and safety during the construction and operational phases of the project.
23	Punjab Water Act 2019	An Act to comprehensively manage and regulate water resources in the Punjab in the interest of conservation and sustainability. It is expedient to provide for comprehensive management of all water resources in the Punjab and to regulate their use in the interest of conservation and sustainability and matters connected with and ancillary thereto.	This act will be applicable to the proposed project. The drinking water supply will be designed in light of PWA, 2019.



2.4 Applicable World Bank Policies

2.4.1 World Bank Operational Policies

The World Bank operational policies applicable to the project and its compliance mechanism, are summarized in the description below

Safeguard Policies	Triggered	Explanation
Environmental Assessment (OP 4.01)	Yes	Under this OP, the World Bank requires environmental assessment (EA) of projects proposed for Bank's financing to help ensure that they are environmentally sound and sustainable and thus to improve decision making through appropriate analysis of actions and of their likely environmental impacts
Natural Habitats (OP/BP 4.04)	No	This OP is not triggered.
Physical Cultural Resource OP/4.11	No	The sub-project does not lie in any near any cultural and heritage resource therefore OP 4.11 will not be triggered. The possible discovery of archaeological sites or random findings during the excavation and earthworks may occur. In such case, this OP will trigger.
Involuntary Resettlement OP/4.12	Yes (Not relevant for 26 villages)	OP 4.12 is not triggered as the sub-project does not require any land acquisition, therefore there will be no involuntary resettlement, livelihood impacts, or restrictions to access. Consequently, there is no need of a Resettlement Action Plan.
Forests (OP/BP 4.36)	No	The sub-project area does not fall under forest area and will not affect any forest. So, this OP is not triggered.
Access to information (BP 17.50)	Yes	The World Bank's Policy on Disclosure of Information is to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience. The Bank has broadened the scope of information about its activities that it makes publicly available. The Bank has established the Info-Shop at headquarters, plus regional Public Information Centers (PICs), to serve individuals seeking to obtain Bank information. In addition, Country Offices are encouraged to establish modest PIC services for their country clientele. This policy is triggered for sub-projects categorized as A and B. The developer consults project affected groups and local NGOs: a) during scoping and before TORs are prepared; b) when the draft EA is available; and c) throughout project implementation as necessary. The developer provides relevant information in a timely manner prior to consultation and in a form and language accessible to the groups being consulted.
Projects on International Waterways (OP 7.50)	Yes	This policy will be triggered. The Project has got the PAD cleared from Legal department. An exemption for notification has been approved by the SAR VP.



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

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

2.6 Environmental, Health & Safety Guidelines

In addition to operational policies (OP), the WBG has also established its EHS guidelines for all the interventions that are financed by the group. These EHS Guidelines are technical reference documents with general and sector-specific examples of Good International Industry Practice (GIIP). Following EHS guidelines are relevant to the proposed project during the construction and operation phase:

EHS Guidelines for Water & Sanitation (2007): Issues associated water and sanitation are presented in the EHS Guidelines for Water and Sanitation (2007).

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

2.7 International Protocol/Conventions

As Pakistan is a member of a number of international organizations such as United Nations Organization (UNO), Organization of the Islamic Conference (OIC), South Asian Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) etc., so it has to follow the international protocols and obligations related to the environment. The major protocols, ratification dates by Pakistan and obligations related to the proposed project are provided in the **Table 5** below.

Table 5: International Agreements/Conventions Relevant to the Project

Sr. No	Agreement/ Convention	Ratification	Description/Relevance
1.	UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972 Web Link: http://whc.unesco.org/en/%20convention%20text/	Pakistan ratified this convention on 23 July 1976.	This Convention requires parties to adopt a general policy on the protection of the natural and cultural heritage, to set up services for such protection, to develop scientific and technical studies, to take appropriate legal, technical, scientific and administrative measures and to foster training and education for such protection. The proposed project design and ESS team paid due attention to archaeological sites and local



Sr. No	Agreement/ Convention	Ratification	Description/Relevance
			norms. Both of these factors will also be considered during project implementation.
2.	Convention on Conservation of Migratory Species of Wild Animals, 1979 https://www.cms.int/	Pakistan signed this convention in 1981 and ratified it in December 1987.	Convention on the Conservation of Migratory Species deals with the conservation and protection of the migratory species. Species covered in the Convention should be given special attention during EA and monitoring and any impacts identified should be mitigated to acceptable levels.
3.	The Rio Declaration, 1992 Web Link: http://www.unesco.org/education/pdf/RIO_E.PDF	Pakistan signed the treaty on 13Jun 1992 and ratified on 1 June 1994	The Rio Declaration comprises 27 principles which address important issues such as; sustainable development to integrate environmental protection into the development process; common but differentiated responsibilities to conserve, protect and restore the earth's ecosystems; public participation and information access at the national level, reduce and eliminate unsustainable patterns of production and consumption.
4.	Convention on Biological Diversity, 1994 Web Link: https://www.cbd.int/	Pakistan signed this treaty in 1992 and it was ratified by cabinet in 1994.	The Convention on the Biological Diversity (CBD) has three main goals: Conservation of biological diversity (or biodiversity); sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources.

2.8 Institution Responsible for Planning, Policies and Regulations

2.8.1 Environmental Protection Agency, Punjab

Implementation of Punjab Environmental Protection Act 1997 (Amended 2012, 2017 & 2022) is the mandate of the Punjab-EPA. Punjab-EPA is headed by a Director General, and sections are headed by Directors, i.e., Director Technical, Director Administration and Finance, and Director Laboratory. Punjab-EPA has established District Environment Offices at district level. As the proposed Project falls in 16 different Tehsil of Punjab, therefore, Punjab-EPA will be responsible for reviewing the report, issuing environmental approval and overall monitoring of the proposed project activities.



PROJECT DESCRIPTION

Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP) is being implemented in 2000 villages in 16 tehsils of Punjab province with the assistance of the World Bank. To implement this project, Executive Committee of National Economic Council (ECNEC) has authorized Punjab Rural Municipal Services Company (PRMSC) to initially implement this project in 200 villages as pilot phase (Annex-1) to better understand feasibility and sustainability of the Project.

Projects components are briefly described below:

COMPONENT 1: Water Supply and Sanitation Infrastructure Development

Component 1 will fill the infrastructure gap in the existing traditional rural Water Supply and Sanitation (WSS) systems that underlies the low access to safely managed water and sanitation in rural Punjab.

- **Subcomponent 1.1: Sanitation Infrastructure Development (US\$ 310.1 million).**
This subcomponent will focus on fecal sludge collection, transference, treatment and disposal.
- **Sub-component 1.2: Water Supply Infrastructure Development (US\$ 157 million).**
The study on technology options and their feasibility informed the choice of technology for water abstraction, treatment, and conveyance.

COMPONENT 2: Behavior Change and Capacity Development

This component will finance activities that facilitate and induce health protective behavior change and build community capacity to support WSS service delivery.

- **Subcomponent 2.1 Awareness raising and behavior change related to safe WASH practices**
The project will support basic hygiene, small-scale infrastructure to directly promote good hygiene practice and
- **Subcomponent 2.2: Training and Capacity Building of Village-level Institutions**
Trainings will target village-level institutions that have a defined role in water and sanitation service provision. These will be complemented by household behavior change but are distinct, in that they will build the capacity of informal village level organizations to perform tasks that both complement and the O&M responsibilities assigned to Service Delivery Units (SDU).

COMPONENT 3: Service delivery Improvement (US\$ 50 million)

- **Subcomponent 3.1: Establishing institutions and building capacity for service delivery**
The service delivery model of the project consists of three tiers: (i) a provincial SDU head office that has functions of both, the Project Implementation and Management Unit (PIMU) as the implementing body of the project and a public-



owned section 42 company. (ii) Tehsil level units that are on frontlines of service delivery; and (iii) Community Caretakers and Operators (CCO) that may be part of Village Councils, Village Organizations, or just village residents.

➤ **Subcomponent 3.2: Solid Waste and Animal Waste Management**

Promoting the safe handling of solid waste is an integral aspect of the design of this project

➤ **Subcomponent 3.3: Water Quality Monitoring**

The project will support a transition in Punjab towards regular and frequent water quality monitoring in rural areas for both drinking water supply and wastewater.

COMPONENT 4: Project Management and Monitoring

➤ **Subcomponent 4.1: Project Monitoring through a customized Management Information System**

The project will develop and use a comprehensive IT based Management Information System (MIS) to track project implementation progress, WSS service delivery performance, the flow of public and donor funds earmarked for WASH and related financial management information, and outcome indicators.

➤ **Subcomponent 4.2: Strengthening of Project Implementation and Management Unit (PIMU)**

The key implementation tier will be the Project implementation and management unit (PIMU), which will be associated with the Department of Local Government and Community Development (LG&CD) – the implementing agency - and led by a full-time Project Director.

PRMSC has divided the 16 tehsils into 6 zones based on geographical location and accordingly hired the services of 6 Engineering Design and Supervisory Consultants (EDCS) for the proposed project. In order to fast track the project implementation and execution of the civil works company with the help of consultant selected 26 priority villages out of 200 pilot villages from eight different tehsils for designing and provision of Water Sanitation and Hygiene (WASH) facilities. The subproject involves provision of water supply, sewerage, overhead tanks & Pumping stations with sewage treatment plants in all twenty-six villages.

3.1 Need and Purpose of Project

The underlying issues related to water supply and sewerage in the target villages are summarized below:

Water Supply Issues:

- No water supply Network in the villages;
- Most of the household use shallow groundwater;
- Shallow ground water is not fit for drinking;
- Polluted drinking water is causing water borne diseases.



Sewerage Issues:

- Properly designed sewerage system does not exist in priority villages;
- Existing open drains are damaged and do not cover the entire settlements;
- No proper Disposal Point in all the villages;
- Sewage collected in soakage pits and open plots seeps into ground and contaminates groundwater;
- Raw sewage ponds are a breeding ground for disease vectors.

Solid waste Issues:

- There is no proper solid waste management system and designated dumping sites in the project area, locals usually throw their waste into open plots or streets.
- There are heaps of waste which attract rodents, flies and disease vectors.
- Organic waste is usually burnt by the villagers, which causes health issues.
- Open drains are used as a garbage/solid waste disposal point thus resulting in decrease of water carrying capacity of these drains.
- During rain, storm water and sewage overflow from the drains and spread solid waste through the area thus causing nuisance, environmental issues and spread of diseases.

3.2 Project Location

Table 2 indicating the Cluster, District and tehsils of priority villages to understand the geographical location of the project, for further assistance of project location a map of relevant tehsils is shown in the figure 1.

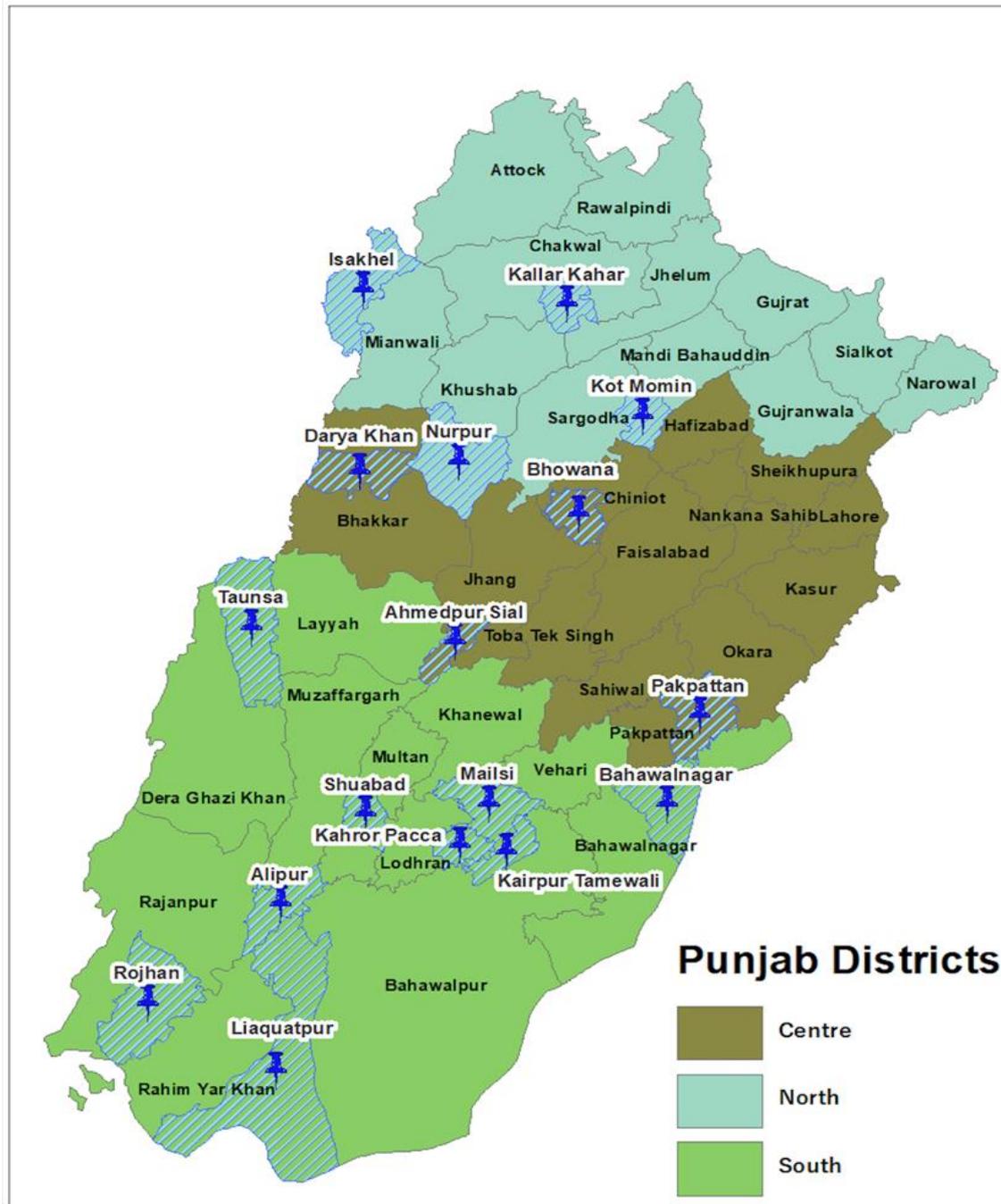


Figure 1: Location Map of Project Area

3.3 Objectives of Project

The project development objective is to provide equitable and sustainable access to safely managed water and sanitation and reduce child stunting.



3.4 Project Description

Existing System

The existing water and sewerage situation of the village is given below and Pictorial view is given in **Plate 3.1**.

A. Existing Water Supply System

There is no existing functional water supply system in any of the priority villages hence no water supply network exists here. At present, domestic boreholes are the main water source for the village which is available at a depth of around 50-75 ft. Deeper tube wells at depth of around 150 ft are also bored which are used for irrigation purposes. People bring drinking water from deep boreholes (outside of the village or even from nearby villages) if their village have brackish groundwater (i.e Bahawalnagar, Bhawana and Liaquatpur). Where the sweet water is available people collect water from deep borehole within their villages. Many villagers perceive that this water is unhygienic which results in major waterborne diseases like hepatitis, cholera and diarrhea.

B. Existing Sewerage System

There is no existing sewerage pipe network or disposal station in the villages. The sewerage system is totally based on open drains of varying sizes and capacities. The sewage is first collected in house collection chamber (soakage pits), which is then carried through existing open channels, drains and ultimately dispose of into nearest sewage pond and fields. Some of this sewage is also used to irrigate nearby crops/farmlands through water courses.

A sewage pond exists in each village which is used as a main sewage recipient. Most of the drains dispose of into this pond and rest of the drains after collecting sewage from the adjacent areas disposed of into nearest fields haphazardly.

C. Existing Solid Waste

Solid waste management system and designated dumping sites are not available in the project area. The waste is usually dumped in the streets, agricultural fields or open plots. The heaps of waste cause nuisance and the situation gets worse during rainy season. The organic waste is burnt to meet the fuel demands in the kitchens. Glimpses of existing conditions are shown in **Plate 3.1**.



**Principal Settlement Chak 226
Liaquatpur**



**Pakhra Sultan Disty near Chak 190
Liaquatpur**



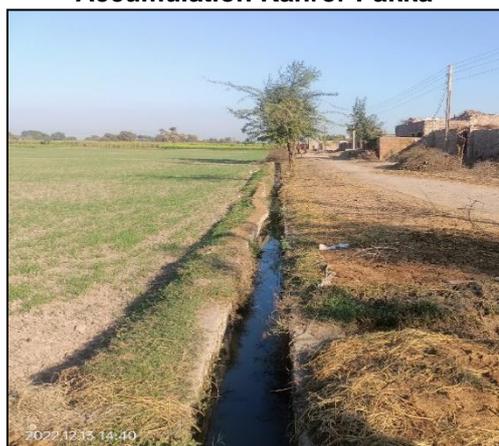
**View of existing drain along soling,
Kahrora Pakka**



**Open Drain with Solid Waste
Accumulation Kahrora Pakka**



Soakage Pits in Chak 190, Bhowana



**Drain conveying water to Pond,
Bhowana**



Sewage Pond Bhowana



Pumping of Wastewater for Irrigation Purposes, Bhowana



Glimpse of Solid waste issue, Bhowana



Glimpse of Solid waste issue, Bhowana



Open Drains in Arifabad Village, Pakpattan



Heaps of Solid Waste in Village Dahku Chishti, Pakpattan



Pictorial View of 3R Disty, Bhowana



Lined Water course for Irrigation Purposes, Bhowana



Sewage in unlined water course for Irrigation purposes, Bhowana



Drinking Water Source for Chak 192, Bhowana



Open Drain with Solid Waste Accumulation, Bhowana





**Sewage Pond of Principal Settlement,
Bhowana**



**Sewage Pond of Minor Settlement,
Bhowana**



**Main Canal Jhang Branch near Chak
No. 199, Bhowana**



**Nullah No.1 Disty near Chak No. 199,
Bhowana**



**Open Sewerage Drains in Village Gahi,
Kalar Kahar**



**Open Solid Waste Disposal in Village
Gahi, Kalar Kahar**



**Sewerage and Solid Waste Disposal
of Village Naseerpur Khurd, Kot
Momin**



**Water Supply in Village Naseerpur
Khurd, Kot Momin**

Plate 1: Glimpses of Existing site Conditions

3.4.1.1 Proposed System

A. Water Supply System

The project aims to improve the existing drinking water problems through provision of properly treated water as per World Health Organization (WHO) guidelines through metered pipe supply network. The project will help to reduce the water consumption as company plans to charge tariff on the basis of volumetric consumption. This project will also help to discourage the installation of wells in individual households. A comprehensive behaviour change communication is one of the components of the project in which residents of the villages will be sensitized on the importance of water conservation. Moreover, it is expected the provision of safe drinking water at door step will help to improve the socio-economic conditions of the society by curbing the medical expenses and saving of time required to fetch water. Moreover, the man-hours lost due to illness caused by the water borne diseases can be reduced. PRMSC is hiring services of Independent third party to ensure the water quality through frequent testing of the treated water at end of treatment train as well as point of use.

Water supply system can be characterized by following main components:

- Water Source
- Distribution System

Water Source

Number of tube wells for water supply system are proposed after assessment of total water demand of the project areas and where sustainable ground resources are available. The design criteria for tube wells are discussed in the following sections;

Design Criteria for Tube wells

An appropriate well design is a blend of hydraulic and economic efficiencies of the tube well over its life span. It includes the selection of the depth, diameter, construction materials (well



casings, screens, filter pack etc.), pump and prime mover in consonance with the local hydro-geological conditions and the design capacity. All these major factors depend upon the "design capacity" which in turn is governed by the aquifer's geometry and parameters.

Capacity of the tube well is based upon the maximum day water requirements, for the served area, with design operational duration (working hours) of 12 hours per day.

In order to design the well, the following major factors are considered:

- Design, construction details, water quality of the existing tube wells;
- Depth to water table under existing and future conditions;
- Groundwater quality;
- Aquifer parameters.

Pumping Facilities

Pumps are devices used to transfer water (or other liquids) from point A to point B with pressure to overcome the resistance along its path. It is important to understand the different types of pumps, their applications, design differences and the procedures used to operate and maintain them.

Water Transmission System

The transmission system's function is to transport water from source to the reservoir, if any, and to the distribution point. Water conduits for the transmission system may be canals, aqueducts or tunnels, free-flow pipelines, or pressure pipelines. The transmission of water is either under gravity or pumping. Pressure pipeline is generally the type of water conduit used for water supply transmission systems.

Water Reservoirs

In distribution systems, whether water is obtained by gravity or by pumping, distribution reservoirs are usually necessary for the following reasons:

- To balance the supply and demand in the system. In small distribution systems, variations in demand may be three or more times the average hourly consumption.
- To maintain adequate and fairly uniform pressure throughout the distribution system.
- To avoid the total interruption of water service when repairing pipes between the source of supply and the reservoir.
- To allow pumps to be operated uniformly throughout the day. Such pumps may be much smaller than would otherwise be required.

Overhead Water Reservoir (OHR)

Overhead Reservoirs (OHRs) are also key component of water distribution system. In water supply system OHRs serve the following functions:

- Store water for use during electric load-shedding and during maintenance works of tube-wells/ pumps.
- Provide balancing of flow and pressure during peak hours.

As per "Technical and Service Delivery Standards for Water Supply and Sanitation Sectors" Storage Capacity of Overhead reservoirs should be based on around 1/6th of average day demand.



Water Distribution System

The purpose of a distribution network is to distribute the potable water from the storage reservoir over the area to be provided, and deliver it to the individual consumer in such a way that at any tap point and at any time sufficient water of good quality can be withdrawn.

Looped System

A distribution network is looped when there are only few or no pipe dead-ends, such that water can move through the system freely. The advantages of a looped system are;

- The lower water velocities in the main reduce head losses, resulting in greater capacity.
- Main breaks can be isolated, minimizing service interruptions to consumers.
- Usually, better chlorine residual content is achieved.



B. Sewerage System

The sewerage system of these villages has been designed so that the final disposal of collected sewage should be in the proposed pumping station. This pumping station will pump sewage into Anaerobic Baffled Reactor (ABR). After treatment, treated effluent complying with PEQS, would be discharged into existing nearby sewerage pond or community owned water courses. The sewerage systems have been designed for design year of 2050. Design criteria and consideration are briefly discussed below:

Design Criteria

The design criteria is based on Standards set forth under the Water and Sanitation Agency (WASA), Lahore criteria and past design experiences of similar projects.

The main objectives of the design criteria are as follows:

- To develop a sewerage system, that can be operated with minimum operation and maintenance cost;
- To collect sewage efficiently and safely to prevent diseases and nuisance; and
- To proposed efficient treatment system which will deliver an effluent that will meet the Punjab Environmental Quality Standards (PEQS)

Sewage Flow Estimation

The most fundamental factor for planning and designing sewerage systems is the estimation of the sewage flow. Otherwise, sewers may prove inadequate resulting in overflow or may prove too large in diameter, which may make the system uneconomical and hydraulically inefficient. For the project area, 80% of the water demand has been taken as sewage generation.

Peak Factor & Flow

The capacities of the sanitary sewer are sufficient to carry peak flows, rather than the average flow because the rates of flows for any design point will vary substantially depending on the local water use customs, climate conditions, the day of the week, the hour of the day etc. So, waste water collection system has been designed to handle peak flows. The peak flow will be calculated by following formula:

$$\text{Peak flow} = \text{Avg. daily flow} * \text{Peak factor}$$

Peak Factor depends upon the population; it decreases with an increase in population. Peak Factor shown in the Table below will be taken for the computation of peak flows;

Population	Peak Factor
Up to 5,000	4.50
5,000 to 10,000	4.00
10,000 to 25,000	3.50
25,000 to 50,000	3.00
50,000 to 100,000	2.50
More than 100,000	2.00



Non-Domestic Sewage Flow

The non-domestic sewage flow has been taken as 80% of average non-Domestic water consumption that will cover institutional, commercial and small industrial discharges.

Infiltration Rate

This is additional quantity due to groundwater seepage in to sewers through faulty joints or cracks formed in the pipes. The quantity of the water depends upon the height of the water table above the sewer invert level and permeability of the ground soil. If water table is well below the sewer invert level, the infiltration can occur only after rain when water is moving down through soil.

PHED Criteria has been followed for infiltration rate for the selected localities of the project area.

Storm Water Allowance

Keeping in view the project area, 33% of peak sewage flow has been taken as storm water allowance.

Total Sewage Flow

Total sewage flow is the sum of all the above flow and sewers / conduits has been designed on this total sewage flow.

$$\text{Total flow} = \text{Peak sewerage flow} + \text{Infiltration} + \text{Storm water Allowance}$$

Manholes

Manholes will be located according to conventional sewer network design i.e., starting point, junctions between sewers and change in direction and grades etc.

Following manhole spacing are adopted for the design of sewerage system;

Table 6: Manhole Spacing

Pipe Size	Interval
9 inches	50 Feet
12 inches	100 Feet
15 inches	150 Feet
18 inches	200 Feet
24 inches	250 Feet
30-42 inches	250 Feet
48-60 inches	250 Feet
Above 60 Inches	250 Feet

Following manholes dimensions are adopted for sewerage systems of project area;



Table 7: Manhole Diameter

Sewer Size	Manhole Internal Diameter
9-18 inches	04 Feet
24-30 inches	05 Feet
36-42 inches	6.5 Feet
48-54 inches	7.5 Feet
60-66 inches	8 Feet
72 inches	9 Feet

Change in Sewer Diameter in Manhole

To minimize the risk of blockage in sewers, the diameter of the outgoing sewer is not less than the diameter of the largest incoming sewer. The top of smaller sewers entering a manhole will normally be at the same level as that of the outgoing sewer.

Slope of Channel Within Manhole

All manhole invert levels used in the sewer calculations has been the centre of the manhole and all distances and slopes has been calculated between canters of manholes.

Drop Manholes

The drop connections to manholes have been provided if the difference in pipe invert level is greater than 3.0 ft otherwise no drop manholes will be provided.

Manhole Steps

Ductile Iron and Malleable Cast iron steps etc. are usually used in the manholes. Keeping in view the project area and current practices malleable cast iron steps shall be used in the manhole.

Sewage Disposal Stations

Sewage lift / pump station are required to pump sewage collected from various sewage zones to the disposal point. The details of Sewage lift / pump station will be discussed in the following sections.

The pumping station consists of following structures:

- i) One screen chamber (Two partitions)
- ii) One Wet well (Two partitions)
- iii) One Dry well
- iv) One valve chamber

Pumps (working + standby) are proposed in dry well having capacity varying from 0.1 to 0.5 cusec depending on the volume of sewerage produce in the village. The sewage will be treated in ABR from where this treated effluent will be disposed into existing water course.

Anaerobic Baffled Reactor (ABR)

Proposed Sewage Treatment plant consists of Screening Chamber, Wet Well, Dry Well with Pumping Machinery and Sewage Force main up to Proposed STP. Anaerobic Baffled Reactor (ABR), which has chambers divided by baffles, provides a mechanism for both primary and secondary sedimentation. The majority of solids are removed by the ABR's first chamber, which also has low sludge formation and high SRT. The bulk of shock loads may be handled by the technology with ease. The system's ease of construction makes it perfect for wastewater treatment. The anaerobic process reduces the formation of sludge biomass, the particles in the effluent are reduced due to significant sedimentation in the baffled chambers, and most importantly, the ABR has lower capital and operating costs than aerobic processes. Another significant benefit is that this technique works best in semi-arid and tropical environments.

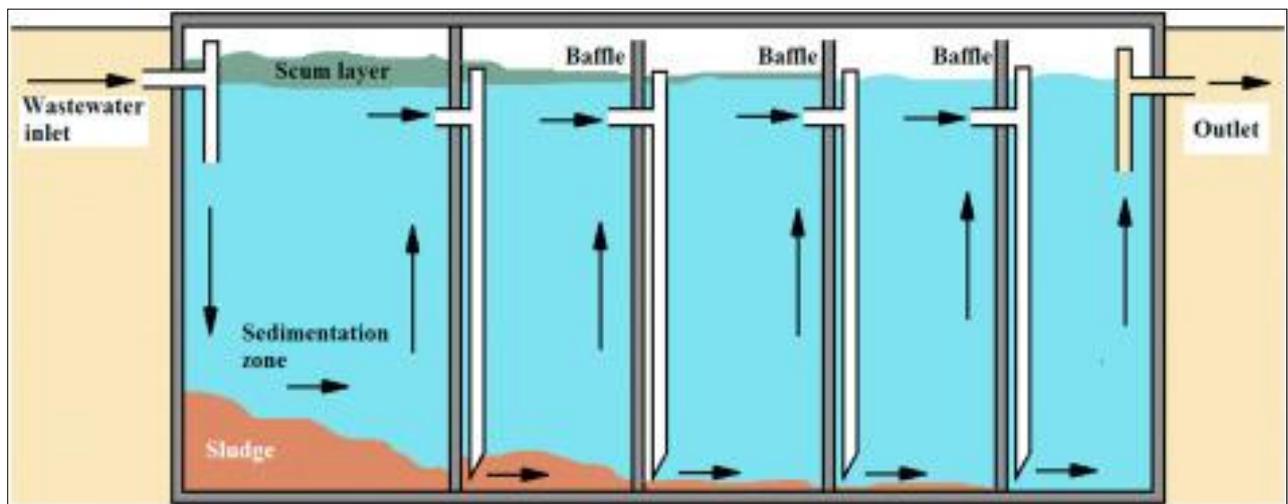


Figure 2: Process Flow Diagram of STP / WWTP / ABR



3.5 Project Cost

The estimated total cost of the project for the proposed 26 priority villages is PKR **3562.56** million.

3.6 Land Acquisition

The laying of piping network for water supply and sewerage system will not require land acquisition, as the pipeline will be buried underground. The network will be designed in a manner that the pipeline is laid along the public roads / streets. However, if pipeline route is required to pass through any private lands, special permission for laying and periodic maintenance shall be sought from the landowners. The land required for the construction of overhead tank, pumping station and STP will mostly consist of state land, acquired through process of No Objection Certificate (NOC). In cases where private land is needed, it shall be obtained through Voluntarily Land Donation (VLD). Village wise breakup of land requirements given in **Table 8**.

As is obvious from the table, state land is mostly available in villages called “Chak”. During British Raj, new canals were built to bring the barani areas under cultivation by introducing the irrigated areas around the core of new villages called Chak. As sufficient state land is available in these villages (Chaks), therefore NOC process was adopted. Whereas in other villages government land is not available hence private land, donated by community members through VLD procedure will be used as an exception. Moreover, due diligence will be conducted to prevent protentional negative socio-economic impacts arising due to this donation and to ensure that the donation is actually voluntary. The template of VLD Screening Checklists is attached as Annexure-7A..

Table 8: Land Requirement Details

Sr. No	Tehsil	Revenue Villages	Private Land required through VLD (In Marla ⁴)	State land required through NOC (In Marla)
1	Pakpattan	Dahku Chishti	30	
			30	
		Arifabad	40	
		Sochan	30	
			40	
2	Kalar Kahar	Makhial	115	
		Gahi	74	
3	Kot Momin	Naseerpur Khurd	30	
4	Bahawalnagar	Chak Muhammad Zaman	22	
		Moza Sadiq Nagar	15	10
5	Khairpur Tamiwali	Sheikh Wahan	80	
		Moza Isa	25	

⁴ 1 Marla land = 272.25 sq feet



6	Kahrur Pakka	Muhammad Pur	7	
		Chowki Rangu Khan	9	5
		Gulhaar	13	
		Dora Mahar	3	
		Chowki Suba Khan	47	10
7	Bhawana	Chak No. 190		130
		Chak No. 192		133
		Chak No. 199		167
		Chak No. 221		156
		Chak No. 226		160
8	Liaquatpur	Chak No. 5/A		70
		Chak No. 17/A		44
		Chak No. 25/A		248
		Chak No. 26/A		76
		Chak No. 29/A		232
		Chak No. 30/A		220
Total			610	1661

Note: The total 610 Marla land required for construction of infrastructures in Tehsils Pakpattan, Kalar Kahar, Kot Momin, Bhawalanager, Khairpur Tamilwali will be acquired through VLD process, whereas majority of 1661 Marla land will in Tehsils Bhowana, Liaquatpur and Kehror Paka will be acquired through State Land NOC process.

3.7 Project Administrative Jurisdiction

The proposed project falls under the jurisdiction of Deputy Commissioners of relevant tehsils of province.

3.8 Project Implementation Schedule

The project will take 10 months in each village from start to finish. The commencement is scheduled simultaneously in June 2023.

3.9 Construction Activities and Required Machinery

Construction activities involve following:

- Earth work
- Structure/ Concrete works
- Pipe laying

Table 9 presents the list of expected machinery required for construction. The number of these machines will be finalized with the detailed design of the proposed road:



Table 9: List of expected Machinery/Equipment

1	Mobile Crane	15	Jack Hammer
2	Dumpers	16	Plate Compactor
3	Road/Power Roller	17	Wood Shuttering
4	Light Weight Compactor	18	Formwork
5	Ramming Machine	19	Steel Cage Shuttering Unit
6	Water Sprinkler and Water Tanker	20	Motor graders
7	Excavator	21	Generators
8	Tractor with Front Blade and Trolley	22	Welding Plant
9	Loader	23	Transit Mixer
10	Road Cutter	24	Vibrators
11	Pneumatic Tyred Roller (PTR)	25	Scaffolding
12	Tandem Roller	26	Light Transport
13	Concrete Mixer Machine	27	Mini/ Hand Roller
14	Tower Crane	28	Barricades

3.10 Construction Camps

Camp sites will be selected based on following considerations:

- Number of workforces deployed;
- Type and quantity of machinery mobilized;
- Availability of adequate area for establishing camp sites including parking areas for machinery, stores and workshops;
- Access to communication and local markets;
- Appropriate distance from sensitive areas including settlements and religious and/or cultural facilities.

Final locations will be selected by the contractor with the assistance of Supervision Consultant. A *centralized* construction camp will be preferred in tehsils where villages are geographically in close proximity; this will result in resource efficiency and better monitoring of construction activities. Care will be taken to safeguard the existing environment of the area and location shall be selected away from settlements. If the campsite is to be established on privately owned land, the contractors will acquire it on rental basis from private landowners. The contractors will return the land on as received basis. All debris, construction materials, left over chemicals and machinery shall be removed before handing back the premises to landowners.

3.11 Construction Materials

The materials used in construction of water supply, sewerage, overhead tanks pumping station & sewage treatment plant (STP) in all villages, would include coarse aggregates (crush), bricks, fine aggregates (sand), soil, water, pipes (RCC & HDPE), cement, reinforcement, asphalt etc.



3.12 Workforce Requirement

Workforce during Construction Phase

Total man power required on site for proposed Project will be approximately 15-30 workers per village per day, depending on the type of construction.

Workforce during Operation Phase

Total man power required during operation phase for proposed Project will be approximately 5 workers per village comprising skilled and unskilled staff.

3.13 Solid Waste Generation

Due to construction activities waste will be generated at construction and contractors camp site. The construction waste will include wastewater, oil spillage from machinery, domestic waste and waste construction materials. Solid waste generated during construction and camp sites will be safely disposed of in demarcated waste disposal sites.

Construction and Operation Phase

The solid waste generation is estimated to be 0.28kg/capita/day during construction phase of the proposed Project.

3.14 Water requirement

Construction Phase

The water consumption is estimated to be 30 liter/day/worker⁵ during construction phase of the proposed Project.

Operation Phase

The water consumption is estimated to be 30 liter/capita/day (during operation phase of the proposed project).

3.15 Wastewater Generation during Construction Phase

The wastewater generation is estimated to be 24 liter/capita/day⁶ for during construction phase of the proposed Project. Temporary toilets with cesspit will be adequately installed and treated periodically, and after the completion of work, the ground will be restored.

⁵ The most basic water requirement is stipulated by the World Health Organization (WHO) and varies between 20 and 50 litres per capita per day (LPCD).

⁶ Design Criteria of Public Health Engineering for Water Supply, Sewerage and Storm Water Drain (Domestic sewage generation = 80% of water consumed/day)



BASELINE PROFILE

4.1 General

This chapter presents the current environment around the proposed development which has been considered with respect to physical, ecological and socio-economic resources. The ESMP of the proposed project covers a comprehensive description of the project area, including the resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project.

