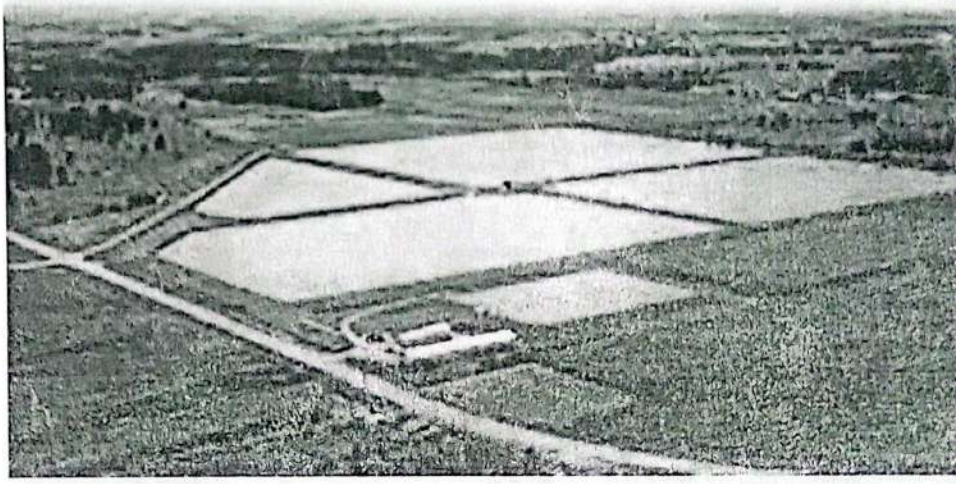
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PUNJAB
MUNICIPAL
DEVELOPMENT
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PMDFC

Environmen



Improvement of Sewerag
System in Jhang City ar
Construction of Was
Water Treatment Pla
(WWTP), (Zone-1&3)

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EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment (EIA/ESIA) has been prepared for Improvement of Sewerage System in Jhang City and Construction of Waste Water Treatment Plant (WWTP) which is being funded by the World Bank through Punjab Cities Program and to be implemented by the Municipal Committee Jhang and supervised by consultants appointed by PMDFC.

Project Background

The development objective of the Punjab Cities Program is to strengthen the performance of participating urban local governments in urban management and service delivery.

The program focuses on urban management and improvement of municipal services infrastructure for the following sectors:

- Parks
- Water Supply and Filtration Plants
- Solid Waste Management
- Sewerage and Waste Water Treatment Plants
- Roads and Street Lights

Subproject Overview

Jhang city is situated on the left bank of the river Chenab at a distance of about 11 Kilometres from its bed and the entire inhabited areas of Jhang district had population of 2,743,416 persons in the year 2017, that generates wastewater which is discharged directly into the fertile land without any treatment and is substantially the biggest pollution source. In view of that sanario, Government of the Punjab (GoPb) through PMDFC a project has launched to install wastewater treatment plants for Jhang City.

Punjab municipal Development Fund Company (PMDFC) has engaged MM Pakistan (Pvt.) Limited to provide consultancy services for the preparation of design while ESIA study of the proposed subproject of Improvement of Sewerage System in Jhang City and Construction of Waste Water Treatment Plant (WWTP) in Zone-1 &3 is prepared by the E&S team of PMDFC.

The Sub-project has a number of financial, social, economic and environmental benefits, including institutional development, rehabilitation and improvement of municipal services, capital investments, better quality of life and employment generation. In addition, a large

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number of secondary benefits are also likely to accrue in the medium to long term such as institutional reforms at the local level.

Nature, Size and Location of Sub-Project

The proposed Sub-project is a non-linear project that involves construction of Sewerage Network, construction of Disposal Satation near construction of disposal station (02 acre) in Chak Ghumnana tehsil and dsitrcit Jhang and construction of WWTP in Chak Ghumnana (96.04 acre) and Chak No.505/506 (1.41 acre) in tehsil and district Jhang. No other project of this nature is being implemented in public as well as private sector because of funding constrains and availability of land.

Scope of Work	**Improvement of Sewerage System in Jhang City and Constructio of Waste Water Treatment Plant (WWTP**
Location	Zone 1 Main areas included in this zone are Lalazar Colony, Satellite Tow Behari Colony, Mohallah Peer Pathan, Mohalalh Iqbal Nagar, Gha Abad along with main Toba Taik Singh road and adjoining area However, sewers will also be laid in some part of Zone-3 around Tot Road. Zone 3 Toba Bypass Road near Chack 206/ Jhok Abbas Shrif, Jhang
Sub-project Cost	**2535.150**Million/- PKR
Total Area	Rehabilitation and laying off new sewerage network 13.33 km Construction of new Disposal Station 2 Acres Rehabilitation of nullah/drain from disposal station to WWTI 3km Construction of WWTP 97 Acres
ESIA implementation cost	8.0 Million/-PKR
Sub-project Duration	2 year approx.

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Major Work Activities	Improvement of Sewerage system and construction of Waste Water Treatment Plant: 1. **Rehabilitation of Existing Sewerage System Part I A** (Missing Sewers and replacement, Desilting of Sewer lines, manhole covers, pumping machinery replacement 2. **Rehabilitation of existing Sewerage System Part I B** (Desilting, replacement of disposal stations machinery and pumping machinery) 3. **Sewer Network** of unserved areas 4. **Construction of Disposal Station and rehabilitation of 3km nullah** from disposal station to WWTP 5. **Construction of Waste Water Treatment Plant** (One Sullage channel, One Screening Chamber, 04 Anaerobic ponds, 04 facultative ponds, 4 sludge drying beds, one treated water pond, administrative block including site lab facility, floating plants covering the 20% of facultative ponds and one effluent water course from WWTP to the nearest water body)
Executing Agency	MC Jhang
Monitoring Agency	Punjab Municipal Development Fund Company (PMDFC)

Sub-project Proponent

Chief Executive Officer of MC Jhang is the proponent of project and intends to get environmental approval for the said sub-project as the proponent by submitting the Environment and Social Impact Assessment Report for the compliance of section 12 of Punjab Environment Protection Act, 2012.

Environmental & Social Baseline[1]

Jhang District is located in the province of Punjab of Pakistan, with Jhang City as its capital. The district is situated on the east bank of the Chenab River and is located at Latitude 31.15° N and longitude 72.22°E. The adjoining areas of the Jhang district include Toba Tek Singh and Faisalabad which lie towards its East, Hafizabad to its North-East, Khanewal to the South, Sargodha in the North, whereas Khushab, Bhakkar and Layyah are located to the West of the district. Jhang is predominantly a rural area. The district is composed of four tehsils namely Jhang, Shorkot, 18-Hazari and Ahmadpur Sial. The main languages spoken in Jhang are Punjabi and Urdu.

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The district has extremes of climate. The summer season begins from the month of April and lasts till October, May, June are the hottest months. The maximum and minimum temperatures in these months are about 45 and 30 Centigrade respectively. The winter season lasts from the month of November to March. December, January and February are the coldest months. The maximum and minimum temperature during this period are about 27 and 6 Centigrade respectively. The annual rainfall is about 288.8 millimeters. Winds and dust storms are common during the summer season and sometimes they cause much damage.

Air, noise and drinking water and wastewater quality analysis were conducted by the certified EPA laboratory for specifically proposed project Improvement of Sewerage System and Construction of Wastewater Treatment Plant to meet the requirement of Punjab EPA. Air quality analysis shows that parameters like CO, SO2, SPM and O3 are within the permissible limits of PEQs at all points. Nitrogen Oxides found exceeded the limits at two points (areas where improvement of sewerage System of Jhang city is proposed and site where construction of WWTP is proposed). Particulate Matter (PM10 and PM 2.5) found exceeded the limits of PEQs at all points. Noise level at all locations is within permissible limits of PEQs else one sample point. For water quality analysis, physical and chemical parameters are found to be in compliance of PEQS only chromium, chloride and nitrites are not complying with PEQs. However biological parameter i.e T. Coliform bacteria, E. Coli and Fecal Coliform in drinking water as per PEQS which must not be detected in 100 ml sample, was detected in all sample collected from the urban areas near the sites of proposed sewerage network, disposal station and WWTP construction. In this way, biological parameters of drinking water are in partial compliance.

Socio economic profile of jhang shows that people belong to agriculture and there are many educational institutes and historical places for tourism. Jhang District is a predominantly rural district, 23 % of its population lives in urban areas. It covers an area of 8,809 km².[3]. Jhang lies in the Faisalabad Division of Punjab province. Other than agriculture and agri-based industry, Jhang is famous for its wood-carving and furniture which is second to none in the world. It has a population of 2.83 million and a literacy rate of 37 percent.[1]

Environmental Impact Assessment:

Identification of impacts and determining of their significance is one of the main purposes of an ESIA report. Environmental and social impacts of any project are identified taking into account all phases of the project cycle, including planning and construction. The

[1] https://itacec.org/document/oxfam/Baseline%20Study%20Reports/District_Jhang.pdf

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environmental issues and impacts of a project depend upon the nature of the project activities, and the types and extent of interventions involved. It is not easy to predict the future since every impact has a different and multi-dimensional nature, and also because it involves personal and subjective judgment for many attributes. An environmental or social impact can be either beneficial or adverse and is assessed by comparing the quality of the existing environment (Baseline) with the predicted quality of the environment once the project is in place.

The specific purpose of this section is to;

- Identify and assess the range of potential impacts and extent of their severity;
- Explain the ways in which the project might affect the baseline setting;
- Suggest viable mitigation measures for the identified impacts.

Screening of Impacts: The E&S[2] and IRS[3]screening checklist suggested that environmental and social impacts of project are minor to moderate and temporary and can be mitigated and managed with prevailing civil construction measures.

The environmental and social safeguards screening checklist depicts that:

- No land requires for wastewater treatment plant and disposal station
- No settlements to be relocated
- No damage of agriculture land or standing crops
- Cutting of 20 small trees and plants will be involved
- Sub project will be of least hindrance in the movement of households of residential units and transport during its construction phase. Anyhow laying of new and replacement of existing sewerage lines may have temporary impacts in the mobility of the local communities.
- Sub project will generate loose earth material during excavation, however, it will be reused or disposed of on daily basis.
- There may be noise generation and exhaust emissions during boring and material transport which will be mitigated by using new and well-tuned machinery by the contractor.
- Safety issues may arise during movement of construction vehicles which will be mitigated.
- Excavation may cause accidents particularly for children and elderly. Special attention will be given to remove irrelevant persons away from sub-project site and install barricade and safety/ caution sign boards for the safety of local community.

[2] Environment and Social Screening Checklist
[3] Involuntary Resettlement Screening Checklist

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- Mismanagement of construction activities / materials & equipment may impact inhabitants along the sub-project.
- The sub -project does not fall in any protected area, such as wildlife sanctuary, game reserve, or national park.
- Smell and odor will be nuisance for the local communities at operation phase of wastewater treatment plant
-

As per ESMF of PCP, Environment and Social Screening and Involuntary Resettlement Screening Checklists were used to screen the potential environmental and social impacts and to categorize the project which is categorized as E-1, S-2. For sewerage system and new construction of wastewater treatment plant, ESIA is prepared, aaccording to Punjab Environment Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment, Schedule (II)F (3) ,2022 i.e., F (3) Combined wastewater treatment plants with treatment capacity greater than 100m3/hour.

Environmental and Social Mitigation Measures

The specific mitigation measures for each of the anticipated environmental and social impacts that may emerge at planning, construction and operation phase, have been considered. These mitigation measures are proposed to significantly reduce the identified potential environmental and social impacts associated with sub-project activities. Proposed mitigation measures include but not limited to the use of PPEs by labor, water spraying for dust control, limiting noise activities during day hours, fencing of construction area, environment quality monitoring during construction and at operation phase, plantation and safety measures for prevention of COVID-19.For handling of odor and smell at operation phase of wastewater treatment plant, floating wetlands are introduced in the facultative ponds for bioremediation which will further reduce the BOD enhance the aesthetic beauty of the overall environmental conditions of the area.

Environment & Social Management & Monitoring Plan:

This ESIA report presents the project's site-specific baseline data, identification, assessment and evaluation of project impacts and preparation of environmental and social management and monitoring plan for mitigation of adverse impacts that may arise due to the proposed project interventions.

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Stakeholder Consultations:

Stakeholder consultations were carried out during preparation of EMMP. Meetings were held with MC Jhang Officials (CO, MOI, MOP, Sub-Engineers) political elites and local communities and key environmental and social issues were discussed. All the respondents were in favor of improvement of sewerage network and construction of WWTP in the larger interest of the public.

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CHAPTER 1

INTRODUCTION

1.1 GENERAL

Jhang city is situated on the left bank of the river Chenab at a distance of about 11 Kilometres from its bed and the entire inhabited areas of Jhang district had population of 2,743,416 persons in the year 2017, that generates wastewater which is discharged directly into the fertile land without any treatment and is substantially the biggest pollution source. In view of that sanario, Government of the Punjab (GoPb) through PMDFC a project has launched to install wastewater treatment plants for Jhang City. Punjab municipal Development Fund Company (PMDFC) has engaged MM Pakistan (Pvt.) Limited to provide Consultancy Services for the preparation of design of the proposed improvement of sewerage system and construction of WWTP while ESIA is developed by the ESM team of PMDFC. The Sub-project has a number of financial, social, economic and environmental benefits, including institutional development, rehabilitation and improvement of municipal services, capital investments, better quality of life and employment generation. In addition, a large number of secondary benefits are also likely to accrue in the medium to long term such as institutional reforms at the local level.

1.2 Environment and Social Screening

The current project requires an Environment and Social Impact Assessment Report for its environmental approval under section 12 of the PEPA Act 1997 (amended 2012 & 2017). Environmental Impact Assessment (ESIA) is a systematic identification and evaluation of potential impacts of proposed projects, plans, programs or legislative actions relative to the physical, chemical, biological, cultural and socio-economic components of the environment followed by mitigation measures in the form of Environmental and Social Management and Monitoring Plan (ESMMP) to ascertain the EPA Punjab requirements.

As per the Environmental and Social Framework (ESMF) of PCP, the sub-projects are categorized in E1, E2 and E3 category and S1, S2 and S3 category based on the magnitude and severity of the environmental and social impacts of the sub-project. This project is categorized as E-1 and S-2. Environmental & Social Screening Checklist and Involuntary Resettlement Checklists for all 05 major components of the subproject are attached as Annexure A.

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1.3 PURPOSE OF THE REPORT

The main purpose of the ESIA report is:

- To identify the environmental issues pertaining to the operational site
- To evaluate the ability of the site in view of social acceptance and environmental soundness
- To provide the maximum information to the proponent and other stakeholders about the existing environmental conditions and the implications of the operational project
- To collect available data, reports, drawings and other relevant information about area of operational project
- To review the applicable Punjab Environmental Quality Standards (PEQS)
- To propose mitigation measures in order to eliminate or to reduce the negative impacts to an acceptable level
- To develop well-resourced environmental and social management and monitoring plan (ESMMP) including site-specific environmental and social mitigation plan
- To prepare and submit an ESIA report to Environmental Protection Agency, Punjab for Environmental Approval.

1.4 IDENTIFICATION OF PROJECT AND PROPONENT

1.4.1 Description of the Project:

Jhang is located in central part of Punjab Province. The increased population and improved socio-economic conditions have exerted immense pressure on city sewerage system. As a result of it, a part of system is outlived and its capacity has decreased due to additional built-up area and with little capacity available in sewer for which it was designed. As a result, sewer chocking causing unhygienic conditions are evident in the city. In addition, existing situation of Jhang sewerage system is far below the acceptable standards. During last 30 years, the city has grown considerably but necessary extensions to sewerage system have not been followed.

In view of the above-mentioned issues, a new sewerage system after integration with existing sewerage system has been proposed in existing MC area as well as in unserved areas. The Project Area under this project has been divided into 2 Zones (Zone 1&3) depending upon the topography of the area. The Zone 2 is not included in Project Area, as PHED is presently working in this Zone and as per guidelines of the Client (PMDFC) for not considering this Zone. Only Zone-1 and Zone-3 have been considered for this Project. The new system has been proposed as the existing sewerage

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system has laid more than 30 years ago and needs its improvement and provision of trunk sewer according to geographic conditions and elimination of disposal station who have no ultimate disposal The under capacity and over lived system proposed to be replaced For these zones sewerage system has been proposed considering the land use (residential, commercial and industrial) The proposed sewerage system comprises of sewage collection (sewage network) disposal and its treatment The collection system will consist of trunk sewers, submain and lateral sewers The sewage generated will be disposed of into proposed Disposal station from where sullage carrier will convey the wastewater into wastewater treatment plant

1.5 DETAILS OF CONSULTANT

The details of the Consultants are provided below:

Punjab Municipal Development Fund Company (PMDFC)

1.6 NATURE, SIZE AND LOCATION OF THE PROJECT

The proposed sub-project involves rehabilitation of existing and laying off new sewerage network, construction of disposal station (02 acre) in Chak Ghumnana tehsil and dsitrcit Jhang and construction of WWTP in Chak Ghumnana (96.04 acre) and Chak No.505/506 (1.41 acre) in tehsil and district Jhang.

Table 1: Size, Nature and Location of Project

Components	Details
Name of the Project	Improvement of Sewerage System in Jhang City ar Construction of Waste Water Treatment Plant (WWTP)
Scope of Work	Project involves Improvement of Sewerage System in Jhang C and Construction of Waste Water Treatment Plant (WWTP) zone 1 & 3 at the periphery of MC Jhang.
Location	Zone 1 Main areas included in this zone are Lalazar Colony, Satell Town, Behari Colony, Mohallah Peer Pathan, Mohalalh Iqb Nagar, Ghazi Abad along with main Toba Taik Singh road a

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Components	Details
	adjoining areas and in some part of Zone-3 around Toba Road Zone 3 Toba Bypass Road near Chack 506/ Jhok Abbas Shrif, Jhang
Nature & importance of the Project	The proposed Sub-project involves improvement of sewerage network, construction of disposal station (02 acre) in Chak Ghumnana tehsil and district Jhang and construction of WWTP in Chak Ghumnana (96.04 acre) and Chak No.505/506 (1.41 acre) in tehsil and district Jhang.
Type & Category	The sub project is categorized as E-1, S-2. EIA/ ESIA is prepared, aaccording to PEPA Review of Initial Environmental Examination and Environmental Impact Assessment, Schedule (II) F (3),2022.
Total Area	Sewerage Network 13.33 km Disposal Station 2 Acres Open Drain 3km WWTP 97 Acres
Cost of the project	2535.150 million/- PKR
ESIA Implementation cost	8 million/-PKR
Project Duration	2 years approx.
Major Work Activities	Improvement of Sewerage system and construction of Waste Water Treatment Plant: 1. **Rehabilitation of Existing Sewerage System Part I A** (Missing Sewers and replacement, Desilting of Sewe lines, manhole covers, pumping machinery replacement 2. **Rehabilitation of existing Sewerage System Part I E**

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Components	Details
	(Desilting, replacement of disposal stations machinery and pumping machinery) 3. **Sewer Network** of unserved areas 4. **Construction of Disposal Station and rehabilitation of 3km nullah** from disposal station to WWTP **Construction of Waste Water Treatment Plant** (One Sullage channel, One Screening Chamber, 04 Anaerobic ponds, 04 facultative ponds, 4 sludge drying beds, one treated water pond, administrative block including site lab facility, floating plants covering the 20% of facultative ponds and one effluent water course from WWTP to the nearest water body)
Sponsoring	Government of the Punjab (through World Bank funding)
Executing Agency & Project Proponent	MC Jhang
Monitoring Agency	Punjab Municipal Development Fund Company (PMDFC) through engagement of consultants

1.7 Study Approach & Methodology

1.7.1 Study Approach

The study has been conducted in accordance with National Regulatory framework and Environmental & Social Management Framework (ESMF) under Punjab Cities Program (World Bank funded program). The study is based on both primary and secondary data and information. Discussions were held with stakeholders including Government officials and community representatives. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

1.7.2 Methodology

Orientation

Meetings and discussions were held among the executing & implementing Agency. This activity was aimed at achieving a common ground of understanding various issues related to the project.

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Planning for Data Collection

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 consultant. The plan included identification of specific data requirements and their sources, determined time schedules and responsibilities for their collection, and indicated the logistics and other supporting needs for the execution of the data acquisition plan.

Data Collection

In this step, primary and secondary data were collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic environmental conditions. The following activities were undertaken to gather the required data:

Environment and Social Screening
Site Reconnaissance
Analysis of Maps and Plans
Literature Review
Desk Research
Public Consultations
Field Observations & Studies
Stakeholders Consultation
Laboratory Analysis

Physical Environment

Information was gathered on the existing physical environment, particularly as related to geology, topography, soils, hydrology and drainage, water quality, air quality and noise

Geology, Topography, Soils

A review was conducted of relevant literature on the geology, topography and soils in the project area.

Air Quality

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed construction on air quality conditions

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Ambient air quality was monitored for Carbon Monoxide (CO), Sulfur Dioxide(SO2), Nitrogen Dioxide (NO2), Particulate Matter (PM10) and other parameters mentioned in PEQS

Noise

Noise level readings were taken for 24 hours and hourly average data was reported.

Water Quality

Water quality monitoring was conducted to determine the water quality situation prior to construction. It has been observed that the surface water and groundwater are the most important environmental variables to be affected in the project. The extent of surface water and groundwater contamination in the project area was assessed based on the test results of chemical and microbiological parameters for surface and ground water. Dissolved oxygen (DO), pH and conductivity measurements were taken in situ at all sampling stations. Laboratory analyses were performed according to SOPs based on recognized methods of ASTM, USEPA, or APHA.

Biological Environment

The status of the flora and fauna of the study area were determined by ecological survey, a review of literature relevant to the area, and an assessment of terrestrial environments

Flora

The vegetative communities were identified and classified into community types. Identification was carried out of dominant tree species, assessment of stage of growth (mature or sapling) and assessment of canopy cover.

Fauna

Information on fauna was gathered from existing literature on reported species as well as observations in the field.

Socio-Cultural Environment

The consultants utilized a combination of desk research, field investigations, census data, structured interviews and reports to generate the data required for description of the existing social environment and assessment of the potential impacts of the construction of the proposed project.

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Identification and Evaluation of Environmental Impacts

The impacts of the project on the physical, biological and socio-economic environment at the design, construction and operational phases were identified and evaluated based on their type and magnitude.

Mitigation Measures and Implementation Arrangements

Adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate them beforehand in the design phase.

1.8. Report Organization

The Environment and Social Impact Assessment (ESIA) report has been organized in 8 chapters.

Chapter 1:

Introduction

Describes the introduction and purpose of this report

Chapter 2: Policy, Legal and Administrative Framework

Description of the national & provincial legislation, regulations and policies those are relevant to project activities and initial environmental examination process.

Chapter 3: Description of Project

This chapter includes the project description, raw materials details and utility requirements.

Chapter 4: Description of Environment

This chapter describes the present environmental settings and socioeconomic value of the project area and surroundings.

Chapter 5: Potential Environmental Impacts and Mitigation Measures

Deals with the identification of potential environmental and social impacts of project for preparation of environmental management and monitoring plan.

Chapter 6: Environmental and Social Management and Monitoring Plan

Deals with the implementation of mitigation measures and monitoring of environmental parameters against likely environmental impacts.

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Chapter 7: Stakeholder Consultation and Capacity Building Program

Deals with the consultations held during surveys. Grievance Redress Mechanism (GRM) description.

Chapter 8: Grievance Redress Mechanism

GRM and its different tiers.

Chapter 9: Conclusion

The conclusion of Initial Environmental Examination report.

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Chapter-2

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This section provides an overview of the policy framework and national legislation that applies to the proposed project. The project is expected to comply with all national/provincial legislation regulations, EPA guidelines, World Bank Operational Policies and guidelines which are relevant and applicable to the sub-project.

2.1. National Policy and Legal Framework

The Climate Change Division is the responsible authority for environmental protection policy making in Pakistan.

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed project are pollution prevention and abatement, restoration of rangelands, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

Prior to the adoption of the 18th Constitutional Amendment, the Pakistan Environmental Protection Act (PEPA) 1997 was the governing law for environmental conservation in the country. Under PEPA 1997 the Pakistan Environmental Protection Council (PEPC) and Pak EPA were primarily responsible for administering PEPA 1997. 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.

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2.2. Regulations for Environmental Assessment, Punjab EPA

Under Section 12 (and subsequent amendment in 2012 and then 2017) of the PEPA (1997), a project falling under any category specified in Schedule I of the IEE/EIA Regulations 2022 requires the proponent of the project to file an IEE with the concerned provincial EPA while projects falling under any category specified in Schedule II require the proponent to file an EIA with the provincial agency, which is responsible for its review and accordance of approval or request any additional information deemed necessary. As this subproject under Punjab Cities Program is funded by World Bank, so in compliance of the WB policies and ESMF of PCP, EIA report has mandatory part of social impact assessment social management plan in the ESMMP and vice versa and termed as Environment and Social Impact Assessment (ESIA) report.

2.3. Regulatory Clearances, Punjab EPA

In accordance with provincial regulatory requirements, an IEE/EIA satisfying the requirements of the Punjab Environmental Protection Act (amended 2012&2017) will be marked cleared by Punjab-EPA and No Objection Certificate (NOC) will be issued for it.

2.4. Guidelines for Environmental Assessment, Pakistan EPA

The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the proposed project are listed below:

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan, EPA 1997;
- Guidelines for Public Consultations; Pakistan EPA May 1997

These guidelines have been adopted by the Punjab Environment Protection Agency after 18th amendment.

2.5. Punjab Environmental Quality Standards (PEQS), 2016

The Punjab Environmental Quality Standards (PEQS), 2016 specify the following standards:

1. Water Quality Analysis Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers);

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2. Air Quality Analysis Maximum allowable concentration of pollutants in gaseous emissions from industrial sources;
3. Noise Quality Analysis

These standards apply to the gaseous emissions and liquid effluents discharged by batching plants, campsites and construction machinery. The standards for vehicles will apply during the construction as well as operation phase of the project. The Air, Noise and Water Quality Analysis is attached as **Annexure D, E, F** respectively.

2.6. Other Environment Related Legislations

Table 2: National and Provincial Legislative Framework

Sr. No.	Act	Description	Applicability to sub-project
1.	**Punjab Environment Protection Act, 1997 (as amended upto 2017)**	The Act establishes the Environmental Protection Agency that deals with the preparation of national environmental policies, prepare & publish national environment report, ensure the enforcement of National Environmental Quality Standards, establishment of ambient air, water and land quality standards, measures to control environmental pollution. Additionally, under this Act, no proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or, where the project is likely to cause an adverse environmental	Section 11,12,13 and 14 of PEPA, 2012 will be applicable throughout the length of project and during operation phase of WWTP.

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		effect, an Environmental Impact Assessment (EIA/ESIA), and has obtained from the approval in respect thereof.	
2.	**Punjab Environment Protection Review of IEE/EIA Regulations 2022**	Provided that the proponent shall file an environmental impact assessment, if the project is likely to cause an adverse environmental impact	• Schedule II- F(3) i applicable under whic this EIA(ESIA) report i developed. As this subproject unde Punjab Cities Program i funded by World Bank so in compliance of th WB policies and ESMI of PCP, EIA report ha mandatory part of socia impact assessmer social management pla in the ESMMP and vic versa and termed a Environment and Socia Impact Assessmer (ESIA) report
2.	Pakistan Penal Code, 1860	The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.	The provisions of the Pena Code, 1860 are applicabl to the project in terms o penalties for effecting human lives and publi property. It also addresses the control of noise, ai emissions and effluen disposal.
3.	Motor Vehicle Rules 1969	It defines powers and	This act is applicable to the

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		responsibilities of Motor Vehicle Examiners (MVEs) The establishment of MVE inspection system is one of the regulatory measures that can be taken to tackle the ambient air quality problems associated with the vehicular emissions during operation phase.	gaseous emission that will be released from the vehicles in operation phase at machinery used during construction phase of this subproject
4.	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".	This act will not be triggerd as no land acquisition is required.
5.	The Punjab Land Acquisition Rules, 1983,	It describes the land acquisition procedure for public purposes or for a company.	This act will not be triggerd as no land acquisition is required.
6.	Pakistan Antiquities Act 1975 and 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 Antiquities Act, 1975 (amended in 1990) states the following: • "Ancient" is any object that is at least 75 years old; • All accidental discoveries of artifacts must be reported to the Federal Department of	The law will be applicable to the project due to its provision that if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed sub-project. Chance Find Procedures are given as Annexure K

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		Archaeology; • The Government is the owner of all buried antiquities discovered on any site, whether protected or otherwise; • All new construction within a distance of 200 feet from protected antiquities is forbidden; • No changes or repairs can be made to a protected monument, even if it is owned privately, without approval of the responsible authorities; and The cultural heritage laws of Pakistan are uniformly applicable to all categories of sites regardless of their state of preservation and classification as monuments of national or world heritage.	
7.	Punjab Restriction of 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	The relevance of this act to the project will be to prohibit child employment for construction of the proposed sub- project activities and it will be applicable throughout the construction activities related to subproject.

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		and 50,000 rupees.	
	The Punjab Occupational Safety and Health Act, 2019	The Punjab Occupational Safety and Health Act, 2019 (IV of 2019) An Act to provide for occupational safety and health at workplace. It is necessary to make and consolidate the law for the occupational safety and health of the persons at workplace and to protect them against risks arising out of the occupational hazards; to promote safe and healthy working environment catering to the physiological and psychological needs of the employees at workplace and to provide for matters connected therewith or ancillary thereto.	The Punjab Occupational Safety and Health Act, 2019 relevant sections to the proposed projects are: 8. Safety and Health, 10. Consultation 13. Notification and investigation of accidents, dangerous occurrences and occupational illness. Adopting this act, PMDFC has developed SOPs for health and safety of the labor and communities which will be applicable in this subproject.

2.7. INTERNATIONAL LAWS/TREATIES

Table 3: INTERNATIONAL LAWS/TREATIES

	The Convention on Conservation of Migratory Species of Wild Animals, (1981)	The Convention requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or cooperate with other countries in matters of research on migratory species. There are no endangered species of plant life or animal life in the vicinity of

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	the Project.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	The convention requires Pakistan to impose strict regulation (including penalization, confiscation of the specimen) regarding trade of all species threatened with extinction or that may become so, in order not to endanger their survival further.
International Union for Conservation of Nature and Natural Resources Red List (2000)	It lists sensitive ecological resources that are experiencing various levels of threats internationally.
Ramsar Convention on Wetlands of International Importance 1971	The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention is an international treaty for the conservation and sustainable utilization of wetlands. It is the only global environmental treaty that deals with a particular ecosystem.
Millennium Development Goals (MDGs)	The Millennium Development Goals (MDGs) were adopted in the General Assembly of the United Nations in the year 2000 by all the countries of world and the world's leading developmental institutions. The MGDs are as follows: Eradicate Extreme Hunger and Poverty Achieve Universal Primary Education Promote Gender Equality and Empower Women Reduce Child Mortality Improve Maternal Health Combat HIV/AIDS Malaria and Other Diseases Ensure Environmental Sustainability Develop A Global Partnership for Development
Basel Convention	The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal is an international treaty that was designed to reduce the

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		movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to Less Developed Countries (LDCs) It does not, however, address the movement of radioactive waste The Convention is also intended to minimize the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist 7LDCs in environmentally sound management of the hazardous and other wastes they generate.

2.7.1. The World Bank Operational Policies

The World Bank (WB) has approved a series of Operational Policies which define the conduct of WB operations. A summary of the status of those Operational Policies which relate to environmental and social impacts are provided in the following sections.

Table 4: Assessment of Applicable World Bank Operational Policies

Safeguard Policies	Triggered?	Explanation
Environmental Assessment OP/4.01	Yes	This sub-project has been categorized as 'Category B'. The sub-project activities may potentially cause negative environmental and social impacts. The sub-project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented.
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
Involuntary Resettlement OP/4.12	No	OP 4.12 is not triggered as the sub-project does not require any land acquisition, therefore there be no involuntary resettlement, livelihood impacts. Consequently, there is no need of a Resettlement Action Plan. If this situation changes, the PMDFC will take

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		immediate steps to prepare a RAP.

2.7.2. World Bank Environmental, Health and Social Guidelines

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

- Environment, Health, and Safety (EHS) Guidelines prepared by International Finance Corporation and World Bank in 2007
- Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues.
- Social Analysis Sourcebook
- WB Committee on disability-inclusive development
- WB guidelines on labour influx
- WB Group Gender Strategy

Table 5: World Bank Policy Core Principles and Applicability on Sub-project

Core Principles	Applicability
Core Principle 1 Environmental and social management procedures and processes are designed to (a) avoid, minimize, or mitigate against adverse impacts; (b) promote environmental and social sustainability in program design; and (c) promote informed decision making relating to a program's environmental and social effects.	Under the light of this Principle in order to mitigate negative impacts envisaged in this Sub-project. ESMMP implementation and monitoring arrangements is developed.

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Core Principle 2 Environmental and social management procedures and processes are designed to avoid, minimize, and mitigate against adverse effects on natural habitats and physical cultural resources resulting from the program	ESMMP prepared to mitigate all minor impacts anticipated during the course of the Sub-project.
Core Principle 3 Program procedures ensure adequate measures to protect public and worker safety against the potential risks associated with (a) construction and/or operations of facilities or other operational practices developed or promoted under the Program and (b) exposure to toxic chemicals, hazardous wastes, and otherwise dangerous materials	All the mitigation measures have been incorporated in the ESMMP to address risks associated with workers and community health and safety. Contractor will ensure compliance with these attributes.
Core Principle 4 Land acquisition and loss of access to natural resources are managed in a way that avoids or minimizes displacement, and affected people are assisted in improving, or at least restoring, their livelihoods and living standards	This core principle doesn't trigger in this Sub-project as no land acquisition is required during the improvement of sewerage network and construction of WWTP.
Core Principle 5	No indigenous/Vulnerable groups exists at the site proposed for improvement of sewerage system and construction of WWTP.
Core Principle 6 Avoid exacerbating social conflict, especially in fragile states, post-conflict areas, or areas subject to territorial disputes.	This principle doesn't trigger in this Sub-project.

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CHAPTER 3

PROJECT DESCRIPTION

This section of the report provides an overview of the rational of the project, brief description of the project, type and category, its objectives location, land use, vegetation features. cost and magnitude of operation and various phases followed by Environmental Approvals or an approach adapted to conduct Environmental Impact Assessment (EIA/ESIA) of Improvement of Sewerage System in Jhang City and Construction of Waste Water Treatment Plant (WWTP) zone in 1 & 3 at Jhang city. For planning horizon 2050, the sewerage system has been proposed in existing MC areas as well as in unserved areas and this will provide 100% coverage of sewerage facilities to the population up to the design horizon. The Project Area has been divided into 2 zones (Zone 1&3) depending upon the topography of the area, although in Site Layout plan. zone 2 is also indicated. However, as per guidelines of the Client (PMDFC) for not considering this zone as PHED is presently working on it, therefore, scope of work for Consultant is limited to only Zone 1&3. The new system has been proposed as the existing sewerage system is more than 30 years old and needs almost complete replacement due to numerous issues (under capacity sewers, old aged Sewerage network etc). For these zones, sewerage system has been proposed considering the landuse (residential, commercial and industrial). The proposed sewerage system comprises sewage collection (sewage network) disposal and its treatment. The collection system will consist of trunk sewers, submain and lateral sewers. The sewage generated will be disposed of into existing and proposed Disposal stations from where suilage carrier and force main will convey the wastewater into wastewater treatment plants (2 No.) one on north east and other on North west side.

3.1. Type and Category of Project

The proposal is to Improvement of Sewerage System in Jhang City and Construction of Waste Water Treatment Plant (WWTP) with total area for sewerage system of 13.33 Km, disposal station is in 2 acres, drain/nullah of 3Km and WWTP 97 acres in Jhang city for the easiness of operation and resultantly revenue generation.

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The current project requires an EIA/ESIA eport for its environmental approval under section 12 of the PEPA Act 1997 (amended 2012 & 2017). EIA/ESIA is a systematic identification and evaluation of potential impacts of proposed projects, plans, programs or legislative actions relative to the physical, chemical, biological, cultural and socio-economic components of the environment followed by mitigation measures in the form Environmental Management Plan to ascertain the EPA Punjab requirements:

As per the Environmental and Social Framework (ESMF) under PCP, the sub-projects are categorized in E1, E2 and E3 category and S1, S2 and S3 category based on the magnitude and severity of the environmental and social impacts of the sub-project.

This project is categorized as E-1 and S-2. Environmental & Social Screening Checklist and Involuntary Resettlement Checklists is attached as **Annexure A.** For new construction of disposal station and wastewater treatment plant, ESIA will be prepared, aaccording to Review of Initial Environmental Examination and Environmental Impact Assessment, Schedule (II)F (3),2022.

3.2. Objective of Project

The Sub-project comprises of the Replacement of old, outlived, damaged or worn-out components in existing infrastructure for; -

- The existing sewerage system was laid against the Topographic conditions of the city. Hence, as well as minor electric shutdown occurred the low-lying areas start overflowing. The resident of the areas suffering bad environmental conditions and difficult to move any side.
- To improve the service delivery by laying of trunk sewer according to topographic conditions. It will provide Improvement of service delivery level of the municipal services in the served areas of the city for provision of better basic urban services for improved livability of the citizen.
- The new system is proposed keeping in view to reduce in annual O&M cost of the infrastructure due to reduced repairs in the forthcoming years because of repair or replacement of infrastructure components.
- The major areas which are adjacent to main roads are without any proper sewerage are slugged drain system, resultantly, overflow occurred on main road and destroy the road infrastructure. The residents as well as the transport are suffering badly. The trunk sewer on these areas are proposed. A disposal station namely "Farooqabad disposal station" come in the thickly populated area and the outlet drain is passing in public land. The owner of the land has occupied their land and drain becomes in shape of pipe & not taking full flow. Keeping of

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the conditions the Municipal Committee Staff cannot operate the pumping capacity at desired conditions. The command area are overflowing. Municipal Committee has installed huge no. of dewatering sets at different locations. On one side, populated the environments and other side huge financial burden on Municipal Committee.

- On completion of scheme about to main disposal stations i.e Farooqabad and Khokaran along with 10 to 15 dewatering sets will be eliminated and sewage water flow by gravity. It will cause in reduction and prompt addressal of the public complaints regarding municipal service delivery.
- The major areas are without sewer along the planned route of trunk sewer which will be benefited with sewerage facility and environmental condition will be improved.
- To provide the wastewater treatment facility for reduction of BOD to bring the effluent within permissible limits of the PEQSs to be discharged into surface water body without harming the environment and the treated water can be used for irrigation purposes meeting the WHO and USEPA Guidelines.
- With the improvement of environmental standards, the growth potential and the local economy of the city will be improved. Hence, the objectives of the project are in line with the sector objectives

3.3. Sector Objectives

The sector objectives include:

1) Provision of efficient and effective municipality services to the masses.
2) Improvement of existing sewerage system in Jhang City
3) To improve existing environmental conditions by provision of wastewater treatment facilities in Jhang City.

3.4. Location and Site layout of the Project

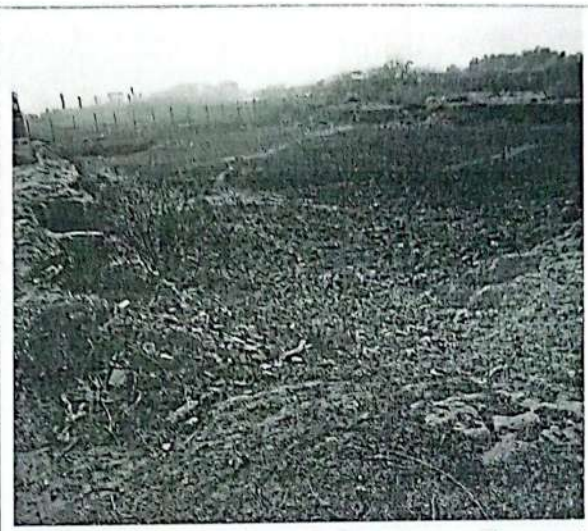
Location:

The proposed improvement of sewerage system and construction of WWTP project is located at the periphery of MC Jhang, main areas included in the zone1 are Lalazar Colony, Satellite Town, Behari Colony, Mohallah Peer Pathan, Mohalalh Iqbal Nagar, Ghazi Abad along with main Toba Taik Singh road and adjoining areas and Toba Bypass Road near Chack 506/ Jhok Abbas Shrif, Jhang

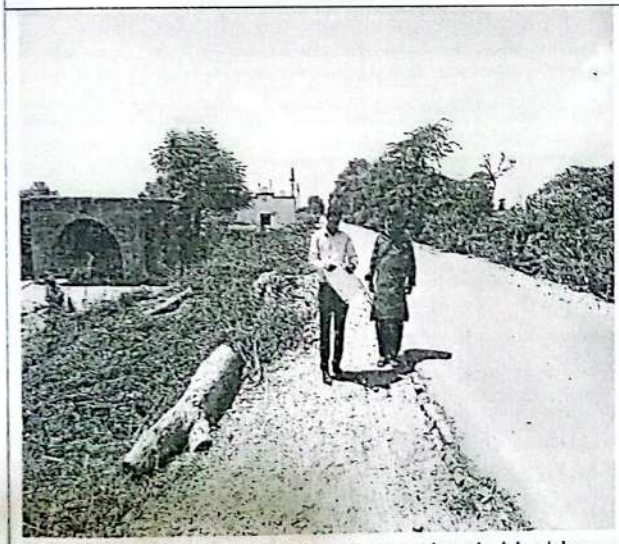
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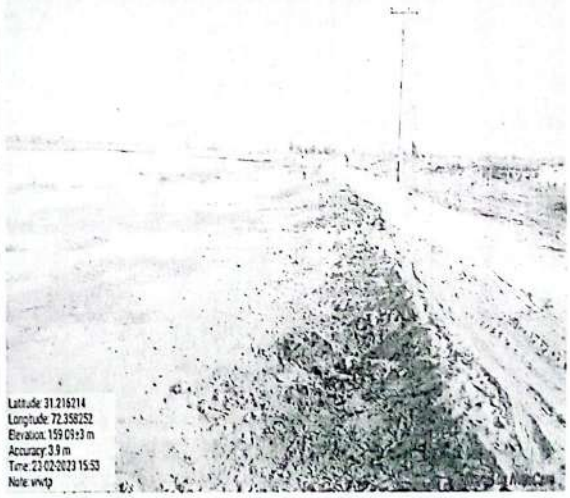
ROW for pipe line along Gojra Road Jhang



site for Construction of Sewerage Disposal Station at Chah Pindianwala,Jhang



ROW for Sewerage Line near chack khokhran disposal station, jhang



WWTP Proposed Site at Toba Bypass road Near Jhok Abbas Shreef

Figure 1:Present Condition of Sewerage Network, Disposal and WWTP

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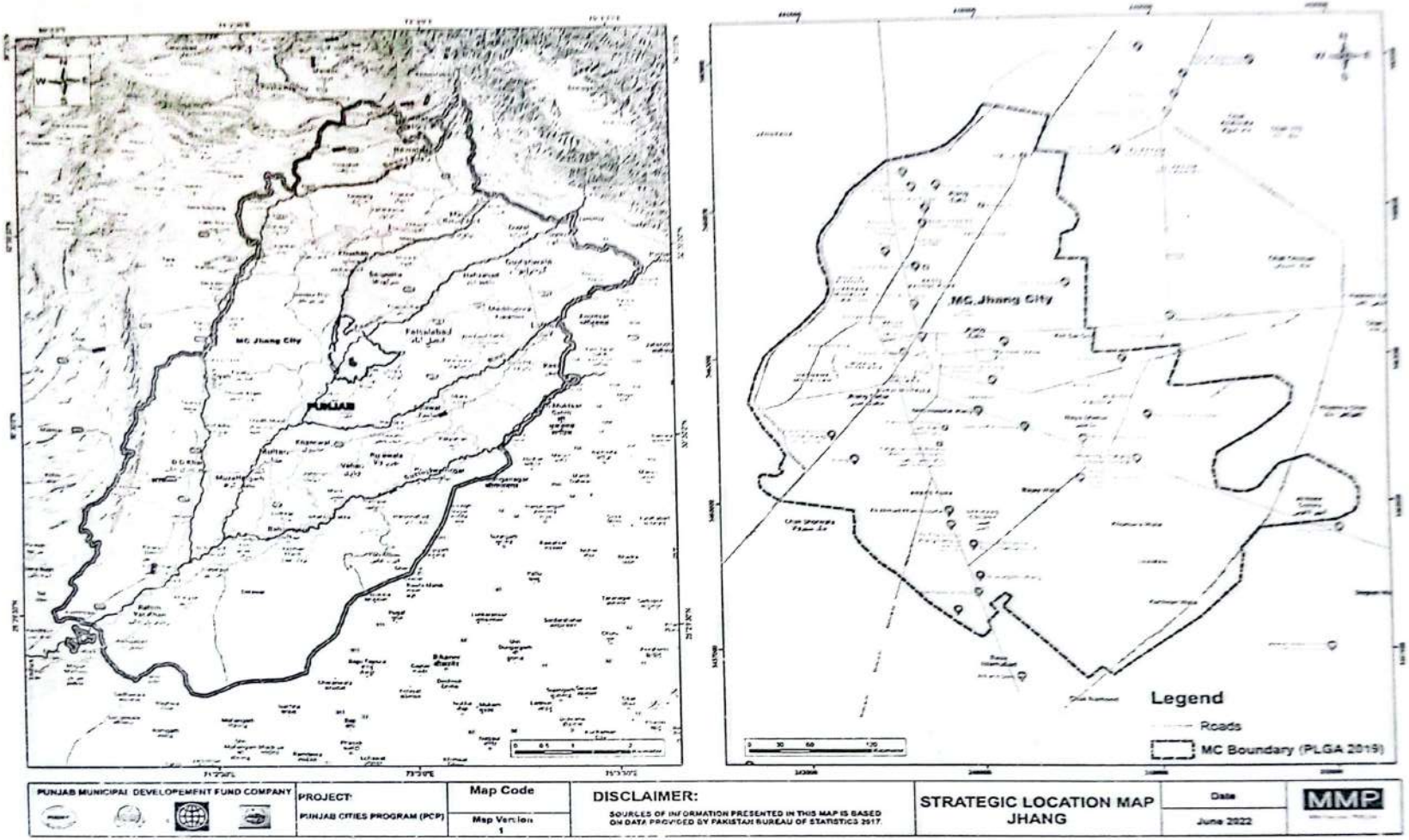


Figure 2:Site Layout plan for Sewerage System and WWTP

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3.5. OBJECTIVES OF EIA/ESIA REPORT

The predominant objectives of this EIA/ESIA report are:

- To assess and report the prevailing environmental conditions of the project area.
- To develop a baseline in order to evaluate the suitability of the project in particular area.
- To recognize activities during pre-construction, construction and operational phases and associated impacts.
- To assist the proponent for planning, designing and implementation of the project, keeping in view the elimination or minimization of negative impacts.
- To develop proper mitigation as well as monitoring plans for the uniform implementation.
- To provide opportunity for the public for a better understanding of the project as well as its impacts on community and environment in context of sustainable development.
- To prepare an EIA/ESIA report for the submission to Environmental Protection Agency, Punjab for Environmental Approval.

3.6. PROJECT ALTERNATIVES

Alternatives can be defined as different means of meeting the general requirements of the activity, which may include:

- ✓ The property on which or location where it is proposed to undertake the activity.
- ✓ The type of activity to be undertaken.
- ✓ The design or layout of the activity.
- ✓ The technology to be used in the activity.
- ✓ The operational aspects of the activity

The purpose of alternatives is to select the best option amongst all available options for sustainability of the project. It is mandatory to suggest alternatives that are most suitable through site visits, analysis, road access, basic infrastructure or by considering public interest during formulation of EIA/ESIA report. Hence, during Project preparation, various alternatives were proposed, screened, and studied against technical, economic, social, and environmental criteria. The primary objective is to identify and adopt options with the least adverse environmental and social impacts followed by maximum environmental benefits.

The improvement sewerage network and construction of WWTP project is a open straight land. The main consideration for the selection of site for the development of a project was availability

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of suitable land with minor environmental and social ramifications. The present site belong t MC Jhang hence, no land acquisition is required; no dismantling of any public structures; and n direct impact to any socially or environmentally sensitive receptors; Based on this environmenta and social assessment, it is established that the project will cause minor to moderat environmental and low social manageable impacts. Consequent to this assessment alternative for the projects were not practical and the present site is best suited for the construction of th project. Therefore, the selected site is ideally suited for construction of the project and no othe site was considered. Similarly, the project will benefit the local community creating jo opportunities as well as it will solve long-standing issues of availability of public transport fo nearby cities.

Eligibility criteria for the implementation of wastewater treatment plants:

(a) Conflict-free land and should be owned by MCs or the provincial government and should be available at technically feasible location preferably near the discharge point/pumping stations o the drain.
(b) Simplest wastewater treatment technology with least operational cost should be selected after alternative analyses, for example, OPs or WSPs.
(c) EIA should be done as per the requirements of PEPA 2012, and accordingly, NOC should be obtained from PEPA before execution of project.
(d) Capacity of wastewater treatment of 50,000 m3/day has been established based on present and projected population of cities for the next 20 years, average water consumption per person per day, wastewater discharges per day, and pollution load of wastewater
(e) Effluent from wastewater treatment should comply with the PEQS established under PEPA 2012 and WHO guidelines for reuse.
This design criteria is established by WB in ESSA and technology selected for wastewater treatment plant in Jhnag is most suitable for meeting these requirements

Why Treatment of Wastewater is Important:
Treatment of wastewater is important for several reasons:

- **Environmental Protection:** Wastewater contains pollutants such as nutrients, organic matter, and pathogens that can have a detrimental hazardous effect on the environment if discharged untreated into water bodies. Treatment of wastewater removes pollutants

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from it, reduces the risk to ecological life, aquatic life and other living organisms that rely on water.

- **Public Health:** Wastewater may contain harmful bacteria, viruses, and other pathogens that can cause disease in humans. Proper treatment of wastewater before it is discharged into water bodies can reduce the risk of these pathogens entering the human food chain, and prevent the spread of waterborne diseases.
- **Water Conservation:** Wastewater can be treated and reused for non-potable purposes such as irrigation, industrial processes, urban gardening, landscaping and even toilet flushing. By treating wastewater, we can reduce the amount of freshwater required for these purposes, which helps to conserve our precious water resources.
- **Regulatory Compliance:** Pakistan has regulations in place that require the treatment of wastewater before it is discharged into water bodies. Compliance with these regulations is essential to avoid penalties, legal action, and damage to a company's reputation.

Technology Options for various methods of wastewater treatment were searched for feasibility, however, wastewater stabilization ponds were selected as the most suitable option for Jhang

What are Waste Stabilization Ponds:

Waste stabilization ponds, also known as oxidation ponds, are large shallow ponds used for the treatment of wastewater. They are designed to use natural processes, such as biological and physical interactions, to treat the wastewater and reduce its pollutants.

Waste stabilization ponds can be classified into three types based on their function and operation: anaerobic ponds, facultative ponds, and maturation ponds. Anaerobic ponds are designed to break down organic matter in the absence of oxygen, while facultative ponds use both aerobic and anaerobic processes to treat wastewater. Maturation ponds are the final step in the treatment process, designed to provide further treatment and disinfection of the wastewater before it is discharged.

Waste stabilization ponds have been used in many parts of the world as a low-cost and effective method of treating wastewater. They require less energy and maintenance than other treatment methods, such as activated sludge systems, and can be used in areas where there is limited access to electricity or other resources. However, they do require a large land area and are sensitive to climate conditions, such as temperature and rainfall.

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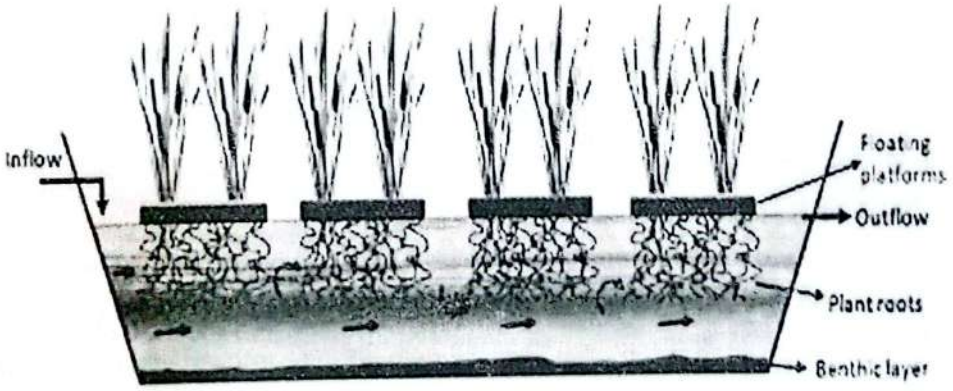
[4]Floating wetlands with wastewater stabilization ponds:

Floating wetlands combined with wastewater stabilization ponds are an innovative approach to wastewater treatment. The concept involves adding a layer of floating plants on top of a wastewater stabilization pond to enhance the removal of nutrients and other pollutants from the wastewater.

The floating wetlands act as a natural filter, removing pollutants through a combination of physical, chemical, and biological processes. The plants absorb nutrients such as nitrogen and phosphorus, which are commonly found in wastewater, and use them for growth. The roots of the plants also provide a habitat for beneficial microorganisms, which further break down pollutants.

Studies have shown that the addition of floating wetlands to wastewater stabilization ponds can significantly improve the treatment efficiency and reduce the amount of pollutants discharged into the environment. Additionally, the use of floating wetlands can enhance the aesthetic value of wastewater treatment facilities and provide habitat for wildlife

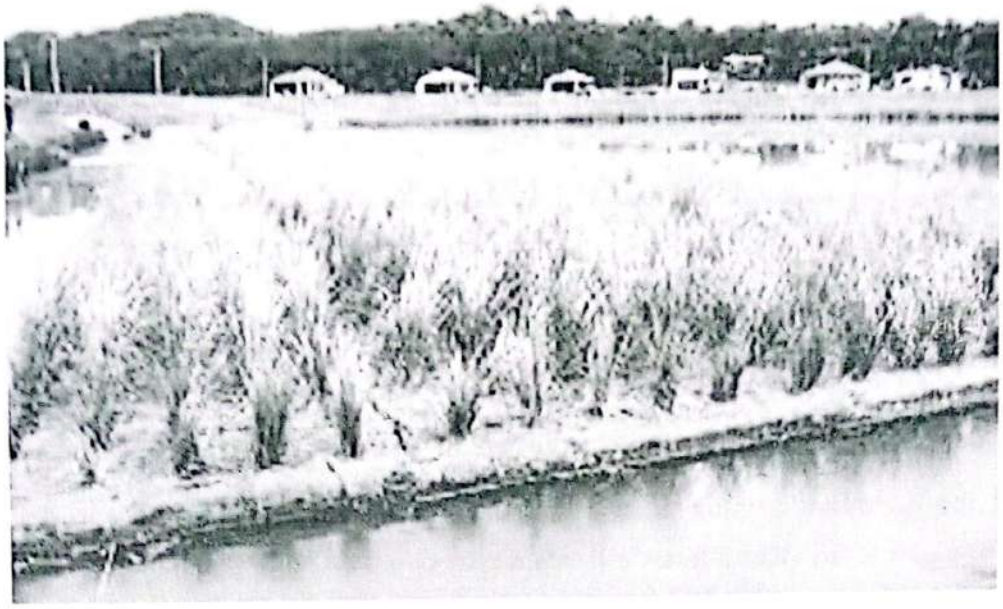
However, the effectiveness of floating wetlands is influenced by several factors, such as plant species, climate conditions, and the design of the system. Therefore, careful planning and monitoring are essential to ensure that the system is operating effectively and efficiently.



Systematic view of Floating Wetland

[4] Chen, Y., Chen, L., Zhang, Y., & Yang, Y. (2016). Floating treatment wetlands for wastewater treatment: A review. International Journal of Phytoremediation, 18(11), 1153-1166.
Vymazal, J., & Březinová, T. (2015). The use of constructed wetlands with floating macrophytes for wastewater treatment. Ecological Engineering, 81, 111-122.
USEPA. (2010). Floating Treatment Wetlands: A Technology Information Sheet. Retrieved from https://www.epa.gov/sites/production/files/2015-06/documents/floating-treatment-wetlands.pdf

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Pictorial view of floating wetlands with WSP

Important factors that can influence floating wetlands in WSP:

Several factors can influence the performance of floating wetlands in wastewater stabilization ponds (WSPs). These include:

- Plant species: The selection of plant species is crucial for the successful performance of floating wetlands in WSPs. Different plant species have different capacities for nutrient uptake and pollutant removal, and their growth and survival can be affected by the water quality parameters and climatic conditions of the WSP.
- Hydraulic loading rate (HLR): The HLR is the volume of wastewater that is applied to the WSP per unit area per day. The HLR can affect the growth and survival of the plants in the floating wetlands and the treatment efficiency of the system. A high HLR can lead to hydraulic overload and cause plant stress, while a low HLR may reduce the contact time between the wastewater and the plants.
- Water quality parameters: The water quality parameters of the WSP, such as pH, temperature, dissolved oxygen, and nutrient concentrations, can affect the growth and survival of the plants in the floating wetlands. For example, a low dissolved oxygen concentration can limit plant growth, while high nutrient concentrations can lead to excessive plant growth and biomass accumulation.
- Climate conditions: The climatic conditions of the WSP, such as temperature, rainfall, and wind, can affect the growth and survival of the plants in the floating wetlands.

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Extreme weather events, such as droughts or floods, can also affect the performance of the system.

- Design and operation: The design and operation of the floating wetlands in the WSP can affect their performance. The size, shape, and placement of the floating wetlands can affect the contact time between the wastewater and the plants, while the frequency and timing of maintenance activities can affect the growth and survival of the plants.

Proper consideration and management of these factors are essential to ensure the effective and efficient performance of floating wetlands in wastewater stabilization ponds.

[5]Best plant species for floating wetland in WSP:

The selection of plant species for floating wetlands in wastewater stabilization ponds (WSPs) depends on several factors, such as the local climate, the water quality parameters of the WSP, and the treatment goals. Some plant species that have been commonly used in floating wetlands in WSPs include:

Cattails (Typha spp.): Cattails are commonly used in floating wetlands due to their high capacity for nutrient uptake and their ability to tolerate fluctuating water levels.

Bulrushes (Scirpus spp.): Bulrushes are tolerant of varying water depths and can remove nutrients and metals from wastewater.

Water hyacinth (Eichhornia crassipes): Water hyacinth has a high growth rate and can remove nutrients such as nitrogen and phosphorus from wastewater. However, it is considered an invasive species in some regions.

Duckweed (Lemna spp.): Duckweed is a fast-growing floating plant that can remove nutrients and organic matter from wastewater.

Water lettuce (Pistia stratiotes): Water lettuce has a high capacity for nutrient uptake and can tolerate a wide range of water quality conditions.

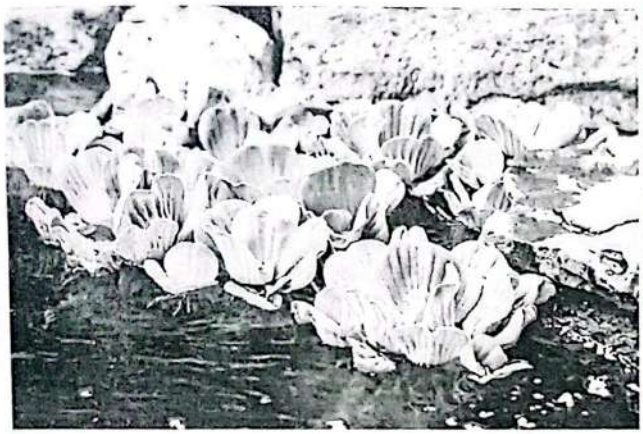
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[5] Souza, T. F., Gonçalves, J. R., & Duarte, E. M. (2017). Evaluation of floating macrophytes as an alternative to the wastewater treatment process. Journal of Environmental Science and Health, Part A, 52(2), 177-184.

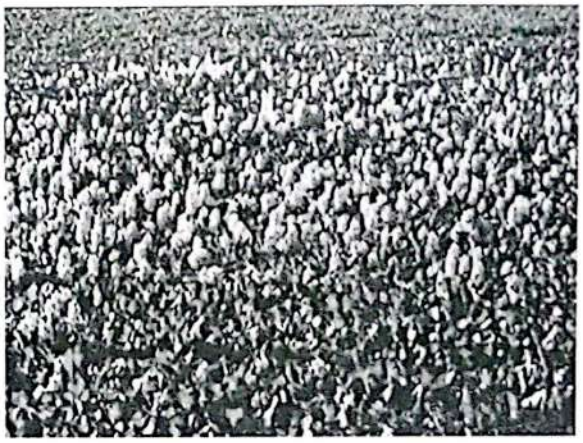
Zhang, Y., Chen, Y., & Chen, L. (2019). Nitrogen and phosphorus removal from simulated wastewater by floating treatment wetlands with water hyacinth and duckweed. Ecological Engineering, 134, 113-121.

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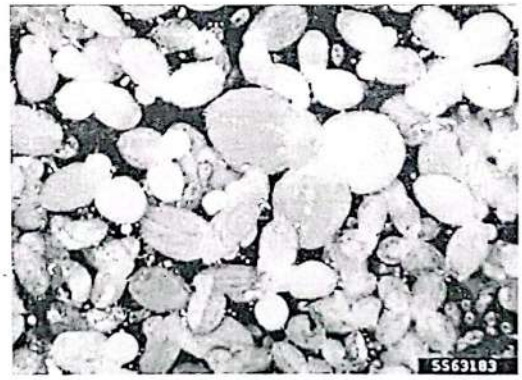
Several studies have evaluated the performance of different plant species in floating wetlands in WSPs. For example, a study conducted in Brazil found that the combination of cattails and bulrushes was effective in removing nutrients and improving the water quality of the WSP (Souza et al., 2017). Another study conducted in China found that the combination of water hyacinth and duckweed was effective in removing nutrients and organic matter from wastewater (Zhang et al., 2019).



Water lettuce (Pistia stratiotes)



Duckweed (Lemna spp.):



Water hyacinth (Eichhornia crassipes)

[6]Is Jhang (Pakistan) climate is supporting for floating wetlands in WSP:

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[6] Tariq, S., Hameed, A., & Mumtaz, R. (2017). Use of constructed wetlands for wastewater treatment in Lahore, Pakistan. Journal of Environmental Health Science and Engineering, 15(1), 1-8.

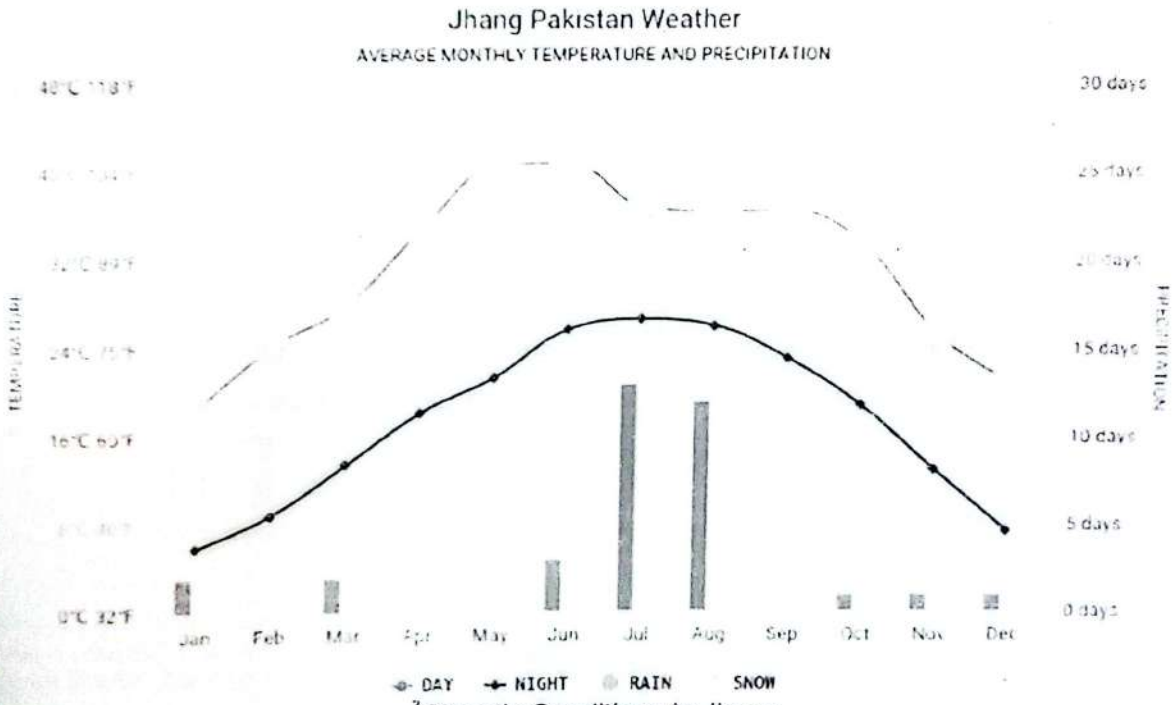
Murtaza, G., Ghafoor, A., Qadir, A., Hussain, A., & Saifullah, M. (2019). Evaluating the efficacy of floating wetlands for nutrient removal from wastewater in Karachi, Pakistan. Journal of Environmental Management, 241, 120-128.

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Jhang is located in the Punjab province of Pakistan and has a semi-arid climate with hot summers and relatively cool winters. The climatic conditions of Jhang can affect the performance of floating wetlands in wastewater stabilization ponds (WSPs).

While there are no specific studies on the performance of floating wetlands in WSPs in Jhang, several studies have evaluated the use of floating wetlands in other regions of Pakistan with similar climatic conditions. For example, a study conducted in Lahore, which is located in the same province as Jhang, found that the use of floating wetlands in WSPs was effective in improving the water quality of wastewater (Tariq et al., 2017). Another study conducted in Karachi, which has a similar climate to Jhang, found that floating wetlands were effective in removing nutrients and organic matter from wastewater (Murtaza et al., 2019).

Overall, the semi-arid climate of Jhang is suitable for the use of floating wetlands in WSPs. However, the performance of the system may be affected by other factors such as the water quality parameters of the WSP and the plant species used in the floating wetlands.



[7]Climatic Conditions in Jhang

[8]Successful stories of WSP with floating wetlands in Pakitan:

[7] http://hikersbay.com/climate/pakistan/jhangsadr?lang=en

There are several successful stories of wastewater stabilization ponds (WSPs) with floating wetlands in Pakistan, which have been effective in improving the water quality of wastewater. Here are some examples:

Naseerabad Wastewater Treatment Plant: The Naseerabad Wastewater Treatment Plant, located in the city of Multan, uses a combination of WSPs and floating wetlands to treat wastewater. The system has a treatment capacity of 12 million gallons per day and has been effective in removing organic matter, nitrogen, and phosphorus from wastewater. The treated wastewater is used for irrigation purposes in the surrounding agricultural fields (Pak-EPA, 2021).

Lahore Compost Private Limited: Lahore Compost Private Limited, located in Lahore, uses a WSP with floating wetlands to treat organic waste and wastewater from food processing industries. The system has a treatment capacity of 8,000 liters per day and has been effective in reducing the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) of the wastewater. The treated wastewater is used for irrigation purposes in the surrounding fields (Ali et al., 2020).

Potohar Region: A study conducted in the Potohar region of Pakistan found that the use of WSPs with floating wetlands was effective in removing nutrients and improving the water quality of wastewater. The system was able to achieve a removal efficiency of 70-80% for total suspended solids (TSS), 65-75% for biological oxygen demand (BOD), and 60-70% for total nitrogen (TN) (Shah et al., 2021).

These successful stories demonstrate the potential of WSPs with floating wetlands as an effective and sustainable solution for wastewater treatment in Pakistan.

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[8] Ali, H., Shabbir, I., & Rafique, U. (2020). Wastewater treatment by using constructed wetlands in Lahore Compost Private Limited. Journal of Environmental Science and Public Health, 4(3), 21-30.

Pak-EPA (2021) Naseerabad Wastewater Treatment Plant Retrieved from http://www.environment.gov.pk/clmu/images/stories/15_projects/15_Water/Water_Resources/15_1_Naseerabad_WWTP.pdf

Shah, F. A., Tahir, M. A., Naseem, M., & Azhar, N. (2021). Assessment of the performance of wastewater stabilization ponds with floating wetlands for municipal wastewater treatment in the Potohar region, Pakistan. Environmental Science and Pollution Research, 28(17), 21120-21132.

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[9]

Floating wetland in Faisalabad

What plants species in Floating wetland with WSP will be good in Jhang:

When selecting plant species for floating wetlands in wastewater stabilization ponds (WSPs) in Jhang, it is important to consider the local climate and water quality parameters of the WSP. Some plant species that may perform well in floating wetlands in Jhang include:

Water hyacinth (Eichhornia crassipes): Water hyacinth is a fast-growing plant that is effective in removing nutrients and organic matter from wastewater. It can tolerate high temperatures and low nutrient concentrations, which makes it suitable for use in floating wetlands in Jhang.

Duckweed (Lemna minor): Duckweed is a small floating plant that can tolerate a wide range of environmental conditions. It is effective in removing nutrients such as nitrogen and phosphorus from wastewater.

Cattails (Typha spp.): Cattails are a popular plant species for use in constructed wetlands and floating wetlands. They are effective in removing organic matter and nutrients from wastewater and can tolerate a range of environmental conditions.

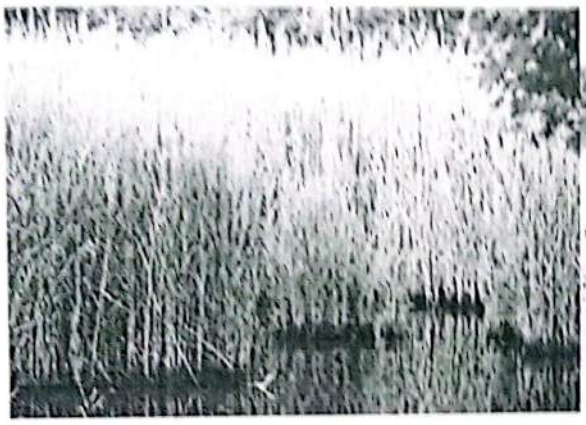
Bulrushes (Scirpus spp.): Bulrushes are a group of plants that are commonly found in wetlands. They are effective in removing nutrients and organic matter from wastewater and can tolerate a range of environmental conditions.

[9] https://members.sws.org/event-calendar/details/july-2021-webinar-floating-wetlands-in-pakistan-344275

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Reed (**Phragmites australis**): Reed is a tall, perennial plant that is commonly found in wetlands. It is effective in removing nutrients and organic matter from wastewater and can tolerate a range of environmental conditions.

These plant species have been used successfully in floating wetlands in wastewater treatment systems in various parts of the world, including Pakistan. However, it is important to conduct local trials to determine the most effective plant species for a specific WSP in Jhang.



Reed (Phragmites australis)



Bulrushes (Scirpus spp.)



Cattails (Typha spp.)

[10]Measures to make WSPs with Floating Wetlands more Aesthetical:

[10] Environmental Protection Agency (EPA). (2002). Constructed wetlands manual. Constructed wetlands for wastewater treatment. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi/2000LYOD.pdf?Dockey=2000LYOD.pdf
Miklasz, K. (2014). The importance of aesthetics in constructed wetland design. World Environmental and Water Resources Congress, 109-115.

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Wastewater stabilization ponds (WSPs) with floating wetlands can be designed to be aesthetically pleasing, while still providing effective treatment of wastewater. Here are some measures that can be taken to make WSPs with floating wetlands more aesthetically appealing.

Select attractive plant species: Choosing plant species that are visually appealing can enhance the aesthetic value of the floating wetland. Some plant species, such as lotus (Nelumbo nucifera) and water lilies (Nymphaea spp.), have attractive flowers and can provide shade and habitat for wildlife (EPA, 2002).

Add landscaping elements: Incorporating landscaping elements, such as rocks, boulders, and driftwood, can enhance the natural aesthetic of the floating wetland. These elements can also provide additional habitat for wildlife (Miklasz, 2014).

Use natural materials: Using natural materials, such as stones and wood, can help blend the floating wetland into the surrounding landscape. These materials can also provide a natural, rustic look that is visually appealing (EPA, 2002).

Incorporate lighting: Adding lighting can enhance the nighttime aesthetic value of the floating wetland. Lighting can also provide safety for visitors and wildlife (Miklasz, 2014).

Provide public access: Providing public access to the floating wetland can increase its aesthetic value by allowing visitors to experience its natural beauty. This can be achieved through the construction of boardwalks or viewing platforms (EPA, 2002).

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Turenscape wetland

'Other Conventional Technologies Options to treat wastewater:

n addition to wastewater stabilization ponds (WSPs) and constructed wetlands, there are everal other conventional technologies that can be used to treat wastewater, including:

Activated Sludge: Activated sludge is a biological treatment process in which nicroorganisms are used to break down organic matter in wastewater. It is commonly used in nunicipal wastewater treatment plants.

Advantages: High removal efficiency of organic matter, nutrients and pathogens; compact and efficient process; widely used and well understood technology.

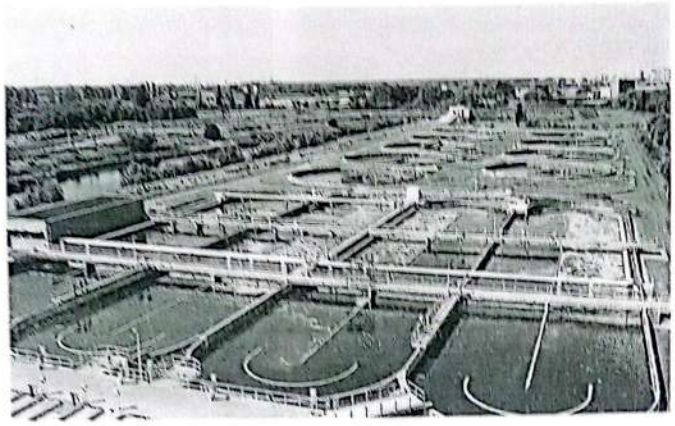
Disadvantages: Sensitive to variations in flow and composition of wastewater; requires significant energy and infrastructure; generation of large quantities of sludge.

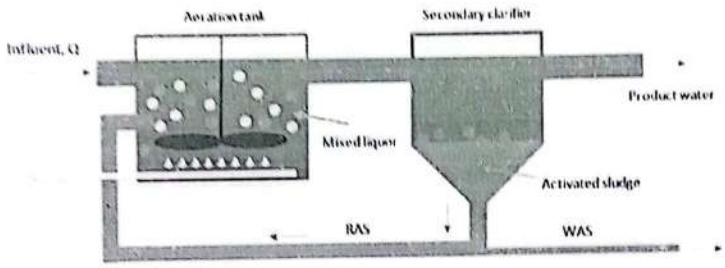
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[11] United States Environmental Protection Agency (2019). Wastewater treatment technologies. Retrieved from https://www.epa.gov/water-research/wastewater-treatment-technologies

Verlicchi, P., Al Aukidy, M., & Zambello, E. (2015). Wastewater treatment and energy efficiency: a review on sustainability challenges and opportunities. Resources, Conservation and Recycling, 105, 163-173

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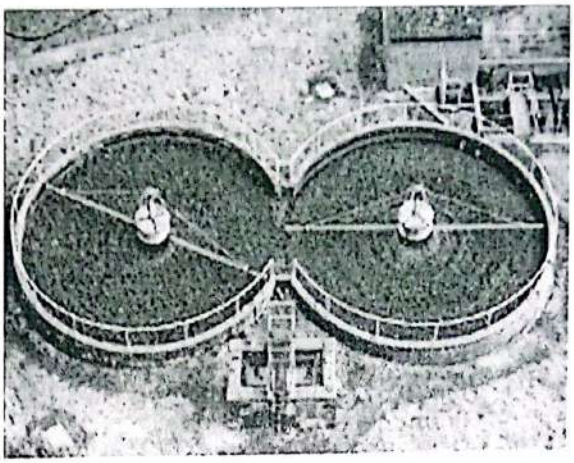
Trickling Filters: Trickling filters are a biological treatment process that use microorganisms attached to a medium to treat wastewater. Wastewater is distributed over a bed of rocks or other media and microorganisms in the media break down organic matter.

Advantages: Simple and robust technology; low energy consumption and infrastructure requirements; can be easily retrofitted into existing treatment systems.

Disadvantages: Limited removal efficiency of nutrients and pathogens; high maintenance requirements; limited ability to handle high peak flows.

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Rotating Biological Contactors: Rotating biological contactors are a type of trickling filter in which a series of rotating disks are used to provide a surface for microorganisms to grow on. Wastewater is sprayed onto the disks and the microorganisms break down organic matter.

Advantages: Efficient removal of organic matter and nutrients; low energy consumption and infrastructure requirements; compact and modular design.

Disadvantages: Sensitive to variations in flow and composition of wastewater; limited ability to handle high peak flows; limited removal efficiency of pathogens.

Membrane Bioreactors: Membrane bioreactors use a combination of biological treatment and membrane filtration to treat wastewater. Microorganisms in the wastewater break down organic matter, and a membrane is used to filter out solids and bacteria.

Advantages: High removal efficiency of organic matter, nutrients, and pathogens; small footprint and high flexibility; high-quality effluent suitable for reuse.

Disadvantages: High energy consumption and operating costs; prone to fouling and membrane damage; expensive initial capital costs.

Disinfection: Disinfection is a process that uses chemicals, such as chlorine or ultraviolet light, to kill pathogens in wastewater. Disinfection is often used as a final step in the treatment process to ensure that the wastewater is safe for discharge into the environment

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Advantages: Efficient removal of pathogens; widely used and well ... Jhang simple and easy to operate.

Disadvantages: Limited removal efficiency of organic matter and ... formation of disinfection byproducts; requires careful handling and safety ...

Each of these conventional technologies has its own advantages and disa... on the specific situation. The choice of technology will depend on factors such as the quality and quantity of the wastewater, the available land and resources, and the regulatory requirements for wastewater treatment in the area.

[12]Why Wastewater Stabilization Ponds with Floating wetland is best option in Jhang:

Overall, the use of floating wetlands with WSPs can be a cost-effective and environmentally sustainable option for treating wastewater in Pakistan, where space limitations and energy constraints can be major challenges for wastewater treatment.

Floating wetlands with Wastewater Stabilization Ponds (WSPs) would be an effective solution for wastewater treatment in Jhang, Pakistan due to several reasons. Here are some references supporting this:

Water scarcity: Jhang is a water-stressed district in Punjab, Pakistan, with limited freshwater resources. Using floating wetlands with WSP can help conserve water resources by reusing treated wastewater for irrigation and other non-potable uses. A study published in the Journal of Environmental Management found that floating wetlands with WSP can be a sustainable solution for wastewater treatment and reuse in water-scarce regions like Jhang (Nasir et al., 2021).

Cost-effectiveness: Constructing conventional wastewater treatment plants can be expensive, especially in rural areas like Jhang where infrastructure is lacking. A study published in the Journal of Environmental Management found that using floating wetlands with WSP can be a

[12] Nasir M, Shahid S, Aslam M, Ali S, Shakoor M B, & Ahmad I (2021). Sustainability assessment of floating wetlands with wastewater treatment plant in water-scarce regions: A case study of Jhang, Pakistan. Journal of Environmental Management, 291, 112697.
Yasin M, Khalid S, Shahid S, Ali S, & Shakoor M B (2015). Floating wetlands for wastewater treatment and reuse in water-scarce regions. Journal of Environmental Management, 236, 558-567.

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cost-effective solution for wastewater treatment in rural areas of Pakistan, including Jh (Yasin et al., 2019).

Adaptability: Floating wetlands with WSP can be designed to fit the specific needs c community or location. A study published in the Journal of Water Process Engineering fo that floating wetlands with WSP can be an adaptable solution for wastewater treatmen remote areas of Pakistan, including Jhang (Khan et al., 2020).

[13]Ecological benefits: Floating wetlands with WSP can also provide ecological benefits creating habitat for aquatic plants and animals. A study published in the Journal of Water Re and Desalination found that floating wetlands with WSP can support the growth of wetl vegetation and improve water quality in Jhang (Ahmad et al., 2020).

Overall, these studies support the idea that floating wetlands with WSP can be a viable sustainable solution for wastewater treatment in Jhang, Pakistan.

3.7. NO-PROJECT OPTION

If no project option is triggered, then we will lose all benefits, opportunities and positive impa originate due to the project such as:

- The project comprises of Replacements of components of the existing Munic Infrastructure to improve the service delivery of MC. Presently, the recovery fi user charges is very low because of unsatisfactory service delivery but v improvement of service delivery, it is expected that the revenue recovery will a improve.
- MC is proposed to levy user charges on the services provided by MC which increase the revenue from the Project.
- Increase in efficiency of all infrastructure components
- Improved service delivery level
- Improved hygienic conditions in the city
- Reduction in vector breeding and generated diseases
- Elimination of obnoxious smell
- Reduction in medical expenditures by Public on health

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[13] Khan, M. A., Khan, M. I., Asif, M., Farooq, R., & Akhtar, M. (2020). Treatment of domestic wastewater usi floating wetlands technology in remote areas of Pakistan. Journal of Water Process Engineering, 38, 101522

Ahmad, S., Abbas, M., Majeed, H., Ahmad, R., & Ashfaq, A. (2020). Floating wetlands for improving water quality Jhang district, Pakistan. Journal of Water Reuse and Desalination, 10(3), 315-322.