ESMP teams conducted the reconnaissance and detailed field visits of the project area from December, 2022 to January, 2023. The prime objective of the field visits was to collect the baseline data on physical, eco-biological and environmental & social aspects along with identification, assessment and categorization of the significant environmental and social impacts of the proposed Project. The secondary data was collected from published sources/reports and relevant departments, which were also verified through visual observations during reconnaissance and detailed surveys.

4.2 Delineation of Study Area/ Area of Influence (Aoi)

As per the environmental screening study conducted earlier, the project falls in “Category E2”. The impacts of the project activities are limited and within the boundary of each targeted revenue village. The relevant revenue village is considered as project area and boundary of revenue village has been considered Area of Influence (Aoi).

To further explain the area of influence on the basis of the project activities, maps explaining the geographical scale and setting of sewerage and water supply network, water and wastewater treatment and disposal of the treated effluent in the pond situated within the principal settlement of the village are provided at annexure-2. It is to be noted that the outfall of the treated effluent is into the existing wastewater collection pond located within the boundary of the village (within the confines of Aoi). As the level of project intervention (water supply and treatment, wastewater collection and treatment system) and on ground conditions (such as sewerage ponds) are similar in all 26 villages therefore, maps of a typical village is shared to develop understanding of the area of influence.



As per the national and provincial regulations along with the requirements of World Bank's OP's, impacts and risks have been analyzed within the project Aol. Environmental and social impacts and risks will also be analyzed for all relevant stages of the project cycle, including pre-construction, construction and operation phases of the project.

4.3 Physical Environment

The physical environment includes topography, geology, soil, climate, hydrology, drainage, seismology, surface water, groundwater and ambient air.

4.3.1 Topography

The proposed project sites are rural settlements comprising residential and agriculture areas. The topography of the project area in south and center is predominantly flat. Whereas, Kallar Kahar in North cluster mainly comprises of mountains and hills. Ground elevation increases from South towards North. The ground elevations variation is given in **Table 10**:

Table 10: Topographic Variations

Sr. No.	Cluster	Tehsils	Elevation (ft)
1	South-I	Bahawalnagar	350 – 387
2		Bahawalpur	335 – 385
3	South-II	Karor pacca	335 – 387
4	South-III	Liaquatpur	387 – 420
5	Central-I	Bahwana	544 - 593
6	Central-II	Pakpattan	487 – 593
7	North	Kot Momin	563 – 610
8		Kallar Kahar	1920 – 2368

4.3.2 Geology

Punjab's area mostly consists of an alluvial plain formed by the southward-flowing Indus River and its four major tributaries. The general slope of the land is from northeast to southwest, but it rises in the areas between rivers. Approximately 70 percent land area of the province comprises flood plains of Indus basin. Geologically, lands in the flood plains are lightly mantled with alluvial deposits transported from the Himalaya foothills. The underlying bedrock is composed of Precambrian metamorphic and tertiary consolidated rocks. The overlying alluvium consists of Pleistocene to recent unconsolidated deposits of sand, clay and silt. The formation age of the alluvium also dates from Pleistocene to recent, the latter being predominant earth river banks and the former around the central part of the plains, no major fault zone traverses the project area.

Tehsil Kallar Kahar is only hilly area of project. The Salt Range is one of the most important geological and historical landmarks of Pakistan. The geology of Kallar Kahar area is mainly richly fossiliferous stratified rocks. These rocks also provide an excellent opportunity for appreciation of tectonics in the field.



4.3.3 Climate and Meteorology

A. Average Temperatures

The project area has hot summer and cold winters. The summer starts from May and lasts till September. June is the hottest month. The mean maximum varies between 37- 41 °C and minimum temperature varies between 24-29 °C respectively for month of June. The winter seasons lasts from November to February. January is the coldest month. The mean maximum ranges between 16 - 21 °C and mean minimum temperature are and 3 - 7 °C in January as shown in the table below: Heat waves and heat stroke.

Table 11: Temperature Variation in Summer and Winter Season

Sr. No.	Cluster	Tehsils	Average Annual Rainfall (mm)	Summer Season		Winter Season	
				Mean Max °C	Mean Min °C	Mean Max °C	Mean Min °C
1	South-I	Bahawalnagar	45	41	29	20	7
2		Bahawalpur	143	41	28	20	7
3	South-II	Kahror pakka	81	41	29	20	7
4	South-III	Liaquatpur	101	46	29	23	5
5	Central-I	Bahwana	135	45	29	21	5
6	Central-II	Pakpattan	95	41	29	20	8
7	North	Kot Momin	188	40	27	19	6
8		Kallar Kahar	206	37	24	16	3

In project areas most of the times of year sunny days dominate. A few days per month are partly cloudy and with seldom overcast days. The maximum participation days are observed during June to August.⁷ In project areas are classified as arid region having average annual rainfall less than 250 mm in a year. Highest intensity of rain is recorded in month of June, July and August owing to monsoon season.

B. Wind

In targeted tehsils windier part of the year is April to August. In south and center zone of the Punjab has June as windiest month. Whereas, in North April is windiest month. In South Punjab dust storms are common from June to August.

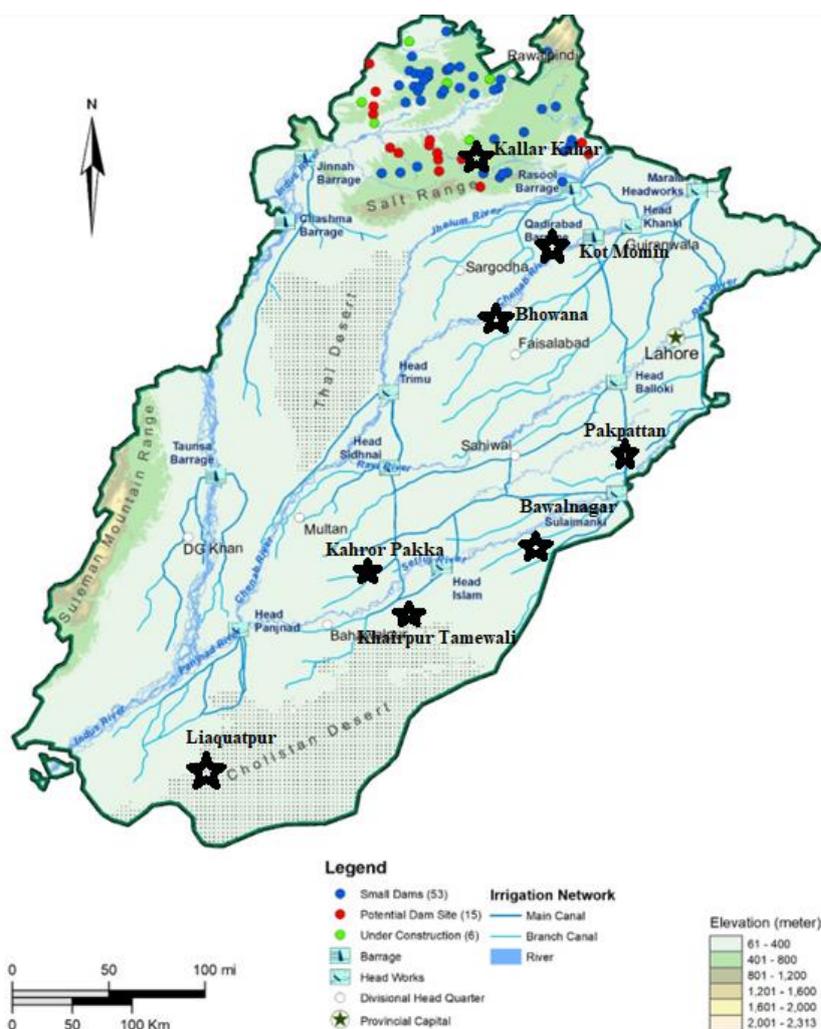
⁷ https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/chiniot_pakistan_1181096

Table 12: Average Wind Speed and Windiest Month in Tehsils

Sr. No.	Cluster	Tehsils	Windiest Month	Avg Wind Speed
1	South-I	Bahawalnagar	June	13.6 Km/hr
2		Khairpur Tamianwali	June	15.7 Km/hr
3	South-II	Karor pacca	June	15.3 Km/hr
4	South-III	Liaquatpur	June	16.2 Km/hr
5	Central-I	Bahwana	June	10.2 Km/hr
6	Central-II	Pakpattan	June	12.4 Km/hr
7	North	Kot Momin	April	9.6 Km/hr
8		Kallar Kahar	April	9.4 Km/hr

4.3.4 Water Resources

Description of surface water and groundwater of targeted villages in different tehsils is as under. Hydrology map of Punjab Province is shown in **Figure 3**.



Source: The Urban Unit on Irrigation department of Punjab Statistics.

Figure 3: Hydrology Map of Punjab Province



Surface water

Punjab is land of Indus River and its four major tributaries in Pakistan, the Jhelum, Chenab, Ravi, and Sutlej rivers. Punjab Irrigation system is one of the world's largest irrigation systems with a command area of over 21 million acres. The system consists of 24 main canals and 12 barrages and vast network of canals, distributaries and minors spanning over 40,000 kilometers. Targeted villages in north, south and center of the Punjab are in command of this irrigation system except for villages in Kallar Kahar, there is no canal or distributary passing nearby. The detail of canal and distributaries passing within or nearby the targeted villages is shared in **table 13**:

Table 13: Surface Water Bodies in Targeted Villages of Relevant Tehsils

Sr. No.	Cluster	Tehsils	Surface Water Bodies of targeted villages in Tehsils			
			Main Canal	Branch Canal	Distributary	Minor Canal
1	South-I	Bahawalnagar	Fordwah	Hakara		
2		Khairpur Tamianwali	Bahawal Canal		Qayamwah, Baagh Ali	
3	South-II	Karor pacca	Chit	Lohdran	Basant, Gopal	
4	South-III	Liaquatpur		Abbasia	1R, 2R, 3R	
5	Central-I	Bahwana		Jhang Branch	Nille No.1 Mochiwala Sultan Pakhra	Arbi Minor
6	Central-II	Pakpattan	Pakpattan			Pakpattan
7	North	Kot Momin	Lower Jhelum	N/A	Kot Momin	N/A
8		Kallar Kahar	N/A	N/A	N/A	N/A

Groundwater/Drinking Water Quality

The findings of the groundwater investigation indicate that the project area has a plentiful supply of groundwater available at depths ranging from 30 to 60 feet, with the exception of the villages of Liquatpur and Kallar Kahar. Liquatpur is characterized by water-logged conditions, while Kallar Kahar is a hilly area where groundwater is situated at depths exceeding 300 feet. The groundwater analysis of the targeted villages in different tehsils revealed the following facts in **table 14**:

Table 14: Groundwater Analysis

Sr. No.	Cluster	Tehsils	Groundwater Detail of targeted villages in Tehsils				
			Depth	Taste	Color	Source	Remarks
1	South-I	Bahawalnagar	30-40 ft	Brackish	Clear	Seepage of Canal Water	High fluoride
2		Khairpur Tamianwali	40-50 ft	Non-Objectionable	Clear	Groundwater	
3	South-II	Karor Pacca	50-60 ft	Non-Objectionable	Clear	Groundwater	Microbial contamination
4	South-III	Liaquatpur	<5ft	Brackish	Clear	Seepage of Canal water	High TDS and Hardness,



							Microbiological contamination
5	Central-I	Bahwana	30 – 40 ft	Non-Objectionable	Yellowish	Groundwater	High turbidity
6	Central-II	Pakpattan	50 – 60 ft	Non-Objectionable	Clear	Groundwater	-
7	North	Kot Momin	30 – 40 ft	Non-Objectionable	Clear	Groundwater	-
8		Kallar Kahar	300 – 350 ft	Non-Objectionable	Clear	Groundwater	Microbiological contamination

Based on the data in the table 14, where the groundwater is brackish, seepage from the canal water will serve as the primary source of water for the water supply system. Whereas, in areas where the groundwater is deemed acceptable in terms of taste, it will be utilized as a source of water following appropriate treatment measures as indicated below:

- Chlorination for Microbial contamination
- Sand and carbon filters for turbidity
- Adsorption media filter for Arsenic / fluoride

A link to the waste and surface water quality is below:

<https://drive.google.com/drive/folders/1ciEcWVSwJToOk6ZTJD7suzwZCpP4q5MX?usp=sharing>

4.3.5 Environmental Monitoring, Sampling and Testing

In order to determine the ambient air, noise levels, groundwater/ drinking water quality, environmental monitoring was carried out through EPA approved environmental labs in the project area. The sampling locations for the environmental monitoring of ambient air, noise and groundwater/ drinking water and wastewater for the relevant tehsils lies within the boundary of the selected villages. To analyze the quality of groundwater and surface water, monitoring was performed for all the villages.

A. Ambient Air Quality

The ambient air quality monitoring period was 24 hours. The results of ambient air quality monitoring are given in **Table 15**.

Table 15: Ambient Air Quality Results

Sr. No.	Parameters	Avg. sampling time	Unit	Location							PEQS	
				South-I Bawalnagar Chak M. Zaman	South-I Khatrpur T. Sheikh Wahan	South-II Kahror Pakka Gulhar	South-III Liaquatpur Chak-17	Central-I Bohwana Chak 225	Central-II Pakpattan Daku Chisti	North Kot Momin Naseerpur Khurd		North Kallar Kahar Gahi
1	Carbon monoxide		mg/m ³ (8 Hour)	0.79	0.87	1.25	1.79	1.175	1.466	1.29	1.26	5



2	Sulphur dioxide	$\mu\text{g}/\text{m}^3$	22.56	20.36	25.27	35.98	16.66	24.98	25.4	26.54	120
3	Ozone	$\mu\text{g}/\text{m}^3$ (1 Hour)	-	-	-	102	68.1	-	88	97	130
4	Nitric oxide	$\mu\text{g}/\text{m}^3$	14.98	16.94	10.89	2.75	0.473	4.12	2.42	2.42	40
5	Nitrogen Dioxide	$\mu\text{g}/\text{m}^3$	25.78	42.54	8.97	17.99	5.971	12.32	19.4	18.1	80
6	PM _(2.5)	$\mu\text{g}/\text{m}^3$	23.53	24.51	28.97	50.2	147.6	67.97	50.4	53.1	35
7	PM ₍₁₀₎	$\mu\text{g}/\text{m}^3$	85.23	74.56	99.82	148.1	239.6	148.6	147.8	145.5	150
8	Suspended particulate Matter	$\mu\text{g}/\text{m}^3$	130	123.6	156.8	396.2	458.6	325.8	389.5	388.2	500

The ambient air quality monitoring is carried out via mobile air quality laboratories that are stationed at the sides of roads. As a result, areas with heavy traffic may exhibit higher concentrations of particulate matter and gases emanating from vehicular exhausts. The central and northern regions of Punjab are comparatively more industrialized than the southern region, which leads to a greater prevalence of anthropogenic sources of air pollution. This disparity is also reflected in the results of the air quality monitoring, where PM_{2.5} and PM₁₀ levels that are near the prescribed limits of the Punjab Environmental Quality Standards (PEQS) are highlighted in yellow in the table. If the levels of particulate matter exceed the prescribed limit set by PEQS, they are highlighted in red in the table.

B. Noise Level

Noise levels were monitored with the help of a portable digital sound meter at the project area for 24 (twenty-four) hours. The results of noise monitoring are given in **Table 16**.

Table 16: Noise Monitoring Results

Zone	Tehsils	Priority Villages	Equivalent Noise Level (Leq) dB(A)		PEQS Limit dB(A)	
			Day Time	Night Time	Day Time	Night Time
Central-I	Pakpattan	Arifabad	56.7	45.2	75	65
Central-II	Bahwana	Chak 192	60.7	52.7		
		Chak 226	61.9	51.1		
North	Kallar kahar	Makhyal	53.9	49.2		
		Gahi	54.2	50.6		
	Kot Momin	Naseerpur Khurd	54	50		
South-I	Bahawalnagar	Chak M Zaman	54.5	42.4		
		Chak Sadiq Nagar	53.1	39.0		
	Khairpur Tamewali	Sheikh Wahan	55.7	41		
		ISA	54.0	42		
South-II	Kahrora Pakka	Gulhar	61.9	51.1		

		Chak 17	54.9	50.1		
South-III	Liaquatpur	Chak 29	53.2	49.4		

The results of the noise monitoring conducted indicate that none of the readings obtained from any of the villages exceeded the prescribed noise limits as set forth by the Punjab Environmental Quality Standards

C. Wastewater Quality

Wastewater samples were collected and was analyzed. The analysis results of wastewater samples are compared with PEQS. The detailed monitored results for wastewater quality are given in **Table 17**.



Plate 1: Sampling of wastewater

Table 17: Results of Wastewater

Sr. No.	Parameters	Unit	Location								PEQS
			South-I KPT Sheikh Wahan	South-I Bawalnagar Chak Sadig	South-II Kahror Pakka	South-III Liaquatpur Chak-25	Central-I Bohwana Chak 190	Central-II Pakpattan Sochan	North Kot Momin Naseerpur Khurd	North Kallar Kahar Gahi	
1	pH		7.58	7.68	7.73	7.27	8.41	7.62	7.08	7.80	6-9
2	Chemical Oxygen Demand	mg/L	157	167	168	208	144	184	208	232	150
3	Biochemical Oxygen Demand	mg/L	83	98	88	108	88	114	128	148	80
4	Total Suspended Solid (TSS)	mg/L	72	135	245	165	160	75	170	180	200
5	Oil & Grease	mg/L	0.0	2.5	0.0	7.8	0.0	0.0	0.0	0.0	10

The collected samples of wastewater are not representative, as they are spot samples taken from open drains and channels. However, the analysis of the wastewater samples indicates that the levels of biological oxygen demand (BOD), chemical oxygen demand (COD), and total suspended solids (TSS) fall within the typical range of sewerage. It should be noted that the BOD and COD levels are higher than the limits established in the Punjab Environmental Quality Standards (PEQS). To meet the PEQS requirements, a potential solution is to utilize an Anaerobic Baffled Reactor (ABR) for wastewater treatment, which can readily ensure compliance with these standards.

4.3.6 Seismology

All tehsils of the project area are located in a low Hazard earthquake zone (Zone 2A) except Kallar Kahar (Zone 2B). Figure 4.19 shows the seismic zoning map of Pakistan.

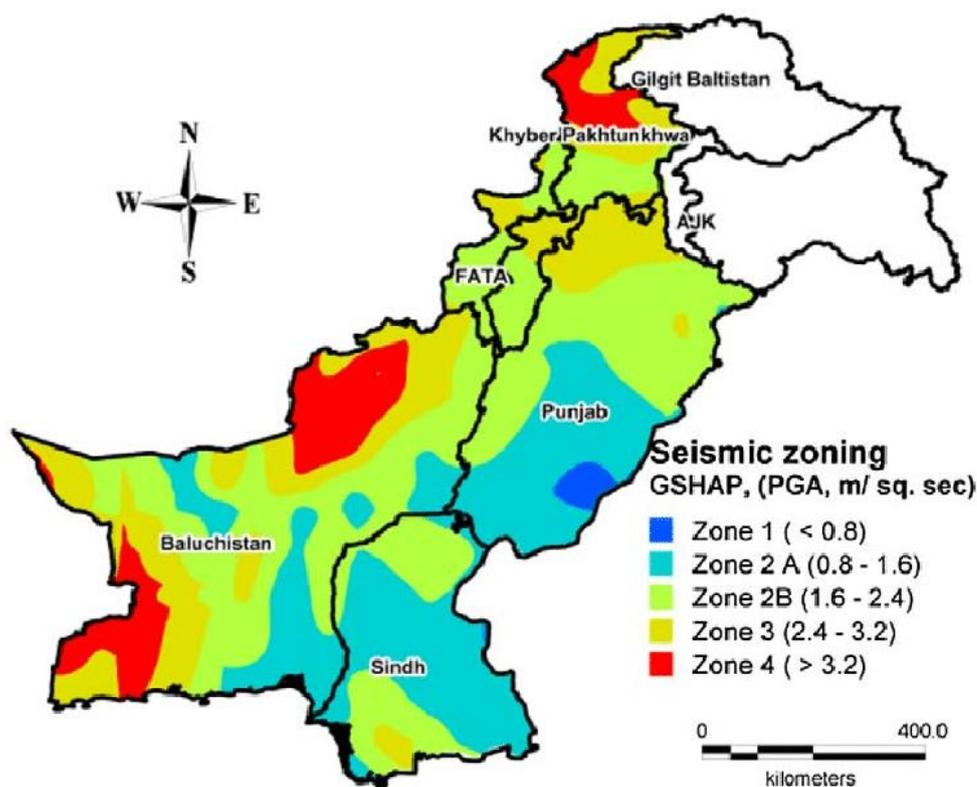


Figure 4: Seismic Zone Map of Project Area



4.4 Sensitive Receptors

Village wise sensitive receptors are identified in the table 18 below:

Table 18: Sensitive Receptors

Zone	Tehsils	Priority Villages	Sensitive Receptors				
			Hospital/ BHU	School	Worship Places	Grave-yards/ Shrine	Others
Canter-I	Pakpattan	Arifabad	0	2	1	1	
		Dhaku Chishti	1	1	1	0	
		Sochan	0	1	1	0	
Center-II	Bhawana	Chak 190	-	2	1	-	
		Chak 192	-	2	3	-	
		Chak 199	0	2	1	-	
		Chak 221	1	3	2	-	
		Chak 226	-	2	2	-	
North	Kallar kahar	Makhyal	-	2	4	4	
		Gahi	-	2	2	3	
	Kot Momin	Naseerpur Khurd	-	2	1	1	
South-I	Bahawalnagar	Chak M Zaman	-	3	1	-	
		Chak Sadiq Nagar	1	5	3	2	
	Khairpur Tamewali	Sheikh Wahan	2	6	3	3	
		ISA	-	2	1	1	
South-II	Kahrur Pakka	Choki Rangu Khan	-	2	3	-	
		Chowki Soba Khan	-	2	3	1	
		Dhora Mahar	-	-	3	-	
		Gulhar	-	2	1	1	
		Muhammad Pur	-	1	3	-	
South-III	Liaqatpur	Chak 5	-	2	2	3	
		Chak 17	1	1	1	-	
		Chak 25	-	4	3	3	
		Chak 26	-	2	1	1	
		Chak 29	-	3	3	-	
		Chak 30	-	3	2	2	
Total		26					

Note: The socially sensitive receptors listed in the table above are within a radius of 100 meters of the execution of work. This distance of 100 meters has been taken as per screening checklist provided in ESMF and also validated through experiences of various EDSC Consultants.



4.5 Biological Environment

Project area is rich in biodiversity because of its diverse landscape and geographical location. The variety of ecosystem is evident and is home to various species. The following section describes the biological environment of the project area.

4.5.1 Flora

The major floral species found in the project area include the following:

Zone	Tehsils	Floral Species
Central-I	Pakpattan	Sumbal (<i>Bombax ceiba</i>), Shesham (<i>Dalbergia sissoo</i>), Eucalyptus (<i>Eucalyptus globulus</i>), Kikar (<i>Acacia karoo</i>), Peepal (<i>Ficus religiosa</i>), Neem (<i>Azadirachta indica</i>) and Poplar (<i>Populus</i>), Mulberries (<i>Morus rubra</i>), Beri (<i>Ziziphus mauritiana</i>), Peaches (<i>Prunus persica</i>) Guava (<i>Psidium guajava</i>), Sweet Lime (<i>Citrus Limetta</i>), Lime (<i>Citrus limon</i>), Date Palm (<i>Phoenix dactylifera</i>) and Jaman (<i>Syzygium cumini</i>), Stenotaphrum, Cyperus rotundus and Phalaris Minor
Central-II	Bahwana	Jand trees (<i>Prosopis spicigera</i>), Karir (<i>Capparisaphylla</i>), Beri (Zizyphus jajaba), Van (<i>Salvadora abeoides</i>), Kikar (<i>Acacia arbica</i>), Shisham (<i>Dalbergia</i>), Aak (<i>Calotropis hamiltonii</i>), Eucalyptus (<i>Eucalyptus camaldulensis</i>), Jaman (<i>Syzygium cumini</i>), Sirris (<i>Albizia lebbek</i>), Neem (<i>Azadirachta indica</i>), Poplar (<i>Salicaceae</i>), Toot/Mulbery/Pilken (<i>Morus alba</i>), Beeri Patta (<i>Heterophragma adenophyllum</i>), Willow (<i>Salix babylonica</i>), Frash (<i>Tamarix aphylla</i>), Simal (<i>Bombax cieba</i>) Palm/Khajoor
North	Kallar Kahar	Zizyphus mauritiana, Morus nigra Eucalyptus citriodora. Khabbal (<i>Cynodon dactylon</i>) Conyza bonariensis Brachiaria ramosa Cannabis sativa, Parthenium hysterophorus, Malvastrum coromandelianum, Datura innoxia, Oxalis corniculata, Amaranthus viridis Aerva javanica Chrysopogon serrulatus, Apluda mutica Heteropogon contortus Justicia adhatoda, Dodonaea viscosa, Asparagus gracilis, Opuntia dillenii
	Kot Momin	the van (<i>Salvadora abeoides</i>), Kari (<i>Salsola foetida</i>), jand (<i>Prosopis spicigera</i>) and malla (Zizyphus nummularia), Kikar (<i>Acacia arabica</i>) and Thali (<i>Dalbergia sissoo</i>), Uksh or Kash or Fareash (<i>Tamarix articulata</i>), Bair (Zizyphus Mauritiana), Tahli or Sheesham (<i>Dalbergia Sissoo</i>), Van (<i>Salvadora Oleoides</i>)
South-I	Bahawalnagar	The Van (<i>Salvadora oleoides</i>), Karil (<i>Capparis aphylla</i>), Jand (<i>Prosopis spicigera</i>), Beri (<i>Zizyphus jajaba</i>), mallha (Zizyphus nummularia) and Shisham (<i>Dalbergia Sissoo</i>)
	Khairpur Tamewali	Kikar (<i>Acacia Nilotica</i>), Frash (<i>Tamasix Aphylla</i>), Pillu (<i>Salvadora Oleoides</i>), Jand (<i>Prosopis Spicigera</i>), Karir (<i>Capparisaphylla</i>), Phog, Khar,
South-II	Kahrora Pakka	The Van (<i>Salvadora oleoides</i>), Karil (<i>Capparis aphylla</i>), Jand (<i>Prosopis spicigera</i>), Beri (<i>Zizyphus jajaba</i>), Kikar (<i>Acacia Nilotica</i>), Frash (<i>Tamasix Aphylla</i>), Pillu (<i>Salvadora Oleoides</i>),
South-III	Liaquatpur	Calligonum polygonoides, Alhagi camelorum, Acacia jacquemontii, Prosopis spicigera, Pennisetum dichotomum, Leptadaenia spartium, Capparis decidua, Haloxylon polygonoides, Dalbergia sissoo, Acacia nilotica, Eucalyptus camaldulensis, Prosopis glandulosa, Saccharum bengalense, Imperata cylindrical, Conyza ambigua, Aeluropus lagopoides, Cymbopogon jwarancusa



4.5.2 Fauna

The faunal species observed in the project areas were verified with the secondary data resources of the Punjab Forest, Wildlife and Fisheries Department and World Wildlife Fund (WWF). The species in vicinity include the following:

A. Mammals

Common animals found in the project area include dogs, cats, house rats and bats. Domestic livestock observed during field visits include buffaloes, cattle, goats, sheep, and donkeys that are used by the local residents for their livelihood.

B. Amphibians

Bullfrog (*Hoplobatrachus tigernius*), Pahari tidda maindak (*Fejervarya limnocharis*) and Indus valley toad (*Bufo stomaticus*) are also present in the nearby ponds and canals during rainy season.

C. Birds

House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) are the most common sight in the area. In addition, following birds are also seen in the project area.

Common Name	Scientific Name
Nightingale	<i>Pycnontus cafer</i>
Parrot	<i>Psittacula krameri</i>
Pigeon	<i>Columba livia</i>
Hoopoe	<i>Upupa epops</i>
Koel	<i>Eudynamys scolopacea</i>
Black kite	<i>Mivus migrains</i>

D. Reptiles

Common tree lizard (*Calotes versicolor*), Monitor lizard (*Varnus bengalensis*), fat tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are observed in and around the proposed site. Indian soft-shell turtle (*Aspideretes gangeticus*) and Indian falpshell (*Lisseyms punctate andersoni*) are also reported by the local residents.

4.5.3 Endangered Species

There are no endangered species of flora and fauna observed in the Study Area.



4.5.4 Legally Protected Areas

The Government of Punjab through Punjab Legally Protected Areas act 2020 may declare an area to be called a protected area, with a specific name such as wetlands, national park, wildlife or game reserves. In order to provide for the protection, preservation, conservation and management of ecologically important areas.

A table indicating legally protected areas and other important ecological hotspots in different district of Punjab is attached below and the wetlands present in the district of the project areas are highlighted red and their distances from the project site is listed below

Sr. No.	Name of Legally Protected Area	Status	District	Distance from nearest project village
1	Bajwat	Game Reserve	Sialkot	250 km
2	Ghamaghar Lake	Not Protected	Kasur	140 km
3	Head Islam	Game Reserve	Multan	150 km
4	Jahlar Lake	Not Protected	Khushab	80 km
5	Kalar Kahar Lake	Wildlife Sanctuary	Chakwal	18 km
6	Khabbaki Lake	Wildlife Sanctuary	Khushab	160 km
7	Kharrar (Kharal) Lake	Wildlife Sanctuary	Okara	70 km
8	Lal Suhanra (Patisar) Lake	National Park	Bahawalpur	30 km
9	Mangla Dam	Not Protected	Jhelum	57 km
10	Marala Headworks	Not Protected	Sialkot	160 km
11	Nammal Lake	Wildlife Sanctuary	Khushab	100 km
12	Qadirabad Barrage	Not Protected	Gujrawala	79 km
13	Qadirabad Link Canal	Game Reserve	Gujrat	100 km
14	Rasool (Rasul) Barrage	Wildlife Sanctuary	Gujrat	90 km
15	Soan River	Not Known	Chakwal	100 km
16	Taunsa Barrage	Wildlife Sanctuary	Muzaffargarh/D GK	43 km
17	Ucchali Lake	Ramsar Site	Khushab	105 km

As indicated from the above table, there are no legally protected areas in the area or in the influence of the project area. The nearest legally protected area is about 16 km away from the nearest project village. A map indicating wildlife sanctuaries and game reserve in different district of Punjab is attached below.

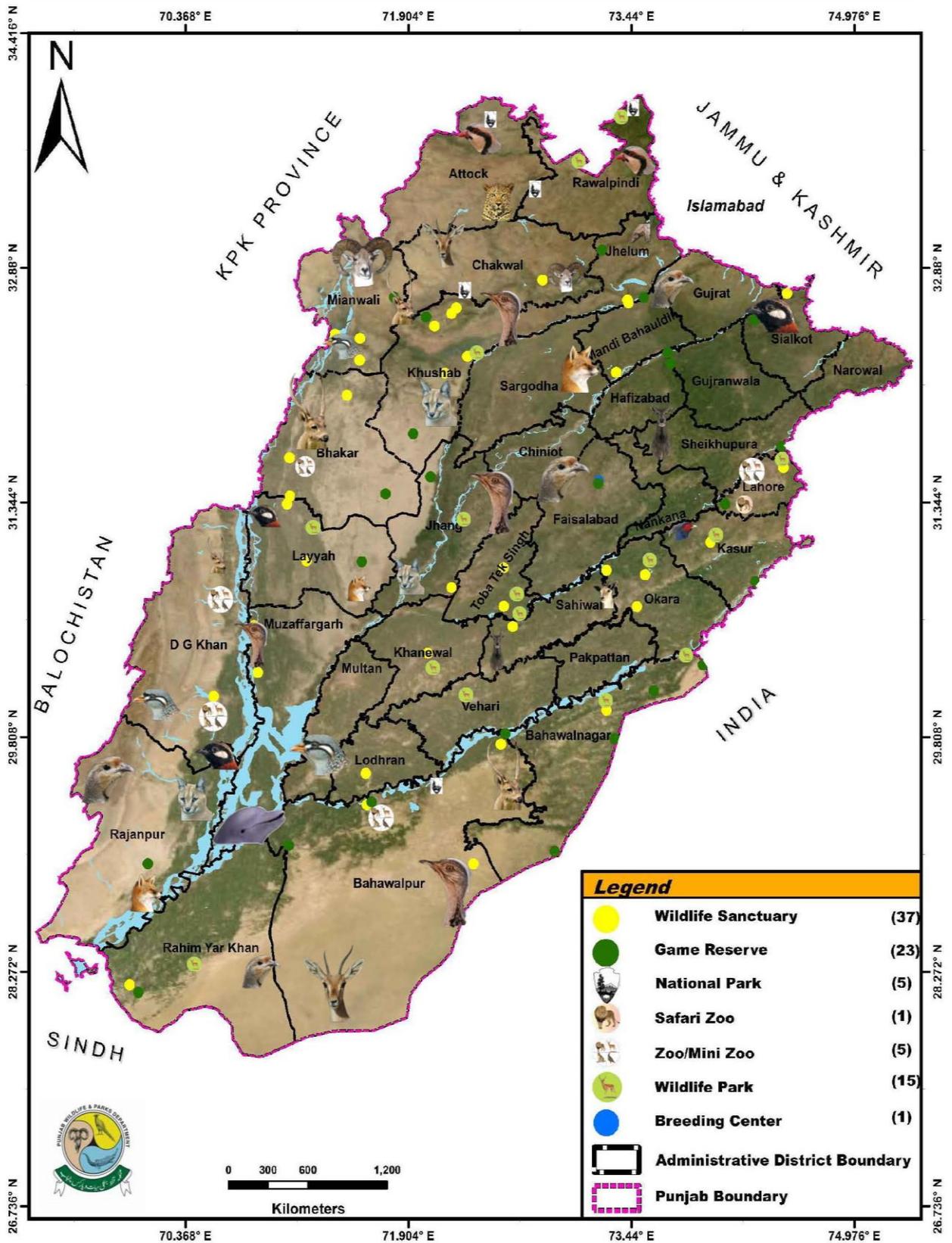


Figure 5: Wildlife Sanctuaries and Game Reserves



4.6 Socioeconomic Profile

4.6.1 Population Size

The project is expected to benefit about 12,000 households in the 26 priority villages. The average population size is less than 3,000 persons per village. However, two larger villages (Sadiqnagar and Sheikh Wahan) are also included, both in the south region.

Cluster	Tehsil	Villages	Number of Households	Male	Female	All sexes
North	Kallar Kahar	Gahi	587	1,690	1561	3,251
		Makhyal	544	1,552	1,433	2,985
	Kot Momin	Naseerpur khrud	226	761	703	1,464
Center	Bhawana	Chak.190	229	888	819	1,707
		Chak.192	193	715	660	1,375
		Chak.199	740	2,187	2,018	4,205
		Chak.221	629	1,682	1,553	3,235
		Chak.226	480	1,562	1,441	3,003
	Pakpattan	Arifabad	279	893	824	1,717
		Dhaku Chihshiti	658	2,152	1,987	4,139
		Sochan	579	2,078	1,919	3,997
South	Bahawalnagar	Chak.Zaman	196	643	594	1,237
		Chak. Sadiqnagar	1,567	4,430	4,089	8,519
	K.P.T	Moza ISA	127	461	425	886
		Shekh Whan	1,391	4,769	4,402	9,171
	Kahror Pakka	Choki Rangu khan	732	2,119	1,956	4,075
		Gulhar	183	661	611	1,272
		Mohammdpur	143	561	518	1,079
		Choki Sooba khan	262	855	789	1,644
		Dora Mahr	48	147	135	282
		Liaqatpur	Chak.5	235	840	775
	Chak 17	242	901	831	1,732	
	Chak 25	391	1,494	1,379	2,873	
	Chak 26	282	939	866	1,805	
Chak 29	442	1,344	1,241	2,585		
Chak 30	323	1,109	1,023	2,132		
Grand Total			11,708	37,433	34,552	71,985

Table 19: Primary data results of Project Area

4.6.2 Findings of Socioeconomic Survey

A. Occupational Status

Agriculture is the primary occupation in the project area, except in Kallar Kahar due to hilly terrain, non-availability of irrigation system, deep groundwater table and small size of land holdings limit agriculture to only a subsistence level. As a result, the majority of the population is engaged in labour, as well as private and Government jobs. In almost all the tehsils of the project area, the majority of individuals are identified as landowners, a significant proportion works as laborers, while owning a business is the third most common occupation. The trend of Government and private jobs is also observed in the project area. **Figure 6** presents percentages of the various occupations in the project area, based on interactions with project communities during field visits, consultations and limited surveys.

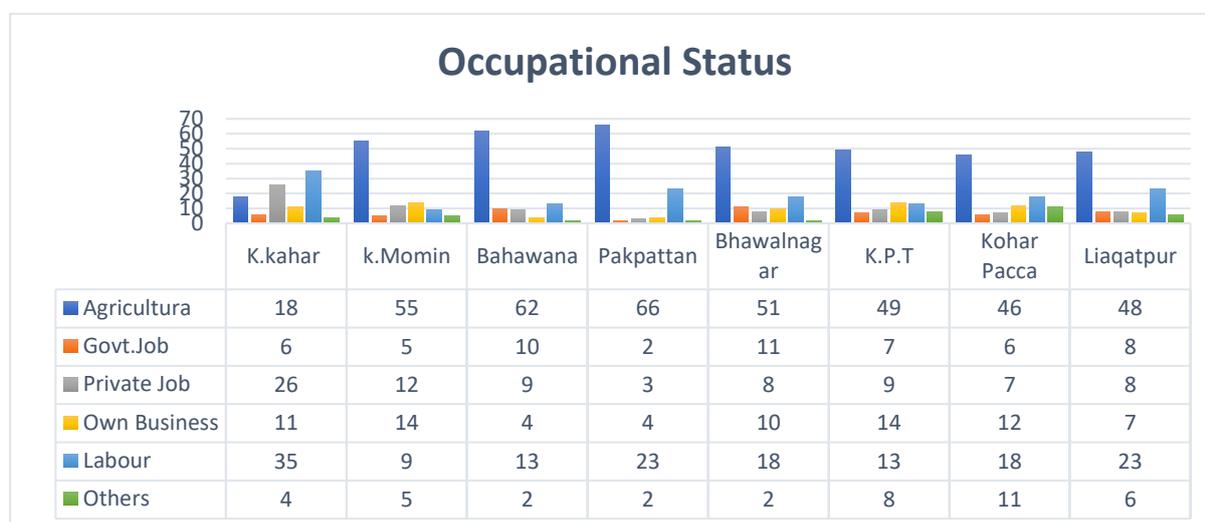


Figure 6: Occupational Status of the Respondents

B. Religion

Islam is the dominant religion in Punjab where, according to the 2017 census, Muslims constitute 97.78% of the population. The minorities include Christians (1.88%), followed by Hindus (0.19%), and other minority groups (0.15%). Based on primary data collected during ESMP preparation, the trend holds for the project area, where Muslims are an overwhelming majority. Christians are the largest minority group accounting for 1.75% of the population and present in all tehsils of the project area. In Tehsil Liaqatpur, a small population of Hindus is also present in five (out of the six) priority villages (Chak No. 17A, Chak No. 25A- Jinnah Colony, Chak No. 26A, Chak No. 29/A and Chak No 30A).

C. Caste System

Several castes/clans have been reported in the project area. Rajpoot, Jutt, Pathan, Awan, Chishti, Bodla, and Arain are among the dominant castes found in the overall project area. In Kallar Kahar, Awan is the majority caste, whereas Jutt, Rajas are also found. In Bhowana and



Pakpattan, Arain, Rajputs and Gujjars are in majority, whereas, Syed, Bodla, and Chishtis also have significant presence. In Bahawalnagar and Khairpur Tamewali, Jutt and Syed are the majority castes, while Chisthi and Wattoos also constitute a considerable proportion of the total population. In Kahror Pakka, Baloch and Kanju are the main castes of the area, while a considerable proportion of population consists of Syed, Rajput, and Jutts. In Liaquatpur, Baloch, Jutt and Waseer are the main casts of the tehsil, while Chandia, and Lashari also maintain significant presence. Despite the concentration of one or two castes in some tehsils, no significant disputes exist among the different castes.

D. Income Levels

The monthly income earned by individuals from various sources varies widely ranging from less than Rs. 20,000 to above Rs. 60,000. Many individuals reported that their income barely covers the basis of household expenses.

In general, the agriculturists and landlords in the project area are wealthier, with incomes often exceeding Rs. 60,000 per month. However, laborers are financially vulnerable, with limited income and resources to support their families. Based on consultations held in project area, 10% or more of the population has a comfortable financial position, while more than 17% of the population has a monthly income below Rs. 20,000/month. The highest incidence of poverty was reported in Tehsil Kehror Pakka and Khairpur Tamiwali. While there are varying income levels found amongst the population, the disparity is not very stark between the different layers. Almost one-fourth of the respondents reported a reasonable average income of Rs. 40,000 to 50,000 in all tehsils of the project area. Percentage of the average monthly income of the respondents is shown in **Figure 7**.

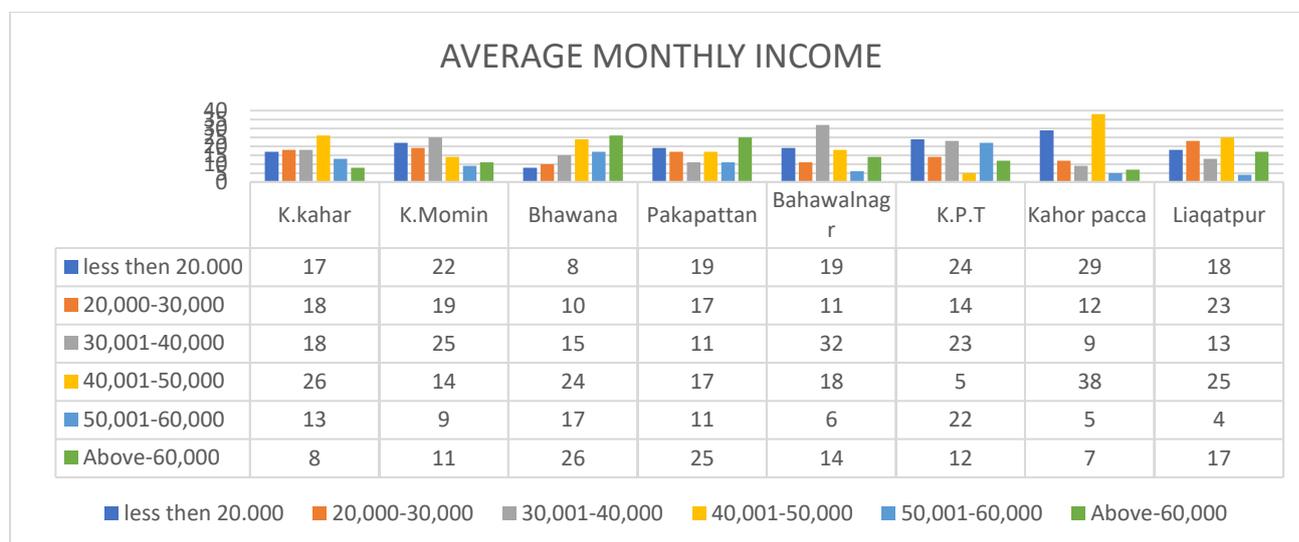
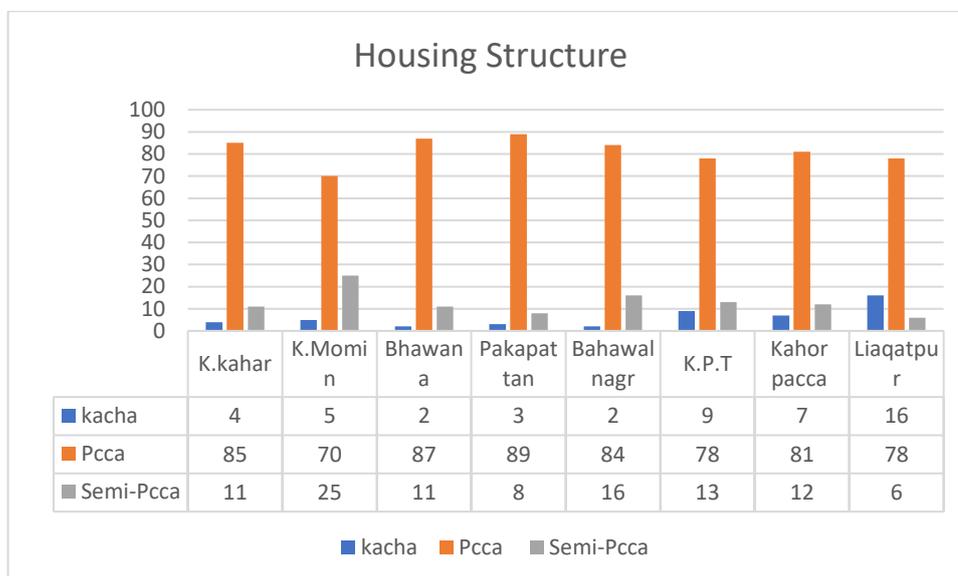


Figure 7: Monthly Income of the Respondents

E. Housing Construction Pattern

During field visits, it was observed that the proposed project areas lack basic amenities. However, the trend of *kacha* houses has diminished and most people have built *pacca* houses with RCC roofs, stone walls with cement mortar, cement plastering & flooring. A few semi-

pacca houses and kacha houses were reported in South Punjab (Kehror Pakka and Liaquatpur tehsils). Type of construction, as shown in **Figure 8**, also corresponds roughly with the income levels described above.



Note: Kacha = A structure constructed of mud.

Semi-Pacca = A structure constructed of a mixture of mud and bricks.

Pacca = A structure constructed of concrete and cement blocks/bricks.

Figure 8: Type of Construction of House

F. Mode of Transport

Public transport facilities are not sufficiently present in the south and North area and people use their personal motorbikes, cycles, and cars, etc. for traveling. However, in Center, people also use Rickshaws. In case of emergencies, they call Rescue 1122 and get aid in 5-10 minutes of time. The project activities are unlikely to impact the transportation modes. However, it will be ensured that access of Rescue 1122 vehicles is not hindered due to project activities.

G. Communications

The project area has telephone connections for internet services and mobile phone coverage is also available, allowing people to access to the internet through their mobile phones. The access roads to all the project sites are in good condition, although the situation of internal streets and roads is poor. The village roads and streets are either metaled, soling, or unpaved. Motorways pass through the project Tehsils Kalar Kahar (although the project villages are around 8 km away from the motorway) and Kot Momin (the project villages are within 2-5 km distance from the motorway). In Tehsil Pakpattan, Bhowana, Kehror Pakka and Liaquatpur



Railway network are also available for communication and highways communication facilities are available in all tehsils of the project area.

H. Health Conditions and Facilities

The poor health conditions in the project area are one of the reasons for initiating the proposed project. The quality of potable water available throughout the project area is highly compromised, as indicated in Section 4.5.4. This has led to the prevalence of several waterborne disease and stunted growth in the project area. The most common diseases in these areas include typhoid, cholera hepatitis, diarrhea, intestinal worms and malaria.

The project area has varying levels of access to health facilities. In the central and northern tehsils of the project area (Pakpattan, Bhowana, Kalar Kahar, and Kot Momin), relatively better health facilities available compared to the southern parts (Liaqatpur, Kehror Pakka, and Khairpur Tamiwali), where access to health facilities is limited. However, Basic Health Units (BHU) are present in these southern areas, providing basic medical services to the population.

I. Educational Facilities

Primary. Middle and High schools are present in the proposed villages. The list of educational facilities located close to the proposed construction and excavation sites is provided as social sensitive receptors in Table-18.

J. Basic Civic Amenities in the Project Area

The proposed project area lacks basic civic amenities including water supply, sewerage system, stormwater drainage, solid waste management, gas supply. Telephone connections are available in the project area, but are limited in some areas. The only facility available in the proposed project area is electricity, which is also inadequate as people suffer long hours of load-shedding and low voltage issues.

K. Mechanism of Conflict Resolution

During the field survey, the project team conducted discussions with local communities to identify the types of disputes commonly prevailing in the project area. The survey revealed that disputes over land, water resources, and property inheritance are the most common causes of conflict. These disputes tend to escalate quickly and often result in violence, thereby causing loss of life, property damage, and displacement of communities. In some cases, the police and judicial system have been ineffective in resolving these conflicts, leading to a lack of trust in state institutions, especially in southern region of project area. In addition, inter-caste tensions, religious differences, and political affiliations may also contribute to the conflict, though no major fault-lines were observed along these.

At the community level in project area, conflict resolution is often handled through informal methods of mediation and negotiation. Local elders, community leaders, and religious figures play a significant role in resolving conflicts in priority villages. The traditional methods of dispute resolution include Jirgas (councils of elders) and Panchayats also called Kathas (village



councils). These methods often involve face-to-face meetings, with both parties presenting their case and a neutral third party facilitating the resolution. In addition to these informal methods, legal systems such as the Punjab Local Government Act 2019 and the Alternative Dispute Resolution Act 2017 also provide a formal mechanism for resolving disputes. However, the use of formal systems is limited in project areas due to lack of accessibility, awareness and enforcement of aforementioned acts. Overall, conflict resolution at the community level in project area is a combination of traditional and modern approaches, with a focus on finding mutually agreeable solutions that maintain social harmony. The proposed GRM system of the project will also strengthen present conflict resolution systems (Village Councils, Jirgas, Panchayats etc.) of the project area. The proposed GRM system will not only improve but also make the Village Councils, Jirgas and Panchayats inclusive and will also sensitize the community about GRM.

L. Presence of NGOs/ CBOs

There are several NGOs and CBOs present in the project area. According to stakeholder consultations and institutional stakeholder consultations, Punjab Rural Support Programme (PRSP) and National Rural Support Programme (NRSP) are working in Tehsil Liaquatpur, Kehror Pakka, Khairpur Tamiwali, and Bhawalangar areas. The scope of both NGOs is WASH, which is also within the mandate of PRMSC. Therefore, these and other similar NGOs have also been identified as important stakeholder of the project. Similarly, Akhoowat and Kashaf are also working in Tehsil Pakpattan, Bhowana, and Kot Momin, providing microfinance and small-scale loan services. Community-Based Organizations (CBOs) were also reported in Tehsil Bhowana and Liaquatpur, working to support marriages, funeral prayers, and other financial needs of the community. CBOs can play an important role in social mobilization, behavior change in target villages, and tariff collection and O&M of the schemes.

4.6.3 Results of Gender Situation Survey

- A gender situation analysis was conducted in all 26 villages/sub-villages across eight tehsils through focus group discussions. The purpose of this qualitative survey was to identify women-related concerns, gender roles and responsibilities, education levels, occupational status, involvement in agriculture and livestock, access to health facilities, willingness to pay, access to power and resources, prevalence of gender-based violence, and needs assessment.
- Traditional gender roles and responsibilities in rural Punjab Center, North, and South are almost identical, with women primarily responsible for domestic and caregiving tasks and men serving as the primary breadwinners. Although females are engaged in agricultural and subsistence farming operations and livestock-related activities, they encounter obstacles in controlling resources, accessing land, credit, and other resources, limiting their productivity and economic opportunities in rural settings.
- Waterborne diseases are a significant public health concern for females and children in the surveyed areas, according to focus group discussions.
- Women-headed households are not uncommon in the surveyed areas, especially in South and North where men migrate for work to other cities or abroad.



- The majority of female respondents in South, North, and Center areas are not involved in decision-making processes, with their decisions limited to day-to-day household affairs. Males make major and decisive decisions, while in the center, some respondents reported that decisions were made through mutual consultation and understanding.
- Although there were few reported violent incidents in South, respondents in other areas considered gender-based violence an act of boldness rather than a crime. The consultation found a lack of knowledge about sexual harassment (SH) and sexual exploitation and abuse (SEA) as crimes and how to report this while having social pressure to keep these incidents secret and treated as a matter of honor.



PUBLIC CONSULTATION

5.1 General

This section describes the outcomes of the public consultation sessions held with different stakeholders that may be directly or indirectly affected by the proposed project. The consultation with community and institutional stakeholders during project planning, designing and implementation stages is a key to sustainable development. Likewise, participation of stakeholders is essential to meet the objectives of meaningful consultation for preparation of ESMP.

5.2 Objectives and Principles of Consultation

The consultation process provided a forum where information relevant to the project was disseminated to the stakeholder. This participation enabled the integration of local and indigenous knowledge into the project design. This not only fosters goodwill and success in the project but also leads to a conflict-free project implementation.

The stakeholders including local community of 26 villages, government representatives, other regulators and the NGOs were met to appraise and discuss the environmental and social perspective of project activities. Their valuable concerns and suggestions were noted and thereafter incorporated in the Environmental and Social Management Plan.

The objectives of the consultation process were to:

- Identify, Inform and involve all stakeholders and local residents including females, minorities and disables, in the consultative and participation process;
- Share information with stakeholders on the construction of the proposed project and expected impacts on the physical, biological and socio-economic environment;
- Understand stakeholders' concerns and perceptions regarding various aspects of the project, including the existing available facilities and the likely impacts of construction and operation related activities of proposed Project; and
- Provide an opportunity to the public to provide valuable suggestions in the project design in a positive manner.

5.3 Consultation and Participation Process

To ascertain the perceptions of different stakeholders about the project scope, its implementation, operation and evaluation, consultation meetings were conducted. The consultation process was carried out in accordance with the World Bank Guidelines on public consultation. A series of consultation sessions were carried out with stakeholders (Govt. departments, farmers, teachers, businessman, women etc.), in December 2022 & January 2023. Total 76 stakeholder consultation sessions were conducted details of sessions are presented in Annex-6.

The project team chose sites that are easily accessible and barrier-free to accommodate all persons. The consultative sessions/meetings are held mostly at Monasteries (Dera) with both men and women separately. The minutes of the meeting from the focus group discussions



and community meetings have been noted down (listed in table 20, table 21 and table 22) and can be shared with the participants (that chose to share their contact information) and the community. These consultative sessions were designed to exchange information, to discuss the strengths, weaknesses, opportunities, and threats of an idea or project. The consultation meetings proved very useful in information sharing and consensus building.

5.4 Identification of Stakeholders

Project stakeholders were engaged in the review and discussions on various project aspects, social and environmental issues at the early stage of impact assessments for feedback. There are two categories of stakeholders in the project:

Individual/Community Stakeholders

Project beneficiaries for instance, Residents of the project area, Shopkeepers, Employees, Customers, Road Users, Vulnerable and Gender.

Institutional Stakeholders

- PRMSC, Environmental Protection Agency Punjab (EPA), Agriculture Department, Livestock Department Punjab, Tehsil Headquarter Hospital THQ.

5.5 Information Dissemination

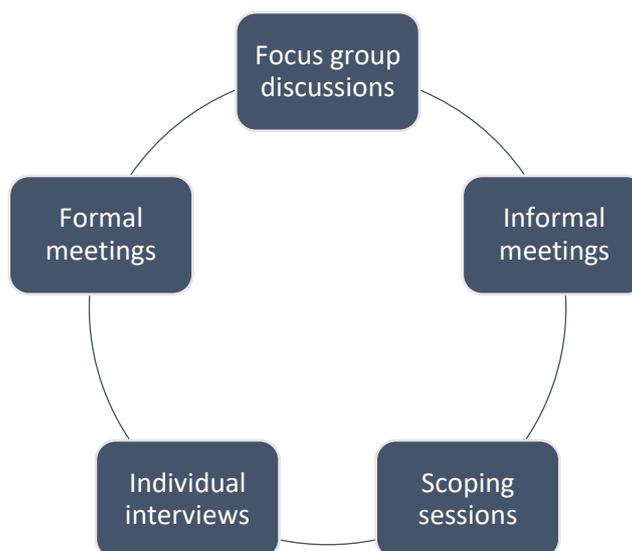
Following information was discussed and disclosed to the stakeholders during the consultation meetings:

- Introduction of the project;
- Description of various project components, their activities and impacts;
- Discuss social and environmental impacts;
- Needs, priorities and reactions of the affected people regarding the proposed projects' impacts; and
- Need of Grievance Redress Mechanism (GRM) in all villages to address the issues & concerns of stakeholders.

For information dissemination to community, culturally appropriate techniques and local language was used.

5.6 Methods of Public Consultation

Public Consultations were carried out in order to establish stakeholder's opinions regarding project implementation. The following methods were used for public consultation and stakeholder's participation:



5.7 Approach Adopted for the Consultation

To hold the meetings, people were informed one day before the meeting to assemble in the villages. In addition, the consultant team contacted the council members and community representatives of each village and informed about the purpose of these consultation meetings. The representatives played a positive role in information dissemination to locals of villages. The meetings held in an encouraging environment where people expressed their concerns and views freely. Formal meetings and interviews were also conducted with female, vulnerable and disabled of the affected community, to explore their needs, problems and priorities related to project execution. In addition to the formal meetings, individual meetings/interviews were also held with the affected females to efficiently involve them in planning process.

5.8 Stakeholders Concerns towards the Project

Concerns raised by the participants, particularly with regard to environmental and social impacts of the project have been listed in following Tables which shows concern and responses as derived from scheme wise consultation meetings.

5.9.1 Concerns and Issues

Following **Table 20** shows concerns and responses of public consultation meetings.

Table 20: Findings of the Consultation Meetings

Sr. No	Concerns Raised	Locations	Response
1	There is no public water supply and people rely on the conventional methods of water collection i.e. Boreholes etc.	All 26 villages	The objective of the proposed project is to provide clean drinking water to all the residents of the community at their



Sr. No	Concerns Raised	Locations	Response
			doorsteps through a piped network.
2	There is no sewerage system and the sewage is being disposed of in open lands which create nuisance.	All 26 villages	The sewage will be connected through a piped network and will be disposed of after adequate treatment through a wastewater treatment plant.
3	There is no collection of solid waste and the waste is dumped directly in the open plots and streets which create nuisance	All 26 villages	A comprehensive solid waste collection system will be developed and waste containers shall be placed at appropriate locations in the villages. PRMSC will collect the solid waste through bins and will transport it to the designated disposal site.
4	The residents of the village are ready to pay the bills for the water supply services. But they have some concerns regarding the billing procedure. They want to know does billing based on household consumption, household size or lump sum amount has to be paid.	Kallar Kahar Kot Momin Pakpattan	Water meters are already in the plan as part of the project and will be provided soon to the community. The water meter will be installed at the household level whereas bulk water metering is installed on each network.
5	The construction activities will cause inconvenience to local residents due to hindrance in routine activities	All 26 villages	The contractor will ensure that construction work do not create disturbance for local people's access to the local route and their routine life activities.
6	Noise and dust will be generated from construction activities and may cause health issues.	All 26 villages	Regular sprinkling of water will be carried out to control the dust emissions at the construction site, whereas construction activities will be avoided during night time.
7	Recreation facilities such as parks and playgrounds should be provided.	Kahrur Pakka Liaquatpur Bhawana	Provision of recreation facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
8	Solid waste produced during construction time is a major concern, should not be piled up in the project area;	Kallar Kahar Kot momin	The construction and other waste generated at the site shall be collected, stored and transported to the final disposal site by the contractor on daily basis.
9	The water is not drinkable and there are several waterborne diseases in the project area	All 26 villages	Waterborne diseases shall be reduced and there will be an improvement in public health with the provision of clean and healthy drinking water.



Sr. No	Concerns Raised	Locations	Response
10	GST or OHR should be constructed as a part of this project.	Kot Momin, Kalar Kahar	An OHR will be constructed as a part of this sub-project.
11	Will there be tree cutting?	All 26 villages	Efforts will be made to protect as much trees / plants as possible. Where avoidance will not be possible, the trees will be offset to nearby locations.
12	Will employment opportunities be generated for locals during the construction phase?	All 26 villages	maximum workforce will be employed from the sub-project area.
13	How the land will be acquired? Will there be any compensation for the land.	All 26 villages	Primarily, the state land will be used for project interventions such as Sewerage Treatment Plant (STP), overhead reservoirs and water treatment systems. However, in case of unavailability of state land, private land through voluntary land donations – as an exception – will be obtained from the land holders having considerable landholdings. Moreover, if there are informal users/occupiers on the state land, they will be assisted to relocate and provided with livelihood assistance as required in (OP 4.12 requirements on non-title land owners/users) for their loss (structures and income).
14	People of nearby village asked, if the water supply and sewerage network will be provided to other villages in the vicinity.	Kallar Kahar	Other villages of the vicinity will be included in the next phase of the project.

5.9 Consultations with Female Community Members

Following **Table 21** shows concerns and responses of gender consultation meetings.

Table 21: Findings of the Consultation Meetings

Sr. No	Concerns Raised	Locations	Response
1	Females shared their serious concern about sewer system as there is no proper sewerage system in community. Drains are open which creates health issues.	All 26 villages	Covered drains are proposed in all selected villages.



Sr. No	Concerns Raised	Locations	Response
2	Women have to go out to the watercourses for washing clothes	Pakpattan, Kot Momin, Khairpur Tamiwali	The issue will be resolved if village is provided with the piped water supply network.
3	Privacy issues were raised by local females of village due to the construction work of labour in the project area.	Kalar Kahar	Labour should be bound to work and stay in the designated area or camp sites. Proper training will be provided to the workers to avoid any gender related issue.
4	Woman show the security concern in moving the villages.	All 26 villages	Security should be ensured so woman could move in the village easily.
5	Most of the colleges are in the town and a great percentage of girls quit the education as it is difficult for them to go for education	Bhowana	Provision of educational facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
6	Poor transportation is one of the concerns highlighted by the woman as it would become difficult for the woman to go to school and college for seeking education well as for job purpose in the nearby town.	Liaqatpur, Kehrur Pakka, Khairpur Tamiwai	Provision of transportation facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
7	Women were unsatisfied with the water quality	Kalar Kahar, Bhawalnager, Liaqatpur, Bhowana	Water related issues will be resolved after the implementation of various subprojects under PRMSC
8	Awareness should be raised in the villages regarding water, sanitation and hygiene services	All 26 villages	Local representatives should conduct awareness programs to educate the community regarding water, sanitation and hygiene services.
9	Family parks for women and children should be constructed in the villages.	Kehrur Pakka, Khairpur Tamiwali, Liaqatpur	Provision of recreational facilities is not the mandate of the proposed project.
10	Proper arrangements should be provided for the safe mobility of women in all communities	All 26 villages	Accessibility shall be not blocked completely and alternate passages shall be provided.

5.10 Consultation with Institutional Stakeholders

Table 22 shows the concerns of institutional stakeholders.

Table 22: Concerns of Relevant Government Departments



Sr. No.	Department	Coverage	Points of Discussion /Apprehensions	Response
1	Environmental Protection Department	Chiniot	<p>Project team described the project location and proposed activities to District Environmental Officer and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • In conducting ESMP, Scoping sessions and Individual interviews should be conducted with all stakeholders. • Social issues regarding private land acquisition, were discussed in detail. • Baseline should be developed separately according to the baseline conditions of Chiniot. • Public Hearings must be done so that stakeholders who have different types of stakes along with their apprehensions can be listed down easily. 	<p>All the suggestions shall be incorporated. Institutional consultations are already underway and efforts shall be made to take all the stakeholders on board.</p>
2	Agriculture Department	Bhowana	<p>The project team described the project location and proposed activities to Deputy Director and A.D Bhowana and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • Deputy Director tells about the major crops are Sugarcane and Rice cultivated in the project area. The wastewater should not be used for agriculture purposes without treatment 	<p>Sewerage treatment plant is the part of proposed project. PRMSC will ensure that wastewater will be used for irrigation (if needed) after adequate treatment through a sewage treatment plant</p>
3	Livestock Department	Pakpattan	<p>The project team described the project location and proposed activities to Artificial Inseminations Technician and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • Waterborne disease and viral disease in animals were discussed 	<p>The proposed project will provide clean drinking water to all the residents of the selected villages and the provision of water for portable use include water for the animal's activities. Waterborne diseases in animals will be resolved after the implementation of this project.</p>
4	Tehsil Headquarter Hospital THQ	Bhowana	<p>Project team described the project location and proposed activities to MS Hospital and inquired about their</p>	<p>The objective of the proposed project is to provide clean</p>



Sr. No.	Department	Coverage	Points of Discussion /Apprehensions	Response
			<p>apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • Show some serious concern regarding water borne diseases. • Every third person in Tehsil Bhawana suffering from Hepatitis. • Due to lack of infrastructure and transportation facilities in villages, it become difficult for the patient to reach the THQ. 	<p>drinking water to all the residents of the selected villages at their doorsteps through a piped network.</p> <p>Waterborne diseases will be resolved after the implementation of this project.</p>
5	Municipal Committee	Liaquatpur	<p>The Project team described the project location and proposed activities Tehsil Manager and Assistant Manager and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • Discussion on field planning and effective approach to adequately cover all the field aspects and collect requisite data. <p>The possible constraints in data acquisition were discussed and an effective way out was decided.</p>	Discussed the scope and main features of the project.
6	Agriculture Department	Lahore, Punjab	<p>The Project team described the project location and proposed activities Field officer and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • Field officer talked about the major crops are Wheat and cotton cultivated in the project area. • The wastewater should not be used for agriculture purposes without treatment • Treated water is used for irrigation purposes <p>Only individual-level solar tube well is present</p>	PRMSC will ensure that wastewater will be used for irrigation (if needed) after adequate treatment.
7	Punjab Irrigation Department	Lahore, Punjab	<p>The Project team described the project location and proposed activities to Executive Engineer and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • The wastewater should not be used for agriculture purposes without treatment • Treated water is used for irrigation purposes <p>Treated waste should be dispose in canals.</p>	PRMSC will ensure that wastewater will be used for irrigation (if needed) after adequate treatment. No wastewater is going to be disposed in the any canal/ nearby water body.



Sr. No.	Department	Coverage	Points of Discussion /Apprehensions	Response
8	Tehsil Headquarter Hospital THQ	Kahror Pakka	<p>The Project team described the project location and proposed activities to MS Hospital and Deputy Director Livestock and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • Show some serious concern regarding water borne diseases. • Every third person in Tehsil suffering from Hepatitis. <p>Due to lack of infrastructure and transportation facilities in villages, it become difficult for the patient to reach the THQ.</p>	<p>The objective of the proposed project is to provide clean drinking water to all the residents of the selected villages at their doorsteps through a piped network.</p> <p>Waterborne diseases will be resolved after the implementation of this project.</p>
9	Livestock Department	Sahiwal	<p>The proeject team described the project location and proposed activities Deputy Director Livestock and inquired about their apprehensions/ suggestions regarding the project;</p> <p>Waterborne disease and viral disease in animals were discussed</p>	<p>The proposed project will provide clean drinking water to all the residents of the selected villages and the provision of water for portable use include water for the animal's activities.</p> <p>Waterborne diseases in animals will be resolved after the implementation of this project.</p>
10	Environment Protection Department	Liaquatpur	<p>The Project team described the project location and proposed activities to Assistant Director District Office and inquired about their apprehensions/ suggestions regarding the project;</p> <ul style="list-style-type: none"> • In conducting ESMP, Scoping sessions and Individual interviews should be conducted with all stakeholders. • Social issues regarding private land acquisition, were discussed in detail. • Baseline should be developed separately according to the baseline conditions of Liaquatpur <p>Public Hearings must be done so that stakeholders who have different types of stakes along with their apprehensions can be listed down easily.</p>	<p>All the suggestions shall be incorporated. Institutional consultations are already underway and efforts shall be made to take all the stakeholders on board.</p>



Sr. No.	Department	Coverage	Points of Discussion /Apprehensions	Response
11	Department of Fisheries	Pakpattan	The project team described the project location and proposed activities Field officer and inquired about their apprehensions/ suggestions regarding the project; Deputy Director District Office tells about the breed of fishes in that area.	No wastewater is going to be disposed in the any nearby water body. So, no aquatic life is going to be affect by this project.
12	Department of Forest	Rahim Yar Khan	The project team described the project location and proposed activities DFO and inquired about their apprehensions/ suggestions regarding the project; <ul style="list-style-type: none"> Show their concerns about the forest in Rahim Yar Khan 	There is no forest in the project boundary or near the project boundary that is going to be affect.
13	Public Health Engineering Department	Punjab	The Client team described the project location and objectives, as PHED is also working in the same domain it was requested to share their work plan for the relevant tehsils with PRMSC to avoid duplication of services or infrastructure. Moreover PHED share their lesson learned to improve the service delivery.	Lesson learned will be considered in project planning and designing phase to improve service delivery.

5.11 Consultation with NGO

According to stakeholder consultations and institutional stakeholder consultations, Punjab Rural Support Programme (PRSP) and National Rural Support Programme (NRSP) are working in Tehsil Liaqatpur, Kehror Pakka, Khairpur Tamiwali, and Bhawalangar areas. The scope of both NGOs is WASH, which is also within the mandate of PRMSC. Similarly, Akhoowat and Kashaf are also working in Tehsil Pakpattan, Bhowana, and Kot Momin, providing microfinance and small scale loan services. Community-Based Organizations (CBOs) were also reported in Tehsil Bhowana and Liaqatpur, working to support marriages, funeral prayers, and other financial needs of the community. CBOs can play an important role in social mobilization, behavior change in target villages, and tariff collection and O&M of the schemes.

5.12 Pressing Needs of the Consulted Villages Suggested by Local People

Local people were consulted to determine the most pressing needs in the project area as perceived by them. The most important needs identified were the provision of water supply and sewerage systems, as well as schools, hospitals/dispensaries, and vocational training institutes for construction work. Due to restricted mobility, locals suggested that a friendly grievance mechanism be developed in all villages to address their concerns during the construction period. Additionally, they recommended that guidance and support be provided to local people for registration of complaints in proposed grievance mechanism.



5.13 Disclosure of ESMP

Public disclosure enables affected groups and interested parties to understand likely implications of the project and to provide input into project design. It promotes dialogue among stakeholders i.e. government, community, NGOs and implementing agencies. As per OP 4.01, the environmental and social aspects must be discussed with the stakeholders.

The objectives of public disclosure are to aid meaningful public consultation and to ensure transparency of World Bank operations to its stakeholders and constituents.

The safeguard documents will be disclosed on the website of PRMSC and on the World Bank external website.

Presentations containing project information and relevant aspects of public interest will be delivered to the public. Furthermore, project brochures, handouts of presentations, and executive summaries of ESMP in Urdu and English languages will also be distributed to the public.

After the approval, Copies of the ESMP shall be made available to communities and interested parties in accessible locations through local government authorities, (e.g., Village councils, district offices etc.)



ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

6.1 General

This chapter identifies the beneficial as well as the potentially significant adverse environmental and social impacts of the proposed project activities during design/ pre-construction, construction and operational phases of the proposed project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A brief description of each aspect and the affected environment in the project area are presented below.

6.2 Scoping of Impacts

Potential environmental and social impacts from the proposed Project on key environmental and socio-economic features were identified through the following actions:

- Demarcation of the Area of Influence (Aoi);
- Desk study of engineering investigations, studies and designs;
- Environmental monitoring of air, noise, surface water, wastewater and groundwater;
- Detailed review and analysis of primary and secondary data available for all environmental parameters in Project area such as physical, ecological and social resources;
- Socio-Economic survey to assess the extent of land acquisition, occupation, income and poverty levels of the affected households;
- Consultations with executing and implementing agencies, local government, affected community, and traditional and religious leaders of the community;
- Stakeholder consultations with relevant departments, government agencies, NGOs and locals; and
- Knowledge assimilation of international best practices on environmental assessment of infrastructure projects.

6.3 Methodology

Selection of an appropriate and customized methodology for the impact assessment is critical for the ESMP study. The impacts have been assessed based on the proposed project life cycle i.e., in Pre-Construction, Construction and Operational and Maintenance (O&M) stages. For the identification of the potentially significant and non-significant environmental and social impacts, different tools were utilized as detailed below:

6.3.1 Screening Checklist

Based on the findings of desk studies and processed satellite imageries, screening checklists were prepared to screen out the potentially significant adverse environmental and social impacts during pre-construction, construction and operational phase of the proposed project. The objective of the impact screening is to assess the significance of the issues related to the atmosphere, climate, water resources, land resources, ecological environment, socio-economic environment, transport, infrastructure and communication, natural risks, hazards and external constraints of the Project for the proposed development. After the compilation of



baseline information and processing of acquired satellite imagery, the screening checklist was filled to screen out the adverse impact of the proposed Project during the pre-construction, construction and operational phases. Then a screening report was prepared and submitted for the perusal of the Client and WB.