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3.8. Description of Project

- **Rehabilitation of Existing Sewerage System Part I A** (Missing Sewers replacement, Desilting of Sewer lines, manhole covers, pumping machinery replace
- **Rehabilitation of existing Sewerage System Part I B** (Desilting, replaceme disposal stations machinery and pumping machinery)
- **Rehabilitation of existing sewers and Sewer Network** of unserved areas
- **Construction of Disposal Station and rehabilitation of 3km nullah** from dis station to WWTP

  Construction of Waste Water Treatment Plant (One Sullage channel, One Scree Chamber, 04 Anaerobic ponds, 04 facultative ponds, 4 sludge drying beds, one tre water pond, administrative block including site lab facility, floating plants coverin 20% of facultative ponds and one effluent water course from WWTP to the nearest v body)

3.9. Wastewater Treatment Plant

- It is a Waste stabiiization ponds technology merged with floating wetlands concept.
- It required an area of 97 Acres approx. with design period till 2032.
- Main components are screening chamber, distribution chamber, Bypass channel, Anaerobic ponds, Facultative ponds with floating plants, sludge drying beds, Auxiliary Facilities and with optional facilities of Composting unit and solar system for whole pl power consumption.
- The mean temperature consider for design is 20° C (justification is provided in the lat section of this chapter).
- The boundary will cover 100 ft plantation buffer zone all around the boundary.
- Area utilized for different components is as :

@ Temperature 20°C				**for MGD**
	Area at top		**No. of ponds**	**10.0**
	Top length (L) ft	**Top Width (W) ft**	**n**	**Area (Acre)**
Anaerobic Ponds (APs)	280.84	175 2	4	5

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Facultative Ponds (FPs)	1098.1	559.4	4	56
Auxiliary Facilities including sludge treatment roads, composing, 100 feet plantation buffer along the boundary etc.				36
Total Area				**97 acre**

- The water will enter at 510 ft level and leave the plant at 506 ft level.
- Removal efficiency in term of BOD will be as:

BOD in[14]	300	PPM
BOD after APs	120	PPM
BOD after FP	60	PPM
Effluent BOD after FP with floating plantation	**24**	**PPM**

DESIGN CRITERIA

Capacity Average Flow	**45.5**	**MLD**		
Average Flow			45.5	MLD
Average Flow			0.53	M^3/sec
Peak Flow :	Peak Factor	1.8	81.9	MLD
Peak Flow :			0.95	M^3/sec
Minimum Flow	Factor	2	22.75	MLD
Minimum Flow			0.26	M^3/sec
DESIGN OF INLET CHAMBER				
Peak Flow			81.9	MLD
Peak Flow			0.95	M^3/sec
Detention time			15	Sec
Volume required			14.22	cum
Liquid depth taken			0.8	Mtr
Area			17.77	M^2
Width taken			4.2	Mtr

[14] BOD was determined after wastewater quality analysis at the time of design (reports are attached in the annexures)

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Length	4.2	Mtr
DESIGN OF COARSE SCREEN		
Peak Flow	0.95	M3/sec
Coarse Screen Opening	50	mm
Depth of water in screen	0.9	Mtr.
velocity through screen	0.7	M/sec
Area of screen	1.35	M2
Angle of inclination with the horizontal	45	degree
Sin (Angle of Inclination)	0.71	
Free Board	0.60	m
Length of screen	2.12	
Width of opening	1.50	mtr
No of opening	30	nos
Number of bars	29	nos
Let width of each bar be	10	mmx75 mm
Total width of channel	1796	mm
Let width of each side be	50	mm
Total width of channel: Provide	1896	mm
Openings	32	
No of bars	31	
Size of Coarse Screen-Width	1.9	m
Size of Coarse Screen-Length	4	m
Velocity in Channal u/s of Screen	0.56	
Velocity through Screen	0.66	
Head Loss No Clogging	0.007	m
Velocity when 50% clogging	1.33	m/sec
Head Loss when 50% clogging	0.074	m
DESIGN OF FINE SCREEN		
Peak Flow	0.95	M3/sec
Nos of screen(Each for handling peak flow)	2	Nos
Velocity(taking) through screen, Assume	0 8	M/sec

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Area	1.18	M^2
Depth of flow taken	0.7	Mtr
Hence width of opening	1.69	Mtr
No of Openings	113	
No of Bars	112	
Width of Channal	2811	
Angle of inclination with the horizontal	75	degree
Clear opening between adjacent bars of screen	15	mm
Bars thickness of screen	10	mm x50mm
Taking width of screen	2000	mm
Nos of opening will be	80	Nos
Nos of bars(10 mm thickness)	79	Nos
Free Board	0.6	m
Sin (Angle of Inclination with horizontal)	0.966	
Inclined length of Screen	1.35	m
Length of chamber before screen	1.5	m
Total Length of chamber	2.85	
Total width of channel	2	Mtr.
Velocity in Channal u/s of Screen	0.68	m/sec
Velocity through Screen	1.12	m/sec
Head Loss through screen	0.041	m
Velocity through screen when 50% clogged	2.246	
Head Loss when 50% clogging	0.234	
Size-2.85 (L)x2(W)x1.7(D)		

DESIGN OF GRIT CHAMBER

GRIT REMOVAL SYSTEM

Two grit removal tank (1 w +1 S) each capable of handling peak flow, will be provided. They are designed to remove grit particle of size of 0.15 mm size and above with a specific gravity of 2.3

$Q/A=V_s \times \eta/(1-\eta)^{-1}$		
Where-η-Desired efficiency of removal of grit particle		

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V_s -settling velocity of minimum size of grit particle to be removed		
Q/A--Design surface overflow rate applicable for grit chamber to be designed		
n-an index which a measure of the basin performance		
Here η value taken	75	%
Say	0.75	
Here V_s value taken	1225	$m^3/m^2/day$
Here n value taken-1/8(for very good performance)	0.13	
Hence surface over flow rate(Q/A)=(Vs*n)/(((1-η)^-n)-1)	806.42	$m^3/m^2/day$
Say	810	$m^3/m^2/day$
This Q/A value has to be reduced to allow for deposition of sand during sand strom by	10.00%	%
Then design overflow rate	729	$m^3/m^2/day$
Peak flow(m^3/day)	102375	(m^3/day)
Hence area required for peak flow	140.43	m^2
Each side of square grit chamber	11.85	mtr.
Hence provide tank length	12.00	mtr.
Hence provide tank Width	12	mtr.
Detention time taken is	1	minute
Depth of tank will be	0.88	mtr.
However in order to provide adequate depth for the grit scraping mechanism, increase to	0.9	mtr.
This gives detention time is	1.03	minute
the detention time of 1.87(slightly higher) minute is immaterial for mechanically cleaned grit removal tank		
Hence size of grit removal chamber is	9 x9x0.9	
Flow height above, H weir,Q=(2/3)*Cd*L*H^1.5*((2g)^.5),Cd=.6,L=9	0.13	m
DESIGN OF ANAEROBIC POND		
No of Anaerobic ponds to provide flexibility in O&M of these ponds	4	Nos

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Each handling flow of(45 5000m3 per day/3)	11375	(m^3/day)
say	11375	(m^3/day)
Volume of anaerobic pond V=Li xQ/λ		
Li-Raw sewage BOD(1000 XB/q)	300	mg/l
Q- average flow	11375	(m^3/day)
λ- volumetric BOD loading(Range between 100-400 gm/m3/day)		
λ=20T-100(as per MEAFNRCD)		
T=mean temperature in coldest month in ^{0}C (The manual by DANIDA ENRECA suggests T as mean in coldest month or quarter. In quarter it is 14.12)	20	
hence λ is	300	kg/ha/day
Hence Volume of tank(V)	11375	m^3
Detention time	1.00	day
Detention time of 2 days or more is desirable to achieve sufficient BOD removal	1.00	day
Hence Volume of each tank (V)	11375	m^3
Hence Volumetric BOD loading(λ) is	300	gm/m3/day
BOD removal efficiency(in %)=2T+20	60	%
For liquid depth	5.5	mtr.
Area at mid depth	2068	m^2
Length shall be L=2B		
Hence mid depth width B=(area/2)$^{1/2}$	32.2	mtr.
Hence mid length L-	64.3	mtr.
Side slope of pond is 1V :2.5 H	2.5	mtr.
Depth for Sludge	1	mtr.
bottom below Mid depth	3.25	mtr.
Free Board	1	mtr.
Top of embankment above mid depth	4.25	
Hence total top length(L)	85.6	mtr.
Hence total top width(W)	53.4	mtr.
Area at top	4570	m^2
Hence total bottom length (L)	48.1	mtr.

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Hence total bottom width(W)	15.9	mtr
Area at Bottom	765	m^2
Provide four anaerobic pond each of 85.6mx53.4m at top surface and 48.1mx15.9 m surface at bottom		

DESIGN OF FACULTATIVE POND

Nomber of Tanks	4	No
Average flow in each tank	11375	cum/sec
BOD enter at Facultative pond after 2 days detention period at anaerobic pond	120	mg/l
Minimum mean monthly temperature ^{0}c	20	
Volumetric BoD loading:-		
λ_s=253 x(1.107-0.002T)$^{(T-20)}$ this value of BOD loading rate recommended as MEAFNRCD(Refer DANIDA)	253.00	kg/ha/day
λs=60(1.099)^T (Refer Jodhpur design)	396.37	
λs=20 T-120	280.00	
λs=20T-60	340.00	
λs=375-6.25L, where L-latitude(28.73), Refer manual	195.44	kg/ha/day
Correction for above MSL=(1+(3 x10-5)xE)		
where E is elevation in meters= 506	1.01518	
then λ_s is	192.52	kg/ha/day
Influent BOD to facultative pond	120	mg/l
value of λ_s is considered recommended as MEAFNRCD	253.00	kg/ha/day
From equation (as per World Bank paper) facultative mid depth area can be calculated as(A)		
$A=10 \times L_i \times Q/\lambda_s$		
A-facultative area at mid depth in m^2		
L_i-influent BOD concentration in mg/l, Li is BOD to be removed	120	
Effluent to be used for restricted irrigation as such 100 effluent BOD is ok however on safe side design for effluent BOD of	60	
Li=	60	
then A is	107905	m^2

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Divide the area in two ponds(area of each facultative pond) at middle of tank	53953	m^2
Take L=2B		
Then width $B=(A/2)^{1/2}$	164	m
Then L is at mid depth	328	m
Hence area at mid depth is	53953	m^2
Adopt liquid depth	1	m
Adopt depth for sludge	0.5	m
Adopt Free Board	1	m
Total Depth of tank	2.5	
Area at bottom embankment slope H/V	2.5	
Length at bottom	322.2	m
width at bottom	158.0	m
Hence area at bottom is -	50912	m^2
Length at top including 1.0 mt free board	334.7	m
width at top including 1.0 mt free board	170.5	m
Area at top including 1.0 mtr free board-	57071	m^2
Volume of pond $V=h/6(S_0+4S_1+S_2)$		
h-height(liquid depth)	1.5	m
S0-area at top	57071	m^2
S1-area at mid water depth	53953	m^2
S2-area at bottom	50912	m^2
Hence V of each tank is	80948	m^3
Then detention time of each tank is	7.12	days
Total detention time of anaerobic + facultative pond is	8.12	days
Total area of ll afacultative ponds at top	228285	m^2
Total area of all anaerobic ponds at top	18279	m^2
Total area	246564	m2
Assuming footprint area of units as % of total area	60.00%	%
Hence total area is-	410940	sqm
Hence total area in hectare taken as	41.09	hactare
	42	

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Total BOD removal in facultative pond	60	mg/l
Provide four Facultative pond each of 334.7mx170.5m at top surface and 322.2mx158 m surface at bottom		
Hence Effluent BOD is	60	mg/l
Faecal Coliform Removal after FP		
Ne/Ni=1/(1+ktθa)(1+Ktθf), Ni=5*10^7, Ne=	334432.9	9.9E+13
Kt=2.6(1.19)^(T-20), T=20, kt=	2.600	
Helminth Removal after FP		
R % removal=100{1-0.14 Exp(-0.38θ))	99.52	%
DESIGN OF MATURATION POND		
No of Maturation ponds to provide flexibility in O&M of these ponds	4	Nos
Each handling flow of (45.5000m3 per day/4)	11375	(m^3/day)
say	11375	(m^3/day)
Volume of maturation pond V=Li xQ/λ		
Li-Raw sewage BOD(1000 XB/q)	60	mg/l
Q- average flow	11375	(m^3/day)
λ- volumetric BOD loading(Range between 100-400 gm/m3/day)		
λ=20T-100(as per MEAFNRCD)		
T=mean temperature in coldest month in ^{0}C (The manual by DANIDA ENRECA suggests T as mean in coldest month or quarter. In quarter it is 15.55)	20	
hence λ is	300	kg/ha/day
Hence Volume of tank(V)	2275	m^3
Detention time	0.20	day
Detention time of 2 days or more is desirable to achieve sufficient BOD removal	2.00	day
Hence Volume of each tank (V)	22750	m^3
Hence Volumetric BOD loading(λ) is	30	gm/m3/day
BOD removal efficiency(in %)=2T+20	60	%
For liquid depth	1.5	mtr.
Area at mid depth	15167	m^2
Length shall be L=2B		

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Hence mid depth width B=(area/2)$^{1/2}$	87.1	mtr.
Hence mid length L-	174.2	mtr.
Side slope of pond is 1V :2.5 H	2.5	mtr.
Depth for Sludge	1	mtr.
bottom below Mid depth	1.25	mtr.
Free Board	0.5	mtr.
Top of embankment above mid depth	1.75	
Hence total top length(L)	182.9	mtr.
Hence total top width(W)	95.8	mtr.
Area at top	17529	m^2
Hence total bottom length (L)	167.9	mtr.
Hence total bottom width(W)	80.8	mtr.
Area at Bottom	13573	m^2
BOD exit at maturation pond after 2 days detention period	**24**	**mg/l**
Provide four maturation pond each of 182.9mx95.8m at top surface and 167.9mx80.8 m surface at bottom		
Faecal Coliform Removal		
Ne/Ni=1/(1+ktθf)(1+Ktθm), Ni=334432.9, Ne=	2236.9	
Kt=2.6(1.19)^(T-20), T=20, kt=	2.600	
Helminth Removal		
R % removal=100(1-0.14 Exp(-0.38θ))	99.5514	%
Sludge Storage and Cleaning requirement		
Population equivalent at 144 LPCD waste	315972	
For anaerobic pond sludge volume	0.04	**cum per capita/year**
For anaerobic pond sludge volume	12638.89	**cum/year**
Sludge volume provided in all anaerobic ponds	2792.27	cum
Cleaning required period	4.53	**years**
say	5	years
Distribution tank for Anaerobic Pond		
Consider one anerobic pond not working,		

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Flow height above weir, H Q=(2/3)*Cd*L*H^1 5*((2g)^ 5),Cd=.6,L=1.2		
Q per tank	0.236979167	cum/sec
Assume weir length	1.5	m
H	0.20	m
Allow free fall of	0.1	m
Total Head loss	0.30	m
Free Board	0.30	m
Clear Water Tank		
flow	45.5	MLD
Tank storage	30	minutes
Tank Capacity	948	cum
Tank depth	4	m
Tank Dia	17.37	m
Provide Tank Dia	18.00	m
Tank Capacity Provided	1017	cum

3.10. Design Criteria of Temperature

1. No design Manual available WSP in Pakistan. So, there could be used only a similar climate area's research and development findings.
2. Mr. Duncan Mara developed a design manual for WSPs in India in 1997 which was adopted by Indian Govt. and implemented throughout the country.
3. The same reference has been adopted in Pakistan in this case as Pakistan has almost same climate conditions.
4. This design manual suggests 20° C for local environment which is adopted same here. (Mara, 1997).
5. Adopted design temperature of 20° C shall result in significant reduction in area requirement (more than 50% less) as well as capital cost of proposed WWTP. At adopted design temperature of 20° C, treated effluent BOD (both filtered and unfiltered) will remain within PEQS limits throughout the year if WSP is properly operated and managed.
6. Mr. Mara in 2007 have suggested the same 20° C in is another study "Waste stabilization pond performance in Pakistan and its implications for wastewater use in agriculture".

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7 Other references use to validate the same temperature are as

a. 'Waste stabilization Ponds' by Marcos von Sperling volume III IWA 2007
b. 'Waste stabilization Ponds for Wastewater Treatment. Anerobic Ponds' by Fernando J. Trevino Quiroga
c. 'Waste Stabilization Ponds and Constructed Wetlands Design Manual' by Kayombo et al. 2004
d. 'Waste Stabilization Ponds, Design Guidelines for southern Pakistan' by Dr Mansoor Ali Khowaja 2000

st Important: Two WWTPs are under construction In Pakistan on the same technology i.e. aste Stabilization Ponds' under ADB fund by PICIIP Sahiwal WWTP and Sialkot WWTP both plants same 20° C has been adopted and same reference has been used.

Geo-Technical Investigation

efore designing of wastewater treatment plant, Geo-Technical Investigations were carried at e proposed site.

ELD INVESTIGATION

eld investigation comprises the following

rilling

s per recommended practice of ASTM D-420, percussion method was adopted for sub-soil xploration. The hole was advanced by hand augur drilling method. The drilling of the holes was arried out up to 50.0 feet depth from existing ground level.

tandard Penetration Test

The objective of this test is to ascertain the resistance afforded to the penetration apparatus to a defined 12" depth. This test gives valuable information regarding the compactness of underlying strata. The test was performed in accordance with ASTM D 1586-84 by Donut type manually operated hammer. Generally, The SPT N-value Increases downward. The degree of compactness and SPT N values of underlying strata represented in borehole logs.

Disturbed Sampling

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After the boring is advanced to the desired sampling depth, the disturbed samples are collected with help of spilt spoon sampler. The disturbed sample have been collected and preserved in the Jars which have been properly indexed and transported to the Laboratory

Water Table

At the time of these investigations ground water table were not encountered at under given depths in Exploratory Boreholes in the month of February 2023.

Borehole No.	Depth (ft)	Depth of Ground Water(feet)
1 to 10	10	Nil
1 to 10	25	Nil
1 and 2	40	Nil

LABORATORY TESTING

Selected soil samples were tested for evaluation of physical and engineering characteristics of the sub-soils, in the laboratory. The laboratory testing was carried out at testing facilities of STS. The following laboratory tests were performed on selected soil samples.

- Sieve Analysis
- Hydrometer Analysis
- Atterberg's limits
- Direct Shear Test
- Moisture Content

Sieve Analysis

Total Seventy-five (75) soil samples selected for classification from the various depths after proper treatment were sieved under wet conditions in accordance with ASTM Standard. The curves have been plotted graphically and attached at end of this report.

Sedimentation/Hydrometer Test

The soil samples collected from the drill hole were sieved through No. 200, but to differentiate between silt and clay fraction, sedimentation test was employed in this test soil sample was

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treated with very diluted HCL and then with Sodium met phosphate for deflocculation. The procedure defined in ASTM standard for Hydrometer analysis was followed. The % age of different sizes were plotted on the grain size curves.

Atterberg's Limits (Liquid & Plastic Limits)

The cohesive soil retrieved with the help of split spoon sampler was tested for liquid and plastic limits in accordance with ASTM D-4318-84. The consistency limits of cohesive soils at various depths. Detail results shown in summary sheet.

Direct Shear Test

The soil possessing non-cohesive characteristics were prepared and tested for their angle of internal friction Ø and cohesion C in accordance with ASTM D3080. The detailed results are given at summary sheet.

Field Moisture Content

The soil samples collected from the bore holes with shell by tube were tested for their field moisture contents.

Conclusions and Recommendations

1. During these investigations, the subsurface was explored to a maximum depth of 10.0, 25.0 and 40 feet below the existing ground surface. Various soil layers encountered at the site below the existing ground surface are described in borehole logs.
2. In order to provide foundation options to the structural engineer/designer, shallow foundations have been proposed. The shallow foundation may be square, strip or raft foundations as per objective of load and site conditions.
3. In case the floors are to be placed on in-situ soils then the top layer of soil containing organic matter and roots must be excavated and replaced with two 150 mm thick compacted layers of engineering fill comprising suitable granular material.
4. If required back filling, engineering fill A-2-4(0) should be used as a back fill material.

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5 The soils at foundation level must be carefully inspected prior to placing the foundations to ensure that the soils are similar to those encountered in the boreholes. In case any loose/ weak material or fill material is encountered in the foundation excavation, it must be completely removed and replaced with properly compacted engineering fill prior to placing the foundations. The foundation excavation must be protected from ingress of water during foundation construction.

6 Plinth protection slab sloping away from the buildings should be provided around the structure to reduce ingress of water to foundation soils.

7. Proper surface drainage should be provided in the project area and the area should be graded to keep the surface runoff away from the structure. The ingress of water from any source should be avoided.

8 The side slopes should be stabilized and erosion of the soil and ingress of water into the soil must be protected.

2. Wastewater Quality Analysis

The design of WWTP has been designed on the waste water analysis conducted on October 2022 by SGS laboratory. Sample were taken from different four locations Disposal Khokharan Chowk, Disposal Farooqabad, Disposal Harmal Pura, Disposal Lakhi Chowk. The results are attached as Annexure A.

Sr#	Location	Results		PEQs	
		COD	BOD @ 20 °C	COD	BOD
1.	Disposal Khokharan Chowk	546	267	150	80
2	Disposal Farooqabad	440	189	150	80
3	Disposal Harmal Pura	421	163	150	80
4	Disposal Lakhi Chowk	613	307	150	80

3.13. Project Financial Revenues

3.13.1. Quantification of Sewerage Revenues against Project Investment

Parameters required to measure sewerage revenues comprise: -

- Existing Population – Projected over useful project life
- Served Population and housing units

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Sewerage Tariff

Sewerage Disposal

3.13.2. Existing and Projected Population – Jhang City

ng (year 2022) population of Jhang district is 217,056 persons. With annual growth rate of and cted over 31 years period of analysis, total population of Jhang city would come around 289,464 ons.

3.13.3. Served Population

ently (Year 2022) about 60 percent population (130,234 persons) is being served with sewerage ty. Additional 40 % population is assumed to be served / benefitted by the sewerage facility due to ect investment. Over 30-year period of analysis additional 86,822 population of Jhang city would served by the proposed facility due to project investment.

3.13.4. Served Housing Units

sting and additional household served with sewerage facility have been worked out based on erage household size of 7 in Jhang city.

3.13.5. Sewerage Tariff

esently There is no sewerage connection fee OR monthly sewerage tariff levy in the Jhang city. The oposed facility is assumed to be supplied free of cost in future also.

3.13.6. Existing and Projected Population & Housing Data

he table below shows a study of the population and households served by sewerage facilities in hang City over a 30-year period.

Table 6: Total Project Population

Years		Total Project Population (Jhang City)	Served Population		Served Households (No) *	
			Served Population, (Existing)	Served Population (additional) due to Project	No of Household - Served presently	No of additional Household - likely to be Served due to Project
		3.6 % annual Growth *	60%	20%	Based on 7 Persons - Avg. family size	
2022	1	217,056	130,234	86,822	18,605	12,403
2027	5	227,724	136,634	91,090	19,519	13,013

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2032	10	238,916	143,350	95,567	20,479	13,652
2037	15	250,659	150,395	100,264	21,485	14,323
2042	20	262,979	157,787	105,191	22,541	15,027
2047	25	275,904	165,542	110,361	23,649	15,766
2052	31	289,464	173,678	115,786	24,811	16,541

3.13.7. Sewerage Disposal

New Disposal Station has been proposed on the flow of year 2050.

Table 7: Flow Year 2050

Population		
Existing (2022)	Number	217,056
Projected (2032)	Number	238,916
Sewerage Disposal		
Existing (2022)	Million Gallons per day	19.29
Projected (2032)	Million Gallons per day	27.48

3.14. COST AND MAGNITUDE OF OPERATION

The total cost of the project is estimated to be 2535.15 million/-PKR, which is further divided into various components/items as shown in below table:

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SN	Description of works		Total cost in Million PKR
1.1	Part IA- Rehabilitation of Existing Sewerage System-Desilting and replacement of machinery		59.772
1.2	Part IB- Rehabilitation of Existing Disposal Stations-Replacement of Machinery		180.013
1.3	Part B-Sewerage System		1000.72
1.4	Part C- Construction of new Disposal Station		224.091
1.5	Part D-Waste Water Treatment Plant		796.565
1.6	Environmental & Social Mitigation and Monitoring Cost		8.00
	Price Contingencies	2%	45.383
	PST-5%	5%	101.469
	0.25% Awareness campaign	0.25%	5.673
	Escalation	5%	113.458
	Total Cost		**2535.150**

3.15. SCHEDULE OF IMPLEMENTATION

Project development will be executed as soon as the no objection certificate (NOC) from the Environmental Protection Agency. Punjab and other required approvals from various departments will be issued. The project is to be completed within 2 year.

Implementation Schedule/Duration: 02 years maximum.

No. of workers involved: 40 approx.

Expected Starting Date: August, 2023

Expected Completion Date September, 2025

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3.16. EXISTENCE OF UTILITY SERVICES WITHIN ROW

There is no existence of Sui gas, water supply, electric tower and fiber optic lines etc. within construction zone of the project.

3.17. TEMPORARY STORAGE AREA

Contractor will systematically layout his construction material within the premises of Sub-Project because ample space is available. Contractor will not be allowed to stockpile construction material on any other site

3.18. PROCESS FLOW CHART/ STEPS

The approach for conducting EIA/ESIA of improvement of sewerage system in Jhang city and construction of WWTP is to follow the requirement of Pakistan Environmental Protection Agency (Review of IEE/EIA).

The EIA/ESIA is undertaken to determine, analyses and present the environmental impacts of proposed site, formulate remedial measures to mitigate the negative impacts and plan in such a way that a rational decision can be made about its implementation. In addition, the EIA/ESIA aims at contributing to reduction or mitigation of adverse impacts. Therefore, this assessment will initially be based on preliminary design and propose mitigation measures that can be incorporated in the final design. This impact based on final design will then be reassessed.

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3.19. GOVERNMENT AND OTHER APPROVALS

At this stage, the Environmental Approval from the Environmental Protection Agency (EPA), Punjab Lahore is the major requirement prior to the execution. After the approval followed by NOC from EPD, other approvals will also be attained.

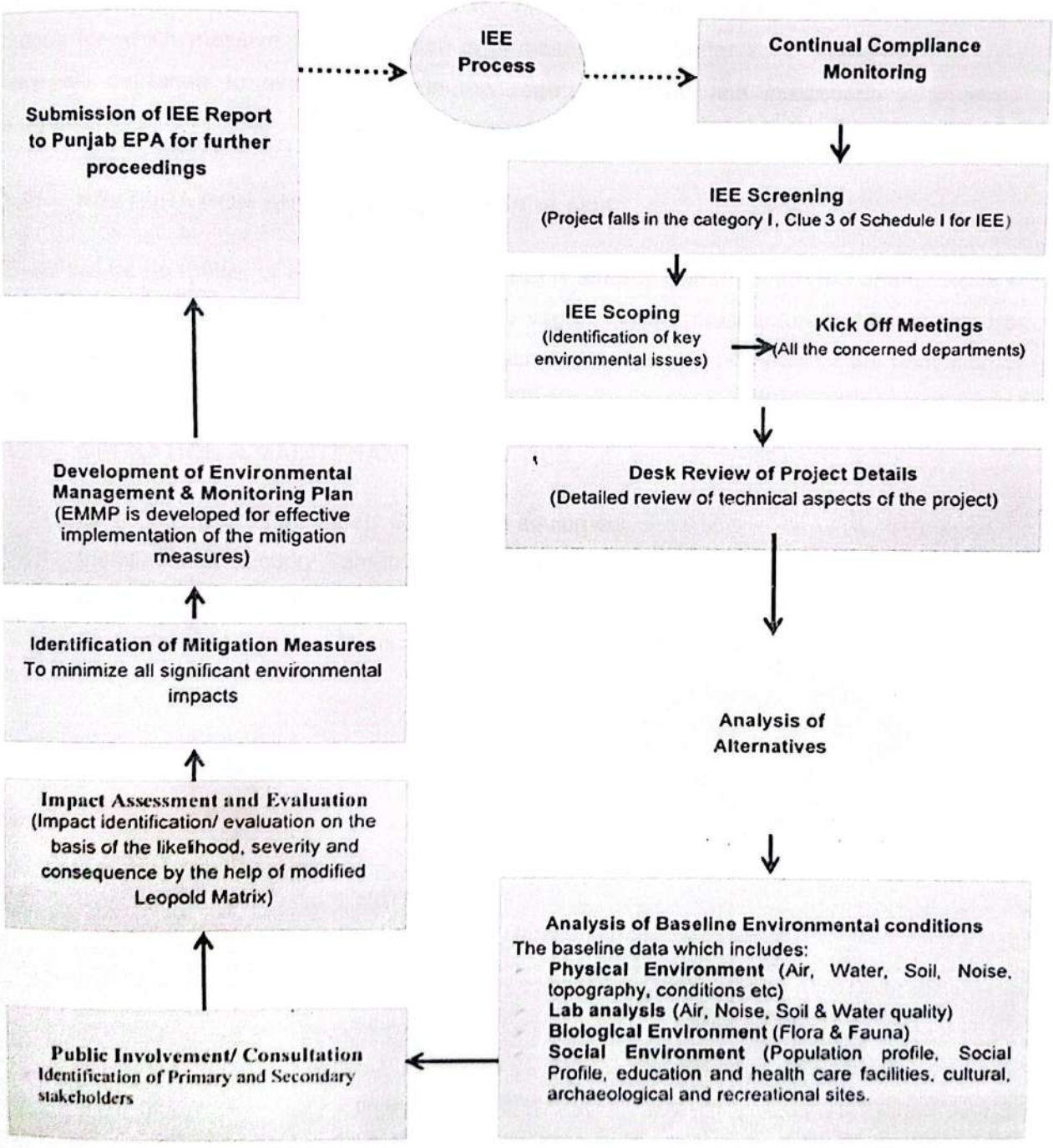


Figure 3: IEE process

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3.20. VEGETATION FEATURES OF THE SITE

The proposed project land belongs to MC Jhang and there will be 20 trees cutting is antic during construction phase of WWTP and will be mitigated by planting of 10 trees for cutting for which massive tree plantation is proposed in the buffer zone. However, ma care will be taken to avoid impact to the vegetation cover and indigenous trees surrounding.

3.21. RESTORATION AND REHABILITATION PLANS

There will be no matter of rehabilitation as the site is already owned by the MC Jhang. the locals or residents will be relocated or any vegetation or infrastructure will be af destructed because land is already an open vacant plot. There is no need for the relo dismantling of significant structure.

3.22. OPERATION & MAINTENANCE ACTIVITIES

- Establishment of Fire Safety Station and equipment
- Installation of Security Cameras
- Maintenance of Landscaped area
- Operational activities of Municipal Waste through Sanitary Staff

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Chapter 5

ENVIRONMENTAL AND SOCIAL BASELINE DATA

5.1 OVERVIEW

This section describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Project Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other relevant agencies.

This chapter is divided in to three categories.



The aim of describing the environmental conditions of the study area is:

- To understand the environmental characteristics of the area
- To assess the existing environmental quality, as well as the environmental impacts of the future developments being studied
- To identify environmentally significant factors or geographical areas that could influence any decision about future development.

The purpose of socio-economic survey was to compile information about:

- The generic characteristics of nearby communities
- Socio-economic status
- Cultural traditions
- Social issues and religious affiliations

An environmental baseline study is essential to have a thorough understanding of the nature of those existing environmental conditions prior to commencement of any proposed project activities. A site visit was planned to obtain environmental data on physical, biological and socioeconomic parameters. In addition to that, interviews with stakeholders, consultation with

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general public in the surroundings as per need and meeting with concerned government departments regarding project were held to obtain NOC of proposed project.

Baseline data includes an inventory of physical, ecological and socio-economic parameters in order to identify any potential impact on and changes to the natural and socioeconomic aspects. Covering these aspects, data has been grouped into three categories:

5.2 PHYSICAL ENVIRONMENT

The physical environment baseline studies describe the physical conditions and characteristics in the defined study area around and within the Project site.

Physical features of proposed area are given as;

5.2.1. Topography[15]

The District Jhang is adjoined by District Toba Tek Singh having District Faisalabad to the East, District Hafizabad to the North-East, District Khanewal on the South, District Sargodha on the North, District Khushab, District Layyah and District Bhakkar on the West. The District Jhang lies between 31°15'N to 31°17'N latitude and 72°18'E to 72°22'E longitude and spread over 8,809 square kilometers. The topography within 2 miles of Project Area is essentially flat, with a maximum elevation change of 194 m and an average elevation above sea level of 173.83 m. Most of the land is plain cultivable except the area near the bank of River Chenab where there is a series of Kirana Hills. In the western part, a desert area called Thal extends from the banks of the Jhelum River to the far west in the districts of Khushab and Bhakkar, while the Sandal Bar area arises from the Pabbarwala area near the Gujranwala boundary as the land abruptly arises from the land level almost at ten feet (3 m) height and almost gains 30 feet (9 m) height and this tract runs up till 87 km in the south and has a breadth of almost 30 to 40 km.

5.2.2. Geology[16]

Most of the unconsolidated alluvial deposits of the roads are of Pleistocene to Recent in age and are overlying the Precambrian basement rock. These were later identified as old and young floodplains of the Ravi River on the Jhang and Chenab Plains. The old floodplains consist of Holocene deposits from the Ravi and Chenab rivers. These were deposited in a subsiding trough by the ancestral and present tributaries to the river Indus. The alluvial fill is more or less

[15] https://elevation.maplogs.com/poi/jhang
[16] https://jhang.punjab.gov.pk/

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homogeneous in nature, and has little continuity vertically or laterally, indicating diverse depositional environments from time to time caused by constant change in the stream courses. The soil consists of young stratified silt loam or very fine sandy loam which makes the subsoil weak in structure with common kankers at only five feet. Kankar or kunkur is a sedimentological term used for residual rolled, often nodular calcium carbonate formed in soils of semi-arid regions. It forms sheets across alluvial plains and can occur as discontinuous lines of nodular kankar or as indurated layers in stratigraphic profiles more commonly referred to as calcrete, hardpan or duricrust. The Rakh and Gogera canals in Faisalabad district have encouraged the water levels in the Project Area as well. However, the belt on the Ravi River has remained narrow. The river bed does include the river channels which have shifted the sand bars and low sandy levees leading to river erosion. The ridges were mostly stabilized by natural vegetation except the slip faces which are of shifting nature. Clay is generally found in lenses. The origin of clay has not been ascertained but presumably it is repeatedly reworked loess. Of the alluvial complex, sand forms the areas of fairly transmissivity aquifer material in which ground water occurs under water table conditions at varying depths.

5.2.3. Geohazards[17]

Geohazards are geological and environmental conditions and involve long-term or short-term geological processes. The earthquake is the only potential geohazard at the project area. According to building code of Pakistan, the Project Area is located in moderate Seismic Zone 2A of Pakistan. Zone 2A represents Peak Ground Acceleration (PGA) from 0.08 to 0.16 g[18].

[17] https://jhang.punjab.gov.pk/
[18] https://iisee.kenken.go.jp/net/seismic_design_code/pakistan/pakistan_table111.html

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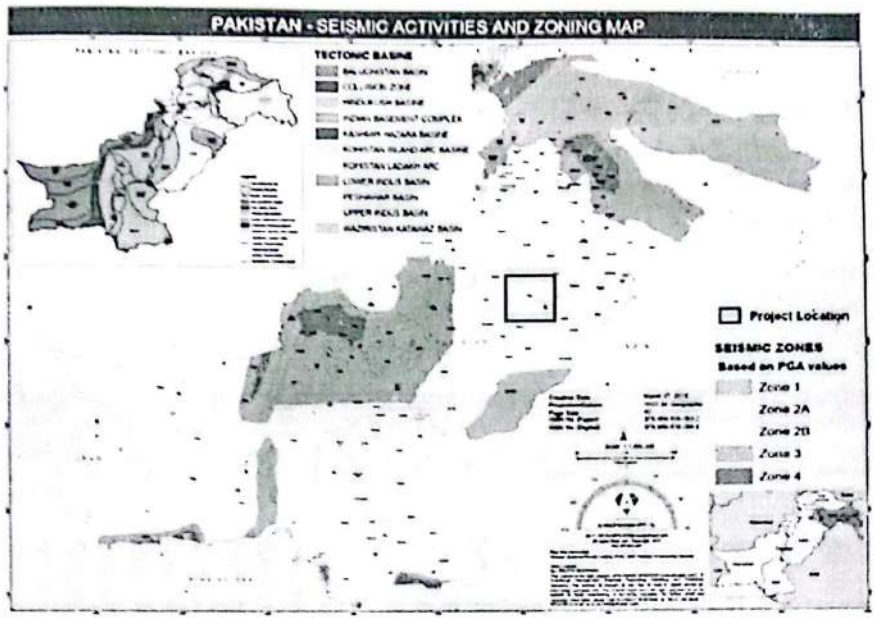


Figure 4:Seismic zoning map of Pakistan (Source: PMD, GSP, 2015)

Healthy soil consists of roughly 40% mineral, 23% water, 23% air, 6% organic material and 8% living organisms. Soil texture is concerned with the relative proportions of mineral particles of various sizes in a soil. These particles are grouped into three basic categories: sand, silt and clay. Sand particles are the largest ones in soil other than gravel or other rocks. Intermediate sized particles are called silt. The very smallest particles in soil are clay.

The soil of Project Area is 6.76% sandy loam, 85.92% loam and 7.32% clay[19]. Project area has been endowed by nature with a rich soil, aided by an efficient irrigation system. It has earned a name for agricultural productivity[20]. The soil of Project Area is suitable for almost all main and major crops like wheat, rice, sugarcane, gram, all sorts of pulses and oil seeds, jawar, bajra and maize. Almost all the area is plain cultivable land except to the North are some rocks near Rabwah at the banks of the River Chenab which belong to the series of Kirana Hills which in nature are like the mountains of Aravalli series. As per Soil Survey of Pakistan, the soil of project area is classified as class 1 very good (loomy) irrigated land.

[19] ibid
[20] https //apply.jar punjab.gov.pk/upload/1373867280_73_550__149paper5.pdf

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	conditions with winds directed towards adjacent residences and other facilities. • The Contractor shall erect a dust/noise barrier has around the site. • All vehicles delivering materials shall be covered to avoid spillage and dust emission. • The Contractor should avoid, where possible and take suitable action to prevent dirt and mud being carried to the roadway (particularly following wet weather). • The contractor should enforce vehicle speed limits to minimize dust generation. • The Contractor shall employ a water truck to sprinkle water for dust suppression on all exposed areas as required (note: the use of waste water / waste oil for dust suppression is prohibited) • All existing roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similar roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres. • Clearance shall be affected immediately by manual sweeping and removal of debris and ensure sprinkled water using appropriate equipment • Dust emissions should be controlled by wet spraying of construction sites and roads which are used for transportation of Construction materials at regular intervals. • Tarpaulin covering is mandatory on trucks /lorries which are used for transporting materials. • All stockpiles including temporary storage of debris and construction materials should be covered using tarpaulin covering. • Noise and Dust barriers with minimum height of 4m should be erected around entire working sites to control dust emission to the ambient air. Selection				

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		conditions with winds directed towards adjacent residences and other facilities. • The Contractor shall erect a dust/noise barrier has around the site. • All vehicles delivering materials shall be covered to avoid spillage and dust emission. • The Contractor should avoid, where possible and take suitable action to prevent dirt and mud being carried to the roadway (particularly following wet weather). • The contractor should enforce vehicle speed limits to minimize dust generation. • The Contractor shall employ a water truck to sprinkle water for dust suppression on all exposed areas as required (note: the use of waste water / waste oil for dust suppression is prohibited) • All existing roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similar roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres. • Clearance shall be affected immediately by manual sweeping and removal of debris and ensure sprinkled water using appropriate equipment • Dust emissions should be controlled by wet spraying of construction sites and roads which are used for transportation of Construction materials at regular intervals. • Tarpaulin covering is mandatory on trucks /lorries which are used for transporting materials. • All stockpiles including temporary storage of debris and construction materials should be covered using tarpaulin covering. • Noise and Dust barriers with minimum height of 4m should be erected around entire working sites to control dust emission to the ambient air. Selection				

			of the suitable material. • Contractor shall take appropriate action to ensure that construction works do not result in damage to the adjacent properties due to vibration. • Contractor shall pay due consideration on vibration impacts of construction on adjoining structures. In the event vibration levels are found to be exceeding national standards, he shall modify the method of construction until compliance with stipulated national vibration standards is met. • Vehicles should be maintained in good condition regularly so that noise and emission generating from wear and tear will be minimal • Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the DPO-ESM to keep noise and air emissions from these at a minimum				
	• Soil and Vegetation Cover Loss		• Construction vehicle, machinery and equipment shall be used and stationed only in the areas of work and in any other area designated/ approved by the MC Jhang. • Ad-hoc and scattered parking and placement of machinery should be avoided to minimize harm to roadside ground cover. • The contractor shall include in the construction site layout plan indicating various areas identified for designated use including parking areas. • Contractor should provide necessary instructions to drivers/operators and other construction workers not to destroy ground vegetation cover unnecessarily. • Designated vehicle parks and maintenance yards must be informed to labor force. • Top soil of productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed				

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			by the MC. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he/she shall obtain the direction from the MC in writing • Removed top soil could be used as a productive soil when replanting/establishing vegetation under landscaping plans Stockpiled topsoil must be returned to cover the areas including cut slopes where the topsoil has been removed due to project activities. • Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the MC. • Waste oil, lubricants and other petroleum products and untreated wastewater shall not be discharged on ground so that to avoid soil pollution. Clean up measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers • Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as incidental to work				
	• Water and Soil Contaminatio n		• The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the MC at his own cost. • The contractor shall indicate on a site layout plan the drainage network and strategic locations in which soil erosion control devices will be installed. The contractor shall, to the extent possible, schedule/stage these sections will have to be stopped during heavy rains due to heavy erosion. • Work that lead to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the MC by submitting a				

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		proposal on actions that will be undertaken by the contractor to prevent erosion.				
• Damage to archeological sites		• Chance Find Procedure will be adopted in case any such discovery of archeological property, the contractor shall take reasonable precaution to prevent his workmen or any other persons from removing/damaging any such article and shall immediately inform the MC and immediately stop construction activities. (Chance Find Procedures are attached as **Annexure k)**				
• Management of Hazardous Waste		• Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material that will be used in the project work to the MC. • Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful Asbestos Containing Materials (ACM) shall not be used for any temporary and permanent work on the SEWERAGE site.				
• Disturbance to Flora and Fauna and vegetation cover		• All construction works shall be carried out in a manner that the destruction to flora and their habitats is minimized. • At current, no trees are found at the proposed site of sewerage but if all such cases of tree removal contractor shall take prior approval from the MC and DPO-ESM prior to removal with a justification as to why the removal is unavoidable and plantation will be carried out with 1:10 removal ratio				
• Wastage of Water		• Arrange adequate supply of water for the project purpose throughout the construction period in consultation with the MC Jhang. • The contractor should discuss the daily requirement for potable and non-potable water and confirm with the MC Jhang that the demand can be met through their supply connection. • Do not extract water from surface water bodies or				

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			water sources without the permission from MC & relevant authority. Obtain permission for extracting ground water, if needed, prior to the commencing of the project, from the relevant authority • The contractor will minimize wastage of water in the construction process/operations by reusing water as much as possible, utilizing only the required amount of water for the construction works etc. • The contractor shall maintain a record of usage of water for various purposes and sources tapped. • The contractor will adopt measures that are technically and financially feasible that avoid or minimize water usage throughout the construction period.				
	• Traffic Jams and Congestion and Road accidents		• The construction materials intended for temporarily storage should be properly stockpiled in most appropriate areas in the Site to avoid disturbance to site mobility, traffic and stored away from drainage paths • Efficient use of all construction material in order to reduce waste generation. • All use of chemicals and hazardous materials will be subject to national and international regulations and requirements. Their use will be minimized and their release will be controlled				
Construction Material Storage, Handling and Use	Spillage Odor	Low	• Contractor shall take all precautions such as storing all chemicals used for construction works in properly closed containers with good ventilations to prevent odor and offensive smell emanating from chemicals and processes applied in construction works or from labor camps • In a situation when/where odor or offensive smell does occur, contractor shall take immediate action to rectify the situation • Contractor is responsible for any compensation	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team

			involved with any health issue arisen out of bad odor and offensive smells				
Construction Machinery/ Equipment Use	• Emissions from Construction Vehicles, Equipment and Machinery • Noise from Vehicles, Plants and Equipment • Health and Safety of Labor /Workers	Low	• The emission standards promulgated under the Punjab Environmental Quality Standards (PEQs) shall be strictly adhered to all vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards. • The contractor shall maintain the average noise levels within the construction site during the day time to 65 dB and night time to 55 dB Punjab Environmental Quality Standards (PEQs). • Noise barriers (cum dust) with minimum height of 4m shall be installed around the site as shown in the following figures and the construction noise levels outside the noise barriers should be maintained below 75dB during day time. • Within the site, the contractor shall measure noise levels on a monthly basis, or as per requirement, and report to the DPO-ESM through the contractor's monthly progress reports. Where, exceedances are noted that can adversely affect construction workers, the contractor shall propose methods to control noise levels. • All machinery and equipment should be well maintained and fitted with noise reduction devices in accordance with manufacturer's instructions. • All vehicles and equipment used in construction shall be fitted with exhaust silences. • During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team

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			from site • Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep noise from these at a minimum. • Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with PPEs				
D- OPERATION PHASE							
Proposed sub project activity	**Anticipated Environment and Social Issues**	**Magnitude of Impacts**	**Proposed Mitigation Measures**	**Mitigation Implementation Responsibility**	**Monitoring Indicators**	**Monitoring Frequency**	**Monitoring Responsibility**
Water use activities taking place at buildings/ shelters (Sanitation)	Water/soil pollution	Low to medium	• Effluent from septic tank can pollute groundwater or surface water, particularly if piped to an open drain. • The MC shall ensure that under no circumstances foul sewage flow can be diverted into a storm water drains and vice versa. •	MC Jhang	• Site Visits • Monitoring Reports • Implementation of GRM	• Site visit	MC Jhang
Seepage / salinity	Weaken the structure strength and in watering and salinity condition.		• Runoff from the Site shall be controlled to ensure that adjacent areas are not affected and disturbance to the public is to minimum. • Anti-percolation material layer will be installed under the sewerage lines that no seepage into the soil occur				
Waste water storage and disposal	Nuisance, odour		• Emission from septic tank during its decommissioning and connection to sewer and from centralised sewerage system.				

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			• The Contractor shall ensure covering and sealing off all water collection tanks and septic tanks at the end of construction works.				
	Unhygienic condition, public health risks		• Sewerage disposal connections to the periphery wastewater system shall be maintained properly with routine maintenance of plumbing/pumps diligently carried out. • Trees shall be managed properly that includes watering, fertilizing, weeding, pest controlling, pruning and training of trees timely. • MCJ shall take necessary actions to prevent the breeding of mosquitoes where stagnation of water in any areas along the sewerage system.				