6.3.2 Notion of Significance

Taking into account these criteria, potential significance was classified as either:

Low: an impact for which no mitigation is necessary;

Medium/moderate: an impact that requires effective mitigation; and

High: an impact, which, if not mitigated, could stop the Project from proceeding.

Reversible/Irreversible: Changes considered irreversible, for example, the loss of biodiversity due to a change in water quality;

The potentially significant impacts were then further investigated in more detail to make a comprehensive assessment of the actual impacts.

6.3.3 Study Area/ Area of Influence

Refer Chapter 4: Description of the Environment, **Section 4.3**.

6.4 Environmental & Social Considerations (E&S) in Project Design

Environmental and social (E&S) aspects have been given due considerations in the project design to make the project sustainable, environmentally friendly and socially acceptable. E&S considerations in project design are summarized below:

- The depth of sewer lines has been kept low in waterlogged villages of Liaquatpur; to avoid groundwater contamination of shallow aquifer. Same practices will be applicable for similar conditions.
- Sewers shall be laid at least 1m away from water supply lines (except for few street in each village, where the street width is less than 2 meters).
- In all cases, the sewer lines shall be laid below water pipeline (the difference between top of the sewer and bottom of water pipeline shall be at least 300 mm);
- Designed manhole covers to withstand anticipated loads & ensure that the covers can be readily replaced if broken to minimize silt/ garbage entry;
- Ensured sufficient hydraulic capacity to accommodate peak flows & adequate slope in gravity mains to ensure self-cleansing velocity in order to prevent built up of solids and hydrogen sulfide generation;
- All structural, layout and engineering designing are in strict accordance with the applicable codes and engineering standard;
- The location of overhead water tanks, pumping station and STP have been finalized in close consultation with local community and representatives of local authorities;
- Tree cutting has been avoided;
- Efficient seepage control measures have been considered in selection of pipe materials during the planning stage;
- Effluent generated during construction phase will be treated through septic tanks.
- Alignments of sewerage and water supply lines have been carefully selected to minimize disturbance to public utilities;



- Relocation of the public utilities, if any, shall be planned and approved in consultation with relevant departments/authorities/stakeholders before project commencement to avoid inconvenience to the public;

6.5 Anticipated Impacts during Pre-Construction/Design Phase

Impacts envisaged during Pre-construction/ Design Phase and the recommended mitigation measures are given below:

6.5.1 Layout Planning & Design

Potential Impact

Incompatible layout plans and engineering designs of the proposed project can undermine the overall aesthetics and ambience of the project area. Mis-utilization of the available spaces may result in a design with low social acceptability and functionality. This impact will be permanent and moderately adverse.

Mitigation Measures

- All structural, layout and engineering designs of the project are in strict accordance with the applicable national and international guidelines/ codes/ standards and engineering practices;
- The layouts of water supply and sewerage networks have been adjusted to cover the whole project area. The water supply system is a loop based system and the sewerage system is based on gravity where the slopes have been provided to ensure gravity flow with adequate velocity.

6.5.2 Environmentally Responsive Design Considerations

Potential Impact

Designing the project components without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality. Improper-designed sewers may not carry the waste load, leading to system-failure and financial losses. The alignment of sewer lines and locations of sewerage pumping station and STP must be properly planned, or else it may lead to both technical and social problems along with environmental issues of backflow creating foul smell and unhygienic conditions.

There are chances of infiltration from sewers which may contaminate the soil and underground water resources. The seepage may also affect the water supply lines and contaminate the potable water.

The construction of high-rise overhead water tanks may cause visual obstruction. The surrounding community may face privacy issues and it may also cause blockage of direct sunlight.



Mitigation Measures

- All sewer lines including trunk, lateral and branch sewer lines have been designed considering the future population and waste generation rate;
- Limit the sewer depth where possible;
- Sewers will be laid 1m away from water supply lines if the width of the street will be sufficient to do so.
- In all cases, the sewer lines shall be laid below water pipeline (the difference between top of the sewer and bottom of water pipeline shall be at least 300 mm);
- Designed manhole covers to withstand anticipated loads & ensure that the covers can be readily replaced if broken to minimize silt/ garbage entry;
- Ensured sufficient hydraulic capacity to accommodate peak flows & adequate slope in gravity mains to ensure self-cleansing velocity in order prevent to built-up of solids.
- The location of overhead water tanks, pumping stations and STP have been finalized in close consultation with local community and representatives of local authorities.

6.5.3 Groundwater

Potential Impact

Groundwater contamination may occur during construction by the improper handling of construction material (fuel, lubricant, bitumen, asphalt etc.) or sanitary water from construction camps and domestic sewage. During operation probability of seepage through the sewers may also contaminate groundwater. This impact is permanent and moderate negative in nature.

Mitigation Measures

- Construction materials that may lead to groundwater contamination will be properly handled and stored.
- Procedure for efficient jointing of selected sewer pipes will be applied to avoid leakage from pipes;
- Alternate sewage disposal arrangements have been suggested in design to cater the sewage flow, generated from the project area, during construction phase.

6.5.4 Surface Water

Potential Impact

There is no existing piped sewerage network or pumping station in the village. There is one large sewage pond in the villages where sewage is disposed by unplanned drains. Thus, endangering the environment of the vicinity. The openly flooded sewage causes nuisance in terms of foul smell and serves as breeding ground for disease causing vectors. Some sewage is also used to irrigate nearby crops.

There will be net environmental improvement in terms of sewage collection thus reducing sewage ponding in the project area and enabling adequate treatment of wastewater.



Mitigation Measures

- The sewage will be collected through a piped network;
- An STP based on ABR technology will be established to treat the sewage;
- The treated effluent as per PEQS will be discharged into the existing watercourses i.e nullahs, for agricultural purposes.

6.5.5 Seismic Hazard

Potential Impact

According to the seismic zoning map of Pakistan, the project area is located in Seismic Zone 2A except Kallar Kaha which is located in Seismic Zone 2B. A low to moderate-intensity earthquake impacting the project site can adversely impact the development. This factor requires special consideration of the designers as project structures (especially overhead water tanks and STP) may be affected negatively in case of earthquake tremors and the significance of damage depends upon the severity of earthquake.

Mitigation Measures

- The components of the proposed project include laying of underground water supply network, sewer lines, construction of overhead water tanks, pumping station and STP have been designed to withstand moderate earthquakes; and
- To mitigate the seismic hazard, Seismic Building Code of Pakistan 2007 (SBC-07) has been adopted. This code specifies minimum requirements for seismic safety of buildings/ structures and has to be applied and used by engineers in conjunction with the necessary understanding of the concepts of structural, geotechnical and earthquake engineering.

6.5.6 Damage to Existing Infrastructure

Potential Impact

The proposed project interventions are mostly subsurface activities and are likely to affect the existing infrastructure. Public utilities such as electric poles might get affected during construction activities and movement of machinery and the community will face temporary electricity cuts. Furthermore, the roads will be cut for laying of water and sewerage pipes and will create accessibility issues.

Mitigation Measures

- Alignment of water supply and sewerage network carefully selected to minimize disturbance to public utilities;
- Relocation of the public utilities shall be planned and approved in consultation with relevant departments/authorities/stakeholders before project commencement if any, to avoid inconvenience to the public;



- The local community will be informed before the relocation of services (if any) and schedule of relocation services will be prepared after consultation with the community to minimize inconvenience to the public;

6.5.7 Physical Cultural Resources

Potential Impact

No historical/ archeological site is present in the project area. However, some cultural resources including mosques, graveyard and shrines are present. People visit the mosques five times a day. Shrines and graveyard are visited occasionally by the surrounding community and devotees. These will not be directly affected but the people may face access issues in visiting these facilities.

Mitigation Measures

- The alternative access routes will be provided in case the access has to be restricted during execution period; and
- There must not be any physical impact on the physical and cultural resources in the project area.

6.5.8 Fire Fighting System

Potential Impact

Absence of a firefighting system may cause severe damage to the camp site and surrounding crops and houses during construction phase.

Mitigation Measures

- Contractor will provide an efficient firefighting system (i.e fire alarm and fire extinguishers) for campsite, workshop and construction site; and
- Campsite will be established in an area with easy access to the water source, helpful in firefighting in case of any incident.

6.5.9 Land Acquisition

The main focus of the project is to install sewers and water supply lines, which will require the use of existing streets and roads for right-of-way (ROW). If private streets or roads are encountered, the project team will consult with landowners prior to commencing any construction activities to gain permission for the use of their land.

As shown in Table-6 Land Requirement, private land will only be needed in five out of the eight tehsils, and the private land requirement is only one-third of the total land requirement in the priority villages. In Bhowana, Liaqatpur, Kehrur Pakka, and Bahawalnagar, a total of 1661 Marla of state land is required, while only 610 Marla of private land is required in Tehsil Pakpattan, Kalar Kahar, Kot Momin, Bahawalnager, Khairpur Tamiwali, and Kahrur Pakka.



Additionally, private land will only be used through voluntarily land donation. In areas where state land is available, a larger portion of land will be acquired through the NOC process to accommodate any future expansion, while the use of private land will be kept to a minimum to reduce the impact on landowners.

The land requirement has also been optimized based on the water source. In Tehsil Liaquatpur, the initial feasibility report indicated the need for state land acquisition for the pipe network solution, but after further technical investigation, it was determined that the lined canal system is not a promising water source. Therefore, initially, standposts and septic tanks will be installed for the community, and in the future, if the water source proves promising, pipe network will be provided. Hence, a smaller portion of land is currently required in this case. Process of VLD is given in Annex- 7.

Priority will be given to the state land that is free of encumbrances and if state land is not available, beneficiary of the project areas will be expected to donate land – as an exception - for project interventions. In case there is no state land or private land through VLD is available, PRMSC will consider the option of land acquisition, after developing and implementing a Resettlement Action Plan (RAP) approved by the World Bank. Compensation will be paid in accordance with the resettlement framework outlined in the Environmental and Social Management Framework (ESMF) Similarly, in case the state land – proposed for the project – is being used by informal occupants (i.e. squatters, illegal occupants, etc.), appropriate compensation for relocation and loss of livelihood will be provided to the claimants.

Mitigation Measures

- Primarily, state land will be used for the project infrastructure activities, however, in case of unavailability of state land, private land through Voluntary Land Donation (VLD) will be considered – as an exception.
- Additionally, in order to minimize the potential negative socio-economic impacts of land acquisition, minimum parcel of land has been proposed to meet the needs of the proposed project in case of private land; unlike in the cases of state land where – considering the future needs of the project expansion – sufficient parcel of state land has been acquired/ proposed.
- In case there is no state land or private land through VLD is available, PRMSC will consider the option of land acquisition, after developing and implementing a Resettlement Action Plan (RAP) approved by the World Bank. Compensation will be paid in accordance with the resettlement framework outlined in the Environmental and Social Management Framework (ESMF).
- Furthermore, the approval / NoL for each VLD case will be sought exclusively from the World Bank.
- A VLD checklist form has also been developed to assess the potential negative socio-economic and livelihood impacts of private land acquisition (Annexure-7A).
- Besides the VLD checklist, VLD tracking sheet has also been developed (attached as Annexure-7B) which will be continuously updated, the same will be available for monitoring of VLD status.



- Without any transparent consent land will not be used through VLD (Procedure as per Annex 7 will be followed plus use of a screening form that assesses the impact of the VLD on the prospective donor is provided at Annex-7A);
- In case of private donors, only less than 10% of their land could be obtained;
- 100% compliance will be ensured of VLD procedure given in ESMP;
- VLD process will be executed by the PRMSC itself, and will not be devolved to any private parties (consultants or contractors).
- Before start of construction activities, it will be ensured that the land (private or public) is free from any form of encumbrances or where there are informal users, they are appropriately provided relocation assistance - in accordance with OP 4.12 – Involuntary Resettlement - before taking possession of land.

6.6 Anticipated Impacts during Construction Phase

Anticipated Impacts during Construction Phase and the recommended mitigation measures are given below:

6.6.1 Topography

Potential Impact

The construction activities are not expected to impact the topography of the area significantly except for those areas where physical activities i.e., earthwork is involved as well as stocking of material. The excavated material is to be mostly backfilled and the excessive material will be transported to strengthen the roadsides or will be dumped at the designated locations. This impact is site-specific, temporary, reversible, possible, and low significant.

Mitigation Measures

- Material stockpiles will be removed as soon as work is completed and the area will be reinstated;
- Temporary storage sites will be allocated for the storage of excavated material;
- Temporary storage sites will be lined and must not allow infiltration;
- The stockpiles must be covered with tarpaulin sheets or other adequate material;
- Piling of material at large extent will not be allowed and the contractor will timely remove excavated material from the site.

6.6.2 Soil Erosion

Potential Impact

The soil would be exposed to erosion due to excavations for laying of sewers and water supply pipes. Construction activities such as clearing, excavation, filling, grading and setting up construction camps will affect the existing soil condition in the study area/ AoI. The clearing of vegetation can also loosen the soil and make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion. This



impact can be categorized as low adverse, site-specific, long-term, highly probable and reversible.

Mitigation Measures

- Good engineering practices such as proper compaction of backfill material and special slope protection measures will be adopted during the construction stage.
- Use of heavy machinery will be restricted as far as possible to avoid the destruction of soil structure;
- Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations should be avoided;
- Stored excavated material shall be covered and preferably reused, e.g., in construction as backfill etc.
- Cutting of trees will be avoided to the best possibility to avoid soil erosion.

6.6.3 Soil Contamination

Potential Impact

Contamination of soil may be caused by oil and chemical spills from construction machinery or uncontrolled runoff from equipment washing yards. This impact is permanent and minor negative in nature.

Mitigation Measures

- Chemicals/ hazardous products and wastes will be stored on impermeable surfaces in secure, covered areas with clear labelling of containers and with a tray or bund to contain leaks;
- All construction wastes from the site will be regularly collected and transported to approved waste disposal sites;
- Awareness of emergency spill response procedures will be provided to the workers on-site;

6.6.4 Trench Failure

Potential Impact

The major construction activities involve excavation operations for laying water supply and sewerage lines. The major hazard associated with the excavation operations is trench failure. The unstable slopes may fail and settle in the trenches which may cause injuries and fatalities to the workers. This impact is probable, site specific and high adverse in nature.

Mitigation Measures

- Careful selection of the site for excavation in light of soil investigation is inevitable
- Provision of adequate shuttering in the trenches;
- Leftover shuttering may also be used in case of loose soil strata.



6.6.5 Construction Camps/Camp Sites

Potential Impact

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which may include noise, health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, the behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderately negative in nature.

Mitigation Measures

- Working hours of noisy activities will be limited to normal daytime working hours when near identified sensitive receptors;
- Waste Management Plan will be implemented to include procedures for the classification, storage and disposal of all construction wastes and the training of employees who handle hazardous materials; and
- Construction camps will be established away from populated areas and NOC/lease agreement will be obtained from private land owners.
- Regular training of workers will be carried out regarding local cultural norms, human behaviour, gender issues and GRM by the contractor during construction activities at site.
- Implementation of code of conduct

6.6.6 Water Quality

Potential Impact

Runoff from the construction works site may contain an increased load of sediments, suspended solids and other contaminants. Potential sources of pollution from the site include:

- Runoff and erosion from exposed soil surfaces, earthwork areas and stockpiles e.g., grouting and cement material with the rain;
- Wash water from dust suppression sprays;
- Fuel and lubricants from maintenance of construction vehicles and mechanical equipment;
- Spillage of liquids stored on-site such as oil, diesel, and solvents etc. are likely to result in water pollution; and
- Uncontrolled discharge of debris and garbage such as packaging, construction material and refuse.

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily



products, which are used during the construction phase may contaminate groundwater and channels carrying water.

There is no major surface water body near the project sites, however, canal distributaries and watercourses are present for irrigation purposes which may get contaminated.

Mitigation Measures

- Protection of groundwater reserves from any source of contamination such as the construction and oil waste by making the ground impermeable through sheets or compaction;
- Stockpiles of cement and other construction materials will be kept covered when not being used;
- Maintenance of vehicles will be carried out only in impermeable areas where any oil spillages can be contained;
- Careful planning of the works to avoid soil excavation works during rainy seasons;
- Controlled activities will be undertaken during monsoon and careful attention must be paid to weather forecast before excavation operations.
- All kinds of waste will be stored in covered containers and disposed of safely as soon as possible; and
- By proper C&D waste management system in place, the contractor will ensure that construction debris does not find its way into the drainage or irrigation channels.

6.6.7 Air Quality

Potential Impact

Air quality will be affected by various construction activities like emissions from generator stack vehicular exhaust, VOCs from uncovered gasoline i.e petrol/diesel, and manoeuvring of construction and public vehicles on construction site. Emissions may be spread over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. In certain climatic condition such as hot summer, airborne dust can become a major nuisance if control techniques are not properly employed.

The air emissions may cause health impacts such as dryness and roughness of the throat, eyes, nose, etc. to the workers, staff of the contractor and the residents of area. These emissions may also affect the bio-physical environment. The impact is negative and temporary in nature.

Mitigation Measures

- All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained to minimize the exhaust emissions;
- Open burning of solid waste from the contractor's camps will be strictly banned;
- Personal Protective Equipment (PPEs) like masks, goggles and gloves etc. will be provided to workers;



- PEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works.
- Regular water sprinkling on the site and access roads will be carried out to suppress excessive dust emission(s);
- Blowing of dust and particulate matter from stockpiled loose materials (e.g., sand, soil) will be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;
- The vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin.
- Sensitive receptors of the area will be informed accordingly

6.6.8 Noise

Potential Impact

Noise level is expected to increase during construction activities. Main sources of noise and vibration will be heavy machinery such as excavators and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within AoI. Health risks associated with exposure to continuous noise levels include high blood pressure, hypertension, annoyance and sleep disturbance, temporary threshold shift etc. The impacts of noise will be temporary and highly adverse in nature.

Mitigation Measures

- Construction workers will be provided suitable hearing protection like ear cap, or earmuffs and training them in their use;
- Selection of up-to-date and well-maintained equipment with reduced noise levels will be ensured by suitable in-built damping techniques or appropriate muffling devices; and
- Residents will be notified earlier before the commencement of excavation operations.
- Construction activities will be restricted to the day-time.
- Sensitive receptors will be informed accordingly.

6.6.9 Municipal and Construction Waste/ Wastewater

Potential Impact

Due to construction activities municipal and construction waste will be generated from construction activities. The waste will include wastewater, domestic waste and construction waste etc.

Improper dumping of waste may generate odor and attract mosquitoes and other disease vectors. Waste bins containing toxic, flammable and corrosive materials may pose a hazard to the workers when handled without PPEs. Unsited waste disposal site selection may pose a serious health concern to the locals and workers onsite. The impact is temporary and minor negative in nature.



Mitigation Measures

- Solid waste generated during construction and campsites will be safely stored, collected, transported and disposed of at the selected disposal site and the contractor will provide and implement a comprehensive solid waste management plan;
- Burning of waste will be prohibited;
- Proper labeling of containers, including the identification and quantity of the contents, hazard contact information etc;
- Closed waste storage bins will be provided on-site to store waste.

6.6.10 Chance of Finding Artifacts

Potential Impact

During excavation, there is a chance of finding artifacts. In case of finding any artifact, the contractor will immediately stop the activities and report through Supervision Consultant to Directorate General (DG) of Archeology, Government of Punjab to take further appropriate action to preserve those antiques or sensitive remains. Chance find procedures are attached as Annexure 3.

6.6.11 Resource Conservation

Potential Impact

The materials used in the construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), brick ballast, water and cement etc. Almost all the materials to be used in the construction of proposed project are non-renewable and therefore their sustainable use is necessary for future use.

Large quantities of water will be used in the construction of concrete pipes, drains, pumping stations, STP, cradles and in watering the unfinished surfaces.

Diesel and residual fuel oils will be used to operate construction machinery and equipment. Sustainable use of energy resources is very important and it will also help to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is very important.

Mitigation Measures

- Wastage of water will be reduced by training the workers involved in water use;
- Water jets and sprays will be used for watering surfaces rather than using overflow system.
- Reuse of construction waste materials will be considered.
- The efficient and well-maintained equipment and machinery will be used.
- The equipment and machinery will be turned off when not in use.



6.6.12 Biodiversity Conservation

Flora

Potential Impact

On account of construction of the proposed water supply and sewerage system, no trees are envisaged to be cut/disturbed but some herbs or shrubs may be required to be removed for excavation. The dust emissions due to excavation operations will stick to the leaves of existing trees and may close their stomata thus hindering the photosynthesis process. Reduced photosynthesis may also reduce the productivity of existing trees. This impact is however temporary but minor negative in nature.

Further, during construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camp's requirements).

Mitigation Measures

- The Contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes. They will use the paths and tracks for movement and will not be allowed to trespass through farmlands;
- Contractor will provide gas cylinders at the camps for cooking purposes and cutting of trees/ bushes for fuel will not be allowed.

Fauna

Potential Impact

There will be no damage to health and life of local animals mostly cats, dogs and jackals and especially the livestock i.e., goats and cows due to construction activities. Some reptiles and insects may get killed/ injured during excavation operations.

Mitigation Measures

- Excavations will be limited to the approved engineering drawings;
- Physical barricades will be provided at critical location near construction sites for restricted movement
- Harassing of animals will be prohibited.

6.6.13 Health and Safety

A. Occupational Health and Safety

Potential Impact

OHS-related risks include working at height (at excavation site & OHT construction site) Health risks and workers safety problems may result at the workplace if the working conditions

provide an unsafe and/or unfavorable working environment. The health and safety issues are also associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers. It will be a long-term and severe negative impact.

Mitigation Measures

- Obligatory insurance against accidents for labourers/workers;
- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- The Contractor's Health and Safety Officer will identify, record, and subsequently send the deployment and activity plan to the supervision consultant's Health & Safety Expert (HSE) who will analyze the hazards of the job and issue the No Objection Certificate (NOC), accordingly.
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g., firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Use of Personal Protective Equipment (PPE) i.e., ear muffs, masks, safety shoes, gloves etc.;
- Use of safety signs at the construction site, as shown below.



B. Community Health and Safety

Potential Impact

The construction activities and vehicular movement at construction sites may result in roadside accidents particularly inflicting local communities who are not familiar with presence of heavy equipment. This is a temporary and moderate negative impact. The labors with different transmittable diseases (e.g., COVID-19) may cause spread out of those diseases in the local residents. Open trenches and deep manhole may cause trip & fall accidents for the local residents.

Mitigation Measures

- Medical screening of the laborers for communicable diseases will be conducted before hiring. Medical screenings are a basic requirement before the hiring of labour to prevent the spread of communicable diseases. However, on the basis of these screenings, diseased potential workers will not be barred from work; instead, necessary measures will be taken to prevent the spread of these diseases.
- The site will be restricted for the entry of irrelevant people particularly children.
- Provision of proper safety and diversion signage, particularly at sensitive/accident-prone spots;



- Setting up speed limits within the village.
- COVID-19 SOPs will be followed at work site and construction camps, if any announced by the Government of Punjab during construction period
- Open trenches and deep excavated manholes will be protected by fence/barricade to avoid any accident.
- Night time lighting will also be provided.
- Awareness campaign regarding HSE will also be provided to local community including at schools.
- Awareness/ training session of labourers will be conducted to promote clean behaviour practices and to curtail medical issues.

C. Emergency Response (Natural and Man-Made Disasters)

Potential Impact

Natural calamities such as flood and man-made disasters such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. Flooding can result in inundation of the village area and excavation / trenches which may leads to accidents or can damage the infrastructure of the project activities. Similarly, during operation it can affect the water supply, and sewerage system. The workers will be trained and facilitated to cope with such emergencies.

Mitigation Measures

- Training of the staff/employees regarding the emergency procedures/plans will be regularly conducted;
- Emergency numbers will be clearly posted; and
- First aid boxes will be provided.
- Minor incidents and near misses will be reported and preventive measures will be formulated accordingly.

6.6.14 Traffic Management

Potential Impact

The traffic influx within the villages is very low. Most of the traffic within the villages include motorbikes and few cars. The project interventions will not create traffic congestion issues in the project area. However, their movement will be disturbed due to the excavation and construction works and people may face accessibility issues. This impact is temporary and major negative in nature.

Mitigation Measures

- The construction activities will be carried out in pockets/reaches, once a patch has been completed (i.e., pipes are laid and covered) then excavation on new patch shall be started;



- Local community will be taken on board to plan alternate access routes in connecting streets to ensure mobility of local traffic; and
- Plan work in a minimum possible time.

6.6.15 Nuisance/ Disturbance to Sensitive Receptors (Educational, Health and Religious Places)

Potential Impact

Since the proposed interventions will be carried out within the village boundaries, therefore, the socially sensitive sites/places including schools, hospitals and religious centers will be temporarily affected due to dust, noise and the community will face accessibility issues due to open trenches. Dust due to earthworks will create health hazard to children and people with ailments. This impact is temporary and major negative in nature.

Mitigation Measures

- Work will be conducted near the religious places with due social diligence and after informing all stakeholders
- Material transport to the site will be scheduled considering school timings;
- Notify concerned schools, hospitals/dispensary etc. 2 weeks prior to the work; conduct a 30 minutes awareness program on nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions and dos and don'ts; and
- Implement all measures suggested in this report viz. dust and noise control, public safety, traffic management, strictly at the sites.

6.6.16 Accessibility

Potential Impact

Excavation of trenches and pipe/sewer laying work in the project area will obstruct access to residences, commercial buildings and businesses adjacent to the proposed project alignment. Disruption of access to commercial establishments may affect livelihood. The potential impacts are negative and moderate but short-term and temporary.

Mitigation Measures

- Leave space for access between mounds of excavated soil;
- Consult affected business people to inform them in advance about the work schedule;
- If there are any holidays (i.e., Eid or Muharram etc.), the Contractor will complete the backfilling work of the trenches and will not leave any trench open before holidays;
- Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.



6.6.17 Gender-Based Violence (GBV)

Potential Impacts

During the construction phase, gender-based violence might arise due to influx of outside labour. Sexual harassment against women might occur as a consequence of mixing of men and women at the construction site, and moving on the roads and markets.

Mitigation Measures

With the effective measures and monitoring, the risk of gender-based violence will be minimized by adopting the following mitigation measures:

- Awareness will be created among the females at community levels about the construction.
- Workers will not be allowed to crowd in the residential area/villages.
- Alternative routes and traffic management plans for the safety of the community particularly for women and children will be ensured.
- Raise awareness among the communities regarding the potential risks of GBV, and establish response services in the nearby communities that can respond to instances of GBV (particularly those related to issues of labor influx);
- Contractor will take proper measures and will ensure Gender Sensitive Grievance Redressal Mechanism to address and resolve issues relating to harassment, intimidation, and exploitation.
- GBV-related issues will be recorded through GRM, two separate focal persons for males and females are part of Village Organization VO – which will also work as members of the Grievance Redressal Committee (GRC) Tier-I. The female focal person – trained on the social protection referral directory – will be responsible for further referral of GBV-related complaints to the forums concerned. A multi-sectoral referral system is proposed, which will include referral to The Punjab Women's Toll-Free Helpline 1043 available 24/7. It is managed and supervised by Punjab Commission on the Status of Women (PCSW). Their helpline team comprises all-women call agents, three legal advisors, a psychosocial counsellor, supervisors, and management staff. The Punjab Commission on the Status of Women (PCSW) has been identified as a key stakeholder. PCSW will be informed of the project activities and an institutional link will be established.
- At the PRMSC Tehsil Office, the Behavior Change and Communication (BCC) Officer – in addition to being member of GRC Tier-I&II – will initially deal with gender related issues/ complaints and further refer the same to the Gender Specialist at Head Office, PRMSC.

6.6.18 Influx of Labor

Potential Impacts

For the implementation of project activities, skilled and unskilled labor is required by the contractor. Mostly, skilled and unskilled workers have been associated with the contractor since a long which they utilize, where they are required for the projects, and while other



workers are hired from different areas that belong to different cultural backgrounds. Social problems and conflicts that are associated with labor influx are as follows:

- **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;
- **Increased risk of illegitimate behaviour and crime:** The influx of workers and service providers into communities may increase the rate of crimes and perception of insecurity by the local community. Such illegitimate behaviour and crimes can include theft, physical assaults, substance abuse, sexual assault and human trafficking;
- **Increased risk of communicable diseases and burden on Tehsil & District health services:** 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. Workers with health concerns relating to substance abuse, mental issues or STDs may not wish to visit the project's medical facility and instead go anonymously to the nearby medical center, this can result in an additional burden on tehsil & district health centres; and
- **Local inflation of prices, accommodations and rents:** A significant increase in demand for goods and services due to labor influx may lead to local price hikes and crowding out of community consumers. Depending on project worker income and form of accommodation provided, there may be increased demand for accommodations, which again may lead to price hikes and crowding out of local residents.

Mitigation Measures

- Labour camp(s) will be established away from residential areas;
- Preference will be given to the local people to work with contractor, and contractor should hire maximum labour force from the project area because this will reduce the labour influx;
- Awareness will be created among the workforce to ensure respect for local customs;
- An effective GRM has been established for the project to resolve all issues related to the community. Thus, progress regarding resolving the issues should be monitored closely.
- Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites;
- Make arrangements to treat the affected workers on time to control the movement of vectors disease;
- Provide proper and free medical screening and counselling for site workers and community members;
- Develop and enforce a strict code of conduct for workers to regulate behaviour in the local communities;
- Labour will be required to sign a code of conduct translated into their local languages at the time of hiring.
- Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel;



- Appropriate fencing, security checkpoints, gates and security guards should be provided at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure the safety of site staff; and
- The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft.

6.6.19 Social/ Cultural Conflicts

Potential Impact

During the construction phase of the project, conflicts may arise between labor force and local community. Furthermore, differences in cultural values may also cause discomfort to local residents. This impact is temporary and minor negative in nature.

Mitigation Measures

- Plan for social grievance redress mechanisms including the local leaders and community representatives;
- Local labor will preferably be employed for construction works;
- Careful planning and training of the workforce to minimize disturbance to the local people;
- Robust and transparent GRM will be implemented

6.6.20 Child Labor

Potential Impact

Due to poverty and the feeble financial situation of the area, the underage children might get involved with the contractor various construction works. This will be the violation of the Child Labor Act. Furthermore, SEA/SH issues might arise which will create social conflicts. This impact is adverse and temporary in nature.

Mitigation Measures

- Standard clause in the contracts related to child labor explicit prohibitions, etc. and contractor will ensure compliance to the contractual provisions as per law of land. Similarly equal wages for similar work will be followed.

6.6.21 Economic Activity

Potential Impact

Due to the construction of the proposed Project, economic activity will be generated in the project area as the laborers and semi-skilled staff will have an opportunity to work in the project area. This will provide them an opportunity to develop their skills and capacities. It will also benefit the local vendors of the project area. This is a positive impact.



6.7 Anticipated Impacts during Operational Phase

Anticipated impacts during Operational Phase and the recommended mitigation measures have been described under biophysical and socio-economic categories as follows:

6.7.1 Soil

Potential Impact of STP

The soil quality may be affected due to leakage/ infiltration from sewer lines and STP bed. The sludge generated from cleaning/ maintenance of pumping stations, manholes, sewers and STP may contaminate the soil. The liner of the STP, while desludging may get dried and cracks may lead to the seepage of wastewater and thus contaminate the soil. Improper disposal of scum and sludge is another concern. This is a moderate negative impact.

Potential Impact of Leachate from Dumping Site

The collected solid waste will be dumped into the existing dumping sites of Tehsils. There is no arrangement of leachate collection and no liner material is present there which will result in contamination of soil due to leachate. The situation will exacerbate in the rainy seasons. This is moderate negative impact.

Mitigation Measures

- Sludge shall be treated before ultimate use/disposal. Various options for sludge treatment include Digestion, Drying/ Dewatering, Composting, Lime Stabilization, Heat Treatment must be considered etc;
- The liner of STP must be regularly maintained and checked for any cracks and leakages;
- Treated sludge should be properly disposed of in an environmentally friendly manner.

6.7.2 Air Quality

Potential Impact of Sewerage System

The operation of sewerage scheme will result in generation of gases including H₂S and CH₄. H₂S is a foul-smelling poisonous gas that might be harmful to the sewer men and could be fatal sometimes. CH₄ is natural gas also referred to as a greenhouse gas. Pakistan is signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and adopted Kyoto Protocol in 1997. Under the Kyoto Protocol, Pakistan is committed to reduce GHG emissions into the environment to prevent interference with climate change. The GHG emissions for the proposed project are a concern due to the anaerobic conditions in the sewer lines and wet wells of the disposal station.

Mitigation Measures

- Provision of exhaust gas vents at appropriate locations in the design;



- Sewer-men will cover their faces with gas mask while entering the sewer for cleaning or maintenance purposes;
- It's better to use sucking machinery for cleaning of sewers;
- Use gas detector before inspection;
- Adequate tree plantation must be done around the STP to control the spread of odour;

6.7.3 Odour

Potential Impact of STP

STP are designed on adequate waste loading and function well if they are not overloaded. The overloading will result in malfunctioning of STP and it will result in significant odour generation in the vicinity. This impact is temporary and high adverse in nature.

Mitigation Measures

- The STP should not be overloaded and personnel dealing in operation should be trained to avoid operational issues;
- Adequate tree plantation must be undertaken to avoid spread of odour in the vicinity.

6.7.4 Elite Capture

Elite capture is a phenomenon prevalent in project area, where the interests and resources of the rich and powerful are prioritized over those of the general public. This has resulted in a situation where the elites have disproportionate control over resources, policies, and decision-making processes in all over the province. Elite capture is often facilitated by corruption, nepotism, and patronage networks, which enable the elites to manipulate the system in their favor. The consequences of elite capture are far-reaching, with the general public often left without access to basic amenities such as health, education, water and sanitation. This has resulted in widespread inequality, marginalization, and poverty in Punjab. Landowners play role as elite capture while donating the land to get the rights to use of water, sewage treated water for agriculture.

Mitigation Measures

- To increase transparency and accountability in decision-making processes.
- Involving multiple stakeholders, including community members, in decision-making processes related to project activities.
- To promote the participation of marginalized groups, such as women and minorities, in decision-making processes. By ensuring that these groups have a voice in decision-making, the risk of elite capture can be reduced.
- Strengthening institutions such as VO's/VC's and regulatory agencies can help ensure that decisions are made in a fair and equitable manner, without undue influence from elites.
- To ensure an effective grievance mechanism for monitoring and reporting any cases of elite capture.
- Robust and transparent GRM will be implemented



- VO's will be strengthened to play a role during distribution of treated water to prioritize the needs of the entire community rather than just a select few elites.
- Due diligence will be held during VLD process to absolve the doner from all the associated land rights.

6.7.5 Social Inclusion

Social inclusion is the process in which individuals and groups take part in the society. Social inclusion in proposed project area is an important aspect for the overall development of the interventions. It is crucial to ensure that every stakeholder of the community have equal access on the provision of clean drinking water and sanitation facilities, improved healthcare facilities, educational facilities and on economic excess and job opportunities. In this proposed project efforts will be made to promote the participation of marginalized groups, such as women and minorities, elderly person in decision-making processes and community activities. These efforts include the participation of the public including marginalized groups in the community meetings for project disclosure, corner meetings for the nomination of their representatives for the Village Organizations/ Village Councils (VOs/VCs), and monthly community meetings. Moreover, due representation for these marginalized groups has also been ensured in the VO membership. In addition to the open electoral process, a minimum of 50% share of the total membership has been allocated for the women members, one seat reserved for the minority, and in case of other socio-lingual differences further quota has also been ensured. These efforts will help to improve the overall quality of life for residents in proposed project area to promote opportunities in inclusive manner.

Mitigation Measures

- Providing awareness campaigns to increase knowledge and understanding of the project. and challenges faced by marginalized groups.
- Ensuring the implementing policies that promote diversity and inclusion, such as affirmative action policies and anti-discrimination laws.
- Providing awareness on the importance of clean drinking water & sanitation, education, job training, and community services to underserved and marginalized populations.
- Encouraging and supporting the active participation of marginalized groups in decision-making processes through VO's to providing opportunities for leadership.
- Fostering partnerships between PRMSC-TO and VOs/VCs to promote social inclusion to address the root causes of social exclusion.
- Regular monitoring and evaluation of project policies and programs to ensure they are effective and inclusive.

6.7.6 End Water User of Treated Wastewater

End wastewater users are the individuals and communities who will use the treated water for various irrigation purpose. These end-users play a crucial role in ensuring the sustainable use of treated wastewater. It is important to understand the value of treated water and the impact of their actions on wastewater availability. During VLD process it will



conveyed that every member of the community would have equal rights on the usage of treated water. The VO of the village will decide the distribution rights of treated wastewater according to the needs of community.

Mitigation Measures

- End water users will adopt water conservation measures such as reducing water wastage, using efficient irrigation methods
- Awareness campaigns will be conducted on the understanding and importance of water conservation and its impacts.
- VO will ensure monitoring and evaluation on regular basis regarding the usage and conservation of treated water.
- Distribution of treated wastewater will be decided by VO's/VCs in village
- Equal rights of the community on the usage of treated water will be ensure by the VO's.

6.7.7 Solid Waste

Domestic and hazardous wastes would be generated during cleaning and maintenance activities. The solid waste during operational phase will consist of plastics, metal and organic wastes present in sewer lines which can cause blockage in sewerage system. This impact is major negative and permanent in nature.

Potential Impact of Solid Waste Management

The waste containers, if not emptied timely, will create nuisance and attract mosquitoes and disease vectors. The situation will exacerbate in the rainy seasons. Furthermore, there would be littering during transportation of waste from the villages to the dumping site.

Mitigation Measures

- Waste shall be collected, stored and disposed of according to relevant standards in approved facilities;
- An organized collection system and its implementation through a licensed contractor;
- The containers will be timely removed and a fine will be imposed on contractor in case of violations;
- Closed containers will be used for transportation of waste to the dumping site;
- Schedule inspection of the sewer lines and STP to keep it clean and to identify any hazardous material; and
- Solid waste bins shall be placed at appropriate locations to avoid mixing in wastewater.



6.7.8 Sludge

Potential Impact

Sludge is semi-solid material which will be settled at the bottom of the STP due to anaerobic decomposition of biomass. Significant amount of sludge will not be produced in ABR, however, periodic desludging will be done to achieve good removal efficiency. The removed sludge in wet form, if left unattended will create nuisance i.e., odor, soil contamination, groundwater contamination (through percolation/ seepage) and will serve as a breeding ground for vector diseases. Sludge will be removed from the ABR once the 50% of the ABR is filled with the sludge.

Mitigation Measures

- Appropriate sludge treatment must be undertaken before disposal of sludge, sludge dewater and drying through sludge drying beds in case of ABR.
- Sludge testing / horticulture purpose/ campaigns. Priority will be given to the use of dried sludge as a land conditioner in the fields.
- If required remaining sludge will be transferred to a nearby dumping site designated by Tehsil Municipal Authority, these sites are already being used for dumping of solid waste.
- Sludge management plan will be followed for proper handling and disposal (Annexure-8).

6.7.9 Water Quality

- Water quality will be enhanced through public standposts and filtration plants
- Water supply lines will be laid as per the engineering design to provide unhindered water quality.
- Leakage of underground wastewater to the water supply lines will be prevented with routine inspection.

6.8 Positive Impacts

6.8.1 Improved Water Supply System

Clean tap water is a dire need of all project tehsils. The provision of adequate water supply system with a reasonable supply of water will provide relief to the community and will resolve the major issue of “water” in the project area. Further, there will be a net improvement in community’s health.

6.8.2 Improved Sewerage System

The proposed project will improve the overall sewerage and drainage system of the project area. Currently, the open wastewater drains in the streets result in foul odor, serves as breeding ground for disease vector and results in inconvenience to the road users and local



community. The project will improve this situation by controlling overflows and proper disposal of wastewater/ storm water.

6.8.3 Improvement in Public Health, Hygiene and Sanitation

With the improvement in sewerage and drainage system, improvement in health, hygiene and sanitation will also be observed. Foul odor will be eliminated and there would be no breeding grounds for diseases vectors. Thus, the project will improve public health, hygiene and sanitation conditions in the project area.

6.8.4 Landscape

Potential Impact

During the operation stage, new saplings of different plants would be planted to enhance the aesthetics to create a buffer zone and to compensate the environmental losses. This will have a positive impact of permanent nature. The presence of adequate flora at available spaces will help in absorbing flue gases and other air quality related impacts of proposed project operation. The plants will be beneficial in dust and noise suppression for the nearby community.

Mitigation Measures

- The saplings planted in the project area against the trees affected and for enhancement of environment should be properly maintained throughout their growth.

6.8.5 Commulative Impacts of Water Extraction & Sewerage Treatment

Potential Impact

Cumulative impact may occur as a result of development of several treatment plants or several water extraction points. Under considering in 26 priority villages, currently there is only one water extraction point for each priority village except Sadiq Nagar and Sheikh Wahan and the people in project area are fulfilling their water demands majorly from ground water resource (agriculture and domestic purpose respectively). The current intervention will provide treated water in the replacement of raw water to the locals which will improve the health and reduce exposure to water borne diseases. Supply of treated water at door set will also discourage the installation of pumps in houses. Furthermore, this project will basically replace the one practice to another practice and will not majorly impact on the consumption rate as people reliance on existing water extraction system will become minimum after the completion of the project. However, there will be no cumulative impact in terms of depleting ground water resources.

On the other hand, for each priority village, one Anaerobic Baffle Reactor (ABR) will be installed, and the treated water will be discharged into an existing sewerage pond. This practice will also have no impact on quality of water resources because sewerage water is already dumped directly into existing sewerage ponds and after this project sewerage water will be discharged into the ponds after treatment which will help to improve the quality of sewerage pond. However, there will be more or less zero cumulative impact after the installation of ABR



Mitigation Measures

- Water quality monitoring should be done by the third party on quarterly basis to ensure the supply of safe drinking water.
- ground water table will be monitored periodically.
- Water metering system should be installed to know the total consumption of water.
- Ensure the treated effluent follows the National Environmental Quality Standards
- Maintenance of ABR should be done annually for its smooth operations.

6.8.6 Other Positive Impacts

Some other positive impacts include the following:

- Economic development
- Employment generation
- Development of deprived areas
- Formation of model villages of tehsil Bhawana

6.9 Operational Sustainability

The sewer pipes water supply lines and other components of the project will not function with improper operation and maintenance of sewerage system and water supply system which is the responsibility of the client.

Mitigation Measures

- Routine/ preventative maintenance shall be carried out as with the passage of time
- Major causes of deposition of silt and floating matters in the sewers are the mixing of solid waste and smaller diameter sewer pipes. Placement of sufficient number of solid waste litter bins/containers shall be ensured along the roads and in streets to avoid entrance of solid waste into sewers;
- Immediate response to all sewer/drainage related complaints followed by prompt correction of defective condition;
- Regular cleaning of sewer lines to remove grease, grit, and other debris that may lead to sewer backups. Cleaning shall be conducted more frequently for problem areas;
- Inspection of the condition of sanitary sewer structures and identifying areas that need repair or maintenance. Items to note may include cracked/deteriorating pipes; leaking joints or seals at manhole; frequent line blockages; lines that generally flow at or near capacity; and suspected infiltration or ex-filtration;
- Any repairs will be conducted by sealing off the affected sewer and pumping the contents into tankers, after which the faulty section will be exposed and repaired following the same basic procedure as when the sewer was built. Trenches will be dug around the faulty section and the leaking joint will be re-sealed, or the pipe will be removed and replaced.
- Water supply lines will be inspected on regular basis to avoid any leakages and loss of resources.



6.10 Induced Impacts

Beside some direct environmental social and economic impacts, the proposed project may have some induced impacts to the physical features of environment. The project is envisaged to improve the infrastructure of the project area.



ENVIRONMENTAL & SOCIAL MANAGEMENT & MONITORING PLAN

7.1 General

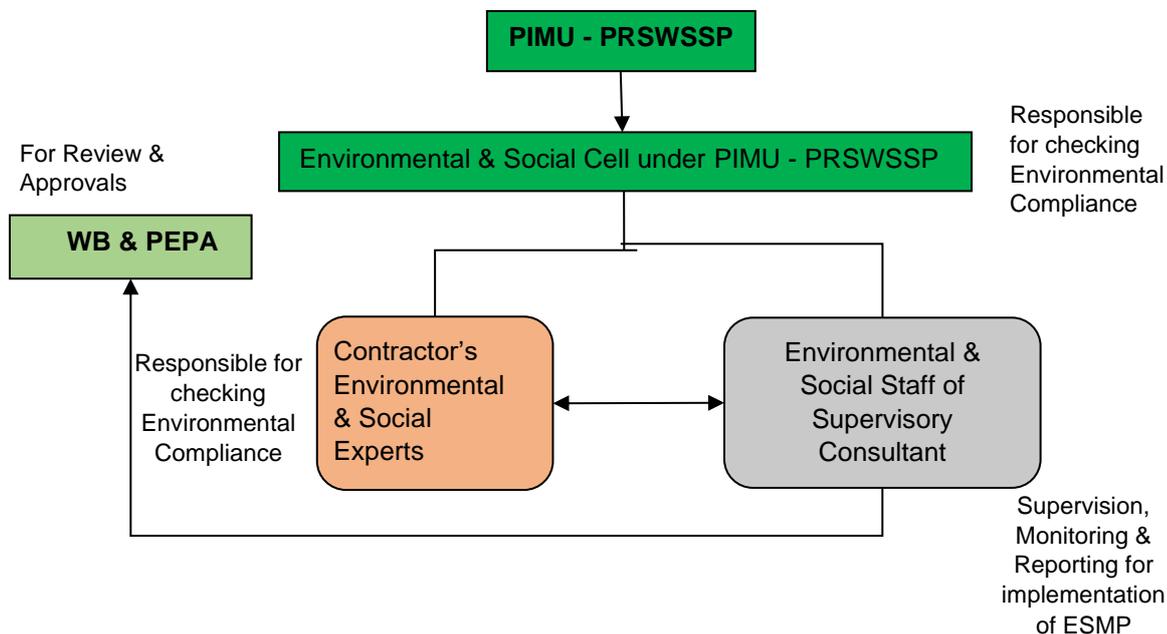
This section aims to address the measures which need to be adopted during each phase of the project to avoid, contain, mitigate or compensate for the potential impacts identified in **Section 6**. The Environmental & Social Management Plan (ESMP) is the major part of this section and forms the gist of this study. ESMP not only includes Best Management Practices (BMPs) but also includes monitoring indicators, frequency, responsibility, and estimated environmental budget. This ensures that mitigation, monitoring, and management consideration form a part of the documentation used for decision making and the basic benefit of defining the responsibilities is to make sure that the suggested mitigation measure will be implemented at the construction and operation stages of the project. A summary of the mitigation measures for potential impacts have also been given in this section to support ESMP. Moreover, a framework for the implementation of ESMP has been discussed in this section.

7.2 Implementation of Environmental & Social Management Plan (ESMP)

The institutional arrangement for the implementation of ESMP for PRSWSSP is presented below. The proponent PIMU-PRMSC will be responsible for compliance of with environmental and social safeguard requirements of the proposed project.

The proposed project activities will be monitored and managed by the PIMU-PRMSC. The Environmental and Social Cell (ESC) staffed by qualified environmental and social specialists has already been established under PRSWSSP. The ESC will be the custodian of the ESMP. ESC will support ensuring the compliance of ESMP. ESC will submit progress reports for the implementation of the ESMP to WB and PEPA as per environmental approval/ NOC conditions for the PRSWSSP.

Figure 9: Organizational Setup for implementation of ESMP



7.2.1 Roles and Responsibilities of the Functionaries involved in ESMP Implementation

A. World Bank

The current proposed project falls under category E2 as per ESMF guidelines; in view of limited environmental and social impacts and thus require an ESMP. World Bank shall review and approve the safeguard documents including ESMP. The Bank shall also review and approve the quarterly and biannually prepared progress reports.

B. Punjab Environmental Protection Department

As per Punjab Environmental Protection (Amendment) Act, 2012, Punjab EPD is responsible for environmental protection and pollution control. The Punjab EPD is responsible for the approval of the EIA/ IEE of all the developmental projects under their jurisdictions. As per Punjab Environmental Protection (Review of Initial IEE/EIA) Regulations 2022, Schedule-II, EIA is required for 'Water Supply, Sewerage System and Treatment (Category F) & Waste Storage and Disposal (Category G). Based on the EIA and ESMP, Punjab EPD will monitor (as and when required) the project activities.

C. PIMU-PRMSC

The Project Director of PIMU-PRMSC is the in-charge for the financial and technical matters related to PRSWSSP. His responsibilities for monitoring the ESMP will consist of:

- Ensuring that the required environmental training is provided to the concerned PIU staff;



- To carry out random site visits to the construction sites to review the environmental performance of the Contractor;
- Review monitoring reports for the progress of environment-related activities;
- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental monitoring reports;
- To assist the Contractor in obtaining necessary approvals from the concerned departments;
- Maintaining interface with the other line departments/ stakeholders; and
- Reporting to the Punjab EPD on the status of ESMP implementation.

D. Environmental and Social Cell (ESC)

ESC has already been established in the PIMU-PRMSC which is responsible to:

- Make sure that all the contractual obligations related to environmental and social compliance are met;
- Monitor the progress regarding the implementation of environmental and social safeguards as provided in the ESMP;
- Oversee the compliance of all the monitoring programs as given in ESMP;
- Check randomly whether monitoring of the environmental aspects of the proposed project during construction and operational phases is being properly carried out;
- Document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports, and make follow-up on these actions to ensure progress toward the desired outcomes;
- Make sure that the contractor implements the additional measures suggested by the SC and PIMU; and
- Report the status of ESMP compliance to the Project Director, PIMU-PRMSC.

E. Supervisory Consultant (SC)

The roles and responsibilities of SC will be:

- To oversee the performance of the Contractor to make sure that the Contractor is complying with ESMP;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner;
- Strong coordination with the Contractor and PIMU-PRMSC;
- Preparing training materials and implementing programs;
- Ensure the implementation of the mitigation measures suggested in ESMP;
- To supervise and monitor environmental activities being performed at the site;
- Periodic reporting as mentioned in ESMP; and
- Suggest any additional mitigation measures (if required).



F. Construction Contractor (CC)

Contractors will be bound to appoint site-based Environmental and Social managers with relevant educational backgrounds and experience for PRSWSSP. The contractors' Environmental and Social manager will carry out the following activities:

- Implementation of the mitigation measures at the construction site;
- Contractor will be bound through the contract to take actions against all the special and general provisions of the contract document;
- Contractor will make sure the compliance of ESMP recommendations related to construction and will also be responsible for effective liaison with local heads of the community;
- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use;
- Compliance with international best SOPs for COVID-19;
- To conduct the environmental and health & safety trainings to the workers/labour; and
- Coordinate with the Environmental Specialist and Social Development Specialist (SDS) of SC and PIMU.

7.2.2 Institutional Arrangement for Implementation of ESMP by PIMU-PRMCS during O&M Phase

The proposed project will be administrated by PIMU-PRMCS during the O&M phase. The Project Director, PRMCS with his ESC will be responsible for the following:

- Compliance with ESMP requirements for the O&M phase;
- Coordinating with the operational staff working under the ESC to monitor environmental compliance during project operation;
- Advising on, and monitoring tree plantations along the stagnant pool of water in the project area;
- Reporting on the progress of environmental compliance to the Punjab EPD;
- Assessing the long-term environmental impacts of project operation;
- Sustaining a working partnership among the PIMU-PRMCS, Punjab Local Government Department, Punjab EPD, Agriculture, Irrigation, Forest and Wildlife departments of Punjab, NGOs, and other related public-private sector organizations.

7.3 Reporting

The contractor will prepare and submit monthly monitoring reports for compliance of implementation to the supervision consultant (SC) environmental team.

The distribution of periodic reports is given in **Table 23**.



Table 23: Distribution of Periodic Reports

Report	Prepared by	Reviewed by	Distribution
Monthly	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer and PRMSC
Quarterly	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer, PRMSC and The World Bank
Annual	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer, PRMSC and The World Bank
Final	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer, PRMSC and The World Bank

7.4 Non-Compliance with the ESMP

The implementation of the proposed ESMP involves inputs from various functionaries as discussed earlier. The contractor will be primarily responsible for ensuring the implementation of the mitigation measures proposed in the ESMP, which will be part of the contract documents. The provision of the environmental mitigation cost will be made in the total cost of the project. However, if the contractor fails to comply with the implementation of ESMP and submission of the monthly compliance reports, deductions will be made from the payments to the Contractor claimed under the heads of environmental components.

7.5 Contractors ESMP

The contractor will prepare a site-specific Contractor's ESMP (C-ESMP) based on the current ESMP and will get it approved by PIMU-PRMSC before the start of work. This will ensure the implementation of the ESMP based on the site conditions at the time of execution, by the contractor.

The C-ESMP will include the following sub-plans:

- Traffic management plan,
- OHS plan,
- Pollution prevention plan,
- Camp management plan

7.6 Inclusion of ESMP in Bidding/ Contract Documents

The present ESMP will be included in the bidding/ contract documents and their implementation will be contractual binding for the contractors.



7.7 Environmental and Social Monitoring Plan

Monitoring will be carried out to ensure that the mitigation plans are regularly and effectively implemented. It will be performed at three levels. At the PIMU level, the ESC will do ESMP monitoring to ensure that the mitigation plans are being effectively implemented. The environmental engineer of the Supervision Consultant will regularly monitor the ESMP implementation by the contractor. At the contractor's level, the environmental monitoring checklist will be filled on daily basis by their environmental manager and countersigned by the environmental engineer (EE) of the Supervision Consultant.

Table 24 outlines the parameters that will be monitored, the expected frequencies of monitoring, and the responsible agency for monitoring.



Table 24: Environmental and Social Management Plan (ESMP)

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Pre-Construction / Design Phase							
Layout Planning & Design	Incompatible layout plans and engineering designs of the proposed project can undermine the overall aesthetics and ambiance of the project area	<ul style="list-style-type: none"> All structural, layout and engineering designs of the project are in strict accordance with the applicable national and international guidelines/ codes/ standards and engineering practices; 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Improperly Designed Sewers	Improper designed sewers may not carry the waste load, leading to system-failure and financial loss.	<ul style="list-style-type: none"> All sewer lines including trunk, lateral and branch sewer lines have been designed considering the future population and waste generation rate; 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
	The construction of high-rise overhead water tanks may cause visual obstruction.	<ul style="list-style-type: none"> The location of groundwater storage tanks, overhead water tanks, pumping stations and STP have been finalized in close consultation with local community and representatives of local authorities. 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Groundwater	During operation probability of seepage through the sewers may also contaminate groundwater.	<ul style="list-style-type: none"> Efficient seepage control measures have been considered in selection of pipe materials during the planning stage 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
		<ul style="list-style-type: none"> Procedure for efficient jointing of selected sewer pipes will be applied to avoid leakage from pipes 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Damage to Existing Infrastructure	There are no public utilities except the electric poles which might get affected during construction activities and movement of machinery and the community will face temporary electricity cuts.	<ul style="list-style-type: none"> Alignment has been selected carefully to minimize disturbance to public utilities; 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
		<ul style="list-style-type: none"> Relocation of the public utilities shall be planned and approved in consultation with relevant departments/authorities/stakeholders before project commencement if any, to avoid inconvenience to the public. 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Physical Cultural Resources	No historical/ archeological site is present in the project area. However, some cultural resources including mosques, graveyards and shrines are present. These will not be directly affected but the people may face access issues in visiting these facilities.	<ul style="list-style-type: none"> The alternative access routes will be provided in case the access has to be restricted during the execution period 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Fire Fighting System	In case of fire hazards, inefficient firefighting system at campsite may cause severe damage to the camp site and surrounding crops and houses. This will be a moderate adverse impact.	<ul style="list-style-type: none"> Contractor will provide firefighting system for construction camp, workshop and construction site; 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
		<ul style="list-style-type: none"> A separate fire alarm system will also be installed at construction camp and near the construction site. 	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Land Acquisition	Private land will be taken through VLD, State land will be used through NOC procedure. There will be no purchase of land, involuntary resettlement and no relocation of people or	<ul style="list-style-type: none"> No one will be forced or pressurized to donate land VLD should not be more than 10 % of the total land holding of the owner 	DC, PIMU-PRMSC	VLD procedure of ESMF	Once at the time of land acquisition	PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	businesses.						
Anticipated Impacts during the Construction Phase							
Topography	The construction activities are not expected to impact the topography of the area significantly except for those areas where physical activities i.e., earthwork is involved as well as stocking of material. The excavated material is to be mostly backfilled and the excessive material will be transported to strengthen the roadsides or will be dumped at the designated locations. This impact is site-specific, temporary, reversible, possible, and low significant	<ul style="list-style-type: none"> Material stockpiles will be removed as soon as work is completed and the area will be reinstated; 	CC, SC, PIMU-PRMSC	Stockpiles and heaps of waste visible at the site.	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Temporary storage sites will be allocated for the storage of excavated material; 	CC, SC, PIMU-PRMSC	Site allocation and preparation	Once before the excavation activity	SC and PIMU	N/A
		<ul style="list-style-type: none"> Temporary storage sites will be lined and must not allow infiltration 	CC, SC, PIMU-PRMSC	Site allocation and preparation	Before utilization of storage site	SC and PIMU	N/A
		<ul style="list-style-type: none"> The stockpiles must be covered with tarpaulin sheets or other adequate material; 	CC, SC, PIMU-PRMSC	Provision of tarpaulin	Before start of construction activity	SC and PIMU	The cost of tarpaulin is provided in the ESMP Budget
		<ul style="list-style-type: none"> Piling of material at large extent will not be allowed and the contractor will timely remove excavated material from the site. 	CC, SC, PIMU-PRMSC	Stockpiles and heaps of waste visible at the site.	Weekly	SC and PIMU	N/A
Soil Erosion	The soil would be exposed to erosion due to excavations for laying of sewers and water supply pipes. Construction activities such as clearing, excavation, filling, grading and setting up construction camps will affect the existing soil condition in the study	<ul style="list-style-type: none"> Good engineering practices will help to control or minimize soil erosion both at the construction sites and in peripheral areas including provision of shuttering; 	CC, SC, PIMU-PRMSC	Provision of shuttering	Once	SC and PIMU	N/A
		<ul style="list-style-type: none"> Use of heavy machinery will be restricted as far as possible to avoid the destruction of soil structure; 	CC, SC, PIMU-PRMSC	Movement of machinery	Hauling of machinery During Construction Work	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	area/ Aol. The clearing of vegetation can also loosen the soil and make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion. During the rain, the eroded soil will mix with stagnant water to transform into slush, which can affect movement of vehicles and machinery and construction workers as well as limit the movements of local people. This impact can be categorized as low adverse, site-specific, long term, permanent, highly probable and reversible.	<ul style="list-style-type: none"> Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations should be avoided; 	CC, SC, PIMU-PRMSC	Excavations beyond the specified spots	During excavation works	SC and PIMU	N/A
		<ul style="list-style-type: none"> Stored excavated material shall be covered and preferably reused, e.g., in construction as backfill etc. 	CC, SC, PIMU-PRMSC	Wastage of excavated material; Backfilling	During backfilling	SC and PIMU	
Soil Contamination	Contamination of soil may be caused by oil and chemical spills from construction machinery or uncontrolled runoff from equipment washing yards. This impact is permanent and minor negative in nature.	<ul style="list-style-type: none"> Chemicals/ hazardous products and wastes will be stored on impermeable surfaces in secure, covered areas with clear labelling of containers and with a tray or bund to contain leaks; 	CC, SC, PIMU-PRMSC	Monitoring compliance to Regular disposal of Chemical/ Hazardous waste; Photographic record;	Monthly	SC and PIMU	N/A
		<ul style="list-style-type: none"> All construction wastes from the site will be regularly removed and transported to approved waste disposal sites 	CC, SC, PIMU-PRMSC	No fall of transported material; Damaged road repaired.	Weekly	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
				Record of harmful incidents that occurred.			
		<ul style="list-style-type: none"> Washing yards will be paved to avoid seepage of runoff from the yard; 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Awareness in emergency spill response procedures will be conducted through trainings; 	CC, SC, PIMU-PRMSC	Training Sessions	Once	SC and PIMU	N/A
		<ul style="list-style-type: none"> Oil leakages, chemicals and other liquids spills will be avoided/minimized by providing appropriate storage places depending on the type of material for storage 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
Trench Failure	The major construction activities involve excavation operations for laying water supply and sewerage lines. The major hazard associated with the excavation operations is trench failure. The unstable slopes may fail and settle in the trenches which may cause injuries and fatalities to the workers. This impact is probable, site specific and high adverse in nature.	<ul style="list-style-type: none"> Provision of adequate shuttering in the trenches; 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Leftover shuttering may also be used in case of loose soil strata. 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Construction Camps/Camp Sites	Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which may include noise, health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderate negative in nature.	<ul style="list-style-type: none"> Working hours of noisy activities will be limited to normal daytime working hours when near identified sensitive receptors; 	CC, SC, PIMU-PRMSC	Field Observations	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Waste Management Plan will be implemented to include procedures for the classification, storage and disposal of all construction wastes and the training of employees who handle hazardous materials; 	CC, SC, PIMU-PRMSC	Compliance to waste management plan;	Monthly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Construction camps will be established away from populated areas 	CC, SC, PIMU-PRMSC	Camp established at least 500m away from the nearest community; Local hired workforce;	Once	SC and PIMU	N/A
		<ul style="list-style-type: none"> NOC/ lease agreement will be signed between landowners and contractors. 	CC, SC, PIMU-PRMSC	Lease agreement signed / NOC obtained	Once before start of construction	SC and PIMU	N/A
		<ul style="list-style-type: none"> Regular training of workers will be carried out regarding local cultural norms, human behaviour, gender issues by the contractor during construction activities at site. 	CC, SC, PIMU-PRMSC	Any complaint from the local community.	Weekly check complaint register	SC and PIMU	Cost is provide in the ESMP Budget



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Water Quality	Runoff and erosion from exposed soil surfaces, earthwork areas and stockpiles e.g., grouting and cement material with the rain. Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water.	<ul style="list-style-type: none"> Protection of groundwater reserves from any source of contamination such as the construction and oily waste by making the ground impermeable through sheets or compaction; 	CC, SC, PIMU-PRMSC	Monitoring compliance; Water quality testing.	Quadrimesterly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Stockpiles of cement and other construction materials will be kept covered when not being used; 	CC, SC, PIMU-PRMSC	Use of tarpaulin for protection; Visual Inspection	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Maintenance of vehicles will be carried out only in impermeable areas where any oil spillages can be contained; 	CC, SC, PIMU-PRMSC	Any spill observed; Availability of sealed containers for used oils and lubricants; Disposal options (e.g., local vendor) explored.	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Careful planning of the works to avoid soil excavation works during rainy seasons; 	CC, SC, PIMU-PRMSC	Visual Inspection	During rainy season	SC and PIMU	N/A
		<ul style="list-style-type: none"> No activity will be undertaken in monsoon and careful attention must be paid to the weather forecast before excavation operations. 	CC, SC, PIMU-PRMSC	Visual Inspection	During rainy season	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost	
		<ul style="list-style-type: none"> All kinds of waste will be stored in covered containers and disposed of safely as soon as possible; 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A	
		<ul style="list-style-type: none"> The contractor will ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged. 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A	
Air Quality	Air quality will be affected by various construction activities. Emissions may be spread over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. In certain climatic condition such as hot summer, airborne dust can become a major nuisance if control techniques are not properly employed	<ul style="list-style-type: none"> All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions; 	CC, SC, PIMU-PRMSC	Dust emission controlled;	Weekly	SC and PIMU	N/A	
		<ul style="list-style-type: none"> Open burning of solid waste from the contractor's camps will be strictly banned; 	CC, SC, PIMU-PRMSC	Monitoring compliance to disposal of waste;	Weekly	SC and PIMU	N/A	
		<ul style="list-style-type: none"> Fuel with substantially lower sulphur content will be preferred; 	CC, SC, PIMU-PRMSC				SC and PIMU	N/A
		<ul style="list-style-type: none"> Personal Protective Equipment (PPEs) like masks, goggles and gloves etc. will be provided to workers; 	CC, SC, PIMU-PRMSC	Implementation of HSE; Visual Inspection	Daily	SC and PIMU	Cost given in ESMP Budget	
		<ul style="list-style-type: none"> PEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works. 	CC, SC, PIMU-PRMSC	Monitoring of machinery and equipment;	Daily	SC and PIMU	N/A	
		<ul style="list-style-type: none"> Regular water sprinkling on the site and access roads will be carried out to suppress excessive dust emission(s) 	CC, SC, PIMU-PRMSC	Visual Monitoring	Daily	SC and PIMU	N/A	
		<ul style="list-style-type: none"> Excavated trenches will be restored immediately to original 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A	