2. **Sub-project:** Construction of Disposal Station

A-Design Stage	**Design Responsibility**	**Implementation responsibility**
2.Permits, NOCs, Clearances		
Necessary consents, permits, and clearances shall be obtained before the start of civil works Permissions and clearances are required mainly from the government agencies including; Environmental Protection Agency (EPA).	PMDFC, MC	MC jhang
3.Preparation of Stakeholder Engagement Plan		

Stakeholder engagement plan with a realistic timeframe covering preliminary, construction and operation phases has been prepared and approved (prior to project appraisal) and implemented effectively ensuring engagement of stakeholders throughout the project cycle.	Design Consultant/ PMDFC	MC Jhang
4. Preparation of Labor Management Procedures EHS SOPS for Labor workers/Including women have been prepared and approved (prior to project appraisal) and will be implemented effectively throughout the project period.	ESFPS	MC Jhang
B-Pre-Construction Phase	**Location/Project Phase**	**Institutional Responsibility** **Implementation** / **Supervision**
Contractors Terms of Reference • The MC Jhang shall ensure to make EIA/ESIA Report approved from Punjab EPA and ESMMP of EIA/ESIA contractor terms of reference and part of the bid documents. • This ESMMP will be used by the contractor to be guided on the structure and control of potential environmental and social issues that are required to be managed to avoid or mitigated adverse consequences. • This ESMMP will address all of the issues addressed here, but not limited to, and will consists of different sub-plans that will cover health and safety, traffic management, worker camp management, material sourcing, waste disposal	Contract Award to completion phase	MC Jhang / Regional Office PMDFC ESM Team PMDFC E&S Supervision Consultants
Grievance Redress Mechanism • Grievance Redress Mechanism has been developed under PCP • MC Jhang with the technical assistance of PMDFC team shall share project details to public, relevant stakeholders and to receive complaints • Display contact details of ESFPs and E&S Supervision consultants for public to lodge their complaints/concerns to the contractor at the entrance and main points of the site • Provide sign boards for pedestrians to inform nature and duration of construction works • Provide alternative access road for residents via Peradeniya • Develop and establish contractor's own procedure for receiving, documenting and addressing complaints from the affected public and nearby communities that is fully in line with and guided by the project's GRM • Ensure to keep a copy of the ESMMP at all times at the project supervision office on site.	Throughout the cycle of project	MC Jhang / Contractor / Regional Office PMDFC ESM Team PMDFC E&S Supervision Consultants

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C-Construction Phase							
Proposed sub project activity	**Anticipated Environment and Social Issues**	**Magnitude of Impacts**	**Proposed Mitigation Measures**	**Mitigation Implementation Responsibility**	**Monitoring Indicators**	**Monitoring Frequency**	**Monitoring Responsibility**
Establishment of Labor Camp	• Availability of Land • Security • Environment, Health and Safety of Labor at Campsite • Community Concerns regarding privacy of women and GBV[44] • Sustainable Use of Environmental	Medium	• At current, land/road proposed for construction of Sewerage system is open and vacant from any legal/illegal occupants. There are no trees of important flora and fauna observed at the site. This vacant space is owned by MCJ (Land Ownership Documents are attached as **Annexure G**) and notified as commercial area at the entry of the main city where urban area is a few meters away. • Currently MC owned land at proposed sewerage site is available for construction of labor camp at the current site • Contractor will prepare Occupational Health and Safety Plan and get approval from MC before the execution of work • Contractor will be instructed (will be included in his term of reference and in the form of EHS SOPs) strictly implement the PMDFC SOPs for EHS of	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports • Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office • E&S Consultants of Supervision Consultants team

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Resources		labor/ construction workers • Contractor will be instructed to prefer the local labor to be engaged. Anyhow, for labor site management, following mitigation measures will be provided: V Contractor will ensure provision of appropriate housing, water supply, and sanitation facilities to construction labor if they will be hired from outstation. VI Good housekeeping will be ensured inside campsite VII. Labor will be provided with hygienically good quality food. VIII. During winter hot water will be provided for bathing and likewise as per the weather condition. **Labor Training and Code of Conduct-** • The contractor shall develop a labor code of conduct indicating specific labor management procedures applicable to different categories of workers including short time and full-time workers. The labor code of conduct shall be consistent with and part of the overall EHS SOPs for Labor developed by the PMDFC. • The labour Code of Conduct shall be translated into Urdu language upon clearance from the MOI of MC Jhang and DPO-ESM of regional office of PMDFC. The code of conduct must be made available to all staff and displayed in the work site in local languages • Labor awareness programs to educate the laborers about the code of conduct, general conduct, the Environmental and Social Management and Monitoring Plan, Public and Occupational Health				

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		and Safety Plan and sustainable use of local environmental resources etc. should be conducted throughout the contract period as per the Labor management plan and ESH plan approved by the MOI and DPO-ESM. • The contractor shall give priority to selecting labor from project influenced areas so as to minimize the need for erecting labor camps and minimizing labor influx. • Frequent supervision of laborers' activities, labor welfare needs, and action to ensure hygienic conditions in the work sites/ camps • Avoid social conflicts among contactor's labor force and the surrounding community or tension and prevalence of gender- based violence through the implementation of LMP. • Conduct awareness program on Gender Based Violence (GBV), good hygienic practices and dangers of sexually transmitted diseases such as HIV/AIDS and sensitize them to avoid interference and consider the privacy of local community women and vulnerable groups. • Introduce a code of conduct for labor teams to prevent alcohol and drug abuse, violence, sexual abuse etc. • Continue consultation and interaction with host community • Prepare an inventory (including names/ National ID numbers/addresses etc.) of entire labor force employed by contractor, and share with the Resident Supervision Consultants. This inventory shall be updated at each recruitment or resignation				

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			of labors.				
Site Preparation	• Accessibility of local communities and Work Site Management • Health and Safety of local communities • Traffic Management	Medium to High	• All public access to the site via adequate fencing and signage which prohibit public access completely, in order to avoid risk to the public • The site entrance will include adequate signage indicating the details of the proposed subproject, implementing agencies etc. as well as safety signage to keep public away. • A fence shall be erected to cover the entire perimeter of the facility using cost effective fence materials consisting of chain link fence fabric, concrete post, etc. as specified in the Technical Specifications in order to ensure, animals and public are unable to access the site. • To avoid land disturbance and movement, the fence shall generally follow the contour of the ground. • Grading shall be performed where necessary to provide a neat appearance • The contractor should provide a site-specific proposed site layout plan that identifies various zones within the construction site for designated use such as material and equipment storage areas, construction vehicle parking areas, vehicle/equipment maintenance areas, labor camps (if any onsite), temporary spoil storage areas etc. which shall be approved by the MC • Parking, repairing vehicles, machinery and equipment shall be stationed only within the work site and/or in any other designated areas by the MC • The contractor should provide instruction and advice to drivers and operators to park vehicles and	MC jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team

5.3. BIOLOGICAL ENVIRONMENT

Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within this project area, the greater is the biodiversity.

The biological environment baseline studies describe the biological conditions and characteristics of the project site on the basis of primary and the secondary data by describing:

5.3.1. Flora & Fauna[29]

The project area has well diversified flora of terrestrial ecosystem. Twenty-four plant species were recorded from the area during field surveys. Most of these plant species supported the population of avifauna directly or indirectly by providing food, water, shelter, roosting or parching. Tree plantations are found along the borders of agricultural fields and along the irrigation channels. Shisham (Dalbergia sisso) and Kikar (Acacia nilotica) are the main tree species. Other species growing in this area are Eucalyptus (Eucalyptus camaldulensis), Simal (Bombax ceiba), Bakin/Dharek (Melia azerdarac), Jaman (Syzigium cumini), Sukhchain (Pongamia glabra), Mulberry (Morus alba), Beri (Zizipus mauritiana) and Khajoor (Phoenix dactylifera). Roadside plantations include Shisham, Kikar, Farash (Tamarlx aphylia) and Eucalyptus. Bohr (Ficus benghalensis), Neem (Azadirachta indica), Beri and Bakain are commonly planted at the farms. Natural vegetation includes Karir (Capparis aphylla), Aak (Calotropis procera), Kana (Saccharum bengalensis), Khabbal (Cynodon dactylon), Lamb (Aristida depressa), Gorkha (Lasiurus sindicus) which are present in graveyards or in the open area along the roads and also along some canals. Koondar (Typha angustata) grows along water ponds and wet places. According to the IUCN Conservation Status of the species, most of the species have been identified to have least concern however for many species, the evaluation has not been done (Table 4).

Table 8.1 : IUCN Conservation Status for Plant Species found in the Project Area

S. No.	Scientific Name	Common Name	IUCN Status

[29]Information was obtained through discussions with the local inhabitants as well as field staff of the Environment and Forest Department and consulting with the previous literature.

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1	*Acacia nilotica*	Desi Kikar	LC
2	*Aristida depressa*	Lamb	NE
3	*Azadirachta indica*	Neem	LC
4	*Albizia lebbeck*	Flea tree	LC
5	*Calotropis procera*	Apple of Sodom/ Aak	LC
6	*Capparis aphylla*	Karir	LC
7	*Cocos nucifera*	Coconut tree	NE
8	*Cynodon dactylon*	Khabbal	NE
9	*Dalbergia sisso*	Sheesham	LC
10	*Eucalyptus camaldulensis*	Sufaida	NE
11	*Fiscus benghalensis*	Banyan/ Bohr	NE
12	*Lasiurus scindicus*	Gorkha	NE
13	*Melia azedarach*	Dherek	LC
14	*Melia azerdarac*	Bakin/ Dharek	NE
15	*Morus alba*	Mulbery	LC
	Moringa olifera	Sohanjna	LC
16	*Phoenix dactylifera*	Date Palm	LC
17	*Pongamia glabra*	Sukchain	LC
18	*Prosopis juliflora*	Kikar	NE
19	*Saccharum bengalense*	Kana	NE
20	*Salvadora Oleoides*	Wan	NE
21	*Syzygium cumini*	Black Plum/ Jaman	LC
22	*Tamarix aphylla*	Farash	NE
23	*Typha angustata*	Koondar	LC

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24	*Ziziphus mauritiana*	Beri	LC
Key	NE = Not Evaluated	DD =Data Deficient	
	LC = Least Concerned	NT = Near Threatened	
	VU= Vulnerable	EN = Endangered	
	CR = Critically Endangered	EW=Extinct in the Wild	
	EX = Extinct	EN*= Endangered in the Study Area due to low Frequency	

5.4.2. Wildlife Park Jhang[30]

The published literature was reviewed extensively to record information of fauna of the project area. In addition to that, a field survey was carried out along the road side and prominent species of mammals, reptiles, birds witnessed were included in the list. Most of the mammals in the Project Area are species that depend on agriculture and settlements for food. These include Jackal (Canis aureus), Mongoose (Herpestes javanicus), Jungle Cat (Felis chaus), Hedgehog (Hemiechinus collaris), and Five Stripped Palm Squirrel (Funambulus pennantii). Porcupine (Hystrix indica) also exists in the area. Small mammals including Indian Mole Rat (Bandicota bengalensis), Soft Furred Rat (Millardia meltada), Field Mouse (Mus musculus), Indian Gerbil (Tatera indica), and House Shrew (Suncus murinus) are the common pests of agriculture crops. Domestic livestock includes buffalo, cattle, goats, sheep, and donkeys.

The bird species known to occur in this area are Cattle Egret (Bubulcus ibis), Pond Heron (Ardeola grayii), Myna (Acridotheres tristis), Red Vented Bulbul (Pycnonotus cafer), Jungle Babbler (Tordoides striatus), Blyth's Reed Warbler (Acrocephalus dumetorum), Indian Great Reed Warbler (Acrocephalus stentoreus), Black Kite (Milvus migrans), Black Shouldered Kite (Elanus caeruleus), Western Koel (Eudynamys scolopacea), Black Drongo (Dicrurus macrocersus), Common Crow (Corvus splendens) and House Sparrow (Passer domesticus). Some migratory birds like Black-bellied Sandgrouse (Pterocles orientalis), Quail (Coturnix coturnix), Rain quail (Coturnix coromandelica) etc. are the most common sight in the area.

Reptiles observed in this area include different type of snakes like Eryxconicus (Common Sand boa), Eryxjohnii (Sand Boa), Eryxtataricus (Tartary Sand Boa), Boigatrigonata (Common Cat-Snake), Lycodonstriatu (Wolf Snake) etc. and Indian spinytailed lizard are also observed in the

[30] https://worldpress.com.pk/pakistan-news/history-of jhang-is-the-oldest-city-punjab/

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area. In addition, common frog and toad were observed along water courses flowing through the plantation in the area near Shorkot. None of these identified species fall under endangered or vulnerable category. The species' conservation status is given in the tables below.

Table 4.2 IUCN Conservation Status for Mammals in the Project Area

S. No.	Scientific Name	Common Name	IUCN Status
1	*Bandicota bengalensis*	Indian Mole Rat	LC
2	*Canis aureus*	Golden Jackal	LC
3	*Felis chaus*	Jungle Cat	LC
4	*Funambulus pennantii*	Five-striped Palm Squirrel	LC
5	*Hemiechinus collaris*	Hedgehog	LC
6	*Herpestes javanicus*	Mongoose	LC
7	*Hystrix indica*	Indian Crested Porcupine	LC
8	*Bubalus bubalis*	Domestic Buffalo	NE
9	*Mus musculus*	Field Mouse	LC
10	*Suncus murinus*	House Shrew	LC
11	*Tatera indica*	Indian Gerbil	LC
12	*Camelus dromedaries*	Camel	NE
13	*Canis lupus familiaris*	Dog	-
14	*Ovis aries*	Sheep	NE
15	*Equus caballus*	Horse	NE
Key	NE = Not Evaluated	DD=Data Deficient	
	LC = Least Concerned	NT = Near Threatened	
	VU=Vulnerable	EN = Endangered	
	CR = Critically Endangered	EW = Extinct in the Wild	
	EX = Extinct	EN* = Endangered in the Study Area due to low frequency	

Table 4.3 IUCN Conservation Status for Birds in the Project Area

S. No.	Scientific Name	Common Name	IUCN Status

1	*Acridotheres ginginianus*	Bank Myna	LC
2	*Acridotheres tristis*	Common Myna	LC
3	*Acrocephalus dumetorum*	**Blyth's Reed Warbler**	LC
4	*Acrocephalus stentoreus*	Indian Great Reed Warbler	LC
5	*Ardeola grayii*	Pond Heron	LC
6	*Bubulcus ibis*	Cattle Egret	LC
7	*Coturnix coromandelica*	Rain quail	LC
8	*Corvus corax*	Raven	LC
9	*Corvus splendens*	Common Crow	LC
10	*Coturnix*	Quail	LC
11	*Dicrurus macrocercus*	Black Drongo	LC
12	*Elanus caeruleus*	Black Shouldered kite	LC
13	*Eudynamys scolopacea*	Western Koel	LC
14	*Francolinus*	Black partridge	LC
15	*Francolinus pondicerianus*	Grey partridge	LC
16	*Lanius schach*	Long-tailed Shrike	LC
17	*Lanius excubitor*	Great Grey Shrike	LC
18	*Motacilla alba*	White Wagtail	LC
19	*Milvus migrans*	Black Kite	LC
20	*Passer domesticus*	House Sparrow	LC
21	*Pterocles orientalis*	Black-bellied Sandgrouse	LC
22	*Pycnonotus cafer*	Red Vented Bulbul	LC
23	*Saxicola caprata*	Pied Bush Chat	LC
24	*Turdoides earlei*	Striated Babbler	LC
25	*Turdoides striata*	Jungle Babbler	LC

Key	NE = Not Evaluated	DD=Data Deficient
	LC = Least Concerned	NT = Near Threatened
	VU=Vulnerable	EN = Endangered
	CR = Critically Endangered	EW=Extinct in the Wild
	EX=Extinct	EN*=Endangered in the Study Area due to low

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Frequency

Table 4.4: IUCN Conservation Status for Fishes in the Project Area

S. No.	Scientific Name	Common Name	IUCN Status
1.	*Notopterus*	But Pari	LC
2.	*Labeo rohita*	Rahu	LC
3.	*Labeo boga*	Bhangan	LC
4.	*Labeo calbasu*	Kalbans	LC
5.	*Labeo gonius*	Sariha	LC
6.	*Cirrhinus mrigala*	Mori	LC
7.	*Cirrhinus reba*	Reba	LC
8.	*Gibelion catla*	Thaila	LC
9.	*Puntius sophore*	Sphor Popra	LC
10.	*Puntius chola*	Chola popra	LC
11.	*Systomus sarana*	Khirni	LC
12.	*Securicula gora*	Bari Chal	LC
13.	*Esomus danricus*	Somara	LC
14.	*Osteobrama cotio*	Pali-ro	LC
15.	*Chela cachius*	Budha	LC
16.	*Rita*	Desi Khaga	LC
17.	*Mystus cavasius*	Kanghar	LC
18.	*Mystus bleekeri*	Kanghar	LC
19.	*Gagata cenia*	Gagata cenia	LC
20.	*Heteropneustes fossilis*	Sanghi	LC
21.	*Channa marulius*	Saul	LC
22.	*Channa punctate*	Daula	LC
23.	*Channa gachua*	Dauli	LC
24.	*Mastacembelus armatus*	Baam	LC
25.	*Macrognathus pancalus*	Garoj	LC
26.	*Chanda nama*	Sheesha	LC

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27.	*Parambassis ranga*	Ranga Shsha	LC
28.	*Glossogobius giuris*	Golu	LC
29.	*Oreochromis niloticus*	Chirra	LC

Key NE = Not Evaluated DD=Data Deficient
LC = Least Concerned NT = Near Threatened
VU=Vulnerable EN = Endangered
CR = Critically Endangered EW=Extinct in the Wild
EX=Extinct EN* = Endangered in the Study Area due to low frequency

Agriculture in Jhang[31]

The land of the tehsil is plane and the land is under the cultivation. The land is fertile. The mostly people of rural area are agricultural. The main crops are the rice, wheat and sugar cane of this land. Now the tunnel farming is new trend start in Jhang. From the tunnel forming, lots of kinds nonseasonal vegetables produced in Jhang which is fulfill the needs of foods in Pakistan. The agriculture is at one No. of this city. The business of poultry in the form of poultry forms in different areas of tehsil is at No.2 in the Punjab.

5.4.3. Environmentally Sensitive Receptors[32]

Environmental sensitive areas are more prone towards human disturbance. For this project, no wetland, estuarine, river, lakes, any water resource, protected areas, mangroves, forests etc. lie within 500 meters of sub-project area and no significant environmental impacts has been envisaged. Similarly, there is no protected forest near the areas of works. Common floral species with rooted vegetation and few different types of herbs, shrubs, and bushes are also present along surrounding roads.

[31] ibid
[32] Information was obtained/observed by Consultant and DPO ESM during field visits

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5.5. SOCIO ECONOMIC ENVIRONMENT

5.5.1. General

This section illustrates the description of socio-economic conditions of the project area. It presents information on the project area's location, population distribution, gender composition, socio-economic conditions, and livelihood activities, state of education and basic facilities.

5.5.2. Administrative Framework

The Project Area mainly lies in the District Jhang and partly lies in District Tobba Tek Singh. District Jhang spreads over an area of 8809 sq. km and comprises of four tehsils and 128 union councils. The Tehsils include Ahmed pur Sial, Athara Hazari, Jhang and Shorkot and Tehsil Jhang is largest among them. Main towns in Jhang district include Sar Muradwala, Ahmedpur Sial, Bhowana, Chak No. 190 Arbianwala, Chund Bharwana, Chiniot, Sheikhan, Shah Jiwana, Wasu Astana, Rabwah, Qaim Bharwana, Shorkot, Sadiq Nihang, Lalian, Barana, Hasoo Balel, Rodu Sultan, Talhi Mangini, Teja Berwala, Ratta Matta, Rajoa Sadat, Ahmed Nagar, Aminpur and Jhang Maghiana.

5.5.3. Demography[33]

According to the recent outcomes published by Pakistan Bureau of Statistics for the 6th Population and Housing Census held in 2017, total population of District Jhang is 2.7 million and District Toba Tek Singh is 2.1 million. According to this report, 78% of population in district Jhang and 80% in Toba Tek Singh are inhabited in rural areas. The gender ratio of the district is approximately 923 females per 1000 males. Total households in Jhang district were 427,513 in 2017, out of which 332,257 were in rural areas while 95,256 were settled in urban areas. Whereas, for Toba Tek Singh District, total number of households was 338,469 of which 70,648 were in urban areas while 267,821 were in rural settlements.

5.6.3. Ethnic Profile

According to the 2017 district census, the Muslim population is by far the largest religious group, constituting 98.7% of the population across these districts. In Project Area, another ethnic group, Ahmadis comprise 1.5% of population followed by Christians, who are barely 1% of the population and are equally spread among the urban and rural area locations.

[33] https://www.citypopulation.de/en/pakistan/distr/admin/toba_tek_singh/73303_Jang/

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5.6.5. Water Sources[34]

The city is considered as a single unit or zone with respect to water supply. Deep ground water is fresh and hence the water supply system is based on deep tube wells installed at various locations in the city. The Town is served by direct pumping in some areas whereas in some areas water is supplied to the consumers through overhead reservoirs.

5.6.6. Social Setup

The population of these districts is derived from Semitic or from Indo-Aryan races. Most of these are predecessors of different tribes who came from Afghanistan and Central Asia and remained here. In colonial age, British government developed canal command systems in these districts and did first land reforms in 1902. At that time British government allotted agricultural land to different farmer tribes and settled them here by bringing them here from different central districts of the combined Punjab like Sialkot, Amratsar, Gurdaspur, Gujranwala, Gujrat and other areas. At the time of partition in 1947 (the largest migration of human history) many refugees from Indian Punjab also settled in these areas. These tribes who came here from different regions were also of same clan who used to already live here. By living here side by side from centuries, homogeneity of culture and races has been developed among these people because of blood relations with each other. These tribes can be divided in two classes, farmer tribes and non-farmer tribes. Farmer's tribes are those who are mainly involved in farming and non-farmer's tribes are those who are engaged in allied agro-based professions. Social life is very simple but legendry in the districts however advanced in the urban centers of the district. Social customs and traditions reflect Islamic touch. People are very much sincere, hospitable, conservative, and humble, they are seriously conscious about their social traditions and feel pride in following them.

5.6.7. Culture and Traditions

Traditionally, men wear turbans and dhotis (like a kilt) in rural settings though in recent years people have started wearing the national dress which is shalwar kameez. The old women still wear dhotis (skirts) but the younger women wear shalwar kameez with overall covering "Chaddar". Tent pegging (naiza baazi) and kabaddi are very popular among the people of Jhang. Punjabi folk dances such as Jhumar and Sammi are popular in this area. Jhumar is a dance for men while Sammi is for women. The famous form of folk music is known as Dhola or

[34] JHANG City Gap analysis report-PCP

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Jhang da Dhola. Teeyan and Trinjan was an important activity for women in which they used to weave cloth using the spinning wheels, but this trend no longer exists. Wooden, Date Leaves and Soil handicrafts are most popular and common. Women design different styles of dresses and make flowers and Embroidery.

These districts are also the resting places of mainly saints and notable individuals. The Tehsil Karor Lal Esan is partially named after a saint, Hazrat Lal Esan, who recited 10 million times the Sura Yaseen (A chapter from The Holy Quran) while standing on foot in the Indus River. In Urdu 10 million is equal to 1 Karor that's why the city is called Karor Lal Esan. Hazrat Lal Esan was the grandfather of the famous Bahudin Zakarya Multani. There is the tomb of Heer (Heroine of a famous folk story) in the north of Jhang City on the way to Faisalabad. Besides that, there is Shrine of Hazrat Sultan Bahu who was a famous scholar and Sufi poet. His Urs is attended by people from far and wide in the start of Muharram (first month of Islamic calendar).

5.6.8. Literacy

The literacy rate according to the census in 2017 was 51.1% (80% male and 58% females) and fortunately there is notable progress in it. Women education is empowered, and the district is ranked 19th out of 34 districts of Pakistan in terms of literacy rate.

5.6.9. Linguistics

About 95% of the population in the Jhang and Shorkot Tehsils as well as in District Toba Tek Singh identified their first language as Punjabi, and 3.8% as Urdu. A local dialect spoken in Jhang, Jhangi, is intermediate between Standard Punjabi and Saraiki.

5.6.10. Land use

Main land use in the project districts is agriculture. Wheat and Cotton are the principal crops in Jhang district while other crops include rice, sugarcane, corn (maize), oilseeds,
fruits, and vegetables. Main fruits grown in District Jhang include orange, date-palm, guava, mango, and pomegranate while vegetables include potato, cucumber, peas, spinach, bitter gourd, reddish and carrots. Toba Tek Singh produces the best oranges in Pakistan and besides that, it is among key producers of cotton, maize, pulses, fruits including guava, peach, watermelon, melon and mango as well as tomato, onion and tobacco.

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5.6.11.Physical Infrastructure

Electricity is supplied through thirteen grid stations in District Jhang. industrial units lie in District Jhang which include sugar mills, cotton ginning and pressing, rice, flour and oil mills as well as textile industries. Toba Tek Singh has a number of poultry and dairy industries. Most of the areas in these districts are facilitated with natural gas and the process of provision natural gas is under process. Electricity is available in urban centers and approximately 70% of rural areas.

5.6.12. Health facilities

DHQ Hospital Jhang has been certified by PHC, and has already been certified by ISO 9001 and 14001 which is a best health facility among all public and private hospitals and has leading OPD numbers from second first (800 bedded) secondary level hospital in Punjab.[35]

Table 4.5 *Health facilities in District Jhang*

Sr. No	Facilities	Number			Beds		
		District	Punjab	Percentage	District	Punjab	Percentage
1.	Hospitals	9	389	2.31	553	48804	1.17
2.	Dispensaries	69	1201	5.75	0	379	0.00
3.	RHCs	11	319	3.45	220	6087	3.61
4.	BHUs	59	2510	2.35	118	4948	2.38
5.	MCH centres	9	280	3.21	0	28	0.00

Source: Bureau of Statistics[36]

5.6.13.Solid Waste Management[37]

The city has un-satisfactory solid waste management system. Resources available to handle the solid waste are limited to serve the whole area of city. The entire city is not served with solid

[35] https://jhang.punjab.gov.pk/district_health
[36] https://www.bos.gop.pk/DistrictProfile
[37]

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waste collection and disposal. The efficiency of the services is 50-55% as given below. Most of the areas of the city remain either un-served or these are partially served.

5.6.14. Health Facilities

The healthcare services in Jhang are delivered through both public and private healthcare facilities providers. These two types of facilities vary in accessibility, content, affordability and equitable provision. The public sector facilities are tightly regulated even when quality may vary widely. On the other hand, private sector provision is not optimally regulated and there are wide variations in quality, however, a clear picture is not available due to inadequate documentation, monitoring and reporting mechanisms on working of private sector healthcare facilities. However, no healthcare facilities come within the proposed project area.

5.6.15. Important Places of Jhang[38]

Important places include Trimmu Barrage was constructed in 1938 –39 by English engineers as a part of the Haveli Project. It is located just below the confluence point of the river Jhelum and Chenab. Trimmu Barrage is located at a distance of about 25 kilometers from Jhang Sadar.

Rivaz Bridge (locally known as Chund Pull) is a bridge over the Chenab River. It is one of the oldest bridges in Pakistan and built in 1905 by British engineers. It is located near Chund Bharwana, Jhang District.

The Thal desert appears to be the oldest geologic formation similar in character to the Bikaner desert, of which it must at one time have formed a part when both were said to be under the sea. The origin of the Thal sand presents an interesting problem. There are similar sand dunes found in east of Qadirpur Bakhsha in Vichhan andKachhi, and that of Gilmala and Pirwala on east side of the Chenab below its junction with Jehlum, but these are believed to be purely local and have no doubt of being formed from sand deposits in old river channels.

Tomb of Hazrat Sultan Bahu at Garh Maharaja, Tomb of Mai Baap at Shorkot, Tomb of Hazrat Shah Jewana at Shah Jewana, Tomb of Hazrat Shah Sadiq Nihang, and Tomb of Pir Abdur-Rehman at Peer Abdur-Rehman, Tomb of Mai Heer, and Tomb of Mirza Sahiban are the other famous attractions in the Jhang city.

[38] http://www.tmakotaddu.lgpunjab.org.pk/mcjhang.lgpunjab.org.pk/wwwroot/Imp-Places.html

5.6.16.Archaeological and Cultural Sites[39]

In Jhang city, there are several archaeological and archaic sites, such as the Mehal Umer Hayat (Chiniot). It is also known as Gulzar Manzil. This Mehal is in the old centre of the ancient town of Distt. Jhang, Ahmad Pur Sial City, is one of the oldest towns of Jhang and 103 km away from head quarter Jhang. It is situated in between Muzaffargarh and Jhang. Tehsil Ahmad Pur Sial consists of 16 union councils and two municipal committees Ahmad Pur Sial and Garh Maharaja. Shrine of Hazrat Sultan Bahu and Hazrat Pir Abdul Rehman also exist in this Tehsil.There is no site of archaeological, historical, religious and cultural importance inside the premises of the proposed project site and even 1km of its boundary lines. However, there are a few places of worship within about 2 km of the propose project site.

5.6.17.Economy of Jhang[40]

Jhang is more famous for its people than for its products. The Jhangvis are hardy peasants who live principally in the plains and have a reputation of being straight-forward, broad minded, hospitable and progressive. Jhang is the centre of a purely agricultural based society. Agriculture is the chief source of income and employment in Jhang. About 85 percent of the Jhang"s cultivable land is irrigated. Wheat and cotton are the principal crops. Other crops grown include rice, sugarcane, corn (maize), oilseeds, fruits, and vegetables. Livestock and poultry are also raised in large numbers in district Jhang.

Economic activity in Jhang has picked up considerably in recent years, due to cheaper land and relatively skilled labour. Due to favorable conditions for agriculture, a number of crops are grown in the area, including Rabi, Kharif, sugarcane, cotton, wheat, bajra, maize and rice. Jhang is also famous for its handicrafts mastered by Jhangvian artists and artisans.The economic status of local population is poor and middle class. The per capita income is Rs. 12,000 to 20,000 per month approx. People mostly work on daily wages (labor). Some people do their own small business-like shops, vendors etc.

There are 7 large scale industries in the district. The Government Woolen centre, Jhang city manufactures blankets for supply to Pakistan Army. Carpets and Durries are also produced for sale among government departments and public. Cottage Industry There are number of hand looms and power looms at Jhang. Jhang is regarded as great market of Khaddar. The major industries in the Jhang city are:

[39] https://www.pakpedia.pk/jhang-city-punjab-history-weather-updates/#jhang_Weather
[40] https://worldpress.com.pk/pakistan-news/history-of-Jhang-is-the-oldest-city-punjab/

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- Sugarmills 05
- Flour mills 22
- Rice mills 68
- Vegetable ghee and cooking oil mills 02
- Brick kilns 171
- Cold storage 04
- Poultry farms 121

5.6.18. NGOs and Social Organizations

There are many NGOs working in the Sub-project area. There is a strong group of non-profit organizations that are involved in the rehabilitation, counselling and financial support of the communities. The famous NGOs working in the Sub-project area are NRSP, Haveli Welfare Foundation, Nai Zindgi Trust, Abbas Welfare Society, Maduki Road Mallowana More Jhang, Akuwat Welfare Society, Kotwali Road Jhang, Al Bilal Welfare Society, Ayoub Chowk Jhang, Al Fallah Welfare Foundation, Jabir Nagar Jhang, Human Welfare Organization, Mouza Machiana Jhang, Iddara Taraqi –e- Khawateen, Civil Line Jhang, Ismail Welfare Society, Satellite Town Jhang, Jhang Educational Trust, District Courts Jhang and Pakistan Markaz-e-Nabina, Jhang Bazar Jhang Sadar.

5.6.19. Socially Sensitive Receptors[41]

There is no major institute situated in the project scheme area. No public infrastructural damage is envisaged as per scope of work under this scheme. No settlements, cultural heritage sites, graveyard, hospital, school/college/educational institute etc. observed within 500 meters of the Sub-project.

5.6.20. Land Acquisition and Resettlement

MC owns the land which will be utilized for the improvement of sewerage system and construction of WWTP. There is no resettlement of public infrastructure/communities/household involved. Land Ownership Document is attached as Annexure G.

[41] Information obtained/observed by consultant and DPO ESM during field visit.

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CHAPTER 6

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. GENERAL

This section identifies the overall impacts of pre-construction (design), construction and operational phases of the proposed project on the physical, biological and socioeconomic environment due to Improvement of sewerage system in Jhang city and construction of WWTP. In addition, it also recommends the measures to mitigate or minimize the project's adverse environmental impacts.

Environmental Impact Matrices

The identification of impacts is done on the basis of literature review, site surveys and expert opinion on prevailing site conditions and sensitive receptors.

Significance	Implications
Low	Should not have an influence on the decision to proceed with the proposed project, provided that recommended mitigation measures to mitigate impacts are implemented.
Medium	Should influence the decision to proceed with the proposed project, provided that recommended measures to mitigate impacts are implemented.
High	Should strongly influence the decision to proceed with the proposed project regardless of mitigation measures

6.2. Anticipated Impacts during Pre-Construction/Design Phase

Following is the description of impacts envisaged and the recommended mitigation measures during Pre-construction/Design Phase:

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6.2.1. Design & Layout Planning

Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the project area. Also, low utilization of the available spaces and not designing the structures taking into account, the prospective and futuristic needs can result in structures with low social acceptability and functionality. This impact will be permanent and moderate negative in nature.

Mitigation:

All structural, layout and engineering designing of MBS should be in strict accordance with the applicable by-laws and engineering parameters.

6.2.2. Topography

Cut and fill of land for the improvement of sewerage system and construction of WWTP will be required that may contribute to moderate change in the topography of the area.

Removal of topsoil and soil erosion may occur on roadside due to excavation, clearing of existing ROW and cutting and dismantling of existing pavements. The changes due to construction of the proposed project, however, will be of localized nature. This impact is permanent and moderate negative in nature.

Mitigation measures will include provision of embankments, designed by considering the Geotechnical investigation studies (if needed). Due consideration should be given to aesthetic improvement during the design phase.

6.2.3. Drainage

Improper drainage from home may cause trash pooling condition; due to which following impact are expected to arise:

- Deterioration of the surface road and reduction of its bearing capacity;
- Public inconvenience in road usage; and

The stagnant water may serve as breeding ground for disease vector

Mitigation measures will include provision of appropriate drainage structures and storm water pumping station in design. Proper slopes shall be incorporated in design feature to avoid the formation of the water layer on road surfaces in rainy seasons.

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6.2.4. Resource Conservation

The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement 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.

Fuel will be used to operate construction machinery, asphalt plant and batching plants. Sustainable use of energy resources is very important not only to continue future use but it will also help to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes shall be considered in planning.

Mitigation measures will include:

- Wastage of water should be reduced by training the workers involved in water use;
- Source of water should be carefully selected. Water use should not disturb the existing community water supplies;
- Ensure adequate insulation to reduce heat loss through batching plants; and
- Regularly monitor CO and CO2 content of the flue gases to verify that combustion systems are using practical excess air volumes.

6.3. Anticipated Impacts during Construction

This section explains how proposed project will affect different environmental aspects and its mitigation measures to manage the impact. The impacts during construction phase will be temporary and localized. Even though, the measures proposed to minimize such impacts.

The potential environmental impacts of the proposed project at site and surrounding area during construction phase of the Improvement of sewerage system and construction of WWTP involve:

- Noise and vibration due to movement of heavy construction machinery, land clearing, excavation and digging
- Fresh water consumption and wastewater from different activities
- Exhaust, particulate emissions and dust generation due to engines, generators, movement of heavy construction machinery and other construction activities
- Solid waste from construction activates and from site camp office/labors camp
- Increase traffic burden due to construction activities and heavy machinery

However, the majority of these impacts will be temporary, reversible and limited to the construction phase and are envisaged to abate with completion of the construction phase.

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6.3.1. Physical Component

The main impacts of the project during construction and development activities are described below

A. Soil Erosion and Land Use Changes

Soil and land may be affected during construction phase due to land clearing operations, excavations and diggings, cutting of trees if any at the proposed project site, onsite stockpiling of materials and equipment, construction of site offices, movement of heavy construction machinery, disposal of wastes and wastewater along with throwing of chemicals, oils, varnishes, coal tar, packaging materials and other compounds on to the land would be associated with impacts on soil and land.

When it comes to proposed project site, no significant impact on soil would arise. Similarly, the project construction will have apparently no impact on topography and slope stability. However, the soil quality may be affected due to vehicle and equipment maintenance and leakage from equipment and vehicles as explained above. Nevertheless, if appropriate mitigation measures are applied then the overall impact on soil during construction phase would be minor.

i. Potential Impacts

The adverse environmental impacts to soils and lands would be in term of:

- Degradation of soils and changing soil properties
- Soil may be contaminated as a result of fuel/minor oils/chemicals spillage leakage, and inappropriate waste (solid as well as liquid) disposal during the proposed project.
- Land instability
- Deterioration of soil due to movement of heavy machinery
- Development of pits and depression in borrow areas and stagnation of water on the land surface.

Impact related to soil erosion and degradation will be occurred during construction phase of the proposed project are characterized below and these will be managed on site by following proposed mitigation measures.

ii. Potential Mitigation Measures

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- Wherever possible, avoid excessive and simultaneous excavations to minimize generation of large volumes of soil and chances of destabilization and erosion of adjacent lands. Backfill the soil borrowing areas and level up the surfaces of the pits and depressions is recommended.
- Spills prevention trays should be provided and used at refueling locations.
- During onsite maintenance of vehicles and equipment, tarpaulin or other impermeable material should be spread on the ground to prevent the contamination of the soil.
- Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.
- Regular inspection should be carried out to detect the leakage in construction vehicles and equipment.
- Domestic solid waste will be disposed in a manner that does not cause soil contamination and ensure provision of dustbins for solid waste at the site.
- Appropriate arrangement, including shovels, plastic bags and absorbent material, should be available near the fuel or oil storage area.
- Select campsite in consultation with site engineer and the project environmentalist and secure a connection of the toilet's wastewater from labors.

As soon as the construction phase is completed or near completion, a plantation program should be implemented around the site. The significance of the residual impacts is therefore expected to be low because these mitigation measures are based on best management practices.

B. Dust During Construction Deteriorates Air Quality

Dust or the equivalent technical term 'particulate matter', is generally defined as any airborne finely divided solid or liquid material up to the size of about 100 microns (micrometers or one-millionth of a meter). During the development / construction, vehicles and machinery will be employed. These will generate some dust and smoke temporarily which will stop on completion of the construction work. During construction phase due to continuous operation of machinery and movement of heavy trucks and vehicles can generate gaseous emissions and can have a slight adverse effect on the surrounding environment. Combustion exhaust from vehicles and construction equipment during construction phase can affect ambient air quality of project area.

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These impacts are classified to be short term, reversible and limited, as it will only occur during the excavation activities. Also, these impacts are expected to be contained within the site boundaries.

i. Potential Impacts

- Particulate matter emitted during construction activities can result in deterioration of ambient air quality in the vicinity of the source and be a nuisance to the communities and construction workers.
- The main health hazards are the particles smaller than 10 microns (designated as 'PM10') as they are respire-able. Larger particles also tend to settle rapidly and often do not reach receptors. In cases where they reach the receptors, the dust is considered a nuisance as it may spoil property and affect visibility.
- Large amount of dust particles will be generated from the project site due to various activities such as movement of the heavy construction vehicles on unpaved roads, earthwork, truck dumping, hauling etc. This will be higher than the existing level of the particulate matter measured at the project site.
- Due to continuous operation of machinery and movement of heavy trucks and vehicles can generate gaseous emissions and can have a slight adverse effect on the surrounding environment.

ii. Potential Mitigation Measures

The potential negative impacts during construction stage of the project will be mitigated to an acceptable level. Following environmental protection measures will be adopted to eliminate adverse environmental impacts or to reduce them to an acceptable level within the legislative and regulatory framework. The proposed mitigation measures are listed below:

- Appropriate waste disposal mechanism will be followed during the construction phase. The construction waste will be disposed in a manner that does not contaminate surface or groundwater.
- The construction waste generated will be used for earth filling within the project site premises.

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- The Contractor needs to make sure that their machinery and equipment are properly tuned and serviced and there is no leakage of oil from construction equipment and machineries.
- Construction labor must be trained in safety procedures for all relevant aspects of construction
- Ensure water sprinkling on daily basis before the start of the construction activities as dust suppressant. Frequency of sprinkling will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors (especially when the wind blows towards the city).
- Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.
- Properly cover construction material such as soil, sand and cement stockpiles for the shortest possible time to prevent wind whipping.
- Plantation will be done at site.

The effects of the dust nuisance are temporary and no long-lasting impacts are expected after the completion of the construction works. It is therefore recommended to put in place all the suggested mitigation measure in order to avoid significant impact during the construction phase of the facility.

C. Noise And Vibration

Noise is a by-product of human activity. Main sources are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers, asphalt plants and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within 50 meters of the proposed site. This noise and vibration will affect nearby public. Therefore, appropriate measures will be there to minimize the repercussion of noise.

i. Potential Impacts

- Noise and vibration can be a source of nuisance for workers and most importantly for local public of the area.
- Distracted attention and inability to concentrate
- Health impact in terms of Irritation and short temperedness, headache, dizziness and ringing ears.

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- Physical stress on labor because they have to speak louder than normal in a noisy environment
- Physical damage to ear drum in case of noise crosses the critical threshold for that as a result partial loss of hearing and inability to hear at normal pitch and sound

ii. Potential Mitigation Measures

All mitigation measures mentioned below should be taken in order to minimize the impacts of noise in the project area. These measures include, but are not limited to the following:

- Plan the traffic route away from the residential settlements.
- Selection of up-to-date and well-tuned machinery.
- Confining excessively noisy work to normal working hours in the day, as far as possible. Therefore, Plan to perform noisy operation at the same time period. The total noise level would not be higher than the level if the operations were performed separately.
- Providing the construction workers with suitable hearing protection like ear plugs, or earmuffs
- It is recommended to use quieted equipment, such as enclosed air compressor and air mufflers (silencer) on all engines
- Select the demolition method that produces the least noise and vibration
- Use of low noise machinery, or machinery with noise shielding and absorption.
- Regular checkups and maintenance of the construction equipment, periodic preventive lubrication and greasing of the noise making mechanical parts.
- Use noise-abating devices wherever needed and practicable.
- Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points

Keeping in view all these measures, it is envisaged that residual noise and vibration impacts during construction activities are expected to be low.

D. Surface And Ground Water Quality

The improvement of the proposed sewerage system and construction of WWTP will involve various operations. This section summarizes the various activities and their potential impacts on the surface and the ground water quality.