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		level and paved after laying of sewer pipes;					
		<ul style="list-style-type: none"> Vehicle speed in the project area will be prescribed not more than 20 km/hr and controlled accordingly; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Diversion will be provided for local traffic movement; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> The vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin. 	CC, SC, PIMU-PRMSC	Use of tarpaulin for protection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Air quality monitoring should be done by the 3rd party. 	CC, SC, PIMU-PRMSC	Air Quality	Monthly	SC and PIMU	Cost is provided in ESMP Budget
Dust	During construction stage, the dust level may increase considerably. Earthworks, site clearing, stockpiling and hauling of materials will generate dust and affect the local air shed. Local people and the workers may be exposed to high dust levels during landscaping, access road and site preparation. This impact is site-specific, temporary, reversible, likely and medium significant.	<ul style="list-style-type: none"> Blowing of dust from potential sources at the worksite will be avoided by shielding them from the exterior, for example using polythene curtains or raising a fence of corrugated sheets around areas of active constructions 	CC, SC, PIMU-PRMSC	Visual Inspection Air levels measured.	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> All excavation work will be sprinkled with water to control dust; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Tires of all the vehicles leaving the site will be washed. No earth, mud, dust and the like will be deposited on the public road; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Noise	Noise level is expected to increase during construction activities. Main sources of noise and vibration will be heavy machinery such as excavators and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within Aol. Health risks associated with exposure to continuous noise levels include high blood pressure, hypertension, annoyance and sleep disturbance, temporary threshold shift etc. The impacts of noise will be temporary and highly adverse in nature.	<ul style="list-style-type: none"> Construction workers will be provided suitable hearing protection like ear cap, or earmuffs and training them in their use; 	CC, SC, PIMU-PRMSC	Visual inspections; Noise levels measured.	Daily	SC and PIMU	Cost is provided in the ESMP Budget
		<ul style="list-style-type: none"> Selection of up-to-date and well-maintained equipment with reduced noise levels will be ensured by suitable in-built damping techniques or appropriate muffling devices 	CC, SC, PIMU-PRMSC	Visual inspections; Noise levels measured.	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Residents will be notified earlier before commencement of excavation operations. 	CC, SC, PIMU-PRMSC	Visual inspections;	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Noise quality monitoring should be done by the 3rd party. 	CC, SC, PIMU-PRMSC	Noise levels measured	Quarterly	SC and PIMU	Cost is provided in the ESMP Budget
Municipal and Construction Waste/ Wastewater	Due to construction activities municipal and construction waste will be generated from construction activities. The construction waste will include wastewater, oil spillage from machinery, domestic waste and construction waste etc.	<ul style="list-style-type: none"> Solid waste generated during construction and camp sites will be safely disposed of in demarcated waste disposal sites and the contractor will provide and implement a comprehensive waste management plan; 	CC, SC, PIMU-PRMSC	Monitoring compliance;	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Burning of waste will be prohibited; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc; 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Emergency Response plan will be prepared to address the accidental spillage of fuels and 	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		hazardous goods;					
		<ul style="list-style-type: none"> Containers with covers will be provided on site to store waste 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
Resource Conservation	<p>The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), brick ballast, water and cement etc. Almost all the materials to be used in the construction of proposed project are non-renewable and therefore their sustainable use is necessary for the future use. Excessive water consumption for drinking and washing purposes by the construction staff may undermine water resources in the project area and in certain cases may disturb the existing water supplies in the project area.</p>	<ul style="list-style-type: none"> Wastage of water will be reduced by training the workers involved in water use; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Wastage of water will be controlled through providing proper valves and through controlling pressure of the water; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Water jets and sprays will be used for watering surfaces rather than using overflow system; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Source of water will be carefully selected. Water use will not disturb the existing community water supplies 	CC, SC, PIMU-PRMSC	Any conflict on the water availability.	Fortnightly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Reuse of construction waste materials will be considered; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Unnecessary equipment washings will be avoided; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> The efficient and well-maintained equipment and machinery will be used; 	CC, SC, PIMU-PRMSC	Noise levels within permissible limits Gas emissions minimized; Dust emission controlled	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> The equipment and machinery will be turned off when not in use; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Regular maintenance of machinery to avoid fuel leakages; 	CC, SC, PIMU-PRMSC	Log of vehicle and equipment repairs;	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Biodiversity Conservation	FLORA On account of construction of the proposed water supply and sewerage system, no trees are envisaged to be cut/disturbed. Hence there will be no direct impact on the flora of project area. However, the dust emissions due to excavation operations will stick on the leaves of existing trees and may close their stomata thus hindering the photosynthesis process.	• Campsites will be established on vacant land as far as possible, at least 500 m away from the residential areas;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;	CC, SC, PIMU-PRMSC	Log Book of vehicle inventory	Daily	SC and PIMU	N/A
		• The Contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes. They will use the paths and tracks for movement and will not be allowed to trespass through farmlands;	CC, SC, PIMU-PRMSC	Any conflict with locals.	Daily	SC and PIMU	N/A
		• Contractor will provide gas cylinders at the camps for cooking purposes and cutting of trees/ bushes for fuel will not be allowed.	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
	FAUNA The local animals mostly cats, dogs and jackals and specially the livestock i.e., goats and cows will get disturbed due to construction activities, specially the noisy activities. However, there will be no damage to their health and life. Some reptiles and insects may get killed/ injured during excavation operations.	• Excavations will be limited to the approved engineering drawings;	CC, SC, PIMU-PRMSC	Visual inspections; Photographic records.	Daily	SC and PIMU	N/A
		• Harassing of animals will be prohibited	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Health and Safety	Health risks and worker's safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment. The health and safety issues are also associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers. It will be a long term and severe negative impact.	<ul style="list-style-type: none"> Obligatory insurance against accidents for labourers/workers; 	CC, SC, PIMU-PRMSC	Accident/ Incident reported.	If happened	SC and PIMU	N/A
		<ul style="list-style-type: none"> Providing basic medical training to specified work staff and basic medical service and supplies to workers; 	CC, SC, PIMU-PRMSC	Maintained Training Record; Pictorial evidence	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Layout plan for camp site, indicating safety measures taken by the contractor, e.g., firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Work safety measures and good workmanship practices will be followed by the contractor to ensure no health risks for labourers, including use of Personal Protective Equipment (PPE) i.e., oxygen masks/ kits etc.; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	Cost is provided in ESMP Budget
		<ul style="list-style-type: none"> Protection devices (ear muffs) will be provided to the workers doing job in the vicinity of high noise generating machines i.e., excavators; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	Cost is provided in ESMP Budget
		<ul style="list-style-type: none"> Use of safety signs at the construction site, as shown below. 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> COVID-19 SOPs will be followed at work site and construction camps; 	CC, SC, PIMU-PRMSC	Implementation of Covid 19-Sops	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Traffic Management	The traffic influx within the villages is very low. Most of the traffic within the villages include motorbikes and few cars. The project interventions will not create traffic congestion issues in the project area. However, their movement will be disturbed due to the excavation and construction works and people may face accessibility issues. This impact is temporary and major negative in nature.	<ul style="list-style-type: none"> The construction activities will be carried out in pockets/reaches, once a patch has been completed (i.e., pipes are laid and covered) then excavation on new patch shall be started; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Local community will be taken on board to plan alternate access routes in connecting streets to ensure mobility of local traffic; 	CC, SC, PIMU-PRMSC	Alternate route maps	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Plan work in a minimum possible time. 	CC, SC, PIMU-PRMSC	Check targeted timeline	Daily	SC and PIMU	N/A
Nuisance/ Disturbance to Social Sensitive Areas	Since the proposed interventions will be carried out within the villages boundaries, therefore, the socially sensitive sites/places including schools, hospitals and religious centers will be temporarily affected due to dust, noise and the community will face accessibility issues due to open trenches. Dust due to earthworks will create health hazard to children and people with ailments. This impact is temporary and major negative in nature.	<ul style="list-style-type: none"> No work will be conducted near the religious places during religious congregations; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Material transport to the site will be scheduled considering school timings; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Notify concerned schools, hospitals/dispensary etc. 2 weeks prior to the work; conduct a 30 minutes awareness program on nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions and dos and don'ts 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Implement all measures suggested elsewhere in this report – dust and noise control, public safety, traffic management, strictly at the sites. 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Accessibility	Excavation of trenches and pipe/sewer laying work in the project area will obstruct access to residences, commercial buildings and businesses adjacent to the proposed project alignment. Disruption of access to commercial establishments may affect livelihood. The potential impacts are negative and moderate but short-term and temporary.	<ul style="list-style-type: none"> Leave space for access between mounds of excavated soil; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Consult affected business people to inform them in advance about the work schedule; 	CC, SC, PIMU-PRMSC	Consultation meeting; Pictorial evidence	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> If there are any holidays (i.e., Eid or Muharram etc.), the Contractor will complete the backfilling work of the trenches and will not leave any trench open before holidays; 	CC, SC, PIMU-PRMSC	Visual inspection Designated borrow and quarry areas used for access material;	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints; 	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
Resilience to Climate Change	There are chances that the open trenches may get flooded during rainy season. Flooding can hamper the construction of overhead storage tanks, pumping station and STP. This impact can be categorized as direct, local, medium term, temporary and reversible.	<ul style="list-style-type: none"> Project components have been designed to withstand flooding; 	CC, SC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	SC and PIMU	N/A
		<ul style="list-style-type: none"> The capacity of the sewerage/ drainage system have been designed and constructed based on extreme weather conditions predicted under international climate change models for Bhawana region to cater for extreme storm water runoff. 	CC, SC, PIMU-PRMSC	Check Meteorological department prediction of rain	Before construction	SC and PIMU	N/A
Liquid and Solid Waste from Construction Camps	Development of construction camps will generate significant quantities of liquid and solid waste. A total of five (05) nos. construction camps will be established in all five	<ul style="list-style-type: none"> The waste generated from the camp site will be disposed of at existing dumping site of the Tehsil Bhawana by the Contractor; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Construction workers and supervisory staff will be 	CC, SC, PIMU-PRMSC	Through Trainings	Monthly	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	villages accommodating approximately 30 skilled and unskilled staff each (i.e., total 150 workers for all villages).	encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;		Photographic record;			
		<ul style="list-style-type: none"> Domestic and chemical effluents from the construction camp will be disposed of by the development of on-site sanitation systems i.e., septic tank prior to discharge to nearby drain. Septic tank will be located adjacent to the construction camp. Proper monitoring to check the compliance of PEQS will be carried out; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper SWM system. Toxic waste will be handled, stored, transported and disposed separately; 	CC, SC, PIMU-PRMSC	Monitoring compliance to Regular disposal of waste; Photographic record;	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> The waste will be properly sealed in containers with proper labels indicating the nature of the waste; 	CC, SC, PIMU-PRMSC	Covered disposal containers placed at camp;	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Solid waste will be segregated at source so that it can be re-used or recycled 	CC, SC, PIMU-PRMSC	Covered disposal containers placed at camp;	Weekly	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Flammable and Hazardous Materials	Flammable materials to be used during the construction activities include diesel, furnace oil, petrol, Liquefied Petroleum Gas (LPG), kerosene oil and machinery fuels. These materials present little risk to the environment, if properly transported stored and used; otherwise, they are potentially very dangerous. Improper storage and handling practices for these flammable and explosive materials can pose dangers of fire and blasts in the area.	<ul style="list-style-type: none"> Safety procedures will be followed by the contractor and labors strictly while using, handling and storage of these materials; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Trainings will be provided to the contractor's staff for handling and using of flammable materials and explosives; 	CC, SC, PIMU-PRMSC	Monitoring compliance to handling of flammable material through inventory register; Photographic record;	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> For safety of construction labors and immediate communities, it is suggested that contractor's staff will be trained about the procedures of safe use, handling and storage of materials; 	CC, SC, PIMU-PRMSC	Visual observation	Twice a week	SC and PIMU	N/A
		<ul style="list-style-type: none"> Emphasis will be to decrease the volume of mucking material by reusing and then the disposal at the marked area in environment friendly way. In order to reduce the volume of disposal material, maximum part of the excavated material can be used in other activities filling of borrow areas and natural depressions in the project area. In order to increase the aesthetics of the area, native grass can be planted by dumping the surplus material in the proposed area with suitable soil 	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		cover.					
Gender Based Violence (GBV)	During construction phase, gender-based violence might arise due to discrimination made against women by unequal work distribution and unequal pay structure among others. Sexual harassment against women might occur as a consequence of mixing of men and women at the construction site, and moving on the roads and markets. This impact is negative in nature during construction stage.	<ul style="list-style-type: none"> Awareness will be created among the females at individual and community levels about the construction sites; 	CC, SC, PIMU-PRMSC			SC and PIMU	N/A
		<ul style="list-style-type: none"> Workers will not be allowed to crowd in the residential communities within the site; 	CC, SC, PIMU-PRMSC	Visual observation	Twice a week	SC and PIMU	N/A
		<ul style="list-style-type: none"> Alternative routes for pedestrian will be provided to avoid mixing of women with workers; 	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Raise awareness among the communities of the potential risks of GBV, and establish response services in the nearby communities that can respond to instances of GBV (particularly those related to issues of labor influx); 	CC, SC, PIMU-PRMSC	Reported issues; Awareness campaigns	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> The Contractor will make sure that no discrimination is made on the basis of gender while hiring of workers; 	CC, SC, PIMU-PRMSC	Hiring Criteria	Before Hiring	SC and PIMU	N/A
		<ul style="list-style-type: none"> Provisions of gender disaggregate bathing, changing, and sanitation facilities; 	CC, SC, PIMU-PRMSC	Design provisions	Once (before construction of construction camps)	SC and PIMU	N/A
		<ul style="list-style-type: none"> Contractor will take proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women. 	CC, SC, PIMU-PRMSC	Visual inspection; Complaints reported	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Influx of Labor	<p>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;</p> <p>Increased risk of illegitimate behaviour and crime: The influx of workers and service providers into communities may increase the rate of crimes and a perception of insecurity by the local community. Such illegitimate behaviour and crimes can include theft, physical assaults, substance abuse, sexual assault and human trafficking;</p>	<ul style="list-style-type: none"> Labour camp(s) will be established away from residential population; 	CC, SC, PIMU-PRMSC	As per approved site	Once	SC and PIMU	N/A
		<ul style="list-style-type: none"> Preference will be given to the local people to work with contractor, and contractor should hire maximum labour force from the project area because this will reduce the labour influx 	CC, SC, PIMU-PRMSC	Hiring Criteria	Once before hiring	SC and PIMU	N/A
		<ul style="list-style-type: none"> Awareness will be created among the work force to ensure respect for local customs; 	CC, SC, PIMU-PRMSC	Monitor training record	Monthly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Construction work will be completed within the stipulated time to move workers to next location; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Labor force will be shuffled with the time; 	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Provide adequate personal hygiene facilities in good condition with adequate supply of clean water; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> Make arrangements to treat the affected workers on time to control the movement of vectors disease 	CC, SC, PIMU-PRMSC	Visual inspection; Complaint reported	Daily	SC and PIMU	N/A
<ul style="list-style-type: none"> Sensitize workers and surrounding communities on awareness and prevention of HIV/AIDS and sexually 	CC, SC, PIMU-PRMSC	Complaint reported	Weekly	SC and PIMU	N/A		



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		transmitted infections (STI) through training, awareness campaigns and workshops during community meetings;					
		<ul style="list-style-type: none"> • Provide proper and free HIV/AIDS and STI health screening and counselling for site workers and community members; 	CC, SC, PIMU-PRMSC	Hiring protocols	Before hiring	SC and PIMU	N/A
		<ul style="list-style-type: none"> • Develop and enforce a strict code of conduct for workers to regulate behaviour in the local communities; 	CC, SC, PIMU-PRMSC	Visual inspection; Complaint reported	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> • Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel; 	CC, SC, PIMU-PRMSC	Visual inspection; Complaints reported	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> • The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft. 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
Social/ Cultural Conflicts	During the construction phase of the project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local biophysical resources. Furthermore, difference in cultural values may also cause discomfort to local residents. This impact is	<ul style="list-style-type: none"> • Public notification through announcements in local mosques during the entire construction phase to avoid any inconvenience in accessibility to the locals; 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		<ul style="list-style-type: none"> • Establishment of formal links with affected communities; 	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> • Plan for social grievance redress mechanisms including the local leaders and community representatives; 	CC, SC, PIMU-PRMSC	During construction of the work	Weekly	SC and PIMU	N/A
		<ul style="list-style-type: none"> • Local labor will preferably be employed for construction works; 	CC, SC, PIMU-PRMSC	Hiring Policies	Once (Before Hiring)	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	temporary and minor negative in nature.	<ul style="list-style-type: none"> Careful planning and training of workforce to minimize disturbance to the local people; Contractor will preferably arrange their own sources of water. 	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
			CC, SC, PIMU-PRMSC	Visual observations	Daily	SC and PIMU	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Child Labor	Due to poverty and feeble financial situation of the area, the underaged children might get involved with the contractor various construction works. This will be the violation of the Child Labor Act. Furthermore, SEA/SH issues might arise which will create social conflicts. This impact is adverse and temporary in nature.	<ul style="list-style-type: none"> Standard clause in the contracts related to child labor explicit prohibitions, etc.) and contractor will ensure compliance to the contractual provisions on bonded and child labor, equal wages for similar work explicit prohibitions, etc.). 	CC, SC, PIMU-PRMSC	Visual Observation	Daily	SC and PIMU	N/A
Anticipated Impacts during Operational Phase							
Soil	The soil quality may be affected due to leakage/ infiltration from sewer lines and STP bed. The sludge generated from cleaning/ maintenance of pumping stations, manholes, sewers and STP may contaminate the soil. The liner of the STP, while desludging may get dried and cracks may lead to the seepage of wastewater and thus contaminate the soil. Improper disposal of scum and sludge is another concern. This is a moderate negative impact.	<ul style="list-style-type: none"> Sludge shall be treated prior to ultimate use/disposal. Various options for sludge treatment include Digestion, Drying/ Dewatering, Composting, Lime Stabilization, Heat Treatment must be considered; 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
Air Quality	The operation of sewerage scheme will result in generation of gases	<ul style="list-style-type: none"> Provision of exhaust gas vents at appropriate locations in the design 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	including H ₂ S and CH ₄ . H ₂ S is a foul-smelling poisonous gas which might be harmful for the sewer-men and could be fatal sometimes. CH ₄ is natural gas also referred to as a greenhouse gas	<ul style="list-style-type: none"> • Sewer-men will cover their faces with gas mask while entering the sewer for cleaning or maintenance purposes; 	PIMU-PRMSC	Visual inspection; Use of PPEs	Weekly	PIMU-PRMSC	Cost given in ESMP Budget
		<ul style="list-style-type: none"> • It's better to use sucking machinery for cleaning of sewers; 	PIMU-PRMSC	Availability	Once	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> • Use gas detector before inspection; 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> • Adequate tree plantation must be done around the STP to control the spread of odour; 	PIMU-PRMSC	Visual inspection	Weekly (maintenance)	PIMU-PRMSC	N/A
Odour	STP are designed on adequate waste loading and function well if they are not overloaded. The overloading will result in malfunctioning of STP and it will result in significant odour generation in the vicinity. This impact is temporary and high adverse in nature.	<ul style="list-style-type: none"> • The STP should not be overloaded and personnel dealing in operation should be trained to avoid operational issues; 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
Solid Waste	Domestic and hazardous wastes would be generated during cleaning and maintenance activities. The solid waste during operational phase will consist of plastics, metal and organic wastes present in sewer lines which can cause blockage in sewerage system.	<ul style="list-style-type: none"> • Waste shall be collected, stored and disposed of according to relevant standards in approved facilities; 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> • An organized collection system and its implementation through a licensed contractor; 	PIMU-PRMSC	Hiring of licensed contractor	Once	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> • The containers will be timely removed and the fine will be imposed on contractor in case of violations; 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> • Closed containers will be used for transportation of waste to the dumping site; 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		<ul style="list-style-type: none"> Schedule inspection of the sewer lines and STP to keep it clean and to identify any hazardous material; 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Solid waste bins shall be placed at appropriate locations to avoid its mixing in wastewater. 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
Sludge	Sludge is semi solid material which will be settled at the bottom of the STP due to anaerobic decomposition of biomass. Significant amount of sludge will not be produced in ABR, however, periodic desludging will be done to achieve good removal efficiency. The removed sludge in wet form, if left unattended will create nuisance i.e., odor, soil contamination, groundwater contamination (through percolation/ seepage) and will serve as breeding ground for disease vector.	<ul style="list-style-type: none"> Appropriate sludge treatment must be undertaken before disposal of sludge; 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> The sludge must never be left unattended and should be transferred to designated dumping site after adequate treatment; 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Dried sludge can be used as a land conditioner in the fields. 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> In case of maintenance/sludge removal, alternative ponds shall remain functional; 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Inlet and outlet pipework access/maintenance pits should be inspected regularly for blockages. These pits should be covered at other times. 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> The water must be bypassed during rain and flooding. 	PIMU-PRMSC	Visual inspection	During rain	PIMU-PRMSC	N/A
Community Health Hazards	During desludging and cleaning operations the sludge will be piled up temporarily along the manholes and will be a hazard for passers-by and local community. This impact is temporary and	<ul style="list-style-type: none"> The treated wastewater shall be routed to the agricultural area in a way that there must not be physical contact of the community; 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> The community must be educated on the effects of treated wastewater to avoid health issues; 	PIMU-PRMSC	Through Seminars	Yearly	PIMU-PRMSC	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	moderate negative in nature. The treated wastewater from STP will be used in agricultures in nearby areas. The community using the part will be exposed to the effects of treated wastewater. This impact is permanent and moderate negative in nature.	<ul style="list-style-type: none"> The sludge must be timely removed from the site and the area must be barricaded during desludging and cleaning periods. 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
Cumulative Impact of Several Water extraction Points and Sewerage Treatment Systems	Cumulative impact may occur as a result of development of several treatment plants or several water extraction points.	<ul style="list-style-type: none"> Water quality monitoring should be done by the third party on quarterly basis to ensure the supply of safe drinking water. 	PIMU-PRMSC	WHO Guideline /PEQS	Quarterly	PIMU-PRMSC	PCRWR through Separate contract
		<ul style="list-style-type: none"> Groundwater table will be monitored periodically. 	PIMU-PRMSC	Depth in meter/feet	Quarterly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Maintenance of ABR should be done annually for its smooth operations. 	PIMU-PRMSC	Visual inspection	Annually	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Ensure the treated effluent follows the National Environmental Quality Standards 	PIMU-PRMSC	PEQS	Monthly	PIMU-PRMSC	PCRWR through Separate contract
		<ul style="list-style-type: none"> Water metering system should be installed to know the total consumption of water. 	PIMU-PRMSC	Water Meters	Once at the time of connection	PIMU-PRMSC	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Social Inclusion	It is crucial to ensure that every stakeholder of the community have equal access on the provision of clean drinking water and sanitation facilities, improved healthcare facilities, educational facilities and on economic excess and job opportunities. In this proposed project efforts will be made to promote the participation of marginalized groups, such as women and minorities, elderly person in decision-making processes and community activities	<ul style="list-style-type: none"> Providing awareness campaigns to increase knowledge and understanding of the project and challenges faced by marginalized groups. 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Providing awareness on the importance of clean drinking water & sanitation, education, job training, and community services to underserved and marginalized populations. 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Fostering partnerships between PRMSC-TO and VOs/VCs to promote social inclusion to address the root causes of social exclusion. 	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Regular monitoring and evaluation of project policies and programs to ensure they are effective and inclusive 	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
Elite Capture	Elite capture is often facilitated by corruption, nepotism, and patronage networks, which enable the elites to manipulate the system in their favor. The consequences of elite capture are far-reaching, with the general public often left without	<ul style="list-style-type: none"> Involving multiple stakeholders, including community members, in decision-making processes related to project activities. 	PIMU-PRMSC	Visual inspection	Monthly in meeting of VO	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Robust and transparent GRM will be implemented 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> To promote the participation of marginalized groups, such as women and minorities, in decision-making processes 					



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	access to basic amenities such as health, education, water and sanitation.	<ul style="list-style-type: none"> Strengthening institutions such as VO's/VC's and regulatory agencies without undue influence from elites 	PIMU-PRMSC	Visual inspection	Once at the time of VO's formation or Change in VO's	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Due diligence will be held during VLD process to absolve the doner from all the associated land rights. 	PIMU-PRMSC	Visual inspection	Once at the time of VLD	PIMU-PRMSC	N/A
End users of Treated wastewater	The VO of the village will decide the distribution rights of treated wastewater according to the needs of community.	<ul style="list-style-type: none"> End water users will adopt water conservation measures such as reducing water wastage, using efficient irrigation methods 	PIMU-PRMSC	Awareness campaigns	Weekly	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Equal rights of the community on the usage of treated water will be ensure by the VO's. 	PIMU-PRMSC	Visual inspection	Need Basis	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Distribution of treated wastewater will be decided by VO's/VCS in village 	PIMU-PRMSC	VO's Meeting	Need Basis	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> VO will ensure monitoring and evaluation on regular basis regarding the usage and conservation of treated water 	PIMU-PRMSC	Visual inspection	Need Basis	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Awareness campaigns will be conducted on the understanding and importance of water conservation and its impacts. 	PIMU-PRMSC	Awareness campaigns	Once at the time of VLD	PIMU-PRMSC	N/A
Occupational Health and Safety Hazards	Infections resulting from direct contact with treated wastewater, and from infected wounds; and Intestinal infections that are transmitted by flies feeding on the STP.	<ul style="list-style-type: none"> The Contractor should prepare OHS and ERPs during operation phase; 	PIMU-PRMSC	Implementation of OHS & ERPs	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Instructing the workforce on handling of treated wastewater; 	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		<ul style="list-style-type: none"> Provide basic medical training to the specified work staff and basic medical service and supplies to 	PIMU-PRMSC	Visual inspection;	Daily	PIMU-PRMSC	N/A



Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		workers;					
		• Obligatory insurance of work laborers against accidents;	PIMU-PRMSC	Visual inspection	Fortnightly	PIMU-PRMSC	N/A
		• Provision of safety measures such as emergency sirens, firefighting equipment, first aid, and contingency measures in case of accidents;	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	Cost is provided in ESMP budget

KEY

CC	Construction Contractor
DC	Design Consultant
EPA	Environment Protection Agency
SC	Supervision Consultant
PIMU-PRMSC	project Implementation Unit – Punjab Rural Municipal Services Company



7.8 Grievance Redressal Mechanism (GRM)

The Grievance Redress Mechanism (GRM), outlines the policy and procedure for documenting, addressing, responding, and employing methods to resolve project grievances and complaints that may emerge during and after PRSWSSP sub-projects implementation. It will also cater to managing any disconnects that emerge from the field level and that have significant implications for the effective implementation of the sub-project interventions.

In an effort to deter fraud and corruption, the use of a dedicated mobile application has been proposed for reporting grievances from the field level to district and provincial headquarters. This will not only provide a coherent system of checks and balances but will also enable swift redressal and effective monitoring of complaints.

The PIMU at the Local Government & Community Development Department (LG&CDD) level will serve as the Secretariat for the Grievance Redressal Committee (GRC Directorate) that will be responsible for providing oversight on the entire GRM process at a strategic level and monitoring complaints management.

Water supply & sanitation are imperative daily basis facilities. Due to, continuous use and all-time requirement, there is a tendency for routine O&M requirements of the facilities. O&M will be needed as soon as project interventions are completed in the village. Due to the huge number of beneficiaries spread, a comprehensive complaint redressal model is indispensable for Service Delivery Unit (SDU). The Grievance Redress Mechanism (GRM) will be consistent with the Component 4 Project Management and Monitoring sub-component 4.2 Grievance Redressal Model is part of the Project of PRSWSSP. Project activities may cause social friction if Projects do not have an effective GRM.

7.8.1 Objectives

The Grievance Redressal Mechanism (GRM) will be consistent with the requirements of the World Bank safeguard policies to ensure the mitigation of community concerns, risk management, and maximization of environmental and social benefits. The overall objective of the GRM is therefore to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the village level.

The GRM will be accessible to diverse members of the community, including women, senior citizens, and other vulnerable groups. Culturally, appropriate communication mechanisms will be used at all sub-project sites both to spread awareness regarding the GRM process as well as complaints management. This GRM will be integrated with the PRSWSSP overall project GRM hotline

7.8.2 Disclosure of GRM

The final processes and procedures for the GRM will be translated into local languages and disseminated at all sub-project locations. These shall be made available (in both leaflet and poster format) to all subproject locations through the offices of each SDU. Dedicated male and female Grievance Focal Persons for each sub-project location will play an instrumental role in



spreading awareness regarding the GRM, including the use of information technology for reporting and monitoring complaints.

7.8.3 Records and Monitoring

The Project Director's Office will maintain an electronic database at the PIMU that will provide a summary of complaints received and mitigations. The PD office will also provide an analysis of the grievances at each sub-project location using a pre-designed Monitoring and Evaluation (M&E) template that will give insight into the type of complaints received and a qualitative and quantitative review of grievance redressal. The PD's office will also be responsible for uploading the actions and results for each grievance for each sub-project location on a periodic basis to the Project website. The dedicated mobile application that will be used to communicate grievances will provide the basis for recording complaints both at the provincial and district levels.

Apart from the electronic database that will be maintained at the PIMU level, a manual register of all complaints and actions taken will be maintained by the Environmental and Social Focal Persons at the Office of the SDU-TOs and a manual register of all day-to-day complaints and their grievance redressal details will be maintained by VOs their office.

GBV-related issues will be recorded through GRM, two separate focal persons for males and females are part of Village Organization VO – which will also work as tier-1 of the Grievance Redressal Committee (GRC). The female focal person – trained on the referral directory – will be responsible for further referral of GBV-related complaints to the forums concerned. A multi-sectoral referral system is proposed, which will include referral to The Punjab Women's Toll-Free Helpline 1043 available 24/7. It is managed and supervised by Punjab Commission on the Status of Women (PCSW). Their helpline team comprises all-women call agents, three legal advisors, a psychosocial counselor, supervisors, and management staff. Moreover, awareness and advocacy training at schools and community level would be conducted on social protection mechanisms/ referral mechanisms vis-à-vis Gender-Based Violence (physical, sexual, verbal, psychological, etc.), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). The Punjab Commission on the Status of Women (PCSW) has been identified as a key stakeholder. PCSW will be informed of the project activities and an institutional link will be established. Furthermore, at the PRMSC Tehsil Office, the Behavior Change and Communication (BCC) Officer – in addition to being member of GRC Tier-I&II – will initially deal with gender related issues/ complaints and further refer the same to the Gender Specialist at Head Office, PRMSC.

7.8.4 Proposed Institutional Mechanisms

It is proposed to establish the following prior to commencing project implementation activities including pre-construction activities:

Tehsil Level-Public Complaints Center (PCC) in SDU-TO will be responsible to receive, log, and resolve complaints at the site and in Village-level. The complainant would be able to launch a complaint on a toll-free number, mobile application, message, or telephone.



Tier 1: Village level –Panchayat/Village Councils (VC) made under Punjab Local Government (Amendment) Ordinance 2021 will act as the 1st Tier of GRM at the village/community level. Since VCs are not functional, the Project Appraisal Document (PAD) recommends establishment of informal Village Organizations (VOs) in lieu of VCs until formal VCs are elected. This informal VO will comprise of nine (09) members including a chairperson. All the members of the VO will be elected by the village community except a line department's representative and a BCC Officer of the PRMSC. These non-elected members are part of the VOs to give credence/ recognition to the VO. Moreover, the BCC Officer will forward the unaddressed complaints to the Tier-II of the GRC.

Tier 2: Grievance Redress Committee (GRC-Tehsil Level) in SDU-TO will be established for each tehsil that will manage GRM aspects for all sub-project locations in each tehsil including decisions to be taken, actions and monitoring of complaints resolution at the sub-project level. GRC-II, Tier-II comprises of nine (09) members. Respective Tehsil Manager will spearhead the Tier-II. Moreover, to ensure community participation in the Tier-II, the chairperson of the concerned village – from where the complaint is lodged – will also be a member.

Tier 3: PIMU Level-GRC at PMIU (LG&CDD) will be responsible to oversee the overall functions of the GRM at a strategic level including monthly review. GRC Tier-III will comprise of nine (09) members. The Project Director / Chief Executive Officer, PRMSC, will spearhead the Tier-III. Moreover, to ensure community participation in the Tier-III, the chairperson of the concerned village – from where the complaint is lodged – will also be a member.

The composition of GRCs of all tiers has been attached as Annexure-9.

7.8.5 GRM Process Implementation

The grievance redress process is described hereunder:

Through the envisaged system, the complainant would be able to launch a complaint on a toll-free number, mobile application, message, or telephone (GRM can accept anonymous grievances).

Details of the complaints and the complainants will be entered into the system and a complaint number will be provided to the complainant through SMS.

In SDU a specific person will be designated to monitor the system and issue necessary instruction to relevant quarter for necessary action.

The GRM will provide an interface to complainants to check the status of their complaint and a dashboard for SDU & PIMU to monitor the progress on the complaints.

The system will bridge the gap between the masses and the service provider.

Monitoring officers will precisely know the details of pending complaints in every SDU. The performance of the SDU could also be easily monitored through it.

The GRM will have a built-in escalation system for moving unresolved complaints to higher levels.

7.8.6 Mode of Complaint

The complainant can lodge their complaints by opting the following modes:

Written Application	Telephonically	Verbally	Android Application	Website

7.8.7 GRM Procedures and Timelines

The tracking and documenting of grievance resolutions will include the following elements:

- Tracking complainant(s) from subprojects sites (field and community level) to PIMU;
- Dedicated staff to update the database routinely;
- Promote transparency, publicize how complaints are being handled, and periodically evaluate the overall functioning of the mechanism;
- Processes for informing stakeholders about the status of a case; and
- Procedures to retrieve data for reporting purposes, including the periodic reports, from Village and Tehsil and document them into the monthly progress reports at PIMU.

GR (Village level) will be responsible to receive, log, and resolve complaints at the village level. The Grievance Redress Committee at the village Panchayats will review and identify actions to be taken to address the complaints at its weekly meeting. If not resolved timely then complaint would be referred to GRC-Tehsil Level (SDU-TO) within 3 days after receiving.



GRC-SDU-TO will try to resolve the complaints in a satisfactory manner anyhow, if not satisfactorily resolved by the village panchayats/councils and Tehsil level, then the grievance will be referred for consideration by GRC at the PIMU/LG&CDD level within one week.

Every effort will be made to address or resolve grievances within the following fixed timelines, which will be an indicator of the performance of the handling system. Acknowledgment of a written submission will be issued to the complainant within three working days.

If the complainant is not satisfied, the complaint will have the option to seek redress through the court of law.



11. ESMP Budget

8.1 Break up of ESMP Budget

The ESMP budget consists of four main components: Health, Safety, and Environment (HSE); Trainings; Environmental Monitoring; and Institutional Strengthening. The cost of the ESMP is divided into two categories, Large and Small, depending on the number of labor requirements. As construction activities in all villages are limited to 10 months, the labor requirement increases with the scope of work. This means that more budget will be required for Personal Protective Equipment (PPE), medical screenings, training costs, and contingency for livelihood assistance. If the number of labors is less than 20, the village will be considered small, and the budget for small villages will be utilized. However, if the labor requirement exceeds 20 for construction activities, the village will be considered large.

Table 25: Village-wise ESMP Cost

Village-wise ESMP Cost			
Sr.	ESMP Component	Cost Small Village*	Cost Large Village*
1	HSE	877,500	1,433,000
2	Training	1,350,000	1,550,000
3	Env. Monitoring	350,000	446,000
4.	Contingency for Livelihood Assistance (10 %)	257,750	342900
	Total (one village)	2,835,250	3,771,900

Institutional strengthening cost will be provided tehsil-wise, Environmental, Social and Gender experts will take care of all the villages in one tehsil.

Table 26: Village-wise ESMP Cost

Tehsil-wise Cost		
4	Institutional Cost	9,000,000

Breakup of each component of the ESMP cost is provided below:



11.2 Budget Estimate for HSE During the Construction Phases

Budget estimate for HSE composed of cost of medical screening of communicable diseases of the labors, cost of tarpaulins to cover the construction material while transporting or storage, cost of handling and disposal of hazardous materials and solid waste, provision of fire alarms and fire extinguishers for fire fighting in case of fire emergency. A special provision for the COVID-19 measure is also part of HSE budget estimate, which will not be utilized if corona situation aggravates and government announce special measures are required to be taken to contain spread of virus. Breakup of the estimate of the HSE cost for large villages is provided in table 28 and for small villages is provided in table 27.

Table 27: Budget Estimate for HSE During the Construction Phase of Large Village

Health, Safety and Environment for Large Villages					
Sr. No.	Description	Quantity	Unit	Rate (PKR)	Amount (PKR)
1	Medical screening for workers (HIV screening, CBC, Hep. BsAg, HCV antibodies, LFTs, RFTs, e.t.c.	30	Persons	2,000	60,000
2	Tarpaulins (High Quality water proof PVC)	50	sft	1,000	50,000
3	Handling of hazardous material (Store all hazardous materials properly, separate incompatibles, and store in ventilated, dry, cool areas)	10	Monthly	10,000	100,000
4	Handling of solid waste (storage, collection, transportation, treatment, utilization, processing, and final disposal of solid wastes)	10	Monthly	20,000	200,000
5	DCP Fire extinguishers (6 kg) in case of fire (The material of the cylinder is steel. The extinguishing agent is mono ammonium phosphate and ammonium sulfate powder and the discharge time of the agent is 13 seconds)	1	Each	10,000	10,000
	CO2 Fire extinguishers (6 kg discharge time of the agent is 13 seconds).	1	Each	20,000	20,000
	Fire alarm (Signal Transmission: Wired Alarm, Working Principle: Manual Alarm Button)	1	Each	10,000	8,000



6	Special Measures for Covid-19 (corona test, quarantine expense in case of corona measures to be taken announced by local government/provincial government, Hand sanitizers)	10	monthly	7,500	75,000
7	Cost of Personal Protective Equipment (PPE)*		Break up Provided		910,000
Total Cost					1,433,000

Table 28: Budget Estimate for HSE During the Construction Phase of Small Villages

Health, Environment and Safety for Large Villages					
Sr. No.	Description	Quantity	Unit	Rate (PKR)	Amount (PKR)
1	Medical screening for workers (HIV screening, CBC, Hep. BsAg, HCV antibodies, LFTs, RFTs, e.t.c.)	15	Persons	2,000	30,000
2	Tarpaulins (High Quality water proof PVC)	35	sft	1,000	35,000
3	Handling of hazardous material (Store all hazardous materials properly, separate incompatibles, and store in ventilated, dry, cool areas)	10	Monthly	8,000	80,000
4	Handling of solid waste (storage, collection, transportation, treatment, utilization, processing, and final disposal of solid wastes)	10	Monthly	15,000	150,000
5	DCP Fire extinguishers (6 kg) in case of fire (The material of the cylinder is steel. The extinguishing agent is mono ammonium phosphate and ammonium sulfate powder and the discharge time of the agent is 13 seconds)	1	Each	10,000	10,000
	CO2 Fire extinguishers (6 kg discharge time of the agent is 13 seconds).	1	Each	20,000	20,000



	Fire alarm (Signal Transmission: Wired Alarm, Working Principle: Manual Alarm Button)	1	Each	10,000	10,000
6	Special Measures for Covid-19 (corona test, quarantine expense in case of corona measures to be taken announced by local government/provincial government, Hand sanitizers)	10	monthly	7,500	75,000
7	Cost of Personal Protective Equipment (PPE)*		Break up Provided		467,500
Total Cost					877,500

11.3 Break Up of Personal Protective Equipment

Personal Protective Equipment cost is including in the ESMP Cost significantly for Health, Safety and Environment and divided into two categories according to the size of villages small & Large. Breakup of the estimate of the HSE cost for large villages is provided in table 28 and for small villages is provided in table 29. Which includes safety items ear plugs, helmets, safety shoes, protective goggles, Gloves, Masks and first aid kits.

Table 29: Break Up of Personal Protective Equipment for Large Village

Item No.	Description	Quantity	Unit	Rate	Amount
				(PKR)	PKR
1	Ear plugs (corded Reusable silicon Earplugs)	300	Each	150	45,000
2	Helmets (PE shell with vents Lining; material: Plastic Chin strap included; Adjust head size by ratchet knob)	30	Each	5,000	150,000
3	Safety shoes (Renowned brand)	30	Each	7,500	225,000



4	Protective goggles (Anti-fog, Anti scratch, Poly-carbonate Scratch and impact resistant, side protection sheet)	30	Each	500	15,000
5	Gloves (made up of nylon, polyurethane with ironclad)	300	Each	1000	300,000
6	Dust Mask (N-95)	1000	Each	150	150,000
7	First Aid Kit (pain killers, eyewash solution, antibiotic ointment, thermometer, plasters, sterile gauze dressings, sterile eye dressings, triangular bandages, crepe rolled bandages, safety pins, disposable sterile gloves and tweezers)	1	Each	25,000	25,000
Total					910,000

Table 30: Break Up of Personal Protective Equipment for Small Village

Item No.	Description	Quantity	Unit	Rate (PKR)	Amount
					PKR
1	Ear plugs (corded Reusable silicon Earplugs)	150	Each	150	22,500
2	Helmets (PE shell with vents Lining; material: Plastic Chin strap included; Adjust head size by ratchet knob)	15	Each	5,000	75,000
3	Safety shoes (Renowned brand)	15	Each	7,500	112,500



4	Protective goggles (Anti-fog, Anti scratch, Poly-carbonate Scratch and impact resistant, side protection sheet)	15	Each	500	7,500
5	Gloves (made up of nylon, polyurethane with ironclad)	150	Each	1000	150,000
6	Dust Mask (N-95)	500	Each	150	75,000
7	First Aid Kit (pain killers, eyewash solution, antibiotic ointment, thermometer, plasters, sterile gauze dressings, sterile eye dressings, triangular bandages, crepe rolled bandages, safety pins, disposable sterile gloves and tweezers)	1	Each	25,000	25,000
Total					467,500

11.4 Environmental Monitoring Cost

Provision for the environmental monitoring is part of the cost of ESMP. Environmental Monitoring will help the client to assess the negative impacts on air and water quality of the concerned villages. Table 31 and Table 32 provide the cost of Environmental Monitoring in large and small villages respectively.

Table 31: Environmental Monitoring Cost for Large Village

Components	Parameters	No. of Samples			Frequency	Responsibility	Duration	Cost (PKR)
		Sampling Points	Frequency	Total				



Construction Phase (10 months)								
Air Quality	All PEQS parameters	1	3	3	Quarterly	Contractor	24 hours	90,000
Ground Water Quality	All PEQS parameters	2	3	6	Quarterly	Contractor	-	96,000
Surface Water Quality	All PEQS parameters	2	3	6	Quarterly	Contractor	-	96,000
Noise Level	-	1	3	3	Quarterly	Contractor	24 hours	14,000
Visits of OHS professionals on monthly basis from tehsil office to the village								150,000
Sub-Total								446,000

Table 32: Environmental Monitoring Cost for Small Village								
Components	Parameters	No. of Samples			Frequency	Responsibility	Duration	Cost (PKR)
		Sampling Points	Frequency	Total				



Construction Phase (10 months)								
Air Quality	All PEQS parameters	1	3	3	Quarterly	Contractor	24 hours	90,000
Ground Water Quality	All PEQS parameters	1	3	3	Quarterly	Contractor	-	48,000
Surface Water Quality	All PEQS parameters	1	3	3	Quarterly	Contractor	-	48,000
Noise Level	-	1	3	3	Quarterly	Contractor	24 hours	14,000
Visits of OHS professionals on monthly basis from tehsil office to the village								150,000
Sub-Total								350,000



8.5 Training Program

The environmental and social training will help to ensure that the requirements of the ESMP are clearly understood and followed by all project personnel. The primary responsibility of providing this training to all project personnel will be that of the contractor and ESC. The training will be provided to different professional groups separately such as managers, skilled personnel, unskilled labors, and camp staff. Capacity building will be aimed at strengthening the ESC, and operational staff in the field of environmental management and social development. **Table 33** provides detail of the training required for the implementation of ESMP during the construction phase.

Table 33: Training Cost for Large Villages					
Training Activity	Participants	Type of Training	Content	Scheduling	Amount (PKR)
Construction Phase (10 months)					
Environment code of practices	Contractor Staff	Presentation	Awareness & applicability of environmental code of practices	Once	300,000
Revision of Environment code of practice	Contractor Staff	Presentation	Revision on Awareness & applicability of environmental code of practices	Once	
Waste Management	Contractor Staff	Lecture	Awareness associated with waste Storage, collection and safe disposal	Once	
Workers Code of Conduct	Contractor Staff	Presentation & FGD	Do's and don't's of community interaction	twice	500,000
Grievance Redress Mechanism	All relevant project staff including contractor	Presentation & FGD	roles and procedures of GRM		



Awareness workshop regarding Covid 19 and other vector borne diseases	Contractor Staff	Presentation	Risk, Prevention and available treatment	Once	300,000
Community/ occupational health and safety	Contractor Staff	Lecture	Awareness on EHS Guidelines	Once	
Emergency Response	Contractor Staff	Workshop	Potential natural and other hazard/emergencies and dealing with emergency to minimize damage	Once	
WB OPs & PEPA Regulations	Managerial Staff of Contractor	Lecture	Awareness on World Bank OPs, PEPA rules, guidelines, regulation and standards for satisfactory compliance	Once	150,000
Resettlement Related Issues	Contractor and ESC Staff of PIMU	Lecture	Awareness on OP 4.12 (Involuntary Resettlement)	Once	300,000
Labour Code of Practise	Contractor Staff	Lecture	Awareness & applicability of Labour code of practices	Once	
Gender Aspects	Contractor Staff	Lecture	Awareness on gender inequalities/GBV OP 4.20	Once	
Sub project total					1,550,000



Table 34: Training Cost for Large Villages

Training Activity	Participants	Type of Training	Content	Scheduling	Amount (PKR)
Construction Phase (10 months)					
Environment code of practices	Contractor Staff	Presentation	Awareness & applicability of environmental code of practices	Once	300,000
Revision of Environment code of practice	Contractor Staff	Presentation	Revision on Awareness & applicability of environmental code of practices	Once	
Waste Management	Contractor Staff	Lecture	Awareness associated with waste Storage, collection and safe disposal	Once	
Workers Code of Conduct	Contractor Staff	Presentation & FGD	Do's and don't's of community interaction	twice	400,000
Greivance Redress Mechanism	All relevant project staff including contractor	Presentation & FGD	roles and procedures of GRM		
Awareness workshop regarding Covid 19 and other vector borne diseases	Contractor Staff	Presentation	Risk, Prevention and available treatment	Once	200,000
Community/ occupational health and safety	Contractor Staff	Lecture	Awareness on EHS Guidelines	Once	



Emergency Response	Contractor Staff	Workshop	Potential natural and other hazard/emergencies and dealing with emergency to minimize damage	Once	
WB OPs & PEPA Regulations	Managerial Staff of Contractor	Lecture	Awareness on World Bank OPs, PEPA rules, guidelines, regulation and standards for satisfactory compliance	Once	150,000
Resettlement Related Issues	Contractor and ESC Staff of PIMU	Lecture	Awareness on OP 4.12 (Involuntary Resettlement)	Once	300,000
Labour Code of Practise	Contractor Staff	Lecture	Awareness & applicability of Labour code of practices	Once	
Gender Aspects	Contractor Staff	Lecture	Awareness on gender inequalities/GBV OP 4.20	Once	
Sub project total					1,350,000

8.6 Institutional Capacity & Strengthening

In order to ensure that the ESMP provisions are implemented efficiently and effectively, capacity building/ strengthening of the implementing parties are required. Therefore, based on the assessment of the institutional capacities of the parties involved in the implementation of the ESMP, the following broad areas of capacity building/strengthening have been identified and recommended for effective implementation of the ESMP.

Table 35 shows the positions proposed for institutional strengthening for effective implementation of environmental and social mitigation measures along with their responsibilities while **Table 36** presents the cost of institutional strengthening.



Table 35: Institutional Strengthening Arrangement Tehsil-wise

Institutional Strengthening	Position	Scheduling (Months)	Responsibility
Contractor	Environmental/ HSE Expert	10	<ul style="list-style-type: none">▪ Responsible for the overall implementation of ESMF processes and procedures in the light of WB policies and Guidelines and local policies and procedures;▪ Closely follow up the integration of safeguard assessment information and inclusion of safeguards self-screening process at the project development and design stage;▪ Provide technical support during proposal development, project design, appraisal process, and resource mobilization plan for the sub-projects in all locations;▪ Undertake follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon environmental and social mitigation implementation plan;▪ Closely provide assistance and design capacity building/training program for the overall implementation of ESMF from PIMU to village level and deliver capacity building training to the field teams to close knowledge/skill gaps and minimize the likelihood of risks happening to sub-projects;▪ Ensure that appropriate environmental and social mitigation measures are proposed and met;▪ Undertake to follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon environmental and social mitigation and implementation plan;▪ At the PIMU level, maintain the record of all information, documents evidence, and reports including progress reports, TPV Reports, training reports, ESMPs, Screening Checklists, etc.;▪ Closely work with SSS and Gender Specialists at the PIMU level and provide technical assistance and advice to the Environment/ Water Quality Officers based at SDU-TO



Institutional Strengthening	Position	Scheduling (Months)	Responsibility
	Social / Resettlement Expert	10	<ul style="list-style-type: none"> ▪ Responsible for the overall implementation of social safeguard of ESMF and RPF and VLD processes and procedures in the light of WB policies and Guidelines and local policies and procedures; ▪ Closely follow up the integration of safeguard assessment information and inclusion of safeguards self-screening process at the project development and design stage; ▪ Provide technical support during proposal development, project design, appraisal process, and resource mobilization plan for the sub-projects in all locations; ▪ Review all the E&S Screening checklists from social safeguards point of view and ensure the correct categorization of each subproject and visit the project sites for Resettlement Checklists (if required); ▪ Overall responsible for the implementation of GRM and Public Disclosure of Information processes and procedures; ▪ Undertake follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon mitigation and implementation plan Closely provide assistance and design capacity building/training program for the overall implementation of social safeguards and RPF from PIMU to village level and deliver capacity building training to the field teams to close knowledge/skill gaps and minimize the likelihood of risks to happen to sub-projects; ▪ Ensure that appropriate social mitigation measures are proposed and met prepare SMPs either separately or integrated with ESMPs; ▪ Undertake follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon social mitigation and implementation plan; ▪ Assist PIMU in hiring consultants (if required for preparation of ARAPs); ▪ At the PIMU level, maintain the record of all information, documents evidence and reports including progress reports, TPV Reports, training reports, SMPs/ ARAPs and Screening Checklists etc. ▪ Closely work with ESS and Gender Specialists at PIMU level and SDU-TO team.



Institutional Strengthening	Position	Scheduling (Months)	Responsibility
	Gender Specialist	10	<ul style="list-style-type: none"> ▪ Ensure implementation of World Bank Gender guidelines and policy; ▪ Provide direct technical assistance and guidance on women's economic empowerment to the PRSWSSP and its delivery partners; ▪ Support the development of tools, systems, processes and approaches that continuously improve technical excellence and impact in the area of transformative approaches to women's economic empowerment; ▪ Lead, coordinate, support, and/or conduct gender and power analyses, effectiveness and efficacy studies, appraisal, evaluation and needs assessments as required by the PRSWSSP; ▪ Assist with quantitative/qualitative assessments in targeted communities to assess effectiveness of interventions and impact; ▪ Support delivery partners to understand the role of gender equality and women's economic empowerment for the PRSWSSP impact groups; ▪ Ensure gender equality and women's economic empowerment criteria are well integrated into market systems approaches; ▪ Work closely with other technical specialists to integrate gender across all PRSWSSP components; ▪ Facilitate and support a strong learning and knowledge-sharing community around gender-transformative practices amongst delivery partners; ▪ Represent work being done in gender transformation and women's economic empowerment under the PRSWSSP in relevant internal and external forums.



Table 36: Cost of Institutional Strengthening (Tehsil Wise)

Sr. No.	Description (Position)	Quantity	Unit	Rate (PKR)	Amount (PKR)
A. Construction Phase - 10 months (for the Contractor)					
1	Environmental Expert/ HSE Expert	300	Days	10,000	3,000,000
2	Social / Resettlement Expert	300	Days	10,000	3,000,000
3	Gender Expert	300	Days	10,000	3,000,000
					9,000,000



8.7 ESMP Cost of Village and Tehsils

Table No. 36 provides the calculated cost of the Environmental and Social Management Plan (ESMP) for the tehsils and their villages based on their categorization (large/small). It is important to note that Naseerpur Khurd is the sole village of Tehsil Kot Momin, which is situated in close proximity to Tehsil Kallar Khara, where two priority villages are located. As the same contractor will be mobilized for both tehsils, the institutional strengthening cost will be shared between them, rather than providing institutional strengthening cost for each tehsil individually. The total estimated cost of ESMP is PKR 88.642 million for 26 villages in 8 tehsils.

Table 37: ESMP Cost of Villages and whole Tehsil

Zone	Tehsils	Labor required	Priority Villages	Category	Village Wise Cost	Institutional Strengthening Cost (Tehsil wise)	Tehsil wise ESMP cost
Canter-I	Pakpattan	30	Arifabad	Large	3,429,000	900000	11,187,000
		30	Dhaku Chishti	Large	3,429,000		
		30	Sochan	Large	3,429,000		
Center-II	Bhawana	30	Chak 190	Large	3,429,000	900000	18,045,000
		30	Chak 192	Large	3,429,000		
		30	Chak 199	Large	3,429,000		
		30	Chak 221	Large	3,429,000		
		30	Chak 226	Large	3,429,000		
North	Kallar kahar	30	Makhyaal	Large	3,429,000	900000	11,187,000
		30	Gahi	Large	3,429,000		
	Kot Momin	30	Naseerpur Khurd	Large	3,429,000		
South-I	Bahawalnagar	30	Chak M Zaman	Large	3,429,000	900000	7,758,000
		30	Chak Sadiq Nagar	Large	3,429,000		



	Khairpur	30	Sheikh Wahan	Large	3,429,000	900000	7,758,000
	Tamewali	30	ISA	Large	3,429,000		
South-II	Kahror Pakka	15	Choki Rangu Khan	Small	2,577,500	900000	13,787,500
		15	Chowki Soba Khan	Small	2,577,500		
		15	Dhora Mahar	Small	2,577,500		
		15	Gulhar	Small	2,577,500		
		15	Muhammad Pur	Small	2,577,500		
South-III	Liaqatpur	20	Chak 5	Small	2,577,500	900000	18,919,500
		20	Chak 17	Small	2,577,500		
		30	Chak 25	Large	3,429,000		
		20	Chak 26	Small	2,577,500		
		30	Chak 29	Large	3,429,000		
		30	Chak 30	Large	3,429,000		
Total					82,342,000	6,300,000	88,642,000



Annexure-1
List of 200 priority Villages



Region	District	Tehsil	Village name (Mouza Census-2008)	Village permanent code (Mouza Census-2008)
South	Bahawalnagar	Bahawalnagar	RATI RAMPURA	33333
South	Bahawalnagar	Bahawalnagar	KAMAL MOHD	33289
South	Bahawalnagar	Bahawalnagar	CHAK GHULAM MUHAMMAD	33367
South	Bahawalnagar	Bahawalnagar	NANAK CHAND	33307
South	Bahawalnagar	Bahawalnagar	MANOHAR GARH	33376
South	Bahawalnagar	Bahawalnagar	TOBA ALLAHYAR	33383
South	Bahawalnagar	Bahawalnagar	MURAD KHARAL	33364
South	Bahawalnagar	Bahawalnagar	ANOKH SINGH	33247
South	Bahawalnagar	Bahawalnagar	CHAK MUHAMMAD ZAMAN	33377
South	Bahawalpur	Khairpur Tamewali	KOT AZIM	32735
South	Bahawalpur	Khairpur Tamewali	GOTH NOOR MUHAMMAD	32812
South	Bahawalpur	Khairpur Tamewali	ISA	32747
South	Bahawalpur	Khairpur Tamewali	AWAL KHAN	32762
South	Bahawalpur	Khairpur Tamewali	USMAN ALI SHAH	32763
South	Bahawalpur	Khairpur Tamewali	ARABUDHU	32795
South	Bahawalpur	Khairpur Tamewali	LALSO-HANRA	32809
South	Bahawalnagar	Bahawalnagar	MOMIN ABAD	33356
South	Bahawalnagar	Bahawalnagar	PHOGANWALA	33360
South	Bahawalnagar	Bahawalnagar	CHAK SADIQ NAGAR	33175
South	Bahawalnagar	Bahawalnagar	KAKKU BODLA	33235
South	Bahawalnagar	Bahawalnagar	ATAR SINGH SANI	33280
South	Bahawalnagar	Bahawalnagar	MOHD YAR CHISHTI	33368
South	Bahawalnagar	Bahawalnagar	KHETRAN WALA	33308
South	Bahawalnagar	Bahawalnagar	QAMARUDIN BODLA	33233
South	Bahawalnagar	Bahawalnagar	KAHANPURA	33278
South	Bahawalnagar	Bahawalnagar	RAMZAN LANGAH	33220
South	Bahawalnagar	Bahawalnagar	QAMAR0-UD-DIN	33223
South	Bahawalnagar	Bahawalnagar	JANDWALA KHURD	33294
South	Bahawalnagar	Bahawalnagar	GANGA SINGH	33284
South	Bahawalpur	Khairpur Tamewali	SHIEKH WAHAN	32779
South	Bahawalpur	Khairpur Tamewali	SHARAF	32730
South	Bahawalpur	Khairpur Tamewali	JALANI	32715
South	Bahawalpur	Khairpur Tamewali	NOOR MOHD KHAN	32815
South	Bahawalpur	Khairpur Tamewali	GULPUR HITHAR	32800
South	Lodhran	Karor Pacca	ALI PUR KANJUN	26661
South	Lodhran	Karor Pacca	CHOKI RANGO KHAN	26662
South	Lodhran	Karor Pacca	GULHAR	26557
South	Lodhran	Karor Pacca	JHOK AHIR	26249
South	Lodhran	Karor Pacca	MOHAMMAD PUR	26230
South	Lodhran	Karor Pacca	CHOKI SOBHA KHAN	26552
South	Lodhran	Karor Pacca	PYWAGNAN	26236
South	Multan	Shuja Abad	MARI NOON	26708
South	Multan	Shuja Abad	JALAL PUR KHAKHI	26723
South	Multan	Shuja Abad	BASTI MITHU SHARQI	36502
South	Multan	Shuja Abad	GURWEZ PUR	26716
South	Multan	Shuja Abad	OBAWRHA SHUMALI	26734
South	Multan	Shuja Abad	MAQEEM PUR	26698
South	Multan	Shuja Abad	KULUCH PUR	26712
South	Multan	Shuja Abad	WAHI NOON	26692
South	Muzaffargarh	Alipur	YAKEWALI	31806



South	Muzaffargarh	Alipur	AZMAT PUR	31800
South	Muzaffargarh	Alipur	GHAUS PUR	31734
South	Muzaffargarh	Alipur	BET NABI SHAH	31798
South	Muzaffargarh	Alipur	MADD SOHANARA SHAH	31911
South	Lodhran	Karor Pacca	NOOR SHAH	26653
South	Lodhran	Karor Pacca	30/M	26416
South	Lodhran	Karor Pacca	HASSA JOYA	26568
South	Lodhran	Karor Pacca	DHORAH MAHAR	26549
South	Multan	Shuja Abad	KHARA	26721
South	Multan	Shuja Abad	BASTI MITHU GHARBI	26699
South	Multan	Shuja Abad	THATHA GHULWAN SHUMALI	26732
South	Multan	Shuja Abad	JHAKAR	26694
South	Muzaffargarh	Alipur	PIRO WALI	31826
South	Muzaffargarh	Alipur	BET MULLAN WALI	31793
South	Muzaffargarh	Alipur	NAU ABAD	31872
South	Muzaffargarh	Alipur	KHIRORAH FAZAL MOHD	31821
South	Muzaffargarh	Alipur	WALWAT	31786
Region	District	Tehsil	Village name (Mouza Census-2008)	Village permanent code (Mouza Census-2008)
South	D.G.Khan	Taunsa	SANJAR SHAHI	29861
South	D.G.Khan	Taunsa	KALUWALA	29712
South	D.G.Khan	Taunsa	BASTI PIR	29841
South	D.G.Khan	Taunsa	JHOK MANU	29867
South	D.G.Khan	Taunsa	CHOLANI	29894
South	Rahim Yar Khan	Liaqatpur	CHAK NO.45/ABBASIA	34983
South	Rahim Yar Khan	Liaqatpur	CHAK NO.5/ABBASIA	35031
South	Rahim Yar Khan	Liaqatpur	CHAK NO.30/ABBASIA	34979
South	Rahim Yar Khan	Liaqatpur	CHAK NO.25/ABBASIA	35038
South	Rahim Yar Khan	Liaqatpur	CHAK NO.17/ABBASIA	35037
South	Rahim Yar Khan	Liaqatpur	CHAK NO.29/ABBASIA	34978
South	Rahim Yar Khan	Liaqatpur	CHAK NO.44/ABBASIA	35000
South	Rajanpur	Rojhan	SALEEM ABAD	32371
South	Rajanpur	Rojhan	CHAK RANWANI	32335
South	Rajanpur	Rojhan	MUTFARQ MAZARI	32369
South	Rajanpur	Rojhan	DERA DILDAR	32358
South	Rajanpur	Rojhan	KOTLA HUSSAN SHAH	32411
South	D.G.Khan	Taunsa	BOHAR	29871
South	D.G.Khan	Taunsa	RIND WALA	29779
South	D.G.Khan	Taunsa	MITHE WALI	29734
South	D.G.Khan	Taunsa	LAKHU	29746
South	D.G.Khan	Taunsa	KABIR SHAH	29766
South	D.G.Khan	Taunsa	SONTRA	29750
South	D.G.Khan	Taunsa	LAL SHAH	29888
South	D.G.Khan	Taunsa	BUZDAR	29720
South	Rahim Yar Khan	Liaqatpur	UNNARRAN	34973
South	Rahim Yar Khan	Liaqatpur	KOTLA DARIGH	34855
South	Rahim Yar Khan	Liaqatpur	ZAFAR ABAD	34945



South	Rahim Yar Khan	Liaqatpur	GALANI	34932
South	Rahim Yar Khan	Liaqatpur	BAHAN WALA	34851
South	Rahim Yar Khan	Liaqatpur	CHAK NO.67/ABBASIA	34989
South	Rahim Yar Khan	Liaqatpur	LAL SHAH	34939
South	Rahim Yar Khan	Liaqatpur	RAQBA PIR MOHSIN SHAH	34913
South	Rahim Yar Khan	Liaqatpur	DODA NAICH	34879
South	Rahim Yar Khan	Liaqatpur	GHOUS ABAD	34952
South	Rahim Yar Khan	Liaqatpur	CHAK NO.1 ABBASIA	35061
South	Rahim Yar Khan	Liaqatpur	CHAK NO.141/ABBASIA	35025
South	Rajanpur	Rojhan	KOCHA MIANWALI NO.1	32368
South	Rajanpur	Rojhan	CHAK UMRANI	32336
South	Rajanpur	Rojhan	KOTLA HAMAL MUSHTARQA MAZARI	32418
North	Chakwal	Kallar Kahar	MAIRA	12719
North	Chakwal	Kallar Kahar	KHAI	12717
North	Chakwal	Kallar Kahar	KHAIR PUR	12698
North	Chakwal	Kallar Kahar	KALU	12703
North	Chakwal	Kallar Kahar	GAHI	12593
North	Chakwal	Kallar Kahar	SARKALAN	12581
North	Khushab	Noorpur Thal	RANG PUR BAGHOR	25084
North	Khushab	Noorpur Thal	29/M.B.	25042
North	Khushab	Noorpur Thal	49/D.B.	25067
North	Khushab	Noorpur Thal	CHAK 17/M.B.	25034
North	Khushab	Noorpur Thal	53/D.B.	25078
North	Mianwali	Isa Khel	KACHH TUNDAR KHEL	25323
North	Mianwali	Isa Khel	KHUDOZAI	25329
North	Mianwali	Isa Khel	KOTKI	25330
North	Mianwali	Isa Khel	GANDA	25333
North	Mianwali	Isa Khel	KOT CHANDANA	25328
North	Mianwali	Isa Khel	TOLA MANGLI	25326
North	Mianwali	Isa Khel	PACCAKIS UMER KHAN	25341
North	Sargodha	Kot Moman	KIRARI WALA	24389
North	Sargodha	Kot Moman	BURJ MUHAMMAD KHAN	24414
North	Sargodha	Kot Moman	SAID NAU	24411
North	Sargodha	Kot Moman	MOHRI WAL	24277
North	Sargodha	Kot Moman	KOTLA PANAH	24458
North	Chakwal	Kallar Kahar	MAKHYAL	12589
North	Chakwal	Kallar Kahar	DAI	12588
North	Khushab	Noorpur Thal	TETRI	25009
North	Khushab	Noorpur Thal	PIPLI SAYEDAN	25023
North	Khushab	Noorpur Thal	ADHI SARGAL	25031
North	Khushab	Noorpur Thal	CHAK 18/M.B.	25035
North	Mianwali	Isa Khel	KARANDI	25306
North	Mianwali	Isa Khel	VANJARI	25321
North	Mianwali	Isa Khel	PACCA ATTOCK PANIYALA	25289
North	Sargodha	Kot Moman	GHULLA PUR	24302
North	Sargodha	Kot Moman	KOT UMERANA	24451
North	Sargodha	Kot Moman	NASEER PUR KALAN	24292
North	Sargodha	Kot Moman	RAM RANG	24468



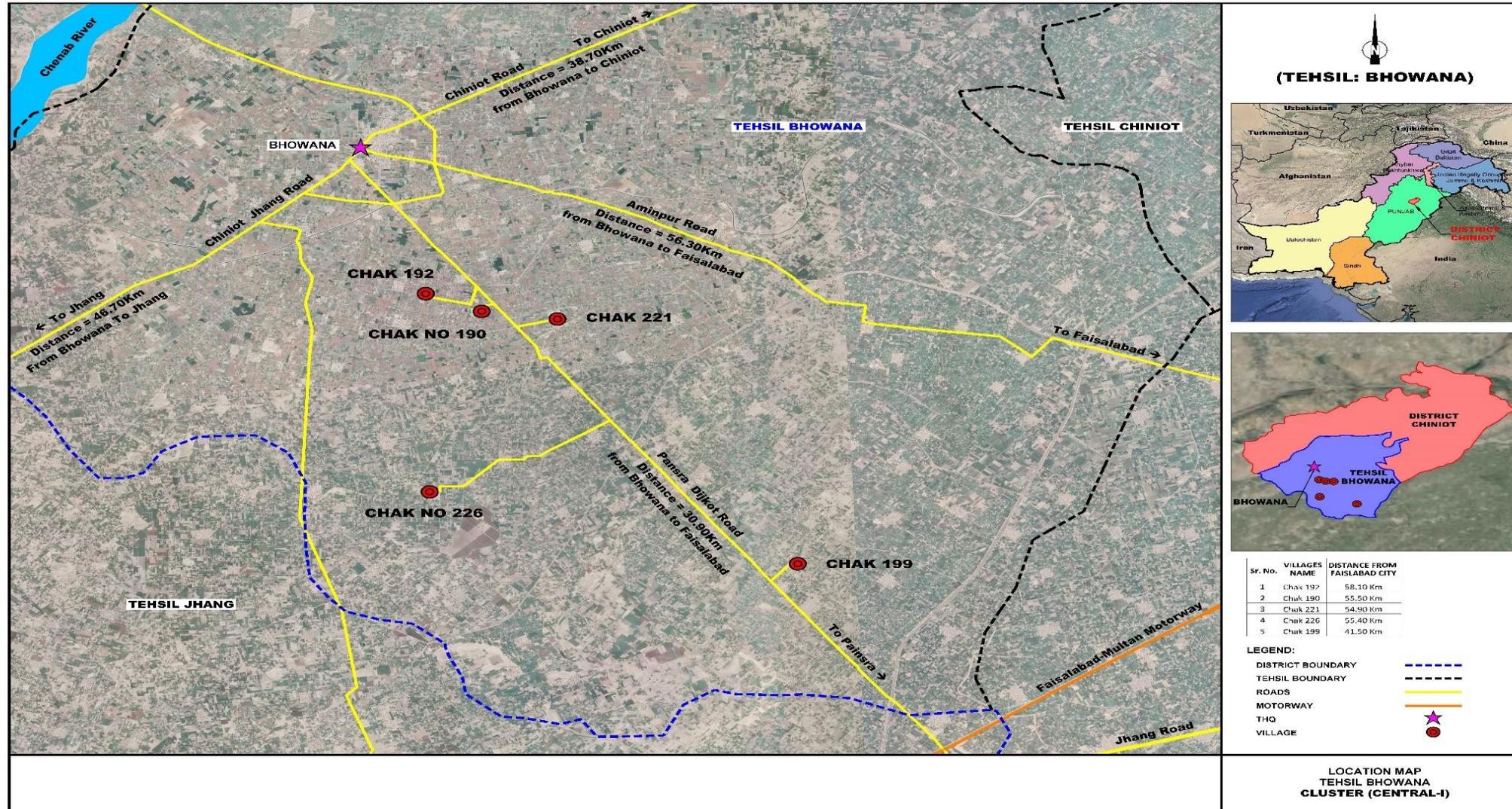
North	Sargodha	Kot Moman	NASIR PUR KHURD	24466
Centre	Bhakkar	Darya Khan	CHAK NO.17/T.D.A	25447
Centre	Bhakkar	Darya Khan	SANDI	25405
Centre	Bhakkar	Darya Khan	LUNDI NASHEB	25409
Centre	Bhakkar	Darya Khan	MURANI SHUMALI	25406
Centre	Bhakkar	Darya Khan	ANGRA DAGGAR	25627
Centre	Chiniot	Bhowana	TAJA BEERWALA	23776
Centre	Chiniot	Bhowana	CHAK NO 190	23803
Centre	Chiniot	Bhowana	CHAK 221	23837
Centre	Chiniot	Bhowana	CHAK 199	23854
Centre	Chiniot	Bhowana	THATTA JHANAB	23792
Centre	Chiniot	Bhowana	BARKHURDAR	23794
Centre	Chiniot	Bhowana	CHAK 226	23816
Centre	Jhang	Ahmad Pur Sial	SEWA	23518
Centre	Jhang	Ahmad Pur Sial	CHAK NO.11/3-L	23522
Centre	Jhang	Ahmad Pur Sial	HAZARAT SULTAN BAHU	23498
Centre	Jhang	Ahmad Pur Sial	FATEH PUR PIRTI	23332
Centre	Jhang	Ahmad Pur Sial	GUDARA	23520
Centre	Bhakkar	Darya Khan	HAJI HUSSAIN SHAH DAGAR	25631
Centre	Bhakkar	Darya Khan	SURANI DAGGAR	25432
Centre	Bhakkar	Darya Khan	SURANI NASHEB	25415
Centre	Bhakkar	Darya Khan	CHAK NO.52-M.L	25426
Centre	Chiniot	Bhowana	SULEMAN	23629
Centre	Chiniot	Bhowana	BILHARKE	23769
Centre	Chiniot	Bhowana	HID	23790
Centre	Chiniot	Bhowana	CHAK 248	23825
Centre	Chiniot	Bhowana	CHAK 192	23805
Centre	Chiniot	Bhowana	KAMOKE	23772
Centre	Jhang	Ahmad Pur Sial	JAIWAIN	23502
Centre	Jhang	Ahmad Pur Sial	DAULUANA SHARQI	23358
Centre	Jhang	Ahmad Pur Sial	BAKHU SARGANA	23544
Centre	Jhang	Ahmad Pur Sial	CHAK NO.2/2-L	23505
Centre	Jhang	Ahmad Pur Sial	CHAK NO.3/3-R	23561
Centre	Pakpattan	Pakpattan	KARAM PUR BHATTI	28075
Centre	Pakpattan	Pakpattan	CHAK NO.57-S.P.	27980
Centre	Pakpattan	Pakpattan	BABLANA	28171
Centre	Pakpattan	Pakpattan	SOCHAN	27952
Centre	Pakpattan	Pakpattan	KILLI	27945
Centre	Pakpattan	Pakpattan	CHAK AHMAD SHER	28096
Centre	Pakpattan	Pakpattan	KALE WAL	28051
Centre	Pakpattan	Pakpattan	ARIF ABAD	27949
Centre	Pakpattan	Pakpattan	DEDAR SINGH	28181
Centre	Pakpattan	Pakpattan	JIWANA MEHTAM	28192
Centre	Pakpattan	Pakpattan	DHAKKU CHISHTI	27934
Centre	Pakpattan	Pakpattan	CHAK NO.93/D.	28013
Centre	Pakpattan	Pakpattan	CHAK NO.32/S.P.	27991
Centre	Pakpattan	Pakpattan	CHAK ELAHYA WALA	28166
Centre	Pakpattan	Pakpattan	JATTU WAL	27944
Centre	Pakpattan	Pakpattan	CHAK NO.47 S.P.	28052
Centre	Pakpattan	Pakpattan	SOHARA	27936
Centre	Pakpattan	Pakpattan	CHAK SARDUL SINGH	27964
Centre	Pakpattan	Pakpattan	CHAK NO.22.S.P.	28067
Centre	Pakpattan	Pakpattan	FARID PUR DOGRAN	27972
Centre	Pakpattan	Pakpattan	CHAK NO.66.D.	28109
Centre	Pakpattan	Pakpattan	GHURI	28094



Centre	Pakpattan	Pakpattan	CHAK NO.34/S.P	27961
Centre	Pakpattan	Pakpattan	CHAK NO.86/D	28035



Annexure-2 Area of Influence

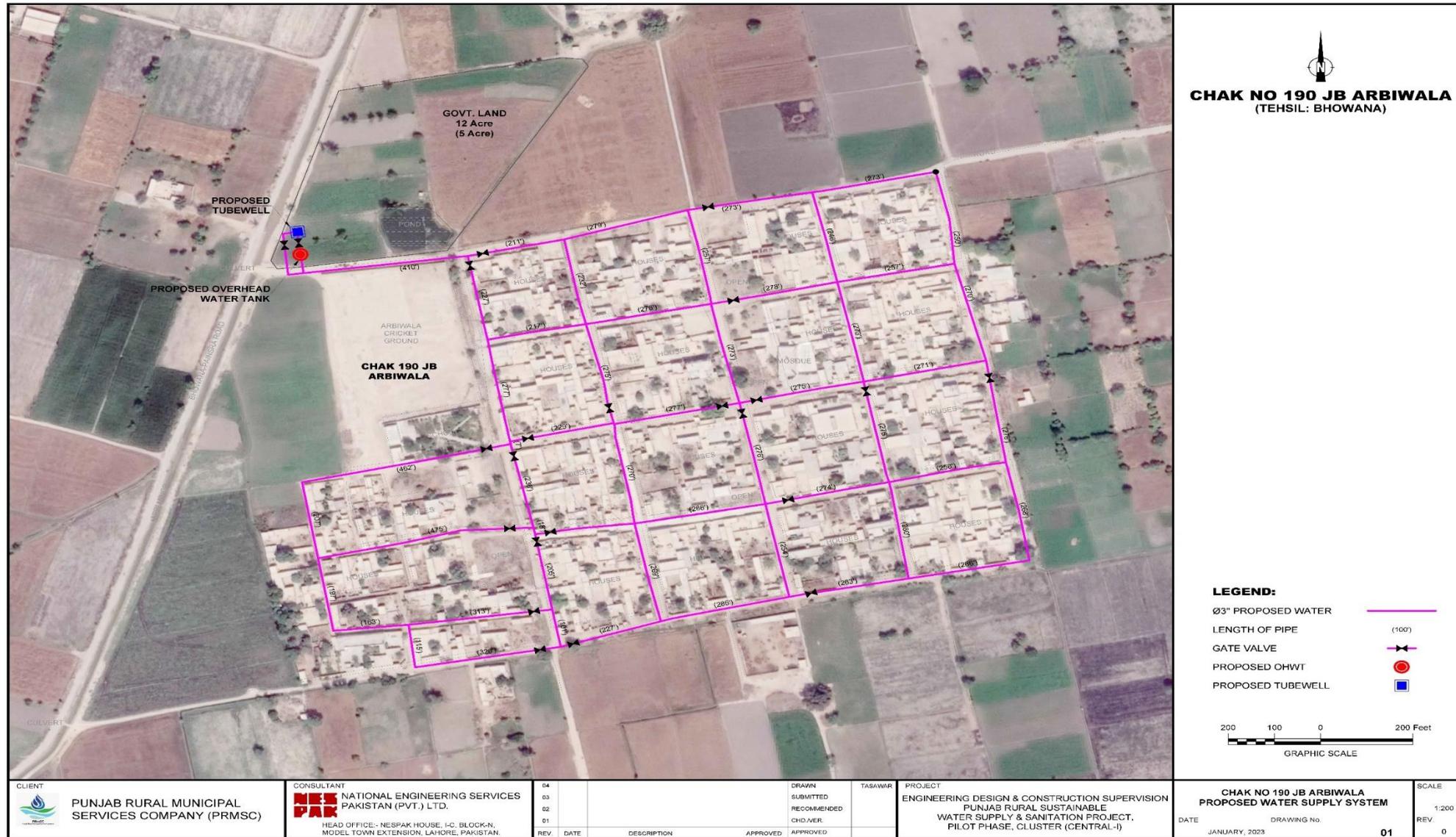


Map indicating the Tehsil Bhowana and relevant villages included in this ESMP



Area of Influence —————

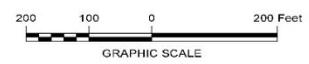
Google map showing overview of Chak -190 (Arbiwala) and surrounding area, Solid black line represents Area of Influence




CHAK NO 190 JB ARBIWALA
 (TEHSIL: BHOWANA)