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Surface water might get contaminated due to the disposal of solid waste from different activities during the construction phase. Similarly ground water quality may also be deteriorated by dint of excavation, digging and removal of vegetation.

i. Potential Impacts

- Unauthorized and excessive abstraction of groundwater, imperfect sealing of the groundwater borehole would allow contaminated water to move down along the borehole.
- In the rainy season during construction phase, runoff results significant pollution in the surroundings. Therefore, Construction of temporary infrastructure such as drainage culverts/ducts may be required.
- Solid waste from camps if established, 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 it.
- The used engine oil and lubricants, and their storage as waste materials has the potential to create impacts if spillage occurs as oil may percolate into the surface soil layer, runoff in to the local watercourses hence adequate measures should bring in to practice in order to prevent spillage. So, there is a possibility that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly
- Contaminated groundwater would lead to serious health consequences as it is used for drinking purposes.
- Wastewater from camps and improper disposal of garbage can contaminate surface and groundwater.
- During construction phase, impacts from the workers include waste and wastewater generated from eating areas, and sewage from temporary sanitary facilities because sewage is characterized by high levels of BOD, ammonia and E-Coli. Adverse water quality impact will be generated only if the sewage is discharged directly into the receiving waters without any prior treatment.

ii. Potential Mitigation Measures

- The surface water quality if there is a potential of contamination should be constantly monitored.

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- Wastes must be collected, stored and taken to approve disposal site. Contractor camp if established should be at proper location.
- Do not construct unauthorized borehole and do not make boreholes at low lying places and depressions, which attract surface runoff and allow water stagnation. Seal off the borehole with cement mortar.
- Ensure regular laboratory testing of the groundwater/ drinking water from site for timely detection of contamination during execution phase.

The majority of the identified adverse impacts on surface and ground water quality are temporary and reversible. Implementation of the recommended mitigations will result in complete abatement of the adverse impacts on surface waters and there would not remain any residual adverse environmental impacts pertaining to this parameter. The site supervisor should ensure compliance/implementation of the measures.

E. Air Quality

Air quality will be affected by fugitive dust emissions from construction machinery and vehicular traffic. Emissions may be carried over longer distances depending upon the wind speed direction, temperature of surrounding air and atmospheric stability. Usage of poor-quality oils petroleum products, additives and chemicals, unplanned excavations and diggings and leaving the dugout sites open and without backfill, loose stock pile of the materials without covering, shielding or water sprinkling will affect the quality of air. Vehicular emissions such as PM_{10}, SOx, NOx and CO_2, CO and the smoke emission will get higher.

i. Potential Impacts

- Transportation of materials and other construction activities will create dust emissions.
- During construction, the continuous operation of machinery and movement of heavy trucks and vehicles may generate gaseous emissions and have negative impact on the surrounding environment.
- Decrease visibility due to smoke and particulate matters
- Deposition of dust and particulates on open surfaces and vehicles
- Inhalation and ingestion of the fugitive dust and consequential health problems.
- Emissions from the generators will also pose significant impact on quantity of GHG emissions.

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ii. Potential Mitigation Measures

- All vehicles, machinery, equipment and generators which are used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions
- The quality lubricants and oil should be used
- Open burning of solid waste from the contractor's camps should be strictly banned
- Regular water sprinkling of the site should be carried out to suppress excessive dust emissions.
- Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions.
- Keep the stockpile materials covered or lightly sprinkle with water in order to avoid dust emissions.
- Use protective inhalation masks and eye glasses during construction works.

The site supervisor is responsible to ensure compliance of the suggested mitigation measures. The impacts during construction phase are envisaged to be low.

F. Solid Waste Generation & Dumping

Solid waste may arise from different activities during construction phase such as waste generated for labor camps, food waste, construction material, waste obtained during excavation and digging etc. Moreover, different types of raw materials will be used during construction phase which in general comprise of the following:

- Cement concrete
- Plastic pipes
- Bricks, tiles,
- Cement plaster
- Steel (RCC, door/ window frames, roofing support, railings of staircase etc.)
- Rubble, sand, Stone (Marble, granite, sand stone)
- Timber/wood
- Paints/varnishes

Dumping of construction wastes/excavated material in the surrounding area of the proposed project may lead to serious implications pertaining to environment as explained below.

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i. Potential Impacts

- Result in degradation of soils
- Solid waste may pose health issues or disturb the scenic beauty of the site
- Generation of solid waste and its improper management may provide breeding place for mosquitoes, rodents and insects
- Heaps of solid waste may cause disturbance in mobility
- If not properly dispose of or covered or store separately during raining season then it will lead to leachate generation that in turn deteriorate soil and groundwater quality.
- Improper disposal of solid waste and debris can choke sewer lines may cause contamination of drinking water.

ii. Potential Mitigation Measures

- The waste/ spoils will be carefully examined and disposed of in an environmental friendly manner by transporting it in closed container and filling at appropriate sites.
- The waste transfer vehicles shall be properly covered.
- Waste should be properly covered at the site and maximum effort shall bring in to practice to avoid contact with precipitation.
- The solid waste generated during this period being predominantly inert in nature. Hence maximum effort would be made to reuse and recycle it. The most of the solid waste material can be used for filing/ leveling of low-laying areas within the site.
- Attempts will be made to keep the waste segregated into different heaps as far as possible so that their further gradation and reuse is facilitated.
- Scattered solid waste should be properly managed in order to avoid contamination and provision of enclosed bins for general refuse at project site.
- The local body/MC or a private company may be arranged to provide appropriate number of skip containers/ trolleys on hire.

The use of the construction material basically depends on their separation and conditions of the separated material. A majority of these materials are durable and therefore, have a high potential for reuse. It would, however, be desirable to have quality standards for the recycled materials. Construction waste can be used in the following manner:

- Reuse of bricks, tiles, stone slabs, timber, piping railings etc. to the extent possible and depending upon their conditions.

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- Sale/ auction of materials which cannot be used at the site due to design constraint
- Plastics, broken glass, scrap metal etc. will be stored and processed within the site premises.
- Rubble/ brick bats can be used for building activity, such as leveling, under coat of lanes where the traffic does not constitute heavy moving loads.
- Larger useless pieces can be sent for filing up low laying areas.
- Fine material such as sand, dust, etc. can be used as cover material
- The unearthed soil can be used for leveling as well as for lawn development
- The broken pieces of the flooring material can be used for leveling in the building or can be disposed of.
- The unused or remaining paints/varnishes/wood can either be reused or can be disposed of.

All attempts should be made to stick to the following measures. The site supervisor is responsible to ensure compliance of the suggested mitigation measures. The impacts during construction phase are envisaged to be low.

6.3.2. Biological Component

A. Impact On Floral Species

Trees are vital source of ecosystem perform variety of functions for the improvement of environment such as reduction in air pollution, noise abatement, cooling effect on earth, supply of oxygen etc. As already explained in above sections that site is commercial in nature and is not habitat of floral species. However, several ornamental plants will be planted for landscaping in decommissioning phase.

i. Potential Impacts

- Cutting of trees from the project site if any
- Cutting of tress for cooking purposes from the surroundings

ii. Potential Mitigation Measures

The following mitigation measures will further minimize any negative impacts on floral resources of the area:

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- In the entire project area, a comprehensive plantation plan will be developed, with due consideration given to landscaping. The plantation plan should be implemented as early as practicable.
- After construction besides introducing new ornamental plants, local tree and plants species will be planted. In addition to providing a better view to the area, the proposed vegetation will help minimize the excess noise, vehicular emissions and dust pollution.
- Indigenous species of trees will be recommended to be planted. Other species suitable for site will be planted to increase scenic beauty. Besides, species having dust retention and odor control properties will be recommended for plantation.
- Slopes must be contoured and grass planted to avoid erosion.
- Use of fuel wood will not be allowed.

With the help of the mitigation measures, the residual impact of the project's construction activities is likely to be negligible.

B. Impact On Faunal Species

During the construction phase, there will be considerable human interventions in the project area which can potentially affect the faunal resources such as land clearing, earthmoving, terrain shaping, and construction activities, construction camp, dredging and filling, solid and hazardous waste, discharge of polluted or treated wastewater and fuel storage.

No environmentally sensitive area (forest, wetland, national park, wildlife sanctuary, or game reserve) is located in the vicinity of the project area. Most of the animals found are common species that are highly adaptable and are able to co-exist with people. Similarly, there is no wildlife present in the Project area. However, none of the species found to be endangered or of global significance.

i. Potential Impacts

- Water quality impacts such as increased sediment disturbance can indirectly affect habitat health
- Soil and water contamination will affect the faunal resources
- Disruption and dislocation (via noise, vibration, lights and human presence) of local birds or other wild animals

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- Tree cutting from the surroundings for heating purposes may disrupt habitat of birds i.e removal of nests during breeding seasons.

ii. Potential Mitigation Measures

- The measure to prevent soil and water contamination will predict any adverse impact on the faunal resources of the area.
- Construction machinery will remain confined within their designated areas of movement.
- Well-tuned machinery will be used to avoid nuisance to wild life in the surroundings

With the help of the mitigation measures, the residual impacts of the project's construction activities are likely to be negligible.

6.3.3. Social Component

A. Health And Safety of Workers

Construction activities are always associated with risks, hazards include traffic, working of mechanized equipment and machineries, excavations, falling objects, confined spaces, trapped energy, tripping etc. The contractor will be made bound to provide its workers necessary personnel protective equipment (PPE) to safeguard themselves against any hazard.

i. Potential Impacts

- Hazards during transportation of waste and construction material
- Risk of injury during movement of heavy machinery, lifting of heavy objects, drilling tipping etc.
- Non observance of worksite safety instructions and non-usage of safety gadgets during construction operation can increase vulnerability to adverse health and personnel safety impacts.
- Fire, explosions and accidents from unsafe storage of hazardous, explosive inflammable and ignitable materials.
- Construction material such as sand, stones, cement may pose health risk
- Unhealthy/ unsafe work conditions if OHS rules and gears are not in placed.
- Transmission lines or electric poles pose a threat to worker/labor health.

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- Generation of solid waste may pose health issues or disturb the scenic beauty of the site.

ii. Potential Mitigation Measures

- Material shall be appropriately covered to prevent dispersal of sand material. Also, Protective health & safety measures should be adopted.
- Training programs for the construction crew will also be arranged to let them know about the construction hazards. Also, ensure provision of basic medical training to specified work staff and basic medical service and supplies to workers
- All the construction work will be contained within the boundaries of the project site and unauthorized personnel will not be allowed to be in the premises of the construction activities without any authorization.
- Protection devices (ear muffs, ear plugs) should be provided to the workers doing job in the vicinity of high noise generating machines
- Provision of adequate sanitation, washing and cooking facilities
- Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. Also, ensure strict use of wearing these protective clothing during work activities
- Elaboration of a contingency planning in case of major accidents
- Clear safety warning signs should be placed along strategic locations within the site. Safety and warning devices such as reflectors, lights, etc. shall be installed at designated spots. During construction, adequate signage, lightning devices, barriers, yellow tape and persons with flags must be there.
- Dustbins should be provided at project site and identification of disposal site for SW with due involvement of MC will be ensured.
- Designated staff should be hired at project site to collect SW at consecutive/ regular intervals
- Ensure the provision of protective devices PPEs, such as earplugs to all those working in a noisy area

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- The equipment and construction machinery will only be operated by properly trained and experienced personnel.
- The total noise level would not be higher than the level if the operations were performed separately.
- Frequent water sprinkling at the site will be carried out at regular intervals to avoid generation of dust.
- Workers/labor at the site if established will be advised to maintain specific distance from transmission line during construction activities. Also, Construction of offices, controls rooms etc. will be proposed away from the electric poles.
- Construction area will be properly identified and the access to the area will be limited to only project related personal.
- After the completion of construction phase, proper site restoration will be carried out to eliminate any safety hazards such as any excavation will be leveled to prevent falling injury to construction crew.

Allegiance to these mitigation measures will avoid any incident. With implementation of the mitigation measures proposed above, impacts will be minimized. Therefore, the significance of the residual impacts is therefore expected to be low because these mitigation measures are based on best management practices.

B. Damage To Archaeological, Historical or Cultural Artifacts

There is no site of archaeological, historical, religious and cultural importance within 2km premises of the project. If later on during, drilling, excavation work, if any archaeological artifact is found, the relevant department will be informed.

6.4. Impacts during Operational Phase

During the operation phase of the proposed project, the anticipated impacts on the physical environment, biological environment, and socio-economic aspects related to the proposed project have been studied for operational stage and are discussed as follows:

6.4.1. Impacts on Physical Environment

A. Soil Contamination

i. Potential Impacts

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During operation phase, soil might be contaminated by dint of inappropriate waste treatment, its disposal and due to improper handling. Otherwise, no significant impacts are envisaged in this regard

ii. Potential Mitigation Measures

- Regular soil testing will be ensured to check the quality of soil.
- Proper handling of sludge will be ensured, design engineers will ensure the best possible design for protection of soil and surrounding environment

If these measures are properly taken by the MC, then the residual impacts will be negligible.

B. Surface and Ground Water Contamination

Surface water can be contaminated if wastewater enter into it whereas wastewater from sewage can also deteriorate ground water quality.

i. Potential Mitigation Measures

The below listed mitigation measures will be useful to control the adverse impacts of above mentioned activities:

- To protect the surface water quality Wastewater will strictly prohibit to enter into any surface water body without meeting PEQs, the sewerage water shall not discharge in the surroundings
- During construction asphalt lining will be ensured to control leaching of wastewater.

After adopting all the recommended mitigation measures, the residual impacts during the operations phase of the project shall be medium to low.

C. Air Quality

The emissions form generator to run machinery at disposal station.

i. Potential Mitigation Measures

- Plantation will be provided on the main entrance would be useful for landscaping and surroundings which will generate fresh oxygen
- Maintenance of generators will be ensured timely.
- Plantation will be done along the premises of sewerage Network and WWTP. Plantation Plan is Attached **as Annexure H.**

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Despite the above measures, there will be some residual impacts on the air quality. The significance of this impact is expected to be from low to moderate.

D. Odour Generation and Associated Issues

a) Potential Impacts

- According to the 'Wastewater Technology Fact Sheet – US EPA', odor WSP based WWTPs is usually generated due to excessive organic load causing anaerobic decomposition and due to inadequate ventilation.
- Ponding could happen due to excessive biological growth or foreign matter in or on the WSP

b) Potential Mitigation Measures

- Mitigation measures to be adopted by the MC include:
- WSP shall be inspected on a daily basis for signs of ponding, uneven flow distribution, clogging, vibration, leakage, flies and unusual odors.
- To avoid odors, the operators shall;
- Reduce loading; increase BOD removal in primary settling tanks; enhance aerobic conditions in treatment units by adding chemical oxidants, pre-aerating, recycling plant effluent, or increasing air to aerated grit chambers; scrub off gases; use plastic media instead of rock.
- Increasing the recirculation rate and checking for vent obstructions shall eliminate the problem.
- Check for clogged nozzles which may not be allowing for equal distribution of flow.
- To avoid Ponding, the operators shall:
- A sampling plan shall be devised by the MC that will assist in locating problems within the plant with the minimum parameters for the samples being influent flow, recirculation rates, BOD5, TSS, pH, DO, settle-able solids and suspended solids.
- The operational performance of both upstream and downstream treatment units will have a direct effect on the performance of a WSP[42].

6.4.2. Social Environment

When a development project is launched in a community, it helps in boosting up the socio-economic conditions by providing the people different economic opportunities. The improvement of sewerage system and construction WWTP would have a positive impact on the commercial activities of the locals. The socio-economic impacts like employment, revenue generation for

[42] https://files.dep.state.pa.us/water/bsdw/OperatorCertification/TrainingModules/ww20_Waste Stabilization Pounds_wb.pdf

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MC and improvement of muncipal services are the direct benefits during this stage for the people of the Project Area. Local people will be hired for different jobs like sewerage system maintenance, Environmental Quality parameter testing and handling of WWTP etc. These are some of the many examples. Operation of the project will also result in the decrease land values. This section will highlight positive and negative impact of the project.

A. Employment Generation

The employment opportunities in the Project Area will be increased due to the development and operation of the proposed project. During development and operation of the proposed project, unskilled workers will be required as labors, sanitary workers and sweepers as well as for the skilled workers such as; environmental engineers and lab analyst to operate WWTP. In totality, the overall economic conditions of the area will be improved.

B. Aesthetic Impacts

Tree plantation followed by ornamental plants within or outside the premises will increase the aesthetic value and scenic beauty of the site. The Proponent will also make arrangements for protection and maintenance of these plants and trees.

C. Occupational Health & Safety Impacts

a) Potential Impacts

- Work at Sewage Treatment Plant is often physically demanding and may involve hazards such as open water, trenches, and slippery walkways, working at heights, energized circuits, and heavy equipment.
- There is a high potential for illnesses arising from contact with viruses, bacteria and other microorganisms in sewage. The most serious viral risk is hepatitis. The most serious bacterial risk is tetanus.
- Work may also involve entry into confined spaces, including manholes, sewers, pipelines, storage tanks, wet wells, digesters, and pump stations. Methane generated from anaerobic biodegradation of sewage can lead to fires and explosions.
- Moreover, cutting, grinding and hot work shall be done in workshop which also has significant safety risk. Unless suitable precautionary protocols in accordance with international good practices are put in place, there is a high risk of injury and accidents taking place at the WWTP during its day-to-day operations.
- Laboratory staff shall be at risk of getting injuries associated with handling of various lab chemicals and reagents.
- Sanitation workers involved in the cleaning and maintenance of interceptor can be exposed to Hydrogen Sulphide (H_2S) when cleaning or maintaining the interceptor. Sanitation workers dealing with sewage may be at increased risk of becoming ill from waterborne diseases

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b) Potential Mitigation Measures

- In order to ensure a safe and healthy working environment for the workers and staff of the WWTP and the sanitation workers involved cleaning and maintenance, the following measures shall be strictly enforced, implemented and monitored by the MC:
- An OHS Management System shall be established and implemented describing standard operating procedures, roles and responsibilities, training needs, emergency response procedures, and reporting and documenting needs.
- Designation of an Environment, Health and Safety (EHS) officer dedicated to the site;
- Workers shall be educated / trained for the following measures as well as they shall be equipped by the plant management accordingly:
- Avoid direct contact with sewage.
- Avoid aerosolizing sewage water or minimizing exposure time in areas where aerosolizing is occurring. Make sure ventilation systems are functioning properly when working around areas where sewage may be aerosolized.
- Thoroughly cleanse all exposed injuries with soap and water and keep them covered with a bandage (preferably waterproof) while at work. Seek medication attention immediately after suffering cuts or penetrating injuries.
- If a worker is suffering from a skin problem, they should see a physician before working with sewage.
- Avoid touching the face, mouth, hands, eyes or nose with dirty hands or other items and avoid nail biting.
- Thoroughly wash the hands and face with soap and water before eating, drinking or smoking.
- Eat/smoke in designated areas away from sewage contamination. These areas must be kept free from contamination by leaving any protective clothing and boots in a separate area, for example.
- Use appropriate protective clothing at work (coveralls) and personal protective equipment (boots, gloves, plastic face shields) and, where required wearing respiratory protective equipment.
- Remove personal protective clothing and footwear at the end of the shift and leave it at work.
- Shower and change out of work clothes before leaving work.
- Report damaged equipment.
- Report all work-related health symptoms to the supervisor / in-charge
- The plant management shall ensure organization of periodic tests for workers for disease exposure such as: Skin tests for tuberculosis and fungal infections, liver function

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tests for hepatitis, white blood cell (leukocyte) counts and urinalysis for Fibrinogen Degradation Product (FDP) concentration.

- Safe reach shall be ensured so that all the staff reach their work stations safely.
- All path, walkways, staircases, ladders and platforms shall be stable and made suitable for the tasks to be undertaken;
- Strict use of Personal Protective Equipment (PPE) by all personnel (especially staff working in Laboratory/chemical building and workshop) shall be ensured.
- Tool Box talks shall be performed at the start of every shift.
- Mandatory training of all employees, including sub-contractors, on Health and Safety Practices for WWTP and its auxiliary facilities shall be ensured.
- Mandatory health and medical check-ups for all sanitary workers working in cleaning of pumping stations and sewers shall be performed.
- A written program (i.e. health information, instruction and training) shall be developed for setting out the procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health hazards of working in WWTP and its auxiliary facilities;
- Accidental fires must be addressed immediately. Firefighting plan shall be developed and appropriate fire extinguishers shall be placed at prominent locations.
- Emergency plan (including fire management) shall be developed and implemented;
- First aid facilities required to attend workers with minor injuries / ailments shall be established at site for meeting emergency situations;
- Availability of first-aid kits and vehicles that can be used to bring any injured employee to the nearest hospital in cases of accidents shall be ensured;
- Mandatory reporting of all accidents or incident of near misses of accidents and immediate adoption of corrective measures shall be ensured.
- The MC shall provide all the necessary financial and manpower resources for the implementation and enforcement of all health and safety programs and activities throughout the operational phase;
- Regular training and orientation on safety practices will be implemented to impart knowledge of safe and efficient working environment.
- Effective and proper housekeeping shall be ensured.
- Heat levels shall be monitored and spot checks shall be done to ensure that workers' welfare is addressed especially during summer months.
- Railing shall be installed around all process tanks and pits.

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- Workers working near water bodies shall be provided with life line and Personal Flotation Device (PFD) and provision / availability of rescue buoys and throw bags shall be ensured;
- Implementation of a confined spaces entry program that is consistent with applicable accepted standards shall be ensured.
- Valves to process tanks shall be locked to prevent accidental flooding during maintenance;
- Provision and use of fall protection equipment shall be ensured during work at heights;
- Work areas shall be maintained to minimize slipping and tripping hazards; Fire and explosion prevention measures shall be adopted in accordance with internationally accepted standards

6.4.3. Biological Environment

During operational phase of the project, there would be significant impact on the surrounding biological environment.

After adopting all recommended mitigation strategies, the residual impacts shall be low.

A. Pathogens and Vectors

a) Potential Impacts

- Workers and staff at wastewater and sludge treatment facilities where treated wastewater or sludge is applied, as well as operators of sludge collection vehicles, can be exposed to the many pathogens contained in sewage.
- Processing of sewage can generate bio-aerosols which are suspensions of particles in the air consisting partially or wholly of microorganisms, such as bacteria, viruses, molds, and fungi. These microorganisms can remain suspended in the air for long periods of time, retaining viability or infectivity.
- Workers may also be exposed to endotoxins, which are produced within a microorganism and released upon destruction of the cell and which can be carried by airborne dust particles. Vectors for sewage pathogens include insects (e.g. mosquitoes, flies), rodents (e.g. rats) and birds (e.g. gulls).

b) Mitigation Measures

- The Contractor shall ensure the following:

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- Comprehensive plan shall be developed and implemented to manage and avoid the spread of vector borne diseases, also taking into account the seasonality of the issue
- Minimize the sludge inventory present at the WWTP as far as possible to prevent breeding of disease vectors;
- Cover the sludge piles present at the WWTP as far as possible;
- Cover all influent drains within WWTP and inject chemicals as required to minimize/prevent breeding of disease vectors;
- Maintain good housekeeping in sewage processing and storage areas.
- Implement safety training program for workers, safe handling and personal hygiene practices to minimize exposure to pathogens and vectors;
- Use of vacuum trucks for removal of sludge instead of manual methods;
- Provision and use of suitable personal protective clothing and equipment to prevent contact with wastewater (e.g., rubber gloves, aprons, boots, etc.).
- Provision of prompt medical attention and cover any skin trauma such as cuts and abrasions to prevent infection and use protective clothing and goggles to prevent contact with spray and splashes;
- Provide areas for workers to shower and change clothes before leaving work and provide laundry service for work clothes;
- Encourage workers to wash hands frequently;
- Provide worker immunization (e.g. for Hepatitis B and tetanus) and health monitoring, including regular physical examinations;
- Reduce aerosol formation and distribution by planting trees around the aeration areas to shield the area from wind and to capture the droplets and particles;
- Reducing aeration rate, if possible, but not to the detriment of wastewater treatment efficiency.
- Avoid handling screenings by hand to prevent needle stick injuries.

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- Maintain good housekeeping in sewage processing and storage areas.
- Advise individuals with asthma, diabetes, or suppressed immune systems not to work at wastewater treatment facilities, because of their greater risk of infection.

B. Community Health & Safety

a) Potential Impacts

Public could face nuisance in terms of odor and pathogens exposure if the waste removed during maintenance / cleaning shall not be removed from the site and disposed timely. Transportation of removed waste could also cause become a source of nuisance to general traffic.

b) Potential Mitigation Measures

EPA certified hazardous waste handlers shall be contracted for the safe and timely removal and transportation of removed waste for its appropriate disposal. Cleaning and maintenance shall be done at night, when the roads are quieter, with less vehicular traffic.

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Chapter 7

ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

7.1. GENERAL

This chapter presents the Environmental Management and Monitoring Plan (EMMP), which describes the various actions taken by the project proponent to ensure long term environment sustainability of the proposed project. Hence, a comprehensive management plan is required that are socially acceptable and environmentally sound. The basic aim of the Environmental Management and Monitoring Plan (EMMP) is to address all the anticipated environmental issues and proposed framework for mitigation measures of pre-construction, during and operational phases of the project. Besides defining roles and responsibilities of various authorities, the EMMP also presents a set of environmental mitigation measures, which focus on avoiding and or preventing the adverse environmental and social impacts emerge due to project activities. The EMMP also suggests institutional setup for ensuring smooth implementation of the various mitigation measures and other recommendations. Institutional arrangements for compliance monitoring, training and capacity building are also included in the EMMP. EMMP also defines frequency of taking samples for monitoring of air quality, solid quality, ground water quality, noise and vibration etc.

EMP will ensure proper management of the identified environmental impacts, either fully prevented or alleviate to an acceptable level. It would be only possible if proper implementation of the EMP and objectives are successfully adapted by concerned departments, institutions and regulatory agencies. Therefore, there is a need to carefully coordinate with the design and construction phase of the project to assure that relevant mitigation measures are implemented at the suitable stage and resources are properly allocated to attain the desired outcome

The Environmental Management and Monitoring plan (EMMP) is one of the outcomes of the EIA/ESIA identifies major areas which need attention during the various stages of the project implementation such as designing phase (pre-construction phase), construction phase as well as operation phase, in particular, (a) what is to be managed and monitored; (b) when and where; (c) by whom; (d) whom to report and follow up if there is an issue that may raise at any stage of the project. An important component to ponder is that monitoring of every environmental parameter continuously is not practical and necessary Environmental

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monitoring functions according to the characteristics of existing environmental conditions and identifies unacceptable changes during construction period.

Based on these guiding principles, the EMMP is prepared for the effective implementation, management of the mitigation measures and monitoring requirements, satisfies the requirement of the Pakistan Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2000.

7.2. PRIMARY OBJECTIVE

The Environmental Management & Monitoring Plan (EMMP) devises a mechanism to address adverse impacts that are likely to arise during pre-construction, construction, operation of the proposed facility and the post closure to enhance project benefits and to introduce good practices to be adopted at various stages of project.

The primary objectives of the EMMP are:

- Outline mitigation measures based on the impact assessment in the EIA/ESIA and define the responsibilities of the contractors, sub-contractors and the project proponent and timing for the implementation of these measures.
- Develop a monitoring mechanism and identify parameters that can confirm the implementation of the mitigation measures.
- Facilitate the implementation of the mitigation measures identified in the EIA/ESIA.
- The development and implementation of environmental monitoring plan for the periodic reviews of the baseline environmental conditions.
- Identify training requirements at various levels.

7.3. ROLES AND RESPONSIBILITIES

This section defines roles and responsibilities of the project proponent (for the implementation of EMP and identify areas where these roles and responsibilities can be shared with other stakeholders.

The project proponent will be responsible for ensuring compliance to all applicable requirements of EMP. The proponent will be responsible for all the activities requiring special attention as specified by the Environmental Expert. Meanwhile, the proponent will ensure that contractor conducts all activities in a manner that minimizes disturbances to the residents and the public in general. The contractor will implement the majority of environmental and social mitigation measures. The contractor will carry out field activities. The contractors are subject to certain liabilities under the environmental laws of the country and under its contract with the proponent

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The organizational roles and responsibilities are summarized below:

Role	Responsibilities
Proponent	▪ Implementation and monitoring of the EMP ▪ Provide all supervisory and management staff with an awareness and understanding of their responsibilities under this EMP. ▪ Provide appropriate and adequate resources are allocated to allow for the effective implementation and maintenance of the EMP. ▪ Conduct periodic reviews of environmental performance are conducted. ▪ Report any major environmental incidents that may have a significant impact on the surrounding environment. ▪ Provide employees and contractors with the relevant environmental instruction in relation to the EMP and awareness and understanding of their obligations and duties.
Construction Contractor	▪ The Contractor will be responsible for on-field implementation of the ESMP and environmental protection liabilities under the Punjab Environmental Protection Act (Amendment 2012). He will also be responsible for compliance of ESMP provisions keeping in view his contract with the MC Jhang. The Contractor will train his crews in all aspects for implementation of the ESMP. ▪ Be aware of and understand the contents of and the reason for implementing the elements of the EMP and ensure all personnel including subcontractors adhere to these requirements. ▪ Provide adequate training in the elements of the EMP to all personnel, including contractors. ▪ Provide personnel involved in the project, including subcontractors and visitors, with the appropriate environmental training required to provide them with awareness and understanding of their responsibilities under the EMP as well as understanding of the

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Role	Responsibilities
	environmental approvals that adhere to the strategies outlined in the EMP. ▪ The contractor/ sub-contractor shall carry out field activities as part of the project construction. The contractors/ sub-contractor will be responsible to implement various mitigation measures prescribed in the ESMMP of EIA/ESIA report. The contractors will also be subjected to certain obligations under the PEPA act, and under their contracts with the concerned authority. ▪ Make sure that all environmental safeguards and precautions are in place and adhered to at all times at the site and activity. ▪ Regularly inspect and monitor all activities for adherence to proper environmental safeguards. ▪ Ensure that all equipment used is properly serviced and that all precautions are in place to prevent the likelihood of an environmental incident occurring. ▪ Report all environmental incidents to the Superintendent's Representative as soon as practicable, but within 24 hours of them.
Superintendent's Representative All employees and subcontractors	▪ Be aware and understand the contents of, and the reason for, implementing the elements of the ESMMP. ▪ Exercise environmental due diligence and achieve compliance with the ESMMP. ▪ Report all environmental incidents to the principal as soon as practicable, but within 24 hours of them occurring.

7.4. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

The impacts, mitigation measures, monitoring indicators, frequency and responsibility has been discussed in Environmental and Social Management and Monitoring Plan (ESMMP) hereunder.

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Table 9: Environmental & Social Management & Monitoring Plan (ESMMP)

1. **Sub-project:** Improvement of Sewerage Network

A-Design Stage	**Design Responsibility**	**Implementation responsibility**
1. Design Aspects		
The following Design Considerations have been integrated with the design of sewerage system and its facilities enabling to it environmentally and socially sustainable. 1. Wastewater Treatment • Safe and sustainable wastewater collection, transport, and treatment systems to ensure human and environmental well-being • The sewerage system that conveys the wastewater discharge of the current population is connected to infrastructure that performs storage and treatment functions, comprising a disposal station, a WWTP-WSP, a floating wetland and a storm water drainage system. • The importance of the master plan is that it allows the identification of problems associated with poor management and improves it through a comprehensive management model that provides solutions based on technical and sustainable criteria, being the innovative part that opens the opportunity for studies to be carried out by professionals; allowing to strengthen learning.	Design Consultant	MC Jhang
2.Permits, NOCs, Clearances		
Necessary consents, permits, and clearances shall be obtained before the start of civil works Permissions and clearances are required mainly from the government agencies including; Environmental Protection Agency (EPA).	PMDFC and MC	MC Jhang
3.Land Acquisition and Resettlement Issues		

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• Mitigation measures would include land clearance only at the most desired places and effective and quick removal of spoil. • It shall be ensured that no resettlement or livelihood disturbance issue left before start of construction works and grievances are adequately addressed. • The contractor's temporary facilities will preferably be established on government owned land. Otherwise, such lands/budlings will be obtained on a rental or lease basis. • It will be ensured that no project works are carried out where AED activities have been or are being carried out	MC Jhang	MC Jhang
4. Preparation of Stakeholder Engagement Plan Stakeholder engagement plan with a realistic timeframe covering preliminary, construction and operation phases has been prepared and approved (prior to project appraisal) and implemented effectively ensuring engagement of stakeholders throughout the project cycle.	Design Consultant/ PMDFC	MC Jhang
3. Preparation of Labor Management Procedures EHS SOPS for Labor workers/Including women have been prepared and approved (prior to project appraisal) and will be implemented effectively throughout the project period.	ESFPS	
3. Preparation of Labor Management Procedures EHS SOPS for Labor workers/Including women have been prepared and approved (prior to project appraisal) and will be implemented effectively throughout the project period.	ESFPS	
B-Pre-Construction Phase	**Location/Project Phase**	**Institutional Responsibility** **Implementatio** **Supervision**

Contractors Terms of Reference • The MC Jhang shall ensure to make EIA/ESIA Report approved from Punjab EPA and ESMMP of EIA/ESIA contractor terms of reference and part of the bid documents. • This ESMMP will be used by the contractor to be guided on the structure and control of potential environmental and social issues that are required to be managed to avoid or mitigated adverse consequences. • This ESMMP will address all of the issues addressed here, but not limited to, and will consists of different sub-plans that will cover health and safety, traffic management, worker camp management, material sourcing, waste disposal	Contract Award to completion phase	MC Jhang	Regional Office PMDFC ESM Team PMDFC E&S Supervision Consultants
Grievance Redress Mechanism • Grievance Redress Mechanism has been developed under PCP • MC Jhang with the technical assistance of PMDFC team shall share project details to public, relevant stakeholders and to receive complaints • Display contact details of ESFPs and E&S Supervision consultants for public to lodge their complaints/concerns to the contractor at the entrance and main points of the site • Provide sign boards for pedestrians to inform nature and duration of construction works • Provide alternative access road for residents via Peradeniya • Develop and establish contractor's own procedure for receiving, documenting and addressing complaints from the affected public and nearby communities that is fully in line with and guided by the project's GRM • Ensure to keep a copy of the ESMMP at all times at the project supervision office on site.	Throughout the cycle of project	MC Jhang Contractor	Regional Office PMDFC ESM Team PMDFC E&S Supervision Consultants

C- Construction phase

Proposed	Anticipated	Mag	Proposed Mitigation Measures	Mitigation	Monitoring	Monitoring	Monitorin

sub project activity	Environment and Social Issues	nitude of Impacts		Implementation Responsibility	Indicators	Frequency	g Responsibility
Establishment of Labor Camp	• Availability of Land • Security • Environment, Health and Safety of Labor at Campsite • Community Concerns regarding privacy of women and GBV[43] • Sustainable Use of Environmental Resources	Medium	• At current, land/road proposed for construction of Sewerage system is open and vacant from any legal/illegal occupants. There are no trees of important flora and fauna observed at the site. This vacant space is owned by MCJ (Land Ownership Documents are attached as **Annexure G**) and notified as commercial area at the entry of the main city where urban area is a few meters away. • Currently MC owned land at proposed sewerage site is available for construction of labor camp at the current site • Contractor will prepare Occupational Health and Safety Plan and get approval from MC before the execution of work • Contractor will be instructed (will be included in his term of reference and in the form of EHS SOPs) strictly implement the PMDFC SOPs for EHS of labor/ construction workers • Contractor will be instructed to prefer the local labor to be engaged. Anyhow, for labor site management, following mitigation measures will be provided: I. Contractor will ensure provision of appropriate housing, water supply, and sanitation facilities to construction labor if they will be hired from outstation. II. Good housekeeping will be ensured inside	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports • Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office • E&S Consultants of Supervision Consultants team

[43] Gender Based Violence

campsite

III. Labor will be provided with hygienically good quality food.

IV. During winter hot water will be provided for bathing and likewise as per the weather condition.

Labor Training and Code of Conduct-

- The contractor shall develop a labor code of conduct indicating specific labor management procedures applicable to different categories of workers including short time and full-time workers. The labor code of conduct shall be consistent with and part of the overall EHS SOPs for Labor developed by the PMDFC.
- The labour Code of Conduct shall be translated into Urdu language upon clearance from the MOI of MC Jhang and DPO-ESM of regional office of PMDFC. The code of conduct must be made available to all staff and displayed in the work site in local languages
- Labor awareness programs to educate the laborers about the code of conduct, general conduct, the Environmental and Social Management and Monitoring Plan, Public and Occupational Health and Safety Plan and sustainable use of local environmental resources etc. should be conducted throughout the contract period as per the Labor management plan and ESH plan approved by the MOI and DPO-ESM.
- The contractor shall give priority to selecting labor from project influenced areas so as to minimize the need for erecting labor camps and minimizing labor influx.

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			• Frequent supervision of laborers' activities, labor welfare needs, and action to ensure hygienic conditions in the work sites/ camps • Avoid social conflicts among contactor's labor force and the surrounding community or tension and prevalence of gender- based violence through the implementation of LMP. • Conduct awareness program on Gender Based Violence (GBV), good hygienic practices and dangers of sexually transmitted diseases such as HIV/AIDS and sensitize them to avoid interference and consider the privacy of local community women and vulnerable groups. • Introduce a code of conduct for labor teams to prevent alcohol and drug abuse, violence, sexual abuse etc. • Continue consultation and interaction with host community • Prepare an inventory (including names/ National ID numbers/addresses etc.) of entire labor force employed by contractor, and share with the Resident Supervision Consultants. This inventory shall be updated at each recruitment or resignation of labors.				
Site Preparation	• Accessibility of local communities and Work Site Management • Health and	Medium to High	• All public access to the site via adequate fencing and signage which prohibit public access completely, in order to avoid risk to the public • The site entrance will include adequate signage indicating the details of the proposed subproject, implementing agencies etc. as well as safety signage to keep public away. • A fence shall be erected to cover the entire perimeter	MC jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementat	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of

Safety of local communities • Traffic Management		of the facility using cost effective fence materials consisting of chain link fence fabric, concrete post, etc. as specified in the Technical Specifications in order to ensure, animals and public are unable to access the site. • To avoid land disturbance and movement, the fence shall generally follow the contour of the ground. • Grading shall be performed where necessary to provide a neat appearance • The contractor should provide a site-specific proposed site layout plan that identifies various zones within the construction site for designated use such as material and equipment storage areas, construction vehicle parking areas, vehicle/equipment maintenance areas, labor camps (if any onsite), temporary spoil storage areas etc. which shall be approved by the MC • Parking, repairing vehicles, machinery and equipment shall be stationed only within the work site and/or in any other designated areas by the MC • The contractor should provide instruction and advice to drivers and operators to park vehicles and store equipment at the designated area **Traffic Safety and Management Plan-** I. The contractor will prepare a **Traffic management plan** in consultation with the city traffic committee approved by the MC and duly disclosed to the public in a timely manner Ii. Carryout a road safety assessment in order to establish traffic control and safety measures such as road humps, fixing of signage etc. prior to commencement of construction		ion of GRM		Supervisio n Consultant s team

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III. Based on the initial road safety analysis a monitoring and management plan shall be prepared and submitted to the MC by contractor and Road Management Plan to be placed at the prominent places

IV. In order to ease traffic within the city, transport of construction material and machinery will be done prior to 6.00 am and after 8.00 pm

V. During school traffic hour's transportation of construction materials and heavy machinery shall not be done.

VI. Provide information and boards at each strategic location indicating basic info – times of closure, diversion routes etc

i. Special consideration shall be given in the preparation of the traffic management plan ensuring the safety of pedestrians and workers at night.

II. Personnel used for traffic control by the contractor shall be properly trained, provided with proper gear including communication equipment, luminous jackets for night use. All signs, barricades, pavement markings used for traffic management should be to the standards and approved by the City Traffic Police

Road Safety Monitoring Plan shall be implemented throughout the construction period.

- Monitoring incidents and accidents and monthly reporting shall be ensured.
- Appropriate safety improvement measures shall be implemented avoiding incidents due to movement of construction vehicles based

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	on the periodic review of reports. **Environment, Health and Safety of Labor and Communities and implementation of ESMMP** i. The contractor will employ a qualified Health and Safety Specialist in his team for a period of 06 months. He/she will submit to the engineer a comprehensive Health and Safety Plan for the site which will be based on an assessment of OSH/EHS ad public safety risks in relation to various types of construction activity and which covers the entire construction period. ii. The H&S specialist will oversee its implementation regularly assessing the risk of various hazards and adopting mitigation measures. iii. He shall ensure the all reasonable precautions will be taken to prevent danger of the workers and the public from accidents such as fire, explosions, blasts, falling to excavated pits, chemical sprays, unsafe power supply lines etc IV. The Contractor shall comply with requirements for the safety of the workmen as per the international labor organization (ILO) convention No. 62 and EHS SOPs of PMDFC to the extent that those are applicable to this contract V. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, boots etc., to the workers and staff. **Community Safety Management Plan-**			

			I. All debris, waste generation from construction activity, labor camps etc. will be disposed only at locations approved by the MC for such purpose II. The debris and spoil shall be disposed in such a manner that; (i) waterways and drainage paths are not blocked (ii) the disposed material should not be washed away by runoff and (iii) should not be a nuisance to the public. (iv) The contractor shall do what is necessary in the minimum to ensure the disposal sites are made safe after disposal of the waste (level the waste, ensure drainage and safety) (v)The contractor shall as much as possible dispose waste on daily basis (or as necessary given the waste quantities generated and onsite stockpiling space) without allowing to stockpile onsite, at identified locations for debris disposal, recommended by the MC. (vi) During transportation, dispose materials should be covered with tarpaulin				
Excavation and Construction Activities	• Dust/Air and noise	High	• All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork. Works to minimize cleared areas and exposed soils at a given time. • Barricades such as humps shall be erected around excavated areas for culverts, silt traps, foundations, sewerage pipes as some work in • The contractor shall effectively manage the dust generating activities such as handling and transporting sand, rubble, bitumen, and cement during periods of high winds or during more stable	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultant of Supervision Consultans team

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	ensure sprinkled water using appropriate equipment • Dust emissions should be controlled by wet spraying of construction sites and roads which are used for transportation of Construction materials at regular intervals. • Tarpaulin covering is mandatory on trucks /lorries which are used for transporting materials. • All stockpiles including temporary storage of debris and construction materials should be covered using tarpaulin covering. • Noise and Dust barriers with minimum height of 4m should be erected around entire working sites to control dust emission to the ambient air. Selection of the suitable material. • Contractor shall take appropriate action to ensure that construction works do not result in damage to the adjacent properties due to vibration. • Contractor shall pay due consideration on vibration impacts of construction on adjoining structures. In the event vibration levels are found to be exceeding national standards, he shall modify the method of construction until compliance with stipulated national vibration standards is met. • Vehicles should be maintained in good condition regularly so that noise and emission generating from wear and tear will be minimal • Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the DPO-ESM to keep noise and air emissions from these at a minimum • Construction vehicle, machinery and equipment shall be used and stationed only in the areas of work and in any other area designated/ approved by the MC Jhang. • Ad-hoc and scattered parking and placement of machinery should be avoided to minimize harm to
• Soil and Vegetation Cover Loss	

roadside ground cover.