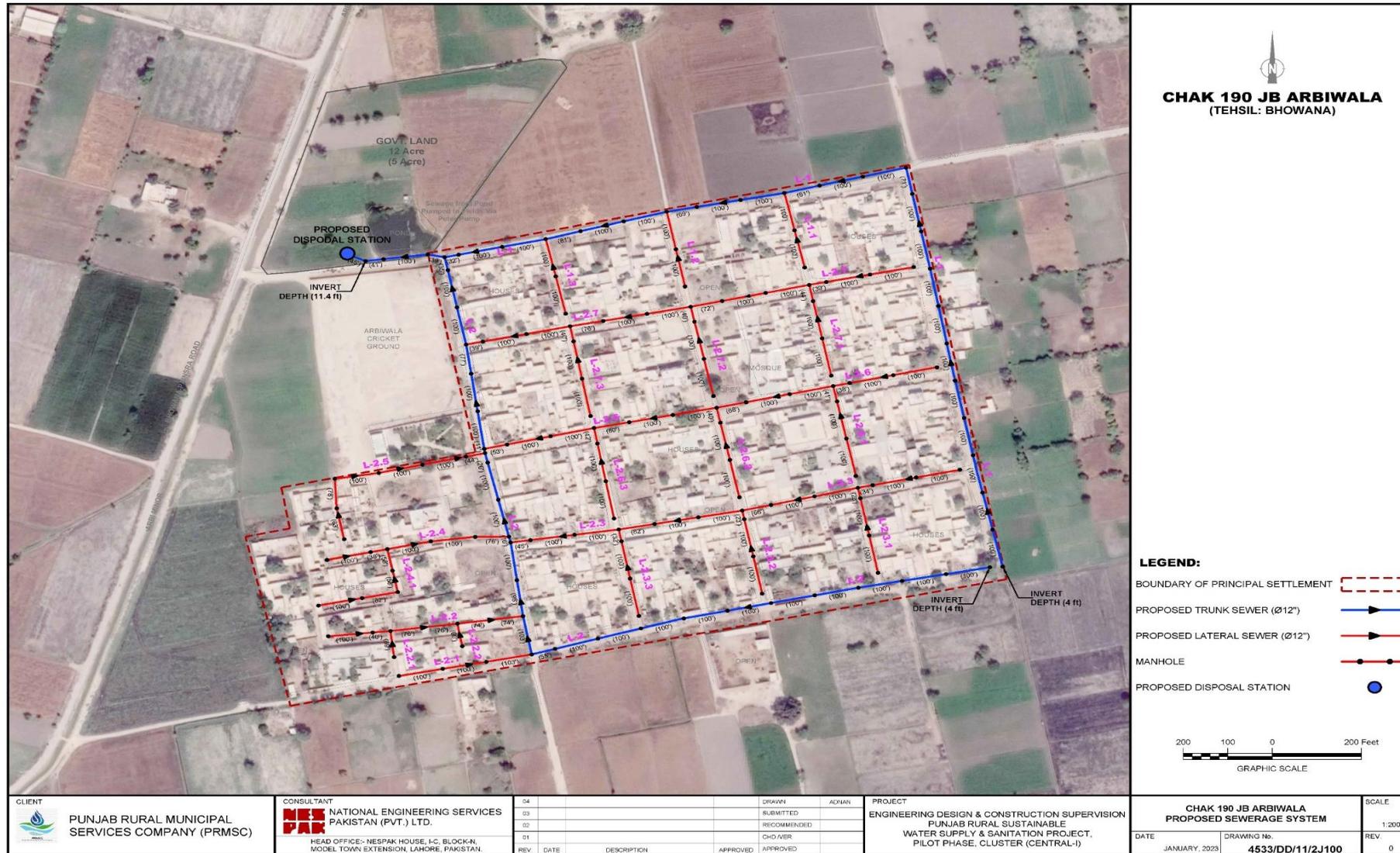
LEGEND:

- Ø3" PROPOSED WATER LENGTH OF PIPE (100) —
- GATE VALVE ⌞
- PROPOSED OHWT ●
- PROPOSED TUBEWELL ■



CLIENT  PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I.C. BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">04</td> <td style="width: 15%;">SUBMITTED</td> <td style="width: 15%;">TASAWAR</td> <td style="width: 15%;">PROJECT</td> <td style="width: 50%;">ENGINEERING DESIGN & CONSTRUCTION SUPERVISION</td> </tr> <tr> <td>02</td> <td>RECOMMENDED</td> <td></td> <td></td> <td>PUNJAB RURAL SUSTAINABLE</td> </tr> <tr> <td>01</td> <td>CHO/VER</td> <td></td> <td></td> <td>WATER SUPPLY & SANITATION PROJECT,</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>PILOT PHASE, CLUSTER (CENTRAL-I)</td> </tr> </table>	04	SUBMITTED	TASAWAR	PROJECT	ENGINEERING DESIGN & CONSTRUCTION SUPERVISION	02	RECOMMENDED			PUNJAB RURAL SUSTAINABLE	01	CHO/VER			WATER SUPPLY & SANITATION PROJECT,					PILOT PHASE, CLUSTER (CENTRAL-I)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">DATE</td> <td style="width: 10%;">DRAWING No.</td> <td style="width: 10%;">SCALE</td> </tr> <tr> <td>JANUARY, 2023</td> <td style="text-align: center;">01</td> <td>1:200</td> </tr> </table>	DATE	DRAWING No.	SCALE	JANUARY, 2023	01	1:200	
04	SUBMITTED	TASAWAR	PROJECT	ENGINEERING DESIGN & CONSTRUCTION SUPERVISION																										
02	RECOMMENDED			PUNJAB RURAL SUSTAINABLE																										
01	CHO/VER			WATER SUPPLY & SANITATION PROJECT,																										
				PILOT PHASE, CLUSTER (CENTRAL-I)																										
DATE	DRAWING No.	SCALE																												
JANUARY, 2023	01	1:200																												

Layout Plan of Proposed Water Supply System in Chak-190



CLIENT
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
 HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

04				
03				
02				
01				
REV.	DATE	DESCRIPTION	APPROVED	APPROVED

DRAWN: ADHAN
 SUBMITTED:
 RECOMMENDED:
 CHD/VER:
 APPROVED:

PROJECT
ENGINEERING DESIGN & CONSTRUCTION SUPERVISION
 PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER (CENTRAL-I)

CHAK 190 JB ARBIWALA PROPOSED SEWERAGE SYSTEM
 DATE: JANUARY, 2023
 DRAWING No: 4533/DD/11/2J100

SCALE
 1:200
 REV. 0

Layout Plan of Proposed Sewerage System in Chak-190



Annexure-3 Chance Find Procedures



CHANCE FIND PROCEDURES

Project may involve deep excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through Supervision Consultant to Directorate General (DG) of Antiquities & Archaeology, Government of Punjab to take further suitable action to preserve those antique or sensitive remains. Representative of the "Director Archaeology and Museum (DAM)" will visit the site and observed the significance of the antique, artifact and Cultural (religious) properties and significance of the project. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance find procedures should be adopted by contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and provincial Archeological Department
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over;
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer.

The contact Address of Directorate General of Antiquities & Archaeology is given below:

1st Floor Aiwan-e-Auqaf Building Near

Lahore High Court, Lahore, Pakistan

Tel: 042-99210870



Annexure-4
PEQS and other relevant standards



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**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

NOTIFICATION (121 of 2016)

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Noise is published for general information:

DR SYED ABUL HASSAN NAJMEE

Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Price: Rs. 10.00 Per Page

(1195)



**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/ 7-26 /2013. In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV, of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Noise:

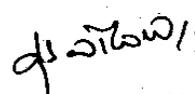
Punjab Environment Quality Standards for Noise

No.	Category of Area/Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2013	
		Limits in dB(A) Leq*			
		Day Time	Night Time	Day Time	Night Time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Day time hours; 6:00am to 10:00pm.
2. Night Time hours; 10:00 pm to 6:00 am.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospital, educational institutions and courts
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority

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


 (IQBAL MOHAMMED CHAUHAN)
 Secretary, Government of the Punjab
 Environment Protection Department



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**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(122 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Ambient Air is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Price Rs. 10.00 Per Page

(1197)



**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013. - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Ambient Air:

Punjab Environmental Quality Standards for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
Sulfur Dioxide (SO ₂)	Annual Average*	80 µg/m ³	Ultraviolet Fluorescence method
	24 hours**	120 µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	40 µg/m ³	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	80 µg/m ³	
Ozone (O ₃)	1 hour	130µg/m ³	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360µg/m ³	High Volume Sampling, (Average flow rate not less than 1.1 m ³ /min).
	24 hours**	500µg/m ³	
Respirable Particulate Matter PM ₁₀	Annual Average*	120µg/m ³	Preferably β-Ray absorption method
	24 hours**	150µg/m ³	
Respirable Particulate Matter PM _{2.5}	Annual Average*	15µg/m ³	Preferably β-Ray absorption method
	24 hours**	35µg/m ³	



Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
	1 hour	15µg/m ³	
Lead (Pb)	Annual Average*	1 µg/m ³	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5µg/m ³	
Carbon Monoxide (CO)	8 hours**	5 mg/m ³	Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m ³	

* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

(Handwritten signature)

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department



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LAHORE MONDAY AUGUST 15, 2016

**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(123 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for motor vehicle exhaust and noise is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

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**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013 - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for motor vehicle exhaust and noise:

**Punjab Environmental Quality Standards for Motor Vehicle
Exhaust and Noise**

(i) For In-use Vehicles

No	Parameter	Standards (maximum permissible limit)	Measuring methods	Applicability
1	2	3	4	5
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode	To be compared with Ringlemann Chart at a distance of 6 meters or more	Immediate effect
2	Carbon Monoxide	6%	Under idling conditions: Non dispersive infrared detection through gas analyzer	
3	Noise	85 dB(A)	Sound-meter at 7.5 meter from the source	

(ii) For New Vehicles

EMISSION STANDARDS FOR DIESEL VEHICLES

(a) For Passenger Cars and Light Commercial Vehicles (g/km)

Type of Vehicle	Category/Class	Tiers	CO	HC+NOx	PM	Measuring method	Applicability
1	2	3	4	5	6	7	8



Passenger Cars	MI: with reference mass (RW) upto 2500 kg	Pak-II IDI	1.0	0.7	0.08	NEDC (ECE 15+EUDCL)	All imported and locally manufactured diesel vehicles with effect from 01-07-2012
	Cars with RW over 2500 kg to meet NI category standards	Pak-II, DI	1.0	0.9	0.10		
Light Commercial Vehicles	NI-I(RW<1250kg)	Pak-II, IDI	1.0	0.70	0.08		
		Pak-II, DI	1.0	0.90	0.10		
	NI-II(1250kg<RW<1700kg)	Pak-II, IDI	1.25	1.0	0.12		
		Pak-II, DI	1.25	1.3	0.14		
	NI-III(RW>1700kg)	Pak-II, IDI	1.50	1.2	0.17		
		Pak-II, DI	1.50	1.6	0.20		

Parameters Standards (maximum permissible limit)	Measuring method
85 dB(A)	Sound-meter at 7.5 meters from the source

(b) For Heavy Duty Diesel Engine and Large Goods Vehicles (g/KWh)

Type of Vehicle	Category/ Class	Tiers	CO	HC	NOx	PM	Measuring method	Applicability
1	2	3	4	5	6	7	8	9
Heavy Duty Diesel Engine	Trucks & Buses	Pak-II	4.0	1.1	7.0	0.15	ECE-R-49	All imported and locally manufactured diesel vehicles with effect from 01-07-2012
Large Goods Vehicle	N2(2000 and up)	Pak-II	4.0	7.0	1.4	0.15	EDC	



Parameters	Standards (maximum permissible limit)	Measuring methods
Noise	85 dB(A)	Sound-meter at 7.5 meters from the source

EMISSION STANDARDS FOR PETROL VEHICLES (g/km)

Type of Vehicle	Category/Class	Tiers	CO	HC+NOx	Measuring method	Applicability
1	2	3	4	5	6	7
Passenger Cars	M1: with reference mass (RW) upto 2500kg. Cars with RW over 2500kg to meet NI category standards	Pak-II	2.20	0.5	NEDC(EC E15+EUDC L)	All imported and new models * locally manufactured petrol vehicles with effect from 01-07-2009**
Light Commercial Vehicles	N1-I(RW<1250kg)	Pak-II	2.20	0.5		
	N1-II(1250kg>RW<1700kg)	Pak-II	4.0	0.65		
	N1-III(RW>1700kg)	Pak-II	5.0	0.08		
Motor Rickshaws & Motor Cycles	2.4 strokes<150cc	Pak-II	5.5	1.5	ECER 40	
	2.4 strokes>150cc	Pak-II	5.5	1.3		



THE PUNJAB GAZETTE (EXTRAORDINARY) AUGUST 15, 2016 1205

Parameters	Standards (maximum permissible limit)	Measuring method
Noise	85 dB(A)	Sound-meter at 7.5 meters from the source

Explanations:

- DI: Direct Injection
IDI: Indirect Injection
EUDCI: Extra Urban Driving Cycle
NEDC: New European Driving Cycle
ECE: Urban Driving Cycle
M: Vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat.
N: Motor vehicles with at least four wheels designed and constructed for the carriage of goods
* Now Model means both model and design type change
** The existing Model of petrol driven vehicles locally manufactured with immediately switched over to Pak-II emission standards but not later than 30th June 2012

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department



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**GOVERNMENT OF THE PUNJAB
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**NOTIFICATION
(124 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Drinking Water is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Price Rs. 10.00 Per Page

(1207)



**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013 - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Drinking Water:

Punjab Environmental Quality Standards for Drinking Water

Properties/Parameters	Standard Values	WHO Standards	Remarks
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period.	Most Asian countries also follow WHO standards
Colour	≤15 TCU	≤15 TCU	
Taste	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Odour	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Turbidity	<5 NTU	<5 NTU	



Properties/Parameters	Standard Values	WHO Standards	Remarks
Total hardness as CaCO ₃	< 500 mg/l	—	
TDS	<1000	< 1000	
pH	6.5 – 8.5	6.5 – 8.5	
Essential Inorganic			
	mg/Litre	mg/Litre	
Aluminum (Al) mg/l	≤0.2	0.2	
Antimony (Sb)	≤0.005 (P)	0.02	
Arsenic (As)	≤0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	<250	250	
Chromium (Cr)	≤0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic			
	mg/l	mg/l	
Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤1.5	1.5	
Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤0.001	0.001	
Nickel (Ni)	≤0.02	0.02	
Nitrate (NO ₃)*	≤50	50	
Nitrite (NO ₂)*	≤3 (P)	3	
Selenium (Se)	0.01(P)	0.01	



Properties/Parameters	Standard Values	WHO Standards	Remarks
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source		
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries
Organic			
Pesticides mg/l			PSQCA No. 4639- 2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.**
Phenolic compounds (as Phenols) mg/l			
Poly-nuclear aromatic hydrocarbons (as PAHs) g/l		0.01 (By GC/MS method)	
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

* Indicates priority health related inorganic constituents, which need regular monitoring.

** PSQCA: Pakistan Standards Quality Control Authority.

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department



Annexure-5 E & S Checklist



E & S Screening Checklist

Environmental and Social screening checklist for of 26 priority villages can be accessed through the following link

https://drive.google.com/drive/folders/1fBccLFGg9k-Sf9Q6zAeGzxBfDvl_rENM?usp=sharing



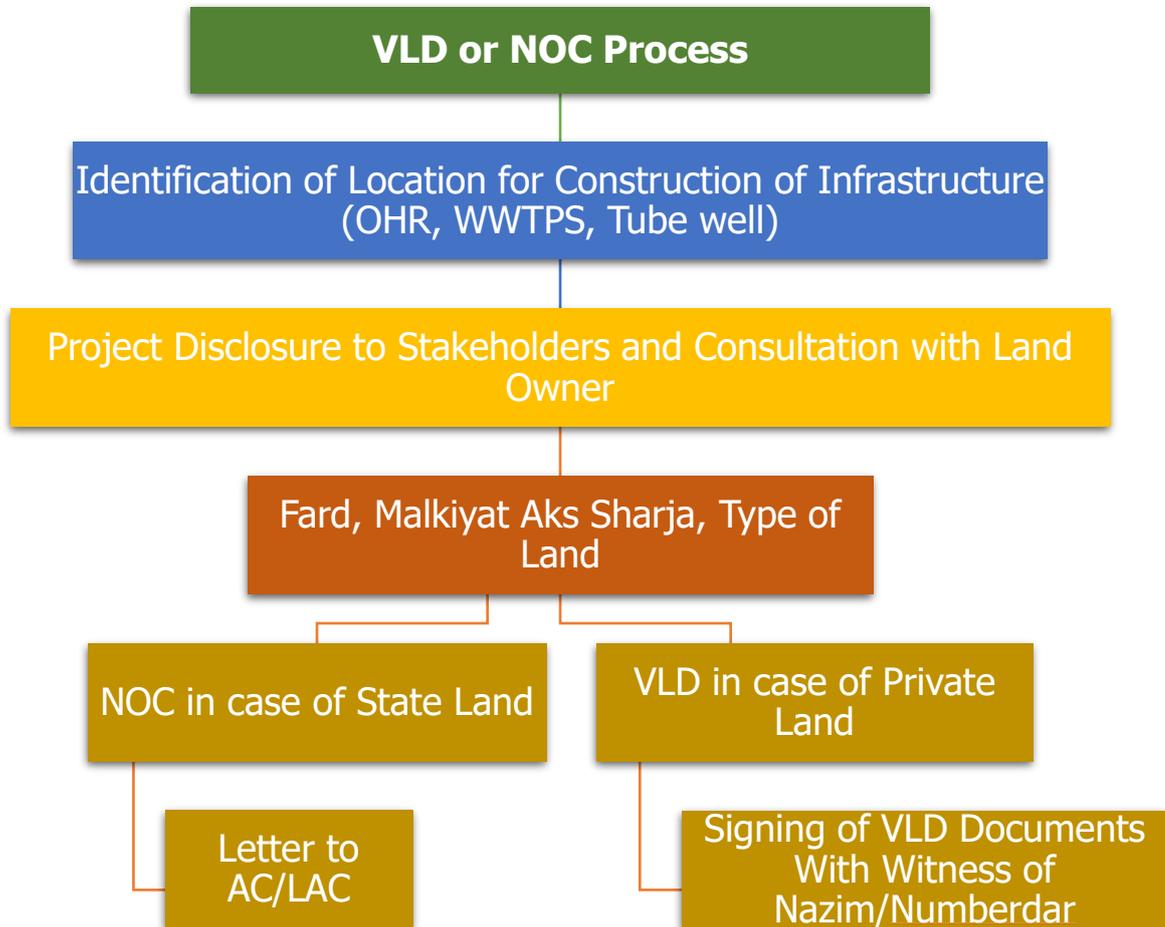
Annexure-6 Consultation Meetings



Details of Consultation Meetings				
Sr. No	Tehsil	Revenue Villages	No. of Meetings Conducted	No. of Participants
1	Pakpattan	Dahku Chishti	2	15
		Arifabad	3	18
		Sochan	4	12
2	Kalar Kahar	Makhial	3	20
		Gahi	2	25
3	Kot Momin	Naseerpur Khurd	3	22
4	Bahawalnagar	Chak Muhammad Zaman	4	18
		Moza Sadiq Nagar	3	19
5	Khairpur Tamiwali	Sheikh Wahan	2	16
		Moza Isa	3	29
6	Kehror Pakka	Muhammad Pur	3	15
		Chowki Rangu Khan	3	23
		Gulhaar	3	24
		Dora Mahar	2	18
		Chowki Suba Khan	3	20
7	Bhawana	Chak No. 190	3	13
		Chak No. 192	2	18
		Chak No. 199	4	15
		Chak No. 221	4	20
		Chak No. 226	4	19
8	Liaqatpur	Chak No. 5/A	2	16
		Chak No. 17/A	3	30
		Chak No. 25/A	3	12
		Chak No. 26/A	2	22
		Chak No. 29/A	3	15
		Chak No. 30/A	3	23
		Total	76	



Annexure-7 VLD Procedure



Specific conditions for the VLD procedure are provided in ESMF.



Annexure-7A VLD Screening Checklist



Checklist of Voluntary Land Donation (VLD) Process

Sr. No.	Description	Checklist Yes=Y; No=N	Requirements
A	Determine the appropriateness of VLD		
1	Has the viability of all other alternative locations/ sites been considered?		Must be Yes
2	Is Govt. land available?		No, In case Yes, the following must be checked
3	Reasons for obtaining land through VLD in spite of the availability of govt. land?		Justifications/ Reasons for VLD
4	Has the cost-benefit analysis been conducted for choosing VLD instead of Govt. land?		Cost
5	Does the cost meet the minimum threshold required for opting for VLD instead of Govt. land?		Must be yes
	Ensure the landowner is not vulnerable (as per provincial poverty line for rural areas or belonging to certain social categories)		No
6	Is the land obtained through VLD owned by a woman who is the sole earner of the family?		VLD not to be taken from the women headed family
	Minority /handicapped persons, and is subject to any of the following impacts:		
7	cost of loses of land holding;		Must be avoided
8	cost of loses shelter; and loses sources of livelihoods.		Must be avoided
B	VLD Requirements		
9	The Titleholder should be holding more than the minimum prescribed land;		Minimum 2 kanals
10	Verify voluntary donation is not more than 10% of area of titleholder's holding		Must be Yes
11	Verify impacts are minor and not requiring physical relocation of titleholder		Must be Yes
12	Verify land must be jointly identified by the Revenue Department/ VO or project authorities.		Must be Yes
13	Does the project technical authorities have authorisation that the land is appropriate for sub-project purposes.		Must be Yes



14	Ensure land is appropriate for sub-project purposes and will not invite adverse social, health, environment, safety impacts		Must be Yes
15	Verify land is free of squatters, encroachers, or other claims or encumbrances		Must be Yes
16	Verification of the voluntary nature of land donations must be obtained from each of the persons donating land.		Must be Yes
17	Does the land donors/ tenants have access to and benefit from this sub-project?		If no, then describe the reasons.
C	Verify requirements of donation and formalization of donation		
18	Verify donation is voluntary and obtain notarized, witnessed statements		Must be Yes
19	Obtain verification of voluntary acceptance of community-devised migratory measures from those expected to be adversely affected		Must be Yes
20	Ensure titleholder understands they will have equal access to infrastructure built on donated land and cannot claim for priority treatment		Must be Yes
21	Ensure grievance redress mechanism is available		Must be Yes
D	Process for Voluntary Donation		
22	Reasons for appropriateness of land donation		Record of reasons for land donation appropriateness
23	Land use for the project		Land use plan (Purpose for which land is being taken)
24	Amount of land required on a permanent and temporary basis		Land requirement plan
25	Amount of land to be donated		Land donation plan
26	Terms of land donation		Land donation agreement
27	Parties intending to donate		List of donor parties in the village
28	Beneficiary of land donation		Beneficiary agreement in favour of PRMSC, LG&CDD
29	Any details that are relevant to why donation may be appropriate		Record of reasons for land donation appropriateness



E Due diligence on land ownership and use			
30	Type of land rights in project area		Land rights assessment
31	Specific due diligence on parcel of land for donation		Parcel-specific due diligence plan
32	Owner/s of land		Owner/s identification
33	Users of land or any occupying parties (Tenants or leaseholder etc.)		Users identification
34	Competing claims of ownership or use		Claims identification
35	Structures and assets on the land		Assets on the proposed land (loss of agriculture, livelihood, assets, loss of economic trees etc.)
36	Encumbrances on the land		Encumbrances assessment (Legal/ financial, Loans etc.)
F Consultation and Disclosure			
37	Consult with land donors and ensure they understand the terms and conditions of the donation		Must be Yes
38	Disclose information about the donation process		Must be Yes
39	Disclose any potential negative impacts on the owner		Must be Yes
40	Informed consent of person donating land		Consent Agreement
41	Indicate some of the concerns raised, if any.		
G Grievance Redress Mechanism (GRM)			
42	Disclosure of GRM process and GRC		Must be Yes
43	Sharing of helpline for complaints and grievances		Must be Yes
H Monitoring and documentation			
44	Verify any land conflicts or conflicting land titling		Must be mentioned and avoided
45	Establish informed consent of person donating land		Must be Yes and Documented
46	Inform the owner, what the land is going to be used for		Must be Yes and Documented
47	Inform them they will be deprived of the title as well as any other right to use the land		Must be Yes and Documented
48	They have the right to refuse to donate the land		Must be Yes and Documented
49	Whether there are alternatives to using this land		Must be Yes and Documented
50	Information about any other costs involved in the process which the owner has to pay.		Must be Yes and Documented



51	They will be informed that neither they nor their family members will be able to get the land back after the mutation.		Must be Yes and Documented
52	What they will need to do to donate the land;		The complete mutation process must be disclosed
53	The intergenerational effect of the donation on their family, what they can do if they (or their family or heirs) want the land back.		Must be Yes and Documented
54	The terms and conditions of the land donation must be mutually agreed upon and detailed in a written agreement.		Must be Yes and Documented
55	Verify donors provide their informed consent		Must be Yes and Documented
56	Establish a grievance redress mechanism		Must be Yes and Documented
57	Establish and communicate the grievance redress mechanism		Must be Yes and Documented
58	Monitor and document the donation process in monitoring reports		Must be Yes and Documented



Annexure-7B VLD Tracking Matrix



Annexure-8 Sludge Management Plan

SLUDGE MANAGEMENT PLAN

Introduction:

An integrated sludge management plan would cover aspects across the value chain of on-site sanitation including safe collection, conveyance, treatment and disposal/reuse of the treated sludge.

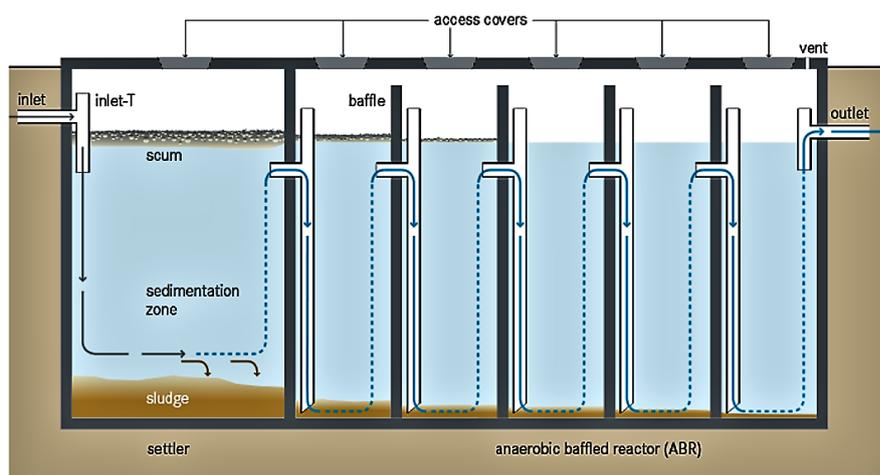
Objectives of Sludge Management & Treatment

Following are the basic objectives of sludge management or treatment

- Reducing its Volume
- Stabilizing its Organic Materials
- Killing off the odor
- Ensure it can be reused
- Properly digested (Non activated)

Anaerobic Baffled Reactor (ABR)

An Anaerobic Baffled Reactor (ABR) technology will be used to treat sewerage water. ABR is an improved septic tank with a series of baffles under which the wastewater is forced to flow. This technology is easily adaptable and can be applied at the household level, in small neighborhoods or even in bigger catchment areas.



- **Sludge Production**

Sludge production is an inherent part of the operation of an anaerobic baffle reactor (ABR), as it involves the biological breakdown of organic matter by microorganisms.

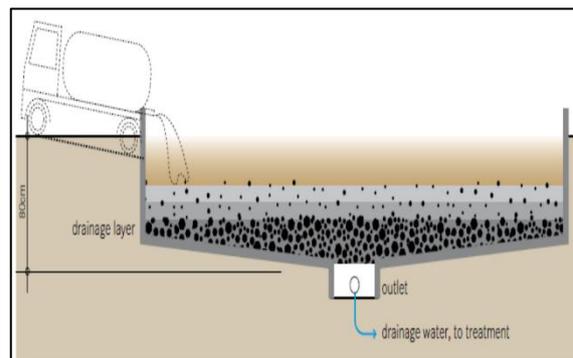
During the treatment process, organic matter is converted to a residual sludge, which consists of biomass, undigested organic matter, and inorganic solids. The amount of sludge produced by an ABR will depend on several factors, including the influent characteristics, hydraulic retention time, and the operating conditions of the reactor. Generally, the longer the hydraulic retention time, the higher the sludge production will be. However, longer retention times may also lead to improved treatment efficiency. It is important to manage the sludge produced by the ABR to prevent excessive accumulation and ensure efficient operation of the system. This may include regular removal of sludge, sludge thickening, digestion, dewatering disposal and monitoring.

- **Sludge Removal from ABR**

Sludge removal from an Anaerobic Baffle Reactor (ABR) is typically required to maintain efficient operation of the system and prevent excessive accumulation of solids. The frequency of sludge removal will depend on factors such as the influent characteristics, hydraulic retention time, and the design of the ABR. In general, it is recommended that sludge should be removed from the ABR when it reaches a certain accumulation level, which can be determined by monitoring the sludge volume and concentration. A common practice is to remove the sludge volume when it reaches around 50% of the reactor volume.

- **Sludge Dewatering**

The digested sludge contains water content ranges from 70% to 95%, with an average of about 85%. This means that the sewerage sludge is relatively wet and contains a significant amount of water. But, even with that moisture content, sludge no longer behaves as a liquid and can be handled as a solid material.



Sludge-drying beds provide the simplest method of dewatering. A digested sludge slurry is spread on an open bed of sand and allowed to remain until dry. Drying takes place by a combination of evaporation and gravity drainage through the sand. A piping network built under the sand collects the water, which is pumped back to the head of the plant.

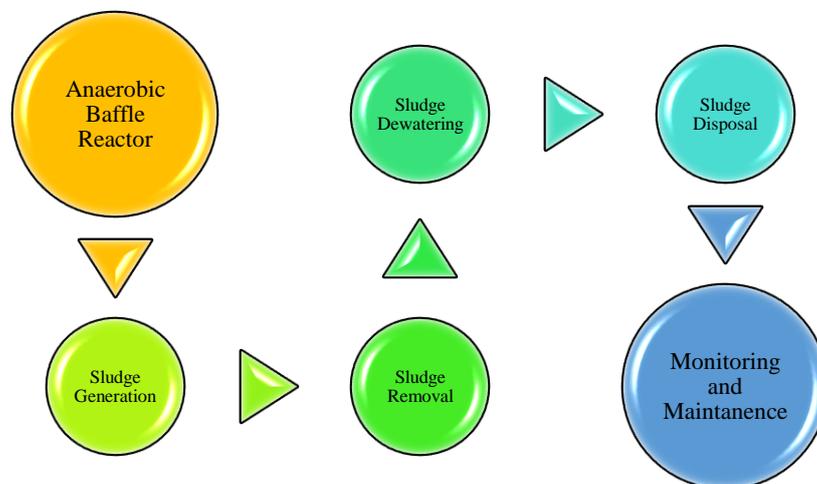
After about six weeks of drying, the sludge cake, as it is called, may have a solids content of about 40 percent. It can then be removed from the sand with a pitchfork or a front-end loader. In order to reduce drying time in wet or cold weather, a glass enclosure may be built over the sand beds.

- **Sludge Disposal / Reuse**

The final destination of treated sewage sludge usually is the land. Dewatered sludge can be buried underground in a sanitary landfill. It also may be spread on agricultural land in order to make use of its value as a soil conditioner and fertilizer after the consent of Village Organization (VO).

- **Monitoring and Maintenance**

It is important to regularly monitor the sludge management process to ensure that it is operating effectively and efficiently. This includes monitoring the quality of the sludge and the effectiveness of the treatment processes.



Sludge Management Plan Flowchart



Annexure-9
Grievance Redressal Committees
All three Tiers



Grievance Redressal Committee – (Tier- 1)



PUNJAB RURAL MUNICIPAL SERVICES COMPANY

(COMPANY REGISTERED WITH SECP UNDER SECTION 42 OF THE COMPANIES ACT, 2017)



PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT **(PRSWSSP)**

ESTABLISHMENT OF FIRST-TIER GRIEVANCES REDRESSAL COMMITTEE **(GRC-I)**

NOTIFICATION

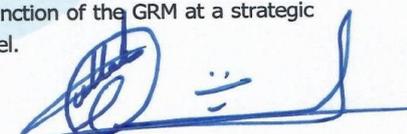
NO.PRMSC/ORDERS/2022: 05

In pursuance of the implementation of the Environment & Social Management Framework (ESMF), First Tier Grievance Redressal Committee (GRC-I) for the PRSWSSP is hereby constituted as under to address the resolution of outstanding/unsettled issues resulting from the Grievance Redressal Cell deliberation/proceedings.

1 Chairperson Village Organization	Convener
2 Vice Chairperson Village Organization	Member
3 Farmer/Worker	Member
4 Minority Member	Member
5 Youth Member	Member
6 Female Member (Focal Person Females)	Member
7 Lady Health Worker (LHW)	Member
8 BCC Officer, PRMSC	Member
9 Line Department concerned (Education, Health, Revenue etc.)	Member

This committee will be responsible to oversee the overall function of the GRM at a strategic level including monthly reviews at the village community level.

PRMSC


ASADULLAH (PAS)
CEO/PROJECT DIRECTOR
(PRMSC)

Dated Lahore, the 30th October, 2022

No. & Date Even

A copy is forwarded for information to:-

1. All DC's concerned
2. All AC's concerned
3. PA to CEO, PRMSC.
4. All Tehsil Managers, PRMSC.
5. All the remaining concerned
6. Master file

ADDRESS: 5TH FLOOR, KD PLAZA MM ALAM ROAD, LAHORE

EMAIL: info.prmisc@punjab.gov.pk | WEBSITE: www.prmisc.punjab.gov.pk | PHONE : (042) 99333608 - (042) 99333616



Grievance Redressal Committee – (Tier- 2)



PUNJAB RURAL MUNICIPAL SERVICES COMPANY

(COMPANY REGISTERED WITH SECP UNDER SECTION 42 OF THE COMPANIES ACT, 2017)



PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSSP)

ESTABLISHMENT OF SECOND-TIER GRIEVANCES REDRESSAL COMMITTEE (GRC-II)

NOTIFICATION

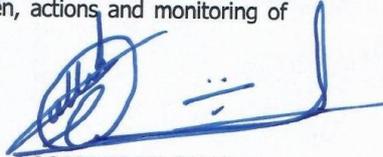
NO.PRMSC/ORDERS/2022: 04

In pursuance of the implementation of the Environment & Social Management Framework (ESMF), a Second Tier Grievance Redressal Committee (GRC-II) for the PRSWSSP is hereby constituted as under to address resolution on outstanding/unsettled issues resulting from the Grievance Redressal Cell deliberation/proceedings.

- | | |
|---|-----------------------|
| 1. Tehsil Manager PRMSC | Convener |
| 2. Deputy Manager Operation PRMSC | Member |
| 3. Deputy Manager Infrastructure PRMSC | Member |
| 4. Research Analyst E&S Safeguards PRMSC | Member |
| 5. BCC Officer PRMSC | Member (Focal Person) |
| 6. Assistant Manager Water & Sewerage PRMSC | Member |
| 7. Assistant Manager SWM PRMSC | Member |
| 8. Chairperson VO/GRC-I of Village concerned | Member |
| 9. Line Department concerned
(Education, Health, Revenue etc.) | Member |

This committee established in SDU-TO for each Tehsil, will manage GRM aspects for all sub-project locations in each tehsil including decisions to be taken, actions and monitoring of complaints resolution at the sub-project level.

PRMSC


ASADULLAH (PAS)
CEO/PROJECT DIRECTOR
(PRMSC)

Dated Lahore, the 30th October, 2022

No. & Date Even

A copy is forwarded for information to:-

1. All DC's concerned
2. All AC's concerned
3. PA to CEO, PRMSC.
4. All Tehsil Managers, PRMSC.
5. All the remaining concerned
3. Master file

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Grievance Redressal Committee – (Tier- 3)



PUNJAB RURAL MUNICIPAL SERVICES COMPANY

(COMPANY REGISTERED WITH SECP UNDER SECTION 42 OF THE COMPANIES ACT, 2017)



PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSSP)

ESTABLISHMENT OF A THIRD-TIER GRIEVANCES REDRESSAL COMMITTEE (GRC-III)

NOTIFICATION

NO.PRMSC/ORDERS/2022: 03

In pursuance of the implementation of the Environment & Social Management Framework (ESMF), a third Tier Grievance Redressal Committee (GRC-III) for the PRSWSSP is hereby constituted as under to address the resolution of outstanding/unsettled issues resulting from the Grievance Redressal Cell deliberation/proceedings.

1. Project Director / CEO PRMSC	Convener
2. Chief Operating Officer PRMSC	Member
3. Chief Infrastructure PRMSC	Member
4. Social & BCC Specialist PRMSC	Member (Focal Person)
5. Gender Specialist PRMSC	Member
6. Environmental Specialist	Member
7. Section Officer (Projects) LG&CD	Member
8. Chairperson VO/GRC-I of Village concerned	Member
9. Line Department concerned (Education, Health, Revenue etc.)	Member

This committee will be responsible to oversee the overall function of the GRM at a strategic level including monthly review.

PRMSC

**ASADULLAH (PAS)
CEO/PROJECT DIRECTOR
(PRMSC)**

Dated Lahore, the 30th October, 2022

No. & Date Even

A copy is forwarded for information to:-

1. All DC's concerned
2. All AC's concerned
3. PA to CEO, PRMSC.
4. All Tehsil Managers, PRMSC.
5. All the remaining concerned
6. Master file

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