- The contractor shall include in the construction site layout plan indicating various areas identified for designated use including parking areas.
- Contractor should provide necessary instructions to drivers/operators and other construction workers not to destroy ground vegetation cover unnecessarily.
- Designated vehicle parks and maintenance yards must be informed to labor force.
- Top soil of productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the MC. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he/she shall obtain the direction from the MC in writing
- Removed top soil could be used as a productive soil when replanting/establishing vegetation under landscaping plans Stockpiled topsoil must be returned to cover the areas including cut slopes where the topsoil has been removed due to project activities.
- Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the MC.
- Waste oil, lubricants and other petroleum products and untreated wastewater shall not be discharged on ground so that to avoid soil pollution. Clean up measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers
- Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as

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		incidental to work				
• Water and Soil Contaminatio n		• The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the MC at his own cost. • The contractor shall indicate on a site layout plan the drainage network and strategic locations in which soil erosion control devices will be installed. The contractor shall, to the extent possible, schedule/stage these sections will have to be stopped during heavy rains due to heavy erosion. • Work that lead to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the MC by submitting a proposal on actions that will be undertaken by the contractor to prevent erosion.				
• Damage to archeological sites		• Chance Find Procedure will be adopted in case any such discovery of archeological property, the contractor shall take reasonable precaution to prevent his workmen or any other persons from removing/damaging any such article and shall immediately inform the MC and immediately stop construction activities. (Chance Find Procedures are attached as **Annexure k)**				
• Management of Hazardous Waste		• Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material that will be used in the project work to the MC. • Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful Asbestos Containing Materials (ACM) shall not be used for any temporary and permanent work on the SEWERAGE site.				
• Disturbance to Flora and		• All construction works shall be carried out in a manner that the destruction to flora and their				

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Fauna and vegetation cover		habitats is minimized. • At current, no trees are found at the proposed site of sewerage but if all such cases of tree removal contractor shall take prior approval from the MC and DPO-ESM prior to removal with a justification as to why the removal is unavoidable and plantation will be carried out with 1:10 removal ratio				
• Wastage of Water		• Arrange adequate supply of water for the project purpose throughout the construction period in consultation with the MC Jhang. • The contractor should discuss the daily requirement for potable and non-potable water and confirm with the MC Jhang that the demand can be met through their supply connection. • Do not extract water from surface water bodies or water sources without the permission from MC & relevant authority. Obtain permission for extracting ground water, if needed, prior to the commencing of the project, from the relevant authority • The contractor will minimize wastage of water in the construction process/operations by reusing water as much as possible, utilizing only the required amount of water for the construction works etc. • The contractor shall maintain a record of usage of water for various purposes and sources tapped. • The contractor will adopt measures that are technically and financially feasible that avoid or minimize water usage throughout the construction period.				
• Traffic Jams and Congestion and Road accidents		• The construction materials intended for temporarily storage should be properly stockpiled in most appropriate areas in the Site to avoid disturbance to site mobility, traffic and stored away from drainage paths				

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			• Efficient use of all construction material in order to reduce waste generation. • All use of chemicals and hazardous materials will be subject to national and international regulations and requirements. Their use will be minimized and their release will be controlled				
Construction Material Storage, Handling and Use	Spillage Odor	Low	• Contractor shall take all precautions such as storing all chemicals used for construction works in properly closed containers with good ventilations to prevent odor and offensive smell emanating from chemicals and processes applied in construction works or from labor camps. • In a situation when/where odor or offensive smell does occur, contractor shall take immediate action to rectify the situation • Contractor is responsible for any compensation involved with any health issue arisen out of bad odor and offensive smells	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team
Construction Machinery/ Equipment Use	• Emissions from Construction Vehicles, Equipment and Machinery • Noise from Vehicles, Plants and Equipment • Health and Safety of Labor /Workers	Low	• The emission standards promulgated under the Punjab Environmental Quality Standards (PEQs) shall be strictly adhered to all vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards. • The contractor shall maintain the average noise levels within the construction site during the day time to 65 dB and night time to 55 dB Punjab Environmental Quality Standards (PEQs). • Noise barriers (cum dust) with minimum height of 4m shall be installed around the site as shown in the following figures and the construction noise levels outside the noise barriers should be maintained below 75dB during day time. • Within the site, the contractor shall measure noise levels on a monthly basis, or as per requirement, and report to the DPO-ESM through the	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team

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			contractor's monthly progress reports. Where, exceedances are noted, that can adversely affect construction workers, the contractor shall propose methods to control noise levels. • All machinery and equipment should be well maintained and fitted with noise reduction devices in accordance with manufacturer's instructions. • All vehicles and equipment used in construction shall be fitted with exhaust silences. • During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site • Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep noise from these at a minimum. • Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with PPEs				
Electrical Works – Wiring, switch, boards, lighting etc.	• Injuries/Incidents due to unsafe electric installations. • Short circuits due to quality compromised		• The labor should be provided with safety shoes, gloves. Safety goggle as per nature of job of worker. • Quality of electric installations should not be compromised. • Wiring should be underground. • Fire retardant plastic wires should be used. • Fire extinguishers should be installed at appropriate places.	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team

	• electric equipment /installations • Fire accidents due to electric installations						
Effect on sensitive receptor	• A graveyard and a Muslim Shrine is observed in ROW of the sub project near disposal site	Low	• Disposal site will be 100meter apart from the sensitive receptor and it will be ensured by contractor that no physical impact occur on sensitive receptor during construction activity	MC Jhang Contractor	• Site Visits • Visual Inspection and pictorial evidence • Monitoring Reports Implementation of GRM	• Daily site visit during construction phase • Fortnightly/ Weekly	• DPO-ESM of PMDFC Regional Office E&S Consultants of Supervision Consultants team

D OPERATION PHASE

Proposed sub project activity	Anticipated Environment and Social Issues	Magnitude of Impacts	Proposed Mitigation Measures	Mitigation Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility
Water use activities taking place at buildings/ shelters (Sanitation)	Water/soil pollution	Low to medium	• Effluent in open drain can pollute groundwater or surface water, particularly if open drain ruptured. • The MC shall ensure that under no circumstances foul sewage flow can be diverted into a storm water drains and vice versa.	MC Jhang	• Site Visits • Monitoring Reports • Implementation of GRM	• Site visit	MC Jhang

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			• Drinking water sample from the water tanks of nearby residents will be taken and analyzed in the EPA certified laboratory • At least six samples will be taken (before =2, during=2, after=2) and results will be compared to check any negative impact of project activities on ground water. • Control to avoid Ground water contamination • Call plumbers for immediate repair. • Minor leakage control with tapes • Disposal of broken/waste pipes along in environment friendly way • Ensure drinking water analysis				
Seepage / salinity	Weaken the structure strength ,produce watering and salinity condition.		• Runoff from the Site shall be controlled to ensure that adjacent areas are not affected and disturbance to the public is to minimum. • PPEs i.e. Masks & Ear plugs will be provided to workers • Ensure proper design, construction and operation of the structure and system to minimize seepage. • Anti-percolation material layer will be installed under the disposal station and open drain that no seepage into the soil occur				
Waste water storage and disposal	Odour		• Emission from disposal station during its decommissioning and connection to centralised sewerage system and when wastewater move through the open drain. • The Contractor shall ensure covering and sealing off all water collection tanks and septic tanks at the end of construction works. • At disposal Station worker will be provided with PPEs.				

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	Nuisance		• Heavy noise from generators to pump Wastewater from sewerage system to disposal station which opens up in an open drain which take wastewater to WWTP will be mitigated by installing Silencer and anti-vibrant mouns to reduce structural damage of disposal station. Noise will be monitored routinely. • Use of machineries & equipments having less noise. • Provision for personal protective equipment (PPE's), ear muffs/ear plugs to workers.				
	Emission of fumes		• Ensure Workers use appropriate clothing. Lay concrete/Asphalt during dry periods				
	Unhygienic condition, public health risks		• Sewerage disposal connections to the periphery wastewater system shall be maintained properly with routine maintenance of plumbing/pumps diligently carried out. • Trees shall be managed properly that includes watering, fertilizing, weeding, pest controlling, pruning and training of trees timely. • MCJ shall take necessary actions to prevent the breeding of mosquitoes where stagnation of water in any areas along the sewerage system.				

3. ESMMP for WWTP

A-Design Stage	**Design Responsibility**	**Implementation responsibility**
1.Preparation of Stakeholder Engagement Plan		
Stakeholder engagement plan with a realistic timeframe covering preliminary, construction and operation phases has been prepared and approved (prior to project appraisal) and implemented effectively ensuring engagement of stakeholders throughout the project cycle.	Design Consultant/ PMDFC	MC Jhang

7.5. ENVIRONMENTAL MONITORING PROGRAM

An environmental monitoring plan provides a delivery mechanism to address the adverse environmental impacts of a project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for all project works. An environmental monitoring program is important as it provides useful information and helps to:

- Assist in detecting the development of any unwanted environmental situation, and thus, provides opportunities for adopting appropriate control measures, and
- Define the responsibilities of the project proponents, contractors and environmental monitors and provides means of effectively communicating environmental issues among them.
- Define monitoring mechanism and identify monitoring parameters.
- Evaluate the performance and effectiveness of mitigation measures proposed in the Environment Management Plan (EMP) and suggest improvements in management plan, if required,
- Identify training requirement at various levels.

An environmental monitoring plan is suggested to monitor environmental parameters during survey, Construction and post Construction phase of the project.

Following environmental record should be maintained:

- Periodic inspection reports of the site
- Audit reports
- Incident record of all moderate and major spills and other incidents and accidents. The record will include:
    - ✓ Location of spill or battery limit of the accident
    - ✓ Estimated quantity or the amount of injury
    - ✓ Spilled material or nature of injury or loss (temporary or permanent)
    - ✓ Restoration measures
    - ✓ Photographs
- Description of any damage to vegetation, water resource, or community asset.
- Corrective measures taken, if any
- Waste Tracking Register that will hold records of waste generated during the Construction period. This will include quantities of waste disposed, recycled, or reused.
- Records of water consumption with use wise breakdown
- Survey reports, in particular, include the following:

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- ✓ Vehicle and equipment noise.
- ✓ Ambient noise survey reports.
- ✓ Ambient level of PM
- ✓ Employment
- ✓ Total number of unskilled, semi-skilled, and skilled jobs offered during Construction.
- ✓ Name and domicile of the employed staff.
- ✓ Environmental and social training records.

It is in great benefit that timely and broad-based stakeholder involvement is an essential element for an effective environmental assessment, as it is linked with project planning, appraisal and development in general.

7.6. EIA/ESIA IMPLEMENTAION BUDGET

Environmental budget details are shown hereunder:

Table 10: EIA/ESIA Implementation Budget

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Item	Quantity	Tentative Cost/Item-Rs./-	Total Cost
A-PPEs for Health and Safety of Labor/Workers			
Face Masks (3 PLY) - box	100	300	30000
Safety Hard Helmets	80	3,000	240000
Safety Shoes	80	3,000	240000
Hand Gloves	80	1,000	80000
Ear Plugs	80	500	40000
Reflective Safety Vest	80	1,000	80000
Safety Goggles	80	500	40000
B-Community Health and Safety			0
First Aid Box Complete	5	10,000	50000
Infrared Thermometer (Benetech GM-2200 or equivalent)	1	40,000	40000
Safety Signs	30	15,000	450000
Safety Cones	80	1,000	80000
Safety Tapes	80	1,500	120000
Portable Delineator with chain	80	2,200	176000
Emergency Portable Lights	50	3,000	150000
Solid Waste Collection Drums with Cover	30	12,000	360000
Fire Fighting Equipment Purchase and refilling	5	10,000	50000
Hiring of Environmental Manager (for 06 months)	6	70,000	420000
Pole Hanging Waste Bins	20	12,000	240000
Labor Campsite Management	1	1,000,000	1000000
Water Sprinkling	1	800,000	800000
Social and Behavior Change Campaign and Labor Awareness/Training	1	800,000	800000
C- Environment Quality Testing during Construction Phase			0
Ambient Air Quality-Before, during, and after construction	15	85000	1275000
Noise Quality-Before, during, and after construction	15	1000	15000
Water Quality-Before, during, and after construction	10	22000	220000
D -Monitoring cost			0
Water Quality Analysis Lab Establishment at site to ensure treated water quality as per WHO/PEQSs	40	25000	1000000
Total (PKR)-A+B+C+D			**7,996,000**

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CHAPTER 8

STAKEHOLDER CONSULTATION & CAPACITY BUILDING PROGRAM

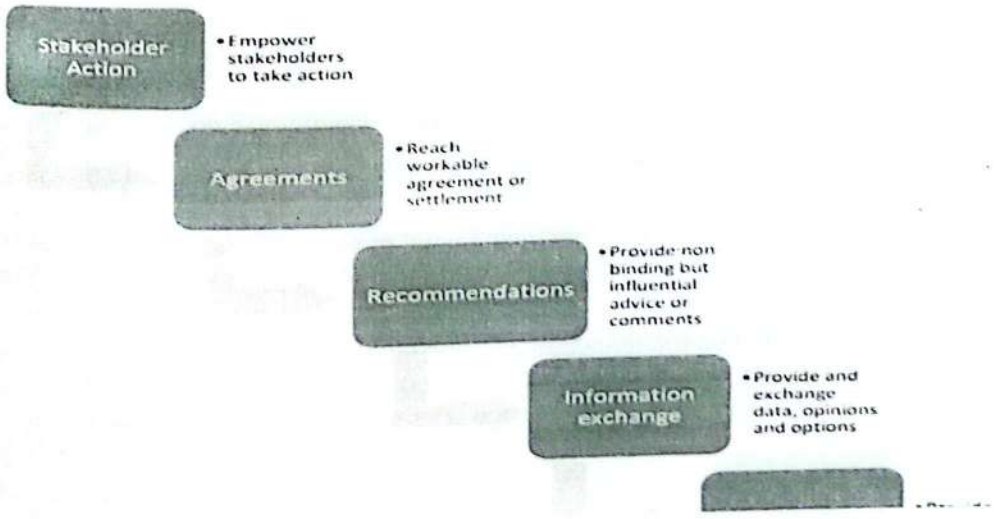
8.1. General

This Section outlines the consultation and participation activities that have been undertaken as part of the impact of Sub-project. Early and ongoing consultation, disclosure and meaningful stakeholder meetings is a key requirement of any developmet Sub-project. The logic behind the consultation is that a Sub-project proponent has shared with all stakeholders' relevant information on the Sub-project interventions and to get feedback and concerns about the Sub-project. The consultation process consists of initiating dialogues among all the stakeholders. The process covers, starting from awareness campaign to the identification, inclusion and participation of Sub-project affected communities. Stakeholders including institutions and concerned communities are generally able to understand the implications of the Sub-project activities.

The present report has been prepared by consulting with local communities and concerned government departments/ organizations to ensure that their views and concerns about Sub-project have been taken into account in the study.

The logic behind public consultation is that a project proponent has shared with all stakeholders' relevant information on the project interventions and potential environmental and social, (positive and negative) impacts. The consultation process consists of initiating dialogues among all the stakeholders. The process covers, starting from awareness campaign to the identification, inclusion and participation of Project affected

Figure 25



Information Discloser and Stakeholder Consultation Processcommunities. Stakeholders including concerned communities are generally able to understand the implications of the Project activities.

The present study report has been prepared by consulting with local communities and concerned government departments/ organizations dealing particularly with related fields and to ensure that their views and concerns have been taken into account in the study.

8.2. Consultant's Perspective

The review of the present assignment suggests that the fundamental logic behind the present multi-sectorial and multi-dimensional strategy for the project rests on the consultation process including participation, inclusion, ownership and equity of genuine development of national resources on a sustainable basis has been designed keeping in view the following essentials;

a) Social acceptability,
b) Technical appropriateness,
c) Financial viability,
d) Environmental friendliness,
e) Pro-poverty reduction,
f) Gender positive and
g) Long-term sustainability prospects.

8.3. Consultation Requirements

8.3.1. Overview

This sub-section provides an overview of the international consultation, disclosure and stakeholder engagement requirements of the national, provincial and European Development Partner Guidelines for consultation.

8.3.2. National and Provincial Consultation Requirements

The Government of Pakistan (GOP) and Government of Punjab places great importance on involving institutional and community stakeholders for determining the impacts associated with Sub-project implementation. In order to understand Sub-project affected stakeholder's perceptions regarding impacts and mitigations of the projet and participation of stakeholders has been taken as integral part of the Study. An attempt has been made to consult with a full range of stakeholders to obtain their views on Sub-project interventions and impacts thereon.

8.3.3. International Conventions on Public Consultation

Similar requirements for access to information and public involvement in decision making are also specified within the following international conventions:

- Agenda 21. (UN, 1992b) Article27 (9) states that the UN system should "provide access for nongovernmental organizations to accurate and timely data and information to promote the effectiveness of their programs and activities and their roles in support of sustainable development".

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- Rio Declaration on Environment and Development (1992). Annex 1 Principle 10 - "Each individual shall have appropriate access to information on hazardous materials and activities in their communities, States shall facilitate and encourage public awareness and participation by making information widely available".

- UN General Assembly Resolution A/RES/S-19/2 (1997). Paragraph 108 - "Access to information and broad public participation in decision-making are fundamental to sustainable development".

8.3.4. Specific Objectives of Consultation Process

The consultation process provides a meaningful understanding of local social issues for the environmental and social impact analyses. The consultation process helps to minimize adverse environmental and social impacts, reduces the expected conflicts, minimizes the risk of Sub-project delays and enables to make the Sub-project more economical and socially acceptable. Moreover, public consultations create a sense of ownership among the stakeholders regarding the Sub-project and ensure the transparency in Sub-project activities. The consultative process for the "ESIA" has included not only the institutional stakeholders, but also the local community of the area. Meetings with institutional stakeholders like government departments, and line agencies has been organized and conducted to discuss Sub-project interventions and potential impacts on the local communities and environment. Public consultations has been carried out with the stakeholders keeping in view the overall objective of evolving their participation. The public consultation aimed to achieve following specific objectives

- Information disclosure to create awareness among various stakeholders about Sub-project development objectives and proposed interventions
- To start interaction process with stakeholders
- To elaborate environmental and social impacts to the stakeholders
- To establish communication and an evolving mechanism for the resolution of social and environmental issues at local and Sub-project level
- To involve Sub-project stakeholders in an inclusive manner at every stage of Sub-project implementation
- To receive feedback from all types of stakeholders on adopting mitigation and enhancement measures for environmental and social impacts

8.4. Identification of Stakeholders

Stakeholders include all those who can affect and are being affected by policies, decisions or actions while implementing any development project. Stakeholders can be individuals, group(s) of people, organizations and institutions. During consultation meetings stakeholders reveal their concerns, apprehensions and demands regarding the adverse project impacts mitigation and enhancement of project benefits to the stakeholders. Stakeholders can be broadly divided into primary and secondary stakeholders.

8.4.1. Primary Stakeholders

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The primary stakeholders are the intended beneficiaries or communities expected to be affected directly by the project interventions. In this case, people living within each Taluka of District Ghotki are considered as Primary Stakeholders. Primary stakeholders identified and consulted include local leaders/ influential, community members (men and women), local representatives, imams, teachers, union council and village council members.

8.4.2. Secondary Stakeholders

This category of stakeholders pertains to those who may not be directly affected but have interests that could contribute to the initiation, implementation at some stage, or affect decision making on Project aspects. The Secondary Stakeholder include, federal/provincial government departments and organizations dealing with education, health, irrigation, agriculture, forest, wildlife, fisheries, and transport etc. Stakeholder consultations meetings were conducted in two stages:

8.5. Public Consultation

Consultations mainly in form of "Focus Group Discussions" (FGD) with Primary Stakeholders in those communities which is near to the Sub-project at public places. It was important to provide meaningful input for the public into the decision-making process through consultation. It was helpful to create a strong foundation for long-lasting and trustful relationships between the Sub-project and the stakeholders. Representatives of the communities, potential vulnerable groups such as women and youth has been consulted to understand their specific issues and concerns. This will enable meaningful participation. The findings and recommendations has been discussed and disclosed in an open and transparent manner with the communities in order to solicit their comments and suggestions in the studies.

Participants were first briefed about the Sub-project objectives and major interventions associated with the Sub-project implementation. Afterward, people were asked to express their views regarding the proposed Sub-project. In general participants appreciated the Sub-project and offered comments & suggestions to enhance the expected environmental and social benefits and to mitigate the adverse impacts. The community perception of the Sub-project is very good but most of the people wish to implement the Sub-project through sustainable and safety manner. The digest of major issues raised by communities during meetings are given below: The complete settlement wise list of participants and their contact numbers are provided in Annex k

Table 11: Consultation with Stakeholders

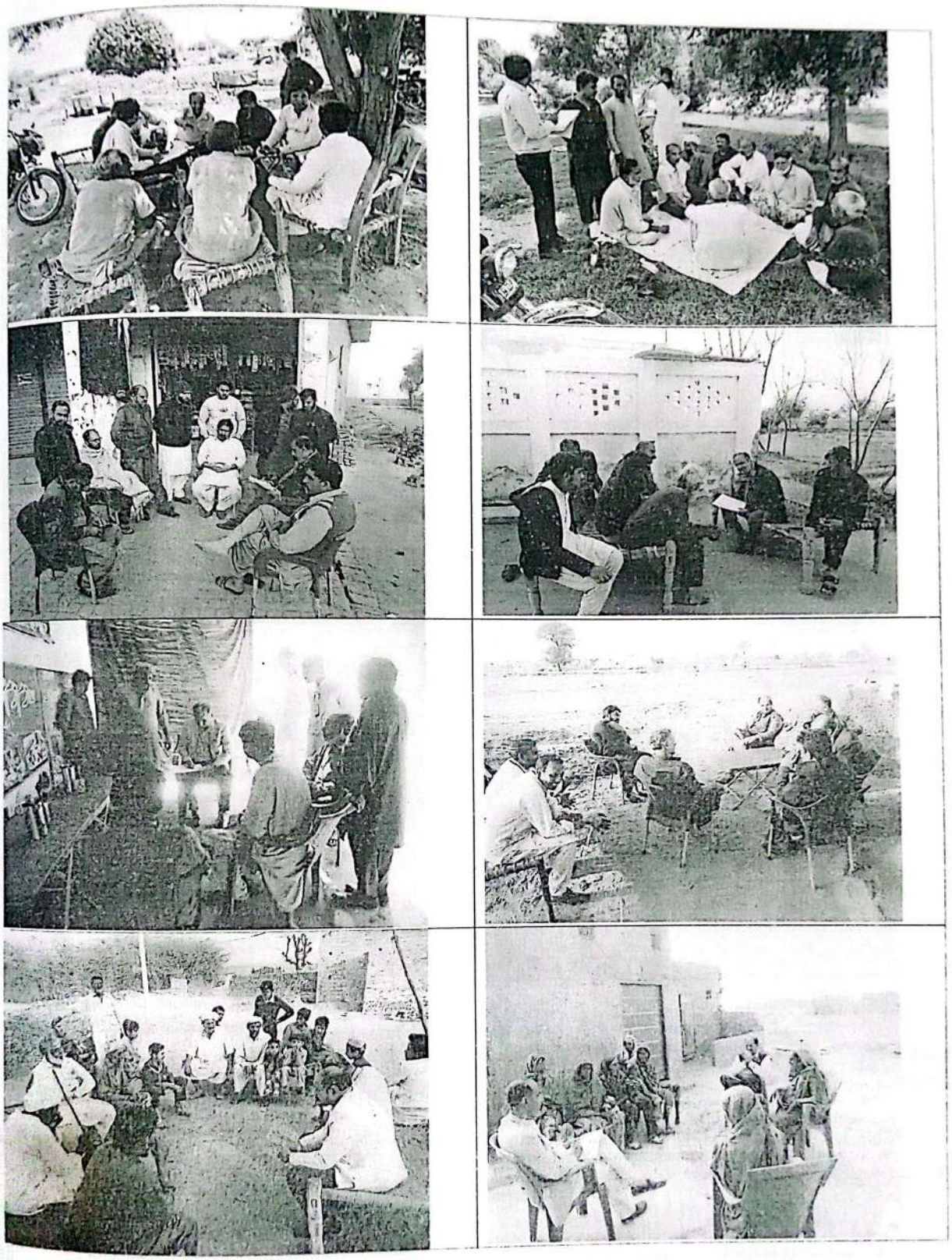
Sr. No.	Settlement	Tehsil	Number of Participants
1	Sultan Colony	Jhang	13
2.	Siddiqueabad		19
3.	Baig Colony		12
4.	Chaudhary Colony		09
5.	Chak No. 268 J.B		07
6.	Setellite Town (near Zafar Park)		09

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Sr. No.	Settlement	Tehsil	Number of Participants
7.	Setellite Town		17
8.	Lalazar Colony		13
9.	Chak Khokhra Disposal Station		11
10	Basti Mughlan Wali (267-Chak Choundra		10
11.	Bihari Colony		12
12.	Chah Pindian Wala		27
13	Basti Nabood Chak-506		04
14.	Chak No. 506		10
15.	Basti Sher Abad (Women Consultation)		08
16.	Mohalla Peer Pathan (Women Consultation)		07
17.	Kalasan Colony (Women Consultation)		09
18.	Mohalla Iqbal Nagar (Women Consultation)		08
19.	Ghaziabad (Women Consultation)		10

Pictorial View of Public Consultation





Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
❖ HSE awareness should be provided to the local public being directly affected by the construction activities.	❖ It should be the implemented during the construction activities to save local community spatially women, old people and children ❖ Comment has been incorporated in the ESIA report
❖ What are the objective of this consultation?	❖ This consultation process was held with the objectives of sharing information with stakeholders on proposed improvement works and expected impacts on the physical, biological and socio-economic environment; understanding stakeholder concerns regarding various aspects of the project; providing an opportunity to the public to influence project design in a positive manner; and creating a sense of ownership of the proposal in the mind of the stakeholders.
❖ People were also concerned that the workers and laborers will be brought by the The Contractor from outside the project area and an opportunity of employment generated locally shall be availed by the people from other areas.	❖ The contractor will be contractually bound to disclose the "Recruitment Policy" that specifically includes a requirement to prioritise local employment for unskilled and semi-skilled positions that become available ❖ Comment has been incorporated in the ESIA report
❖ Participants told us that the project will have positive impacts towards the health, environment, women & children.	❖ According to the medical experts, a sewage system is vital to improving health but is often not implemented due to a lack of resources, infrastructure, available technology, and space. But implementation of this project will improve the health for local community.
❖ Is there a grievance redress mechanism system in place and will it be effective?	❖ There is a grievance redress mechanism in place which with cooperation from the PMDFC is expected to handle any issues fairly.
❖ The participants requested that all vehicles, machinery, equipment and generators used during construction activities shall be in good condition and shall be properly tuned and maintained in good working conditions in order to minimize exhaust emissions.	❖ It is recognised that a project of this scale and duration has the potential to impact the environment and the community, both in a beneficial and adverse way. The activities that could cause the most important effects include: ➢ Direct impacts on air quality during construction activities ➢ Noise and vibration impacts on nearby sensitive receptors ➢ Impacts on soil related to the modification of the local topography (excavation and spoil disposal) Social impacts associated with: ➢ Employment generation ➢ Workers well-being ➢ Community health, safety and well-being ❖ Chapter 6 and 7 and Table: 7.2 covers all impacts and their mitigation.
❖ One of the participant told that before start of construction activities for the project, The Contractor will inform residents of the area about detail of work, likely disturbances and their duration and as to whom they should address their complaints.	❖ Prior to starting of work, the contractor shall prepare a method statement for major construction activities and share with all stakeholders. This shall be simple and explain the contractor's work process that is actually conducted on site, with safety and safeguard concerns. ❖ Comment has been incorporated in the ESIA report
❖ One of the participant said that the safety of the public at all stages of the construction will be ensured	❖ During the project implementation stage, measures will be prepared that will include GRM and institutional arrangements. ❖ Comment has been incorporated in the ESIA report
❖ What is the objective and scope of the ESIA?	❖ Identify and assess the potential environmental and social impacts that the Project may have on the environment and communities within its area of influence (AOI) ❖ To help avoid or where avoidance is not possible minimise, mitigate or compensate for adverse impacts on the environment and communities

Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
❖ Safety while crossing the road especially students/pupils, old and women.	❖ To avoid any safety related incidences and ensure well-being of the local residents, the construction work will be fenced at the edge of the RoW to prevent any pedestrian and animal crossings through the passages ❖ To facilitate the movement of locals across the road, adequate number of underpasses at appropriate distances will be provided ❖ Chapter 7 and table 7 2 covers impacts and mitigation
❖ Hire those contractors, who will be familiar and respect with community's views and concerns.	❖ Comment has been incorporated in the ESIA report
❖ What are the objectives of this project?	❖ To provide a socially, environmentally and economically sustainable solution for disposal of sewerage and wastewater, and ❖ To ensure efficiency for quick and safe disposal of sewage / wastewater by lying of Trunk Sewerage System
❖ The all participants agreed that the dust and noise generation during the construction activities will be the major issue for the residents.	❖ In Table: 7.2 all impacts have been assessed. Unmitigated noise impacts during construction are likely to be significant especially for receptors close to the project boundary and require mitigation such as noise barriers. During operation, noise levels will meet international standards and expected to be minimal. ❖ Comment has been incorporated in the ESIA report
❖ It was also mentioned that the relevant Government personnel must ensure the Contractor staff is cooperative with the general public and maintain the right attitude and try to facilitate them instead of being confrontational.	❖ During the project implementation stage, measures will be prepared that will include GRM and institutional arrangements.
❖ The rehabilitation of the Sewerage system will be beneficial for the entire area and also beneficial for social and a significant environmental enhancement is also expected.	❖ This sub-project team committed to providing local residents for effective, comfortable and healthy environment through the rehabilitation work. ❖ Comment has been incorporated in the ESIA report
❖ What is the need of this project?	❖ In the absence of the project towards improvement of the sewerage situation in the zone, the circumstances are worsening over the period and public had to suffer inconvenience on account of routine sewage overflows and heavy flooding during rains. If the project is not initiated; the situation will exacerbate specially during monsoon season and due to flooding, the socio-economic activities of the project area will be affected and several other problems will arise including odour and vector borne diseases which will further create health issues i.e. dengue.
❖ Participants suggested that the protective measures during construction in order to safeguard their interests.	❖ The prime objective of the ESMP study is to meet the World Bank's requirement of conducting environmental and social assessment in accordance with ESS to help ensure that project is environmentally and socially sound.
❖ People were of the strong apprehension that upon completion of the project, the local crossings available on the road may be disturbed and they will be put to trouble by way of long distances for crossing or otherwise.	❖ The Contractor will take proper safety measures (placing warning tapes around excavations) to avoid people, especially children, accidentally falling into excavations and during all the constuction activities. ❖ Environmental impacts on local communities related to traffic, air quality and noise have been assessed and mitigation measures in detail in the chapter 5 and 6 of the ESIA
❖ What are the potential risk and impacts?	❖ The risks and impacts of the Project have been summarised in the chapter 6 Environment and social impact assessment covers all impacts and their mitigation

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Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
❖ What consultation and participation has been performed?	❖ The ESIA has been prepared based on consultation with concerned communities and government departments
❖ The people told us that, the old Sewerage pipes collapse, blocking the Sewerage line. Most of city's sewer pipes are old, and have outlived their potential utility.	❖ This project will improve the city Sewerage system problems drastically. ❖ Comment has been incorporated in the ESIA report

8.6. Institutional Consultation

The consultant environmental and social team visited various organizations and offices located in the tehsil and district level for information disclosure and to get feedback. Institutional stakeholder consultations were more formal as they involved government personnel and non-governmental organization, who were consulted. They were briefed on the ESIA process, the proposed Sub-project, proposed interventions and the potential negative and positive impact of the Sub-project on the area's environment.

The public sector representatives of the different line departments expressed their complete support and efforts towards the Sub-project development and mentioned the intent to ensure the Sub-project was completed at the earliest to the highest quality standards. In addition, these officials expressed the commitment to ensuring the support and would adhere to all environmental and social compliance standards with no leniency in this regard to be expected from the relevant Government line departments. The digest of comment and suggestions received is given as under, whereas, complete list of offices visited, official consulted and feedback received is provided below:

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Table 13 Consultation with Institutional Stakeholders

Sr. No	Department/ Organization	Name	Designation	Contact No.
1.	MC, Jhang	Adil Shehzad Ranjha	Chief Officer	0300-6062567
		Auon Muhammad	Sub-Engineer	0313-5122929
		Muhammad Akram	Sub-Engineer	-
2.	Irrigation Department	Muhammad Bilal Khalid	S.D.O	0315-2700381
		Hafiz Danish Majeed	Sub-Engineer	0341-0518828
3.	Agriculture Department	Dr. Ehtishamul Haq	Agriculture Officer	0335-6478101
		Ejaz Saleh	Agriculture Officer	0300-7482846
4.	Public Health Engineering	Kashif Fayyaz	EXEN	0345-7940638
5.	Forest Department	Fayyaz Ahmed Khan	Divisional Forest Officer	0344-7942737
6.	Environment Protection Department	Shamim Ahmed	Assistant Director	0333-9917541
		Muhammad Aslam	Inspector	0345-4284644
		Ubaidullah Rehman	Field Assistant	0301-7690565
7.	Wildlife Department	Tariq Shah	Assistant Director	0300-4087554
		Ghazanfar Hussain	Inspector	0345-7989400
		Ghulam Muhammad	S.C	0307-7502200
	DC Office	Shahbaz Khan	PSO	0346-1574084
		Muhammad Mohsin	Assistant	0347-9200081

Pictorial View of Institutional Consultation

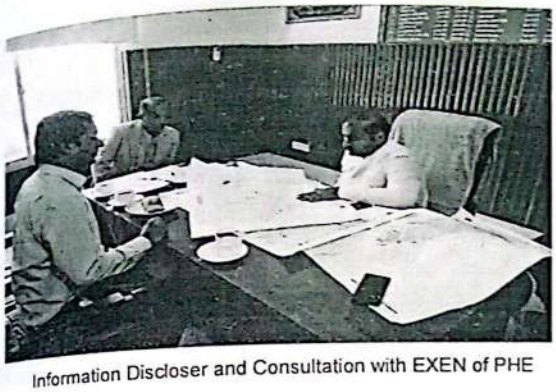


Information Discloser and Consultation with Agriculture Department



Information Discloser and Consultation with C.O of MC Jhang

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Information Discloser and Consultation with EXEN of PHE



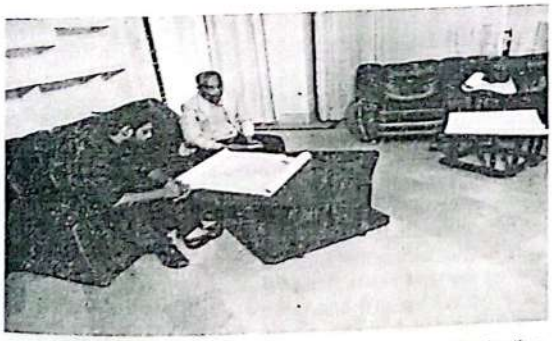
Information Discloser and Consultation with official of Forest Department



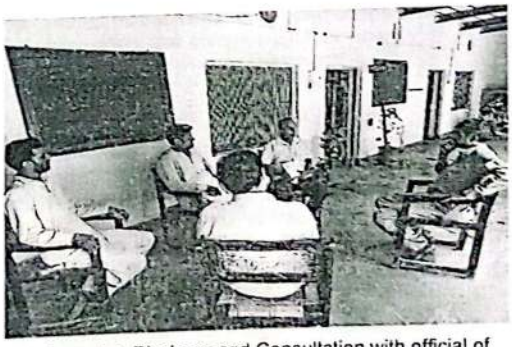
Information Discloser and Consultation with official of Wildlife Department



Information Discloser and Consultation with official of DC office



Information Discloser and Consultation with official of Irrigation Department



Information Discloser and Consultation with official of Environment Protection Department

Table 14: Feedback and Concerns

Departments	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
Environment Protection Department	❖ What are the objectives of the project?	❖ The proposed project will provide a socially, environmentally and economically sustainable solution for disposal of sewerage and wastewater The Project intends to ensure efficiency in safe and quick disposal of sewage/wastewater by laying of Trunk Sewerage System

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Departments	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
	❖ Where are the project activities to be implemented during the construction?	❖ Project activities will be implemented within and outside the existing residential and commercial areas. In order to avoid restricting the mobility of the local stakeholders, construction vehicles will remain confined within their designated areas of movement;
	❖ What are the solution of traffic problem during the construction?	❖ All necessary measures will be taken to ensure the safety of traffic during construction, including barricades (including signs, pavement markings, flags, and lights) All such barricades will be set up to facilitate the local traffic.
	❖ If the land is required for the project then what about the compensation?	❖ Most of the alignment is along the main road which is the property of government. Minor acquisition may be required from private property. ❖ Due consideration should be given to minimum or no land acquisition. ❖ Land should be acquired according to World Bank Safegaurd Policies. ❖ Compensation should be given as per World Bank Safegaurd Policies.
	❖ What are the mitigation measures for emission control?	❖ All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions; ❖ Proper maintenance and repair of power generators and construction machinery is needed to minimize the hazardous emissions;
Public Health Engineering	❖ The proposed project is essential for the improvement of public health and socio-economic development, particularly in Jhang city with a high incidence of water-related diseases, which affect particularly children. This actually is not new as drinking water and waste have already been recognised as key health issues in Jhang city and the proposed project will effectively change the present scenario. Traditionally in this proposed project, improvements in Sewerage system have been promoted as essential public health measures to improve the population's health status and reduce the burden of disease.	❖ The proposed Sewerage Networks Rehabilitation project is aimed towards the introduction of a sustainable sewerage infrastructure that will be able to fulfil the city needs for the next many decades. The project will result in the drastic improvement of sewage collection and conveyance system to cater the existing and future drainage needs and will help towards the development of infrastructure, business and routine life in these regions especially the project area which is very much populated. Locals will be benefited by this, as this will contribute to their livelihoods.
	❖ What are the benefits of the project on the local population?	❖ With the improvement in sewerage system, improvement in health, hygiene and sanitation will also be observed. ❖ The proposed Sewerage Networks Rehabilitation project is aimed towards the introduction of a sustainable sewerage infrastructure that will be able to fulfil the city needs for the next many decades. The project will result in the drastic improvement of sewage collection and conveyance system to cater the existing and future drainage needs
Agriculture Department	❖ It is recommended that as per world standards the water supply line and sewerage line should be on specific distance as they could not be mixed when these become damaged	

Departments	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
	❖ What is the procedure to address grivances?	❖ The most of the concerns raised by stakeholders have been incorporated into the project's environmental and social assessment and EMP. In addition a Grievance Redress Mechanism/Complaint Handling Mechanism will be developed at the implementation level by forming Grievance Redress Committee which will receive and resolve complaints of the project affected persons and other stakeholders of the project area.
	❖ Cutting of trees should be avoided at the maximum level	❖ Incorporate technical design measures to minimize removal of these trees as far as possible
	❖ Efforts should be made to transplant the trees according to the available facilities.	❖ A tree plantation plan to compensate for the anticipated loss of vegetation during the construction activities, and to help abate pollution caused by emissions, dust, and noise during the operation.
	❖ There is no sensitive area near the project interventions.	❖ Comment has been incorporated in the ESIA report
Wildlife Department	❖ Overall, the Projects interventions will have positive impacts on environmental and social conditions, including the positive impacts on environmental, aesthetics and hygienic conditions of the Jhang city.	❖ Yes improvement of the Sewerage system will create a healthy lifestyle in the entire city.
	❖ The official of Wildlife department desire to receive regular updates on the project development.	❖ Definitely, the consultation process will be on going process and World Bank's disclosure policy will be adopted.
Irrigation Department	❖ The construction activities and vehicular movement at construction sites and access service roads may also result in road side accidents particularly inflicting local communities who are not familiar with presence of heavy equipment and machinery.	❖ The labourers with different transmittable diseases should be restricted within the construction site; ❖ Efforts will be made to create awareness about road safety among the drivers operating construction vehicles. ❖ Timely public notification on planned construction works. ❖ Close consultation with local communities (residential areas along the project alignment) to identify optimal solutions for diversions to maintain community integrity & social links; ❖ Provision of proper safety signage, particularly at sensitive/accident-prone spots; ❖ The communicable disease of most concern during construction phase, like sexually-transmitted disease (STDs) such as HIV/AIDS, should be prevented by successful initiative typically involving health awareness, education initiatives training heath workers in disease treatment, immunization program and providing health service
MC, Jhang	❖ Minimize the effects of noise, dust vibration, traffic and lightening associated with construction activities on the communities living near the project area that can cause disturbances and emotional stress	❖ Construction machinery will be placed in an adequate locations away from the sensitive areas to minimize the impacts related to the noise. ❖ The chapter 6 Environment and social impact assessment covers all impacts and their mitigation and also see table 7.2

Departments	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
DC Office	❖ Solid waste produced due to construction activities should be disposed of properly	❖ Solid waste generated during construction and at camp sites will be disposed of safely at the waste disposal sites approved by the relevant Government authority.
	❖ Sprinkling of water should be regular in the morning, noon and evening on the daily basis.	❖ It is the liability of the contractor to save local environment ❖ The chapter 6 Environment and social impact assessment covers all impacts and their mitigation.
	❖ Utilities disturbed at the site should be restored as early as possible.	❖ The utilities to be shifted due to the construction of proposed project will be relocated on priority basis to minimize the impact on the stakeholders.

Women Stakeholders Consultation

Gender issues are gaining importance in development Sub-projects because female members of the community are generally neglected while designing, assessing and implementing such Sub-projects. Females are generally more vulnerable than male members of the society. This Sub-project is also no exception to it. Conducting women consultations in the Sub-project area was a challenging task. However, the process has been carried out by holding consultation sessions with women of local communities randomly. A participatory and consultative approach has been employed for information gathering and data collection.

Female participants were first briefed about the Sub-project objectives and interventions and then were requested to give their views. Women's main concerns were generally related to the existing hardships they are facing and suggestions, as under:

- One of the participant said that we are fed up with the stench of wastewater and mosquito-borne diseases like malaria and dengue fever.
- The consumption of contaminated ground water is causing health issues in children and women especially in pregnant women.
- In some areas pit holes are dug for household waste water and it collects the water, the women members of family are supposed to empty the pit hole and dispose off directly in open passages/streets or nearby open fields which is an unhygienic practice and creates unpleasant and unhealthy impacts on the areas and overll on women health.
- Women are suppressed and not consulted during decision making.
- Proper sanitation infrastructure is not priority of the communities due to which women households are affecting badly.
- Women are not allowed to leave the house without permission of head of family, most of women are not aware of hygienic practices and products.
- The waste water from households converted into wastewater pounds because of water logging in some of areas of the city, the water level raises and enters into household cause water borne diseases and damages the foundations of houses.
- Drinking water in the area is contaminated and people have to use this contaminated water
- Waste dumping is major issue faced by local communities, lack of awareness and lack of proper waste management system has resulted in waste dumps of center of the town which

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CHAPTER 9

GRIEVAENCE REDRESS MECHANISM (GRM)

In order to receive and facilitate the resolution of affected people concerns, compliments, and grievance about the project's environmental and social performance an Environmental Grievance Redress Mechanism (GRM) has been established. The GRM will address affected people's concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate and readily accessible to all segments of the affected people at no costs and without retribution.

The GRM will be accessible to diverse members of the communities, including women, senior citizens, and people with disabilities, laborers/workers, and other vulnerable groups. ESMF GRM will be integrated with the PCP's overall program GRM hotline to be developed by the Consultants under the scope of PCP.

9.1. GRM AT SUB-PROJECT SITE

Grievance Redress Mechanism (GRM) is to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the local level. In case of any complaint, E&S expert of supervision consultant team will act as focal person of GRC who may be contacted at site and his contact details will be provided at project site.

GRIEVANCE REDRESS COMMITTEE (GRC)- MC Jhang

ESFPs of MC Jhang will be focal persons and responsible for handling the GRM at MC level

GRC AT ADMINISTRATIVE LEVEL

Administrative of each MC will chair the GRC at Administrative level

Types of Grievances

The following are some of the environmental and social issues could be subject for grievance from the affected people.

Environmental Issues	Social Issues	EHS Issues
• Noise Pollution • Air Pollution • Fugitive Dust • Water Pollution • Solid Waste Management • House Keeping • Cutting of Trees • Borrow Areas Management • Protection of Wildlife • Campsite Management	• Accidental Insurance for labor • Non-Provision of PPEs to labor as per nature of their jobs • Loss of any public infrastructure • Protection of sensitive receptors • Compensation for any economic losses • Traffic Management • Labor grievance	• First Aid • Fire Safety • Workplace Safety • Tools Box Talks • Provision of PPEs • Work at Height Safety • Excavation Safety • Heavy Machinery Issues

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redressal
- Gender discrimination
- Security Arrangements
- Impacts on livelihood
- Irregular Traffic Movement
- Obstruction in access
- Intensive schedule of construction activities
- Child Labor
- Unsafe conditions for the community (Community Health and Safety, CHS)

CHAPTER 10

CONCLUSION AND RECOMMENDATIONS

10.1. CONCLUSION

The present report presents the Environmental and Social Impact Assessment (EIA/ESIA) of improvement of sewerage system in Jhang city and construction of WWTP. During the preparation of EIA /ESIAreport for the proposed developmental project, it is observed and established that the negative environmental impacts are permanent and moderate to high nature. No depletion, deterioration or exploitation of local natural resources is expected to be caused by the proposed project activities. It is accordingly recommended that the Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subjected to the payment of requisite scrutiny fee by the proponent of the project. The project does not pose any serious negative environmental impacts. Adequate mitigation measures have been proposed to address negative impacts arising from the project.

In addition, the improvement of sewerage system in Jhang city and construction of WWTP can be beneficial for the community in multiple ways. This project is unique and need of the hour to improve air quality, traffic congestion and safety issues of the public of MC Jhang. It will generate revenue for MC Jhang.

10.2. RECOMMENDATIONS

The Initial Environmental Examination (EIA/ESIA) as well as survey results are finally evaluated to recommend the following:

- Adherence to the Environmental and Social Management and Monitoring Plan (ESMMP) as proposed in this report is mandatory.
- During the construction phase of this project, all the required PPEs should be provided to the workers.
- Proper housekeeping in and around the site must be given consideration.
- The fire safety precautions must be considered to prevent or reduce the likelihood of fire. Placing and maintaining fire extinguishers at easily accessible points is highly recommended.
- Proper indication of exit points must be there for emergency situation.
- Proper safety and information sign boards must be placed at required places.
- Adequate training of workers must be done to deal with the emergency situations

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Glossary

Act	Act means the Pakistan Environmental Protection Act, 1997
Affected Household	All members of a household operating as a single economic unit, who are affected by a project
Affected Households	All members of a household operating as a single economic unit, who are affected by a project
Biological Oxygen Demand (BOD)	BOD is a measurement of oxygen required by bactena to oxidize (stabilize) the organic matter in the wastewater
Blackwater	Blackwater is wastewater from toilets and latrines containing feces or body fluids and water from sinks used for food preparation or disposal of chemical or biological ingredients
Contamination	Contamination introduction of impurities in the environment
Compensation	Payment in cash or in kind for an asset or a resource that is acquired or affected by a project due to land acquisition at the time the asset needs to be replaced
Drain	A channel or pipe along which liquid drains away; esp. (a) a pipe for leading away rainwater etc.; (b) an open channel made to drain an area of land; an artificial river
Disease Vectors	insects or small mammals carrying disease-causing germs
Displaced persons	The titleholders / the persons in whose name the project-affected businesses registered/who run the business and who are authorized to receive the resettlement assistance granted for the loss business locations.
Environment	Environment means (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 inter-relationships between any of the factors in sub-clause (a) to (f)
Entitlement	Resettlement entitlements with respect to a particular eligibility category are the sum total of resettlement and rehabilitation assistance provided to displaced persons in the respective eligibility category.
Environmental Assessment	Environmental Assessment is a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead
Ecosystem	Ecosystem is a biological community plus the surrounding physical environment
Endangered Species	Endangered Species are species in danger of becoming extinct

Greywater	Greywater is the water that has been used once in a house or building for washing clothes shower, bathing, hand washing, or dishwashing and can therefore be used again in toilets or to water gardens and landscaping
Household	Household means all persons living and eating together as a single social unit and cooking from the same kitchen whether or not related to each other.
Impact on Environment	Impact on Environment means any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources.
Infiltration	seepage of water intro ground
Invasive Non-native Species	a species that is introduced into an area or region from outside
Income restoration assistance	Support to restore and/or improve the incomes of displaced persons through allowances and provision of alternative means of income generation
Involuntary Resettlement	Resettlement is involuntary when it occurs the displaced persons give their consent without having the power to refuse resettlement.
Implementing agency	Agency, public or private, that is responsible for planning, design, and implementation of a development project.
Income Restoration	Income Restoration means re-establishing income sources and livelihoods of DPs to a minimum of the pre-project level.
Involuntary resettlement	Development project results in unavoidable resettlement losses that such as those for the vendors that have been displaced and have no option but to rebuild their lives, incomes and asset bases elsewhere.
Kanal	A kanal is a traditional unit of land area in Pakistan. This is equivalent to about 505.857 square meters.
Land acquisition	Land acquisition means the process whereby a person is compelled by a public agency to alienate all or part of the land she/he owns or possesses, to the ownership and possession of that agency, for public purposes in return for fair compensation.
Mitigation Measure	Means a measure for the control, reduction or elimination of an adverse impact of a development on the environment, including a restorative measure
Meaningful consultation	A process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to displaced persons; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of displaced persons and other stakeholders

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	into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.
Pathogens	the microorganisms that are capable of producing disease
Potable water	is water that is safe for drinking and cooking
Regulations	means the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environment Impact Assessment Regulations, 2000
Rehabilitation assistance	Support provided to displaced persons to supplement their income losses in order to improve, or at least achieve full restoration of, their pre-project living standards and quality of life.
Relocation assistance	Support provided to persons who are physically displaced by a project. Relocation assistance may include transportation, food, shelter, and social services that are provided to the displaced persons during their relocation. It may also include cash allowances that compensate displaced persons for the inconvenience associated with resettlement and defray the expenses of a transition to a new locale, such as moving expenses and lost work days.
Replacement Cost	Cost of replacing lost assets and incomes, including cost of transactions. It is the open/fair market value of a project affected property. For agriculture land, this includes reference to land of equal size, type and productive potential in the vicinity of the affected land and land preparation costs where required. For houses and other buildings, this includes reference to the market price of materials and labour, and the cost of transporting materials to the building site. The replacement cost further includes the cost of any registration and transfer taxes for land and buildings.
Resettlement	Resettlement is a general term related to land acquisition and compensation for loss of asset whether it involves actual relocation, loss of land, shelter, assets or other means of livelihood.
Sanitation	treatment and disposal of sewage
Soakway	a pit into which wastewater flows in order to drain slowly out into the surrounding soil
Septic Tank	a tank (associated either with a sewage works or with a residence not connected to a sewer) in which the solid content of sewage is allowed to settle and accumulate and is purified by the action of anaerobic bacteria
Sewer	a conduit that carries away sewage or wastewater
Stabilization Ponds	shallow ponds or lagoons constructed to treat domestic wastewater
Sludge	any muddy or slimy matter or deposit; a thick suspension of fine particles or gel in a liquid, esp. one formed as waste in any of various industrial and mechanical processes

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Soil Erosion	physical removal of soil, either by wind or by running water
Sedimentation	Deposition of material in the form of sediment, as a geological process, or in a liquid in a tank, centrifuge, etc
Suspended Solids (SS)	organic and inorganic particles, which do not dissolve in the wastewater but remain suspended
Vulnerable Household	The households disproportionately affected by land acquisition and resettlement, including non-titleholders/informal users of land, marginal farmers/agriculture tenants or those who become marginal as a result of land acquisition that include the affected households below the poverty line, the landless, informal business operators/vendors, refugees, internally displaced persons, elderly, disabled and female headed households.

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List of References

1. https://itacec.org/document/oxfam/Baseline%20Study%20Reports/District_Jhang.pdf
2. https://elevation.maplogs.com/poi/jhang
3. https://jhang.punjab.gov.pk/
4. https://reliefweb.int/sites/reliefweb.int/files/resources/Pak_Seismic%20Map_Ver02_A0L_070315.pdf
5. https://www.ikprress.org/index.php/JOBARI/article/view/2998
6. https://apply.jar.punjab.gov.pk/upload/1373867280_73_550__149paper5.pdf
7. https://world-weather.info/archive/pakistan/jhang/
8. Asian Development Bank, 2017, Climate change profile of Pakistan: https://www.adb.org/sites/default/files/ publication/357876/climate-change-profile-pakistan.pdf
9. G. Rasul et al. 2012b. Climate Change in Pakistan Focused on Sindh Province. Technical Report. No. 25. Islamabad: Pakistan Meteorological Department.
10. Global Change Impact Studies Centre. 2005. Final Technical Report for APN CAPABLE Project. Islamabad. http://www.gcisc.org.pk/2005-CRP01-CMY-Khan_CAPaBLE_FinalReport.pdf
11. https://cms.ndma.gov.pk
12. https://www.scirp.org/journal/paperinformation.aspx?paperid=66521
13. https://www.researchgate.net/figure/Seismic-zoning-map-of-Pakistan-according-to-Building-Code-of-Pakistan-BCP-2007_fig2_274272010
14. https://iisee.kenken.go.jp/net/seismic_design_code/pakistan/pakistan_table111.html
15. http://www.pmd.gov.pk/SeismicReport_PMD.pdf
16. Information was obtained/observed by Consultant and DPO ESM during field visits.
17. https://www.citypopulation.de/en/pakistan/distr/admin/toba_tek_singh/73303_Jang/
18. https://www.bos.gop.pk/DistrictProfile
19. http://www.tmakotaddu.lgpunjab.org.pk/mcjhang.lgpunjab.org.pk/wwwroot/Imp-Places.html
20. https://www.pakpedia.pk/jhang-city-punjab-history-weather-updates/#jhang_Weather
21. https://worldpress.com.pk/pakistan-news/history-of-Jhang-is-the-oldest-city-punjab

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Terms of References

CLIENT RESPONSIBILITY

We expect the following inputs from the clients

- As soon as the Proposal is accepted, the Consultants will request for the nomination of senior officer to be nominated as Coordinator who will be responsible for all coordination activities as required by the Consultants and to whom the Consultants will refer for information and assistance. All correspondence between the Consultants and the CLIENT will be routed through the coordinator.
- Asian will require free access to all relevant information available with the Client.
- Assess and identify major potential issues and impacts particularly those which may have influence on design, construction and operation at any stage.
- The report developed for the CLIENT shall be the property of the CLIENT and the Consultants shall adhere to confidentiality morally as well as legally.
- Client will provide relevant documents as:
  1. Signed application on company letter head (pattern will be provided)
  2. Undertaking on Rs. 100/- Stamp Paper (pattern will be provided)
  3. Affidavit on Rs. 100/- Stamp Paper (pattern will be provided)
  4. Copy of CNIC of proponent
  5. Signature on Schedule IV (pattern will be provided)
  6. Layout Map of the project
  7. Other NOCS/ Certificate's form other concerned departments (if any)
- Project proponent will provide the Bank Drafts of amount of Rs. 15,000/- in favor of D.G EPA Punjab which is review fee for ESIA.
- If any legal litigation arises from stakeholders during the preceding of IEE, the consultant will not be responsible for the delay in the approval process due to legal litigation.

Signature:

Ms. Dr. Ashraf Bodla

Environment Specialist

Date:

Signature:

Name

Designation

Date:

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Annexure: A: Environmental and Social Screening Checklist

Environmental & Social Screening Checklist

Instructions:

Environmental and Social Focal Persons (ESFPs)[46] nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs use this Checklist for screening.

The Checklist will be attached with the main document[47] of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used.

(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits.

Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	**Ahwaz Faraz MOI (I&S)** **Muhammad Aslam- MOP**	
Name of MC:	**Jhang**	
Sub-Project Sector:	**Sewerage**	
Sub-Project Title:	**Construction of Waste Water Treatment Plant at Toba Bypass Road near Chack 506/ Jhok Abbas Shrif, Jhang (WWTP)**	
Sub- Project Categorization:	**E-1 ✓**	**S-1**
	E-2	**S-2✓**
	E-3	**S-3**
Date of Screening:	**23-02-2023**	
Anticipated Project Activities	➢ Excavation and backfilling involved, the excavation would be carried out either by manual labor or by machines like power shovels, track excavators. Transport excavated material to fix disposal sites. ➢ Pipe Laying Activities. ➢ Construction of Inlet and outlet Drains structure. ➢ Construction of Boundary wall. ➢ Construction of Retaining ponds Beds. ➢ Electric Installations. ➢ Back Filling: Lastly, the trenches will be filled up with the excavated earth in layers about 15 cm thick. Each layer will be properly watered and rammed. ➢ Staff Quarters+ Security Guard Room, Lab facility ➢ Buffer zone and tree plantation	

[46] In all MCs, ESFPs are notified by Local government. MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors

[47] It is meant as PC-I and/or engineering estimates of sub-project

imated Cost of Subprojects	2228.87 Million
imated cost for implementation E/A ESIA	PKR05 million
mpletion Time/Duration	12 months

CHECKLIST

Screening Questions	Yes	No	Remarks
Project Siting			
the Sub-Project area adjacent to or within any of the lowing?			
nvironmentally sensitive areas?			
egally protected Area		✓	No legally protected area lies within 100 meters jurisdiction of sub-project
ny surface water body (river canal, stream, lake wetland) within 200 meters f the proposed sub-project		✓	No surface water body (river canal, stream, lake wetland) exists within 200 meters of the proposed sub-project
Estuarine		✓	Not observed in sub-project area
Special area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigations
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the sub-project area
Mangroves Forest		✓	No mangrove forest in the sub-project area.
Man-made forest /game reserve, orchid crops or any other area of environmental mportance	✓		Sub-project area is predominantly sand dunes area located outside the Jhang city. Sub-project is located in an open land and it is not in use for entitled agriculture. Anyhow, in patches crops grown by the non-entitled farmers (confirmed after consultation with farmers and revenue department) were observed for which ARAP will be developed and crop compensation will be provided as per WB policies
Socially sensitive /important areas/communities/ people?			

Physical Cultural Resources (PCRs) and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, Gordwarah, Temple, Fort, archeological/historical site) within 100 m of the proposed sub-project		✓	No PCR observed in this area's 100 meters vicinity where sub-project interventions are proposed so have no direct/indirect significant environmental & social impacts
Sensitive receptors (Schools, colleges, Shrine, Mosque, Church, hospitals and clinics) within 100 meters of the proposed sub project		✓	No sensitive receptor observed in the 100 meters of the sub-project interventions so have no direct/indirect significant environmental & social impacts on sensitive receptors during construction phase.
Any graveyard of local community (Muslims or Christians)		✓	Not observed in sub-project area
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments48 of the society and women or children)?			No Negative impact are envisaged on vulnerable groups
Already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	Existing infrastructure or public amenities are not required to be dismantled or may be temporarily affected by any mean as this area is away from the urban population
B. Potential Environmental Impacts Will the sub-project cause…			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	No habitats, biodiversity and protected area are observed in the area which may be disturbed

[48] Due to caste, creed, religion or gender e.g. transgender

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Cutting of trees?	✓		Cutting of trees involved during construction phase. Dry grasses and Shesham, Keeker species exist at the end of area in patches) Number of trees are 13 Tree Management Plan will be prepared and made part of EIA/ESIA[49]
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disturbance to habitats/biodiversity of environmentally sensitive or protected areas is envisaged as no such area is found at the proposed project site.
Generation of wastewater during construction or operation?	✓		During construction, wastewater will be generated from contractor's camp etc., The generated wastewater will require proper disposal and mitigation measures will be provided in the ESMMP of EIA/ESIA During operational phase, significant adverse impacts on environment and surrounding settlements of the sub-project area will occur i.e. odor and breeding site for the mosquitos. Accordingly, mitigation measures will be proposed in the ESMMP of the EIA/ESIA. The municipal wastewater will be drained into the Wastewater Treatment Plant (WTP) through a sewerage conveyance system. The treated wastewater will essentially comply the the PEQSs. WTP will be exclusively designed for the municipal wastewater and wastewater from all the localities will be discharged into the WTP. There will be no chance of mixing industrial wastewater and storm water with the municipal wastewater before treatment.

[49] Provision of 100m buffer zone in the form of raised walls and plantation is proposed

Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of wastewater?	✓		Wastewater will be generated during construction phase by contractor camp and construction activities. Wastewater from contactor camp will require proper treatment and management before disposal to the sewerage system or natural drain. At operational phase, due to leakage and clogging of the sewerage system, and overflow at WTP may result in seepage and pondage. This might result contamination of groundwater. Mitigation measures will be provided in the ESMMP of EIA/ESIA and these will be made part of the sewerage system and WTP designs. For example, provision of appropriate material sheet beneath the ponds will be placed to mitigate seepage of wastewater to the groundwater. Wastewater after treatment and PEQS compliance will be released into the nearby man-made or natural water body.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No such impact foreseen, as the sub-project is located away from the surface water bodies. No other significant adverse impacts on alteration of surface water hydrology of waterways and increase in sediment of streams/rivers during construction phase.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction.	✓		Un-skilled local labor will be preferred to be hired from the nearby human settlements. For construction of labor camp, PMDFC SOPs will be followed and mitigation measures will be provided in the ESSMP of EIA/ESIA Report Chemical storage facilities will be regularly monitor.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in the scope of proposed project activities

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			However, for labor camp management, provisions for water availability will be made in the ESMMP of EIA
Serious contamination of soil due to construction works?		✓	Construction materials will be stored properly Mitigation will be provided in the ESMMP of EIA/ESIA.
Aggravation of solid waste problems in the area?		✓	No aggravation of solid waste problems in the area is anticipated. The waste construction material will be collected and disposed at designated place on daily basis. For solid waste of labor camp, mitigation measures shall be provided in the ESMMP od EIA Report
Generation of hazardous waste?	✓		Hazardous waste generated during construction activities in terms of oils, rubber lining, sealants will be managed with precautions and mitigation measures will be provided in the ESMMP of EIA/ESIA An Environmental Quality Testing laboratory will be managed by the MC Jhang at site to ensure effective monitoring of treated wastewater to ensure that treated wastewater is in compliance with the PEQSs and WHO Guidelines to be reused for the agricultural activities.
Increased air pollution due to sub-project construction and operation?	✓		The sub-project construction and operational phases will result in air pollution. Air pollution control measures during construction and operational phases will be included in the design of the sub-project and these will be described in detail in EIA/ESIA and ESMMP.
Noise and vibration due to sub-project construction or operation?	✓		Noise and vibration will be generated during construction and operational phases. Mitigations will be included in the design of the sub-project

			EIA /ESIA and ESMMP will cover noise and vibration aspects, impacts and mitigations in detail.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		In the proposed wastewater treatment technology, waste stabilization ponds will be used and further bio-remediation (floating wetlands) will be introduced in which minimal chances of mosquito breeding are anticipated During construction and operational phases breading habitats of mosquitoes and rodent might be created. Accordingly, mitigations will be developed and made part of the design, EIA/ESIA and ESMMP.
Use of chemicals during construction?	✓		Multiple chemicals will be used during construction and operational phases. Chemical management system for the safe use of chemicals will be made part of the EIA/ESIA and ESMMP.
C: Potential Social Impacts Will the Sub-Project cause...			
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities. However, during construction of sewerage system and WTP chance find may happen. Chance Find Procedure will be applied during the project construction phase.
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)	✓		No Displacement or involuntary resettlement of people or economic displacement expected due to the sub- project intervention Anyhow, at current there are some crops (Wheat & fodder crops) at some patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy.

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Disproportionate impacts on the poor, women and children and or other vulnerable groups 50(mentioned above)?		✓	There will be no impact on the poor women, children and or other vulnerable groups
Temporary impediments in movements of people/transport and animals?	✓		There would be hindrance in the mobility of people during construction phase. However, this will be a temporary impact and would be managed by proper controlling the traffic and providing a temporary access route. The Contractor in this context will ensure good housekeeping.
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Not to be envisaged during construction phase. Local unskilled labor will be preferred by the Contractor.
Social conflicts if workers from other areas are hired.	✓		Contractor will hire local workers for unskilled construction activities Training/awareness raising sessions will be conducted for labor to avoid social conflicts
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		Contractor will follow EHS SOPs which will be made part of bid documents to avoid physical hazards and risks related to OHS
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	✓		There would be some safety issues during material transportation, during construction phase. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or	✓		There would be safety issues during construction and operational phases due to storage of fuel and other chemicals and transport. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors and

[50] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

where their failure could result in injury to the community throughout project construction, operation, and decommissioning.			MC during WTP operations
Any impact on sensitive receptors (mentioned above)		✓	No impact on sensitive receptors is observed as explained above.
Any impact of negative nature on already existing infrastructure including public amenities	✓	✓	No public infrastructure was found at site proposed for construction of WWTP so no such impact is envisaged. Anyhow, at current there are some crops (Wheat & fodder-crops) at the some patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy.

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	Name: Faraz Ahwaz	Name: Muhammad Asif Gillani
Designation: Environment Specialist	Designation: Municipal Officer Planning (MOI)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 23-02-2023	Date: 23-02-2023	Date: 23-02-2023

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INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage

Sub-Project Title: Construction of Waste Water Treatment Plant at Toba Bypass Road near Chack 506/ Jhok Abbas Sharif, Jhang (WWTP1)

Sub- Project Categorization: E-1 & S-2

Date of Screening: 23-02-2023

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		No, this project required no Land Acquisition as proposed site for construction of WWTP is State owned land which will be transferred to the MC Jhang -procedure is already initiated by the DC Jhang Anyhow, at current there are some crops (Wheat & fodder crops) at the small patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy.
If yes, then describe the type of land being acquired from the categories below		✓		No, this project required no Land Acquisition
Has any AED been conducted at the proposed location by the government*? Yes/No		✓		Not observed in subproject area and also confirmed by MC Staff and during public consultation with the nearby communities
Land (Quantify and describe types of land being acquired in "remarks column".		✓		97 Acres of land is required for WWTP and land is already owned by Government Anyhow, at current there are some crops (Wheat &fodder crops) at some patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy
Government and LG owned land free of occupation (agriculture or settlement)	✓			It is Government owned land Which is free of any occupation. Anyhow at current there are some crops (Wheat & fodder crops) at some patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy

Government or state-owned land (other than LG) free of occupation (agriculture or settlement)	✓			Government owned land present for sub-project intervention and free of occupation (agriculture or settlement) at present. Anyhow, at current there are some crops (Wheat & fodder crops) at some patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy
Private land		✓		
Residential		✓		
Commercial		✓		
Agricultural		✓		
Communal		✓		
Others (specify in "remarks").		✓		
Name of owner/owners and type of ownership document if available.	✓			Land is owned by Government.
If land is being acquired, describe any structures constructedon it		✓		
Land-based assets.		✓		No land-based assets present on this land other than trees.
Residential structures		✓		
Commercial structures (specify in "remarks")		✓		
Community structures (specify in "remarks")		✓		
Agriculture structures (specify in "remarks")		✓		
Public utilities (specify in "remarks")		✓		
Others (specify in "remarks")		✓		
If agricultural land is being acquired, specify the following:		✓		
Agriculture related impacts		✓		
Crops and vegetables (specify types and cropping area in 'remarks).		✓		
Trees (specify number and types	✓			13 mature & younger trees. Trees and

in "remarks")				types are sheesham and Keekar)
Others (specify in "remarks").		✓		
Affected Persons (APs)		✓		No APs
Will any people be displaced from the land when acquired? Yes/No		✓		No displacement will occur
Number of APs		✓		
Males		✓		
Females		✓		
Titled landowners		✓		Land is owned by Government
Tenants and sharecroppers		✓		
Leaseholders		✓		
Agriculture wage laborers		✓		
Encroachers and squatters (specify in remarks column)		✓		Not observed when first E&S Survey was conducted on 23-02-2023. Anyhow, at current there are some crops (Wheat & fodder crops) at the some patches of the land for which ARAP will be developed to pay the crop compensation as per the World Bank policy.
Vulnerable APs (e.g,. women headed households, minors and aged, orphans, disabled persons, and those below the poverty line) Specify the number and vulnerability in "remarks".		✓		Not observed when first E&S Survey was conducted on 23-02-2023
Others (specify in "remarks")		✓		

Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq Farooqi	Name: Muhammad Aslam	Name: Muhammad Asif Gillani
Designation: Social Safeguards Specialist	Designation: Municipal Officer Planning (MOP)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:

Environmental & Social Screening Checklist

Instructions:

Environmental and Social Focal Persons (ESFPs)[51] nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist

It is to be attached with the main document[52] of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	**Ahwaz Faraz MOI (I&S)** **Muhammad Aslam- MOP**
Name of MC:	**Jhang**
Sub-Project Sector:	**Sewerage**
Sub-Project Title:	**Construction of New Disposal Station Near Chah Pindian Wala, Jhang**
Sub- Project Categorization:	**E-1✓** **S-1** **E-2** **S-2✓** **E-3** **S-3**
Date of Screening:	**23-02-2023**
Anticipated Project Activities	➢ Construction of Civil works for the new disposal station. ➢ Construction of collection chamber. ➢ Installation of inflow and outflow pipes. ➢ Construction of embanked facultative sewage disposal ponds. ➢ Transport and installation of pumping machinery.
Estimated Cost of Subprojects	**2228.87 Million**
Completion Time/Duration	**PKR06 million**
Estimated Labor for Subproject	**15**

CHECKLIST

[51] In all MCs, ESFPs are notified by Local government; MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors.

[52] It is meant as PC-I and/or engineering estimates of sub-project

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Screening Questions	Yes	No	Remarks
A Project Siting			
Is the Sub-Project area adjacent to or within any of the following?			
Environmentally sensitive areas?		✓	No legally protected area lies within 100 meters jurisdiction of sub project
Legally protected Area		✓	No surface water body (river, canal, stream, lake, wetland) exists within 200 meters of the proposed sub project
Any surface water body (river, canal, stream, lake, wetland) within 250 meters of the proposed sub project		✓	Not observed in sub project area
Estuarine		✓	No Wild life park or other biodiversity areas observed during site E & S investigations
Special area for protecting biodiversity		✓	No buffer zone for fauna and flora exists surrounding the sub-project area
Buffer zone of protected area		✓	No mangrove forest in the sub-project area
Mangroves Forest		✓	Not observed
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Not observed
Culturally sensitive /important areas/communities/ people?			
Physical Cultural Resources (PCRs) and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, Gordwarah, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject .	✓		1 Mosque and 01 Shrine observed within 200-meter area of the sub-project There would be hindrance in the mobility of people during construction phase. However this will be a temporary impact and would be managed by mitigation measure provided in the ESMMP of EIA/ESIA No other significant adverse impacts on sensitive receptors are foreseen

			Peer Rehmat Shah 's Shrine and 21/22nd Jan, their festival is celebrated by the local community and contractor will be communicated to avoid construction working that period of time.
Sensitive receptors (Schools, colleges, Shrine, Mosque, Church, hospitals and clinics) within 100 meters of the proposed sub project	✓		One Muslim graveyard and a shrine is observed in the vicinity
Any graveyard of local community (Muslims or Christians)	✓		01 Muslim graveyard observed within 200 meter of sub-project area However, MC Jhang with ensure that no sewerage lines will be constructed within 100 m range of the graveyard
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[53] of the society and women or children)?	✓		Local community of Chah Pindianwala was consulted and according to their socio economic profile, they are living below the poverty line. Social Development Plan for the betterment of their conditions will be developed
Already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public amenities are required to be dismantled. Current site of proposed disposal station was being used by the Shakar Ganj Sugar Mill to dispose off their industrial effluent. Public consultation with the Sugar Mill was conducted and findings will be provided in the EIA/ESIA Report
B. Potential Environmental Impacts Will the sub-project cause…			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	No such impact is envisaged

[53] Due to caste, creed, religion or gender e.g. transgender

Cutting of trees?		✓	Tree cutting will not be involved
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No such impact is anticipated
Generation of wastewater during construction or operation?	✓		Wastewater generation during construction will be limited. Anyhow, mitigation measures will be provided in the ESMMP of EIA/ESIA Report During operational phase, it's a collection point for sewerage water and then wastewater will be disposed to WWTP for treatment.
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of wastewater?	✓		Spillage and seepage during construction and operational phases may occur. Mitigations measures will be incorporated in the operation phase and described in detail in EIA/ESIA and ESMMP.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No such impact foreseen, as construction activities are minor and within the boundary.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction.	✓		Un-skilled local labor will be preferred to be hired from the nearby human settlements. For construction of labor camp, PMDFC SOPs will be followed and mitigation measures will be provided in the ESSMP of EIA/ESIA Report Chemical storage facilities will be regularly monitor.
Over pumping of ground water, leading to salinization and ground subsidence?	✓		No over pumping/pumping involved in the scope of proposed project activities However, for labor camp management, provisions for water availability will be made in the ESMMP of EIA/ESIA

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Serious contamination of soil due to construction works.		✓	Land is already a disposal site for sugar mill effluent so legacy of soil contamination will be investigated at the design stage before construction of disposal station structure and design parameters will take to avoid any contamination. Construction materials should be stored properly, no leakage or leachate is expected.
Aggravation of solid waste problems in the area?	✓		No aggravation of solid waste problems in the area is anticipated. The waste construction material will be collected and disposed at designated place on daily basis. For solid waste of labor camp, mitigation measures shall be provided in the ESMMP od EIA/ESIA Report
Generation of hazardous waste?	✓		Hazardous waste material is expected to be generated during construction phase and mitigation measures to hazardous waste handling will be provided in the ESMMP of EIA/ESIA.
Increased air pollution due to sub-project construction and operation?	✓		The subproject interventions are on small scale and construction activities are within the boundary that will not significantly increase air pollution. During operational phase, smell problem may increase for which budder zone of 100m is proposed in which tree plantation will be ensured to absorb the odor However, mitigation plan for construction and operational phases will be developed and made part of ESMMP of EIA/ESIA
Noise and vibration due to sub-project construction or operation?	✓		Noise and vibration will be generated during excavation and pipe laying activities but the level is expected to be low. However, the

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			noise will be monitored on regularly during construction by the contractor
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		During construction and operational phases due to mismanagement accidental pondage may result in the creation of temporary breeding habitats for diseases Mitigation measures will be included in the design, EIA/ESIA and ESMMP.
✓ 15. Use of chemicals during construction?	✓		Chemicals will be used during construction such as rubber lining and sealants. Better chemical use and storage practices will be used during construction phase mitigation measures will be provided in the ESMMP of EIA/ESIA
C: Potential Social Impacts Will the sub-project cause…			
Impairment of historical/cultural areas: disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No such impact is anticipated
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No such impact envisaged
Disproportionate impacts on the poor, women and children and or other vulnerable groups 54(mentioned above)?	✓		Due to the breeding of mosquitoes in the storage pond there is a possibility that the prevalence of related disease burden might increase among women and children in the vicinity of the sub-project. Accordingly,

[54] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

			mitigations will be proposed in the design, EIA/ESIA and ESMMP
Temporary impediments in movements of people/transport and animals?	✓		Mitigation measures will be provided in the ESMMP of EIA/ESIA
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)		✓	No such impact is envisaged
Social conflicts if workers from other areas are hired.		✓	Contractor will hire local worker for construction activities Anyhow, labor management plan will be developed and made part of EIA/ESIA ESMMP
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation.	✓		There would be safety issues during the construction and operational phases of the sub-project. For example, collection of hazardous gasses in the wastewater storage chambers and these might become fatal during cleaning of chambers. ESH SOPs have been included in the PC-1; these need to be followed by contractor and operator of the sub-project.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	✓		There would be some safety issues during martial transportation, road compaction during construction phase. The ESH SOPs have been included in the PC-I that have to be followed by the contractors

Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning.	✓		There would be safety issues during the construction phase due to the storage of fuel and other chemicals and transport. The ESH SOPs will be included in the bid documents to be followed by the contractors
Any impact on sensitive receptors (mentioned above)	✓		For graveyard, it is proposed to layout the sewerage line at-least 100m away from the boundary while a shrine is observed and it will be considered to avoid construction activities during their religious Urs

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	**Name:** Faraz Ahwaz	**Name:** Muhammad Asif Gillani
Designation: Environment Specialist	**Designation:** Municipal Officer Planning (MOI)	**Designation:** Deputy Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature:	**Signature**	**Signature:**
Date: 23-02-2023	**Date:** 23-02-2023	**Date:** 23-02-2023

Pictures of Field Visit

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Public Consultation at site 500ft away from proposed site for Construction of Sewerage Disposal Station at Chan Pindianwala[65] Jhang

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Under Five Marla Scheme of Government these lands were allotted by the Government to the landless peoples

Name of City/MC/LG: Jhang

Sub-Project Sector: Park

Sub-Project Title: Construction of New Disposal Station near Chah Pindian Wala, Jhang

Sub- Project Categorization: E-2 & S-2

Date of Screening: 23-02-2023

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Open field area and land owned by Government so no land will be acquired for this sub project. For transfer of land to MC Jhang, process has been initiated by the DC Jhang and will be completed in a few days.
If yes, then describe the type of land being acquired from thecategories below:		✓		
Has any AED been conducted at the proposed location by thegovernment[1]? Yes/No		✓		Not observed in sub-project area and also confirmed by MC Staff and from the local communities during public consultation
Land (Quantify and describe types of land being acquired in"remarks column".		✓		
Government and LG owned land free of occupation(agriculture or settlement)		✓		Land owned by Government so no land acquired for this sub-project for construction of disposal station.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		Govt land and free of occupation is available which is proposed for the construction of disposal station.
Private land		✓		Not required
Residential		✓		Not required
Commercial		✓		Not required
Agricultural		✓		Not required
Communal		✓		Not required
Others (specify in "remarks").		✓		Not required
Name of owner/owners and type of ownership document ifavailable.		✓		Not required
If land is being acquired, describe any structures constructedon it		✓		Not required
Land-based assets:		✓		Not applicable
Residential structures		✓		Not applicable
Commercial structures (specify in "remarks")		✓		Not applicable
Community structures (specify in "remarks")		✓		Not applicable
Agriculture structures (specify in "remarks")		✓		Not applicable
Public utilities (specify in "remarks")		✓		Not applicable
Others (specify in "remarks")		✓		Not applicable
If agricultural land is being acquired, specify the following		✓		Not applicable

Agriculture related impacts		✓		Not applicable
Crops and vegetables (specify types and cropping area in "remarks).		✓		Not applicable
Trees (specify number and types in "remarks").		✓		Not applicable
Others (specify in "remarks").		✓		Not applicable
Affected Persons (APs)		✓		Not applicable
Will any people be displaced from the land when acquired? Yes/No		✓		Not applicable
Number of APs		✓		Not applicable
Males		✓		Not applicable
Females		✓		Not applicable
Titled landowners		✓		Not applicable
Tenants and sharecroppers		✓		Not applicable
Leaseholders		✓		Not applicable
Agriculture wage laborers		✓		Not applicable
Encroachers and squatters (specify in remarks column)		✓		No encroachers and squatters present at the sub-project land
Vulnerable APs (e.g., women headed households, minors and aged, orphans, disabled persons, and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		Not applicable
Others (specify in "remarks")		✓		

Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq Farooqi	**Name:** Muhammad Aslam	**Name:** Muhammad Asif Gillani
Designation: Social Safeguards Specialist	**Designation:** Municipal Officer Planning (MOP)	**Designation:** Deputy Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature	**Signature**	**Signature:**
Date: 23-02-2023	**Date:** 23-02-2023	**Date:** 23-02-2023

Instructions:

(i) Environmental and Social Focal Persons (ESFPs)[56] nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

(ii) Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist

(iii) It is to be attached with the main document[57] of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

(iv) This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

(v) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	**Ahwaz Faraz MOI (I&S)** **Muhammad Aslam- MOP**
Name of MC:	**Jhang**
Sub-Project Sector:	**Sewerage**
Sub-Project Title:	**Laying of Trunk sewer and Branch sewers (9-60 inch) Zone 1, Jhang City**
Sub- Project Categorization:	✓ **E-1** **S-1** **E-2** **S-2**✓ **E-3** **S-3**
Date of Screening:	**23-02-2023**
Anticipated Project Activities	➢ Marking of the Alignment: The centerline of the sewer will be marked with a theodolite and invert tap. It would be marked either by reference line or with the help of sight rail. The position of the manhole will also be marked. ➢ After marking the centerline of the sewer, the excavation up to 07 feet deep and 5 feet wide trench will be done. The excavation would be carried out either by manual labor or by machines like power shovels, track excavators etc. ➢ Timbering of the Trench: When the depth of excavation is more than 2 m, timber bracing or sheet piling will be provided on both sides of the trench so that it may not collapse. The extent of timbering required will depend upon the type of soil and the depth of excavation. ➢ Preparation of Sub-grade: For soft soil, the bed of the sewer will be prepared by plain concrete (1:3:6). The thickness of concrete

[56] In all MCs, ESFPs are notified by Local government; MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors

[57] It is meant as PC-I and/or engineering estimates of sub project

	would vary from 15 to 20 cm. The bedding layer will not require in case of hard soil ➢ Laying and Joining of Pipes: Laying of (18 to 60 inches) High Density Poly Ethylene (HDPE) pipes. After joining, both sides of the pipe will be finished with concrete. ➢ Testing of Straightness of Alignment and Obstruction. ➢ Back Filling: Lastly, the trenches will be filled up with the excavated earth in layers about 15 cm thick. Each layer will be properly watered and rammed
Estimated Cost of Subprojects	**2228.87 Million**
Completion Time/Duration	06 months

CHECKLIST

Screening Questions	Yes	No	Remarks
A. Project Siting **Is the Sub-Project area adjacent to or within any of the following?**			
Environmentally sensitive areas?			
Legally protected Area		✓	No legally protected area lies within 200 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 200 meters of the proposed sub project		✓	No water body observed within 200 meters in the Sub-Project area
Estuarine		✓	Not observed in sub project area
Special area for protecting biodiversity		✓	Not observed in sub project area
Buffer zone of protected area		✓	Not observed in sub project area
Mangroves Forest		✓	Not observed in sub project area
Man-made forest /game reserve, orchid crops or any other area of environmental	✓		Mostly are urban area around these lines but at some places green fields are

nce			present on both sides
Socially sensitive /important areas/communities/ people?			
Physical Cultural Resources (PCRs) and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, Gordwareh, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject	✓		03 Mosque, one shrine observed within 100 meters of the Sub-Project interventions but have no direct/indirect significant environmental & social impacts. There would be hindrance in the mobility of people during Sewerage construction phase. However, this will be a temporary impact and would be managed by proper controlling the traffic. No other significant adverse impacts on sensitive receptors are foreseen
Sensitive receptors (Schools, colleges, Shrine, Mosque, Church, hospitals and clinics) within 100 meters of the proposed sub project	✓		2 school, 2 collages, and 01 madrassa exist within 100 m of the subproject interventions There would be hindrance in the mobility of people during Sewerage construction phase. However, this will be a temporary impact and would be managed by proper controlling the traffic. No other significant adverse impacts on sensitive receptors are foreseen
Any graveyard of local community (Muslims or Christians)	✓		One Graveyard exist within 100 m of the subproject interventions along Gojra Road but have no direct/indirect significant environmental & social impacts
Any demographic or socio-economic aspects of the subproject area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities,		✓	No negative impact observed on vulnerable groups (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities) Sub-Project area

people in old age, socially isolated households58 of the society and women or children)?			
already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	Public amenities exist along the Road but away from project line area so not required any type of dismantling.
B. Potential Environmental Impacts Will the Sub-Project cause…			
1 Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	No significant adverse impacts on environment
2 Cutting of trees?		✓	No Cutting of trees involved during construction phase
3 Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No significant adverse impacts on environment.
4 Generation of wastewater during construction or operation?		✓	Construction activities on minor level so waste water generation activities on lower level
5 Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of wastewater?		✓	No such impact anticipated as no wastewater will be generated during construction activities.
6 Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No such impact foreseen, as work activities are limited level and away from the surface water bodies so no other significant adverse impacts on sensitive receptors are foreseen during construction Phase.
7 Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in		✓	No construction labor camps envisaged and a rental house is used as a labor camp. Due to limited scope of work under

58 Due to caste, creed, religion or gender e.g. transgender

construction			Sub-Project and un-skilled local labor will be engaged for the construction activities. Chemical storage activities monitor regularly
8 Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of construction activities.
9 Serious contamination of soil due to construction works?		✓	Construction materials should be storage properly, no leakage or leaching Process involve so contamination of soil not observed
10 Aggravation of solid waste problems in the area?		✓	No aggravation of solid waste problems in the area is anticipated. The waste construction material will be collected and disposed at designated place on daily basis
11 Generation of hazardous waste?		✓	Bitumen containing solid waste will be generated during dismantling of existing road at some point during laying of sewerage line that will be disposed properly at designated place.
12 Increased air pollution due to sub-project construction and operation?		✓	The subproject interventions are on small scale that will not significantly increase air pollution
13 Noise and vibration due to sub-project construction or operation?	✓		Noise and vibration will be generated during excavation and pipe laying activities but the level is expected to be low. However, the noise will be monitored on regularly during construction by the contractor
14 Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?		✓	No Temporary breeding habitats creates during Construction activities for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid
15 Use of chemicals during construction?		✓	No chemicals will be used during

			construction activities
C. Potential Social Impacts			
Will the Sub-Project cause...			
1. Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
2. Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	Not observed in sub project area
3. Disproportionate impacts on the poor, women and children and or other vulnerable groups 59(mentioned above)?		✓	There will be no Impact on the poor women, children and or other vulnerable groups
4. Temporary impediments in movements of people/transport and animals?	✓		There would be hindrance in the mobility of people during construction phase. However, this will be a temporary impact and would be managed by proper controlling the traffic. The Contractor in this context will ensure housekeeping.
5. Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Due to Limited Scope of work activities, Local unskilled labor will be preferred by the Contractor
6. Social conflicts if workers from other areas are hired	✓		Contractor will Hire local worker for unskilled construction activities
7. Risks and vulnerabilities related to occupational health and safety due to physical chemical, biological, and radiological hazards during project construction and	✓		Contractor will follow EHS SOPs to avoid physical hazards which are part of PC-I

Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

operation?			
g. Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	✓		There would be some safety issues during martial transportation during construction phase. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors
h. Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning.	✓		There would be safety issues in Construction phase. During storage of fuel and other chemicals and transport. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors
i. Any impact on sensitive receptors (mentioned above)		✓	Not observed in sub project area
j. Any impact of negative nature on already existing infrastructure including public amenities		✓	Not observed in sub project area

Prepared By:	**Endorsed By:**	**Reviewed By:**
Name: Muhammad Imran	**Name:** Faraz Ahwaz	**Name:** Muhammad Asif Gillani
Designation: Environment Specialist	**Designation:** Municipal Officer Planning (MOI)	**Designation:** Deputy Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature:	**Signature**	**Signature:**
Date: 23-02-2023	**Date:** 23-02-2023	**Date:** 23-02-2023



Govt Vocational institute near Gulshan Fatima Colony, Jhang



Jamia Masjid Al-Rahmet



ROW for pipe line along Gojra Road Jhang



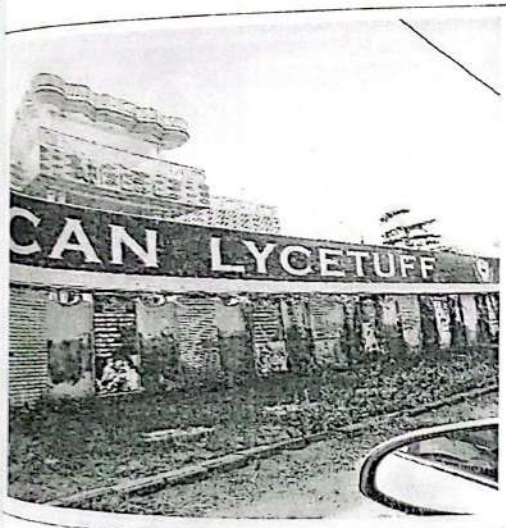
ROW for Sewerage pipe line along Gojra Road Jhang



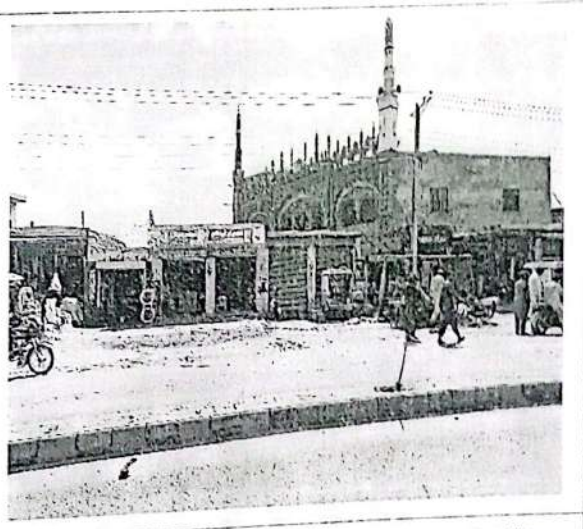
Rai Hospital at Gojra Road, jhang



Faisal Magiana Hospitan near Jamia Chowk



American Lycetuff School Near District Jail, Jhang



Jamia Masjid Anwaae e Madina Near Setilite Town, jhang

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage

Sub-Project Title: Laying of Trunk and sub main RCC sewers (18- 60 inch) Zone 1, Jhang City

Sub- Project Categorization: E-1 & S-2

Date of Screening: 23-02-2023

SECTION 1	Yes	No	Expected	Remarks
es the project require land acquisition? s/No		✓		Already Road exists and pipe line laying along the road. land owned by District Govt so no land acquired for this sub project
es, then describe the type of land ng acquired from thecategories below:		✓		No Land acquired for this sub project
t any AED been conducted at the posed location by the government[1]? s/No		✓		Not observed in sub project area and confirm by MC Staff also
nt (Quantify and describe types of t being acquired in"remarks column".		✓		No Land acquired for this sub project
vernment and LG owned land free of cupation(agriculture or settlement)		✓		Already land owned by District Govt so no land acquired for this sub project
vernment or state-owned land (other n LG) free ofoccupation (agriculture or tlement)		✓		No Land acquired for this sub project
ivate land		✓		No Land acquired for this sub project
sidential		✓		No Land acquired for this sub project
mmercial		✓		No Land acquired for this sub project
ricultural		✓		No Land acquired for this sub project
mmunal		✓		No Land acquired for this sub project
hers (specify in "remarks").		✓		Already land owned by District Govt so no land acquired for this sub project
me of owner/owners and type of nership document ifavailable		✓		Already land owned by District Govt t so no land acquired for this sub project
nd is being acquired, describe any uctures constructedon it		✓		No Land acquired for this sub project
e-based assets·		✓		No Land acquired for this sub project
sidential structures		✓		No Land acquired for this sub project
mmercial structures (specify in marks")		✓		No Land acquired for this sub project
mmunity structures (specify in marks")		✓		No Land acquired for this sub project
riculture structures (specify in marks")		✓		

...ther utilities (specify in "remarks")	✓			PARCO line crossing required for Sewerage line at Gojra Road near Kalma chowk. Applied for NOC from PARCO Authorities.
...ers (specify in "remarks")		✓		No Land acquired for this sub project
...ricultural land is being acquired, ...ich the following:		✓		No Land acquired for this sub project
...iculture related impacts		✓		No Land acquired for this sub project
...ps and vegetables (specify types and ...ping area in "remarks).		✓		No Land acquired for this sub project
...es (specify number and types in ...marks")		✓		No Land acquired for this sub project
...ers (specify in "remarks").		✓		No Land acquired for this sub project
...fected Persons (APs)		✓		No Persons Affected during this Project
...ll any people be displaced from the ...d when acquired? Yes/No		✓		No Land acquired for this sub project
...mber of APs		✓		No Persons Affected during this Project
...les		✓		No Persons Affected during this Project
...ales		✓		No Persons Affected during this Project
...es landowners		✓		No Land acquired for this sub project
...enants and sharecroppers		✓		No Land acquired for this sub project
...seholders		✓		No Land acquired for this sub project
...iculture wage laborers		✓		Not involved in this project
...croachers and squatters (specify in ...marks column)		✓		No Land acquired for this sub project
...erable APs (e.g. women headed ...seholds, minors and aged, orphans, ...icapped persons, and those below the ...erty line) Specify the number and ...ecify in "remarks".		✓		No Land acquired for this sub project no one effected during this this intervention
...ers specify in "remarks")		✓		Not involved in this project

Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq Farooqi	**Name:** Muhammad Aslam	**Name:** Muhammad Asif Gillani
Designation: Social Safeguards Specialist	**Designation:** Municipal Officer Planning (MOP)	**Designation:** Deputy Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature:	**Signature**	**Signature:**

s:

ntal and Social Focal Persons (ESFPs)[60] nominated by the MCs for PCP environmental and nagement, will use this checklist in field for environmental and social screening and tion of each and every sub-project proposed to be executed under the Program.

ogram Officers-Environmental and Social Management deputed by PMDFC in regional offices cally assist and support the ESFPs/MCs in filling in of this Checklist

attached with the main document[61] of sub-projects at planning stage and will be duly signed by nt ESFP and endorsed by the respective DPO-ESM

cklist focuses on environmental issues and social concerns. To ensure that social dimensions uately considered, Involuntary Resettlement Screening Checklist will also be used

purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of nental and social attributes or to enhance the existing environmental & social benefits. Use the s" section to discuss any anticipated mitigation measures.

f ESFP:	**Ahwaz Faraz MOI (I&S)** **Muhammad Aslam- MOP**
of MC:	**Jhang**
roject Sector:	**Sewerage**
roject Title:	**Construction of Manholes (10) Zone 1- Jhang City**
Project Categorization:	✓ E-1 S-1 E-2 S-2✓ E-3 S-3
of Screening:	**23-02-2023**
icipated Project Activities	➢ Diversion of existing line from manhole construction point. ➢ Supply of construction material (bricks, cement sand etc.) and machinery (concrete mixture) at site. ➢ Construction of manholes. ➢ Restoration of diversion.
stimated Cost of Subprojects	**2228.87 Million**
ompletion Time/Duration	06 months

CHECKLIST

Screening Questions	Yes	No	Remarks
A. Project Siting			
Is the Sub-Project area adjacent to or within any of the			

MCs. ESFPs are notified by Local government; MO (I&S) are focal persons for environmental sector and MO(P) are focal
for social sectors.
means as PC-I and/or engineering estimates of sub-project

following?			
Environmentally sensitive areas?			
Legally protected Area		✓	Not observed in sub project area
Any surface water body (river, canal, stream, lake wetland) within 250 meters of the proposed sub project		✓	No surface water body (river, canal stream, lake wetland) within 250 meters of the proposed sub project
Estuarine		✓	Not observed in sub project area
Special area for protecting biodiversity		✓	Not observed in sub project area
Buffer zone of protected area		✓	Not observed in sub project area
Mangroves Forest		✓	Not observed in sub project area
Man-made forest /game reserve, orchid /crops or any other area of environmental importance	✓		Open field area exists under 200 meters at some point of this intervention
Socially sensitive /important areas/communities/ people?			
Physical Cultural Resources (PCRs) and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, Gordwarah, Temple, Dargah, archeological/historical site) within 100 m of the proposed subproject			1 Mosque, observed within 100 meters of the Sub Project interventions but have no direct/indirect significant environmental & social impacts
Sensitive receptors (Schools, colleges, Shrine, Mosque, Church, hospitals and clinics) within 100 meters of the proposed sub project	✓		2 school and 01 madrassa exist within 100 m of the subproject interventions There would be hindrance in the mobility of people during Sewerage construction phase However, this will be a temporary impact and would be managed by proper controlling the traffic No other significant adverse impacts on sensitive receptors are foreseen
Graveyard of local community (Muslims or		✓	Not observed in sub project area

Christians)			
Any demographic or socio-economic aspects of the subproject area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments62 of the society and women or children)?		✓	No negative impact observed on vulnerable groups (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities) Sub-Project area
Already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No infrastructure will be dismantled due to construction activities.
B. Potential Environmental Impacts Will the Sub-Project cause…			
1 Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	Not observed in sub project area
2 Cutting of trees?		✓	No Cutting of trees involved during construction phase
3 Disruption to habitats/biodiversity of surrounding ecosystem/environment?			No significant adverse impacts on environment.
4 Generation of wastewater during construction or operation?		✓	No wastewater generation during construction and operation envisaged
5 Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of wastewater?		✓	Construction activities on minor level so waste water generation activities on lower level
6 Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion		✓	No such impact foreseen as work activities are limited level and within the boundary and away from water bodies

[62] Due to caste, creed, religion or gender e.g. transgender

at construction site?			so surface water hydrology of waterways have no impact during construction activities.
7 Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction.		✓	No construction labor camps envisaged due to limited scope of work under Sub-Project and un-skilled local labor will be engaged for the construction activities.
8 Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of construction activities.
9 Serious contamination of soil due to construction works.		✓	Construction materials should be storage properly, no leakage or leaching Process involve so contamination of soil not observed
10 Aggravation of solid waste problems in the area?		✓	No aggravation of solid waste problems in the area is anticipated. The waste construction material will be collected and disposed at designated place on daily basis
11 Generation of hazardous waste?		✓	No hazardous waste material generated during project activities
12 Increased air pollution due to sub-project construction and operation?		✓	The subproject interventions are on small scale that will not significantly increase air pollution
13 Noise and vibration due to sub-project construction or operation?	✓		Noise and vibration will be generated during excavation and pipe laying activities but the level is expected to be low. However, the noise will be monitored on regularly during construction by the contractor
14 Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?		✓	Not observed in sub project area
15 Use of chemicals during construction?		✓	No chemicals will be used during

			construction activities
c. Potential Social Impacts			
Will the Sub-Project cause…			
a. Impairment of historical/cultural areas; disruption of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
b. Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If 'Yes', please also fill Involuntary Resettlement Screening Checklist)		✓	Not observed in sub project area
c. Disproportionate impacts on the poor, women and children and or other vulnerable groups (mentioned above)?		✓	There will be no Impact on the poor women, children and or other vulnerable groups
d. Temporary impediments in movements of people/transport and animals?		✓	There would be negligible hindrances in the mobility of people during the construction phase. Housekeeping will be ensured by the Contractor in this context.
e. Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Not observed in sub project area
f. Social conflicts if workers from other areas are hired?		✓	Contractor will Hire local worker for unskilled construction activities
g. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and		✓	There would be some safety issues during martial transportation, and other construction activities

[1] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

operation?			
8 Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		There would be some safety issues during marial transportation, construction activities during construction phase. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors
9 Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning.	✓		There would be safety issues in Construction phase. During storage of fuel and other chemicals and transport. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors
10 Any impact on sensitive receptors (mentioned above)		✓	Not observed in sub project area
11 Any impact of negative nature on already existing infrastructure including public amenities		✓	Not observed in sub project area

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	Name: Muhammad Faraz Ahwaz	Name: Muhammad Asif Gillani
Designation: Environment Specialist	Designation: Municipal Officer Infrastructure (MO1)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 23-02-2023	Date: 23-02-2023	Date: 23-02-2023

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG. Jhang

Sub-Project Sector: Sewerage

Sub-Project Title: Construction of Manholes (10) Zone 1- Jhang City

Sub-Project Categorization: E-1 & S-2

Date of Screening: 23-02-2023

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		New Manhole Proposed at some points of Sewerage Line that laying along the road and land is already owned by Govt. So no land acquired for this sub project
If yes, then describe the type of land being acquired from thecategories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government'? Yes/No		✓		Not observed in sub project area and confirm by MC Staff also
Land (Quantify and describe types of land being acquired in"remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation(agriculture or settlement)		✓		Land is already owned by Govt. So no land acquired for this sub project
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project

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Agricultural		✓		No Land acquired for this sub project
Communal		✓		No Land acquired for this sub project
Others (specify in "remarks").		✓		land is already owned by Govt. So, no land acquired for this sub project
Name of owner/owners and type of ownership document ifavailable.		✓		land is already owned by Govt. So, no land acquired for this sub project
If land is being acquired, describe any structures constructedon it		✓		No Land acquired for this sub project
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub project
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		
Public utilities (specify in "remarks")		✓		New Manhole Proposed at some points of Sewerage Line that laying along the road and land is already owned by Govt. So, no land acquired for this sub project. Ramps are away from ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub project
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Land acquired for this sub project

Crops and vegetables (specify types and cropping area in "remarks").		✓	No Land acquired for this sub project
Trees (specify number and types in "remarks").		✓	No Land acquired for this sub project
Others (specify in "remarks").		✓	No Land acquired for this sub project
Affected Persons (APs)		✓	No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No		✓	No Land acquired for this sub project
Number of Aps		✓	No Persons Affected during this Project
Males		✓	No Persons Affected during this Project
Females		✓	No Persons Affected during this Project
Tried landowners		✓	No Land acquired for this sub project
Tenants and sharecroppers		✓	No Land acquired for this sub project
Leaseholders		✓	No Land acquired for this sub project
Agriculture wage laborers		✓	Not involved in this project
Encroachers and squatters (specify in remarks column)		✓	No Land acquired for this sub project
Vulnerable APs (e.g women headed households, minors and aged, orphans, disabled persons, and those below the poverty line). Specify the number and vulnerability in "remarks"		✓	No Land acquired for this sub project no one effected during this this intervention
Others (specify in "remarks")		✓	Not involved in this project

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Instructions:

Environmental and Social Focal Persons (ESFPs)64 nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist

It is to be attached with the main document65 of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	Faraz Ahwaz - MOI (I&S) Mr. Aslam – MOP
Name of MC:	Jhang
Sub-Project Sector:	Sewerage System
Sub-Project Title:	Rehabilitation & Improvement of Sewerage System in Jhang City
Sub-Project Categorization:	E-1 S-1 E-2 S-2 ✓E-3 S-3 ✓
Date of Screening:	20-02-2023
Anticipated Project Activities	Desilting of Existing Sewer Drains (09)
Estimated Cost of Subprojects	198.595 Million/- PKR
Completion Time/Duration	02 months
Estimated Labor for Subproject	30

[illegible] MCs ESFPs are notified by Local government. MO (I&S) are focal persons for environmental sector and MO(P) are focal [illegible] for social sectors
[illegible] meant as PC-I and/or engineering estimates of sub-project

Screening Questions	Yes	No	Remarks
A Project Siting Is the Sub-Project area adjacent to or within any of the following:			
Environmentally sensitive areas?		✓	
Legally protected Area		✓	No legally protected area lies within 500 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meter of the proposed sub project[1]		✓	Not observed
Estuarine		✓	Not observed in Sub-Project area
Special area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops is not observed within the project interventions.
Socially sensitive /important areas/communities/ people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, *Gordwarah*, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject[1]		✓	No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meter of the proposed sub project[1]		✓	No such receptors observed within 100 meters of location of Sub-Project that are outside of construction limits.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, peri-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[1] of the society and women or children)?		✓	It's a small-scale project regarding desilting of existing drains and replacement of machinery from disposal stations. Hence, no demographically or socio-economically vulnerable aspects of the sub-project were observed.

Screening Questions	Yes	No	Remarks
...ready existing infrastructure including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public infrastructure will be damaged/dismantled due to any Sub-Project interventions.
B. Potential Environmental Impacts Will the Sub-Project cause…			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?	✓		No generation of wastewater due to scope of work under Sub-Project. Anyhow silt will be generated which shall be transported safely to MC designated disposal site within 24 hours
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?		✓	No such impact is envisaged. Anyhow, at silt disposal site, it is ensured through contractor terms of reference to carry out water quality analysis of the ground water before and after disposal
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-related camps and chemicals used in construction?		✓	No campsite establishment envisaged. Local labor will be engaged by the Contractor as no skilled labor is the requirement for this activity.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of desilting activities.

Screening Questions	Yes	No	Remarks
Serious contamination of soil due to construction works?	✓		When desilting is performed in existing sewerage lines desilted material is highly contagious and lead to soil contamination which will be mitigated by proper handling of the desilted material and will be disposed off at dumping site assigned by MC Jhang
Aggravation of solid waste problems in the area?	✓		The Municipal Solid waste and mud excavated from the existing drains to be disposed at proper disposal sites on daily basis. Stockpiling of desilt material may produce smell and nuisance for the commuters and to avoid this, silt material shall be disposed off within 24 hours from the disposal site(which is 8 km from the de-siltation areas) and an activated GRM will be established at site to get complaints from the communities
Generation of hazardous waste?	✓		When desilting is performed in existing sewer lines, desilted material may be contagious and hazardous for health of workers and community However, EHS SOPs will be strictly followed during the overall activity and the desilted material will be disposed off at dumping site assigned by MC Jhang.
Increased air pollution due to sub-project construction and operation?	✓		Frequent monitoring of air quality particularly odor will support to review the effectiveness of the mitigation measures. Limit the air emissions within PEQS.
Noise and vibration due to sub-project construction or operation?	✓		All noise-making equipment will be installed with acoustic enclosures. Timings of noise construction activities will be regulated near sensitive receptors. Further regular monitoring of noise levels will be adopted and continuous monitoring is proposed during the construction stage as a migratory measure.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		The stagnant water and desilted material in desilting areas may create temporary breeding habitat for mosquitoes and resulting in mosquitos borne diseases issue. Handling and dispose off in 24 hours of waste will avoid the creation of breeding habitats. Use of anti-mosquito spray will be ensured by contractor
Use of chemicals during construction?		✓	No chemicals will be used during desilting activities
C: Potential Social Impacts Will the Sub-Project cause…			

Screening Questions	Yes	No	Remarks
Impairment of historical/cultural areas disfiguration of landscape or potential loss/damage to physical Cultural Resources (CR)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) If 'Yes', please also fill involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups (mentioned above)?		✓	There will be no direct/indirect impact on the poor, women, children and or other vulnerable groups. However, at current accessibility of the local residents is vulnerable due to chocked sewer lines and it aggravates during rainy season which will get better after desilting of main sewer lines
Temporary impediments in movements of people/transport and animals?	✓		There would be temporary hindrances in movements of local people/transport during the desilting process. However, movement will be restricted for a few hours only, and the residents/people will be informed before the construction activities in confined areas and streets while alternate route will be provided in the main roads
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	✓		Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during desiltation activities, separate sanitary facilities and water will be adequately supplied to the labor force by the contractor to avoid and conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to desilting of existing sewers.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		Workers will be provided requisite PPEs to minimize such exposure and associated harmful occupational health effects Also, regular monitoring will be conducted by the MCs focal persons and supervision consultants and regional office team of PMDFC Implementation through PMDFC EHS SOPs will be ensured.

Screening Questions	Yes	No	Remarks
Risks to community health and safety due to the transport, storage and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		Safe transportation management of silt from sewer lines to disposal site will reduce the risks to community health and safety.
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		Regular monitoring will be scheduled for compliance of Occupational Health & Safety SOPs.
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	No damages to any public amenity is envisaged for the project interventions.

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	Name: Faraz Ahwaz	Name: Muhammad Asif Gillani
Designation: Environment Specialist	Designation: Municipal Officer Infrastructure (MOI)	Designation: Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

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INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

Sub-Project Title: Desiltation of Chocked Sewer-Lines

Sub- Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by MC so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[66]?		✓		Ramps are not involved. No AED been conducted at the proposed location by the Government[1]
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		No Land acquired for this sub project
Others (specify in "remarks").		✓		land owned by govt so no land acquired for this sub project
Name of owner/owners and type of ownership document if available.		✓		Already existing sewerage drainage and land is owned by govt.

[1] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Instructions:

Environmental and Social Focal Persons (ESFPs)67 nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist

It is to be attached with the main document68 of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	Faraz Ahwaz - MOI (I&S) Mr. Aslam – MOP
Name of MC:	Jhang
Sub-Project Sector:	Sewerage System
Sub-Project Title:	Rehabilitation & Improvement of Sewerage System in Jhang City
Sub-Project Categorization:	E-1 S-1 E-2 S-2 ✓ E-3 ✓ S-3
Date of Screening:	20-02-2023
Anticipated Project Activities	Laying of Missing Sewer Links at Tibba Sultan, New Gadian Wala, Goghaywali and in Farooqabad and Khokra Chak at the existing ROW under MC owned roads
Estimated Cost of Subprojects	198.595 Million/- PKR
Completion Time/Duration	02 months
Estimated Labor required	10

Screening Questions	Yes	No	Remarks

In all MCs, ESFPs are notified by Local government. MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors

It is meant as PC-I and/or engineering estimates of sub-project

Project Siting Is the Sub-Project area adjacent to or within any of the following			
Environmentally sensitive areas?		✓	
Legally protected Area		✓	No legally protected area lies within 500 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meter of the proposed sub project[69]		✓	Not observed
Estuarine		✓	Not observed in Sub-Project area
Steppe area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops not observed within the project interventions.
Socially sensitive /important areas communities/ people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, *Gordwarah*, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject[70]	✓		No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meter of the proposed sub project[71]	✓		No such receptors observed within 100 meters of location of Sub-Project that are outside of construction limits.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[72] of the society and women or children)?		✓	It's a small-scale project regarding laying of underground missing sewer lines at the existing MC owned roads. Hence, no demographically or socio-economically vulnerable aspects of the sub-project were observed.
Already existing infrastructure [73](including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public infrastructure will be damaged/dismantled due to any Sub-Project interventions.

[69] Ibid
[70] According to Environmental Assessment Guidelines adopted by Punjab EPA
[71] Ibid
[72] Due to caste, creed, religion or gender e.g. transgender
[73] Sewerage /Drainage system, Water supply lines, tube-wells, WAPDA/Telephone transmission lines/electric poles, Railway tracks, Gas lines, Roads, Shops/Plazas, Banks, Industry, Disposal stations etc.

Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		Regular monitoring and GRM will help to minimize the impacts if any
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	No damages to any public amenity required for the project interventions.

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	**Name:** Faraz Ahwaz	**Name:** Muhammad Asif Gillani
Designation: Environment Specialist	**Designation:** Municipal Officer Infrastructure (MOI)	**Designation:** Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature:	**Signature**	**Signature:**
Date: 20-02-2023	**Date:** 20-02-2023	**Date:** 20-02-2023

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

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Sub-Project Title: Laying of Missing Sewer Links

Sub-Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by govt so no land acquired for this sub project
If yes then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[75]?		✓		Ramps are not involved. No AED been conducted at the proposed location by the Government[1]
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		No Land acquired for this sub project
Others (specify in "remarks").		✓		land owned by govt so no land acquired for this sub project
Name of owner/owners and type of ownership document if available.		✓		Already existing sewerage drainage and land is owned by govt.
If land is being acquired, describe any structures constructed on it		✓		No Land acquired for this sub project
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project

[75] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub project
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		No
Public utilities (specify in "remarks")		✓		land owned by govt so no land acquired for this sub project No Ramps are ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub project
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Agriculture related impacts foreseen for this sub project
Crops and vegetables (specify types and cropping area in "remarks).		✓		Not anticipated during this sub project
Trees (specify number and types in "remarks").		✓		No tree cutting involved during this sub project
Others (specify in "remarks").		✓		No Land acquired for this sub project
Affected Persons (APs)		✓		No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No		✓		No Land acquired for this sub project
Number of APs		✓		No Persons Affected during this Project
Males		✓		No Persons Affected during this Project
Females		✓		No Persons Affected during this Project
Titled land owners		✓		No Land acquired for this sub project
Tenants and sharecroppers		✓		No Land acquired for this sub project
Leaseholders		✓		No Land acquired for this sub project
Agriculture wage laborers		✓		Not involved in this project
Encroachers and squatters (specify in remarks column)		✓		No Land acquired for this sub project
Vulnerable APs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		No Land acquired for this sub project no one effected during this this intervention
Others (specify in "remarks")		✓		Not involved in this project

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
How will people be affected?		✓		There would be Temporary hindrances in movements of people/transport during the construction phase However, it will be hours based activity and alternate route will be provided in the main roads

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Ihsan Ul Haq	Name: Mr. Aslam	Name: Hassan Ali
Designation: Environment Specialist	Designation: Municipal Officer Planning (MOP)	Designation: Deputy Program Officer Social Safeguards
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Instructions:
Environmental and Social Focal Persons (ESFPs)76 nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.
Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist It is to be attached with the main document77 of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM
This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used
(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

76 In all MCs, ESFPs are notified by Local government; MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors
77 It is meant as PC-I and/or engineering estimates of sub-project

Name of ESFP:	Faraz Ahwaz - MOI (I&S) Mr. Aslam – MOP
Name of MC:	Jhang
Sub-Project Sector:	Sewerage System
Sub-Project Title:	Rehabilitation & Improvement of Sewerage System in Jhang City
Sub- Project Categorization:	E-1 S-1 E-2 S-2 ✓ E-3 ✓ S-3
Date of Screening:	20-02-2023
Anticipated Project Activities	Replacement of damaged delivery mains and suction and delivery pipes.
Estimated Cost of Subprojects	198.595 Million/- PKR
Completion Time/Duration	03 months
Estimated Labor for Subproject	5

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Sub-Project area adjacent to or within any of the following:			
Environmentally sensitive areas?		✓	
Legally protected Area		✓	No legally protected area lies within 500 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meter of the proposed sub project[78]		✓	No water body exists there
Estuarine		✓	Not observed in Sub-Project area
Special area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops is not observed within the project interventions
Socially sensitive /important areas/communities/ people?			

PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, *Gordwarah*, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject[79]		✓	No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meter of the proposed sub project[80]		✓	No such receptors observed within 100 meters of location of Sub-Project that are outside of construction limits.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[81] of the society and women or children)?		✓	It's a small-scale project regarding rehabilitation of existing disposal stations machinery. Hence, no demographically or socio-economically vulnerable aspects of the sub-project were observed.
Already existing infrastructure [82](including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public infrastructure will be damaged/dismantled due to any Sub-Project interventions.
B. Potential Environmental Impacts Will the Sub-Project cause…			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?		✓	No Waste water will be generated during replacement of machinery as this activity will be carried out in dry well
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?		✓	No impact.

[79] According to Environmental Assessment Guidelines adopted by Punjab EPA
[80] Ibid
[81] Due to caste, creed, religion or gender e.g. transgender
[82] Sewerage /Drainage system, Water supply lines, tube-wells, WAPDA/Telephone transmission lines/electric poles, Railway tracks, Gas pipelines, Roads, Shops/Plazas, Banks, Industry, Disposal stations etc

Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		✓	No campsite establishment envisaged. Local labor will be engaged by the contractor.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of work.
Serious contamination of soil due to construction works?		✓	Not identified
Aggravation of solid waste problems in the area?		✓	Not identified
Generation of hazardous waste?		✓	Not identified
Increased air pollution due to sub-project construction and operation?	✓		Not identified
Noise and vibration due to sub-project construction or operation?		✓	No such impact is envisaged
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?		✓	No such impact is envisaged
Use of chemicals during construction?		✓	No chemicals will be used during machinery replacement activities
C. Potential Social Impacts (Will the Sub-Project cause…			
Impairment of historical/cultural areas disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups [63] (mentioned above)?		✓	There will be no direct/indirect impact on the poor women, children and or other vulnerable groups.
Temporary impediments in movements of people/transport and animals?		✓	No such impact is identified

[63] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and people living below the poverty line

Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	✓		Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor by the contractor to avoid and conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to replacement of machinery. Contractor will hire local workers.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		To avoid any electricity hazard, it will be ensured that all the connections are switched off before replacement of machinery and valves from waste water are closed during the replacement work However, this activity will be completed in a short interval of time. Workers will be provided requisite PPEs during work and contractor will ensure the implementation of Occupational Health SOPs developed by the PMDFC.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	No Such risk is identified
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such risk is envisaged
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	No damages to any public amenity required for the project interventions

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	Name: Faraz Ahwaz	Name: Muhammad Asif Gillani
Designation: Environment Specialist	Designation: Municipal Officer Infrastructure (MOI)	Designation: Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

Sub-Project Title: Replacement of Damaged Machinery from Existing Disposal Stations

Sub- Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist				
SECTION 1	**Yes**	**No**	**Expected**	**Remarks**
Does the project require land acquisition? Yes/No		✓		Land owned by govt so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[84]?		✓		Ramps are not involved. No AED been conducted at the proposed location by

[84] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

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Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
				the Government'
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		No Land acquired for this sub project
Others (specify in "remarks").		✓		land owned by govt so no land acquired for this sub project
Name of owner/owners and type of ownership document if available.		✓		Already existing sewerage drainage and land is owned by govt.
If land is being acquired, describe any structures constructed on it		✓		No Land acquired for this sub project
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub project
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		No
Public utilities (specify in "remarks")		✓		land owned by govt so no land acquired for this sub project. No Ramps are ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub project
If agricultural land is being acquired, specify the following		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Agriculture related impacts foreseen for this sub project

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GPS Map Camera
Jhang, Punjab, Pakistan
Unnamed Road, Jhang, Punjab, Pakistan
Lat 31.308807°
Long 72.321607°
20/02/23 03:18 PM GMT +05:00
GPS Map Camera
Jhang, Punjab, Pakistan
78W8+5RV, Sargodha Rd, Ali Town Jhang, Punjab 35200, Pakistan
Lat 31.295546°
Long 72.316868°
20/02/23 03:11 PM GMT +05:00
GPS Map Camera
Jhang, Punjab, Pakistan
638 Sultan Colony Rd, Bhabrana Mohalla Mohalla Bhabrana, Jhang, Punjab, Pakistan
Lat 31.284064°
Long 72.309098°
20/02/23 02:57 PM GMT +05:00
GPS Map Camera
Jhang Sadar, Punjab, Pakistan
78C3+537, Hasnana Mohallah Jhang Sadar, Jhang, Punjab, Pakistan
Lat 31.270766°
Long 72.303177°
20/02/23 02:48 PM GMT +05:00
GPS Map Camera
Jhang, Punjab, Pakistan
5 Circular Rd, Pindi Mohalla Jhang, Punjab, Pakistan
Lat 31.275853°
Long 72.302437°
20/02/23 02:47 PM GMT +05:00
GPS Map Camera
Jhang, Punjab, Pakistan
777W+9QF, Jhang, Punjab, Pakistan
Lat 31.263523°
Long 72.296718°
20/02/23 02:30 PM GMT +05:00
Google

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INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

Sub-Project Title: Repair of Sullage Pumping Units

Sub- Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist				
SECTION 1	**Yes**	**No**	**Expected**	**Remarks**
Does the project require land acquisition? Yes/No		✓		Land owned by MC so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[87]?		✓		Ramps are not involved. No AED been conducted at the proposed location by the Government[1]
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		No Land acquired for this sub project
Others (specify in "remarks").		✓		land owned by govt so no

[1] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

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Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Name of owner/owners and type of ownership document if available.		✓		land acquired for this sub project
If land is being acquired, describe any structures constructed on it		✓		Already existing sewerage drainage and land is owned by govt.
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub project
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		No Land acquired for this sub project
Public utilities (specify in "remarks")		✓		No
Others (specify in "remarks")		✓		land owned by govt so no land acquired for this sub project. No Ramps are ROW.
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Land acquired for this sub project
Crops and vegetables (specify types and cropping area in "remarks).		✓		No Agriculture related impacts foreseen for this sub project
Trees (specify number and types in "remarks").		✓		Not anticipated during this sub project
Others (specify in "remarks").		✓		No tree cutting involved during this sub project
Affected Persons (APs)		✓		No Land acquired for this sub project
Will any people be displaced from the land when acquired? Yes/No		✓		No Persons Affected during this Project
Number of APs		✓		No Land acquired for this sub project
Males		✓		No Persons Affected during this Project
Females		✓		No Persons Affected during this Project
Titled land owners		✓		No Persons Affected during this Project
Tenants and sharecroppers		✓		No Land acquired for this sub project
Leaseholders		✓		No Land acquired for this sub project
				No Land acquired for this

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Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Agriculture wage laborers				sub project
Encroachers and squatters (specify in remarks column)		✓		Not involved in this project
Vulnerable APs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		No Land acquired for this sub project
Others (specify in "remarks")		✓		No Land acquired for this sub project no one effected during this this intervention
How will people be affected?		✓		Not involved in this project
		✓		There would be Temporary hindrances in movements of people/transport during the desilting phase. However, GRM will be established at site to ensure the best management and silt material will be disposed off in 24 hours to the disposal site

Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq	**Name:** Mr. Aslam	**Name:** Muhammad Asif Gillani
Designation: Social Safeguards Specialist	**Designation:** Municipal Officer Planning (MOP)	**Designation:** Deputy Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature:	**Signature:**	**Signature:**
Date: 20-02-2023	**Date:** 20-02-2023	**Date:** 20-02-2023

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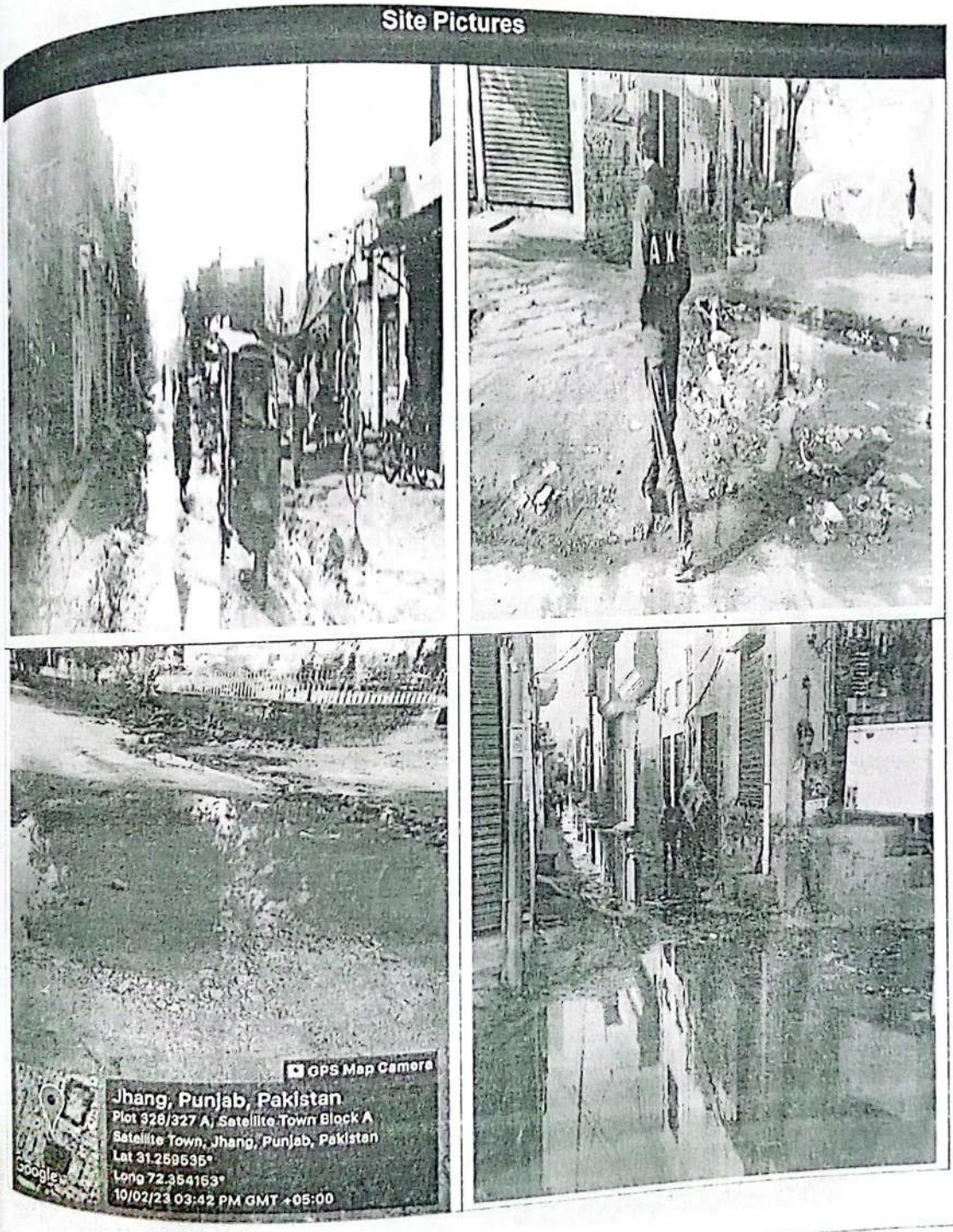


Fig 1: Existing Conditions of Sewerage Water Ponding at streets

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ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Instructions:

Environmental and Social Focal Persons (ESFPs)88 nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist

It is to be attached with the main document89 of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	Faraz Ahwaz - MOI (I&S) Mr. Aslam – MOP
Name of MC:	Jhang
Sub-Project Sector:	Sewerage System
Sub-Project Title:	Rehabilitation of Sewerage System in Jhang City part II
Sub-Project Categorization:	E-1 S-1 E-2 S-2 ✓ E-3 ✓ S-3
Date of Screening:	20-02-2023
Anticipated Project Activities	Replacement of pumping machinery
Estimated Cost of Subprojects	118.63 Million/- PKR
Estimated Cost of Environment and social management and mitigation	1,212,500/- PKR

In all MCs ESFPs are notified by Local government: MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors

It is meant as PC I and/or engineering estimates of sub-project

Completion Time/Duration	02 months
Estimated Labor required	10

Screening Questions	**Yes**	**No**	**Remarks**
A Project Siting Is the Sub-Project area adjacent to or within any of the following:			
Environmentally sensitive areas?		✓	
Legally protected Area		✓	No legally protected area lies within 500 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meter of the proposed sub project[90]		✓	Not observed
Estuarine		✓	Not observed in Sub-Project area
Special area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops not observed within the project interventions.
Socially sensitive /important areas/communities/ people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, *Gordwarah*, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject[91]	✓		No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meter of the proposed sub project[92]	✓		No such receptors observed within 100 meters of location of Sub-Project that are outside of construction limits.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.

[90] Ibid
[91] According to Environmental Assessment Guidelines adopted by Punjab EPA
[92] Ibid

Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[93] of the society and women or children)?		✓	It's a small-scale project regarding laying of underground missing sewer lines at the existing MC owned roads. Hence, no demographically or socio-economically vulnerable aspects of the sub-project were observed.
Already existing infrastructure [94] (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public infrastructure will be damaged/dismantled due to any Sub-Project interventions.
B. Potential Environmental Impacts Will the Sub-Project cause…			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?		✓	No generation of wastewater due to scope of work under Sub-Project.
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?		✓	No impact.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		✓	No campsite establishment envisaged. Local labor should be engaged by the Contractor.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of laying of sewer lines.
Serious contamination of soil due to construction works?		✓	No such impact is identified.
Aggravation of solid waste problems in the area?	✓		Excavated material will be reused to restore the roads
Generation of hazardous waste?		✓	No such waste will be generated
Increased air pollution due to sub-project construction and operation?	✓		Due to use of machinery, may be temporary impact which will be diluted in the air

[93] Due to caste, creed, religion or gender e.g. transgender

[94] Sewerage /Drainage system, Water supply lines, tube-wells, WAPDA/Telephone transmission lines/electric poles, Railway tracks, Gas pipelines, Roads, Shops/Plazas, Banks, Industry, Disposal stations etc

Noise and vibration due to sub-project construction or operation?	✓		To avoid temporary impacts, timings of noise construction activities will be regulated. Further regular monitoring of noise levels will be adopted and continuous monitoring is proposed during the activity.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		Excavated material will be reused and not scattered around
Use of chemicals during construction?		✓	No chemicals will be used during construction activities
C. Potential Social Impacts Will the Sub-Project cause. .			
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups [95](mentioned above)?		✓	There will be no direct/indirect impact on the poor women, children and or other vulnerable groups.
Temporary impediments in movements of people/transport and animals?	✓		There would be Temporary hindrances in movements of people/transport during the construction phase. The movement will be restricted for a few hours only, and the residents/people will be informed before the construction activities.
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	✓		Local unskilled labor will be hired by the contractor due to limited work activities. It is a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor force by the contractor to avoid and conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to lying of sewer lines Contractor will hire local worker during construction activities.

[95] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and ergological hazards during project construction and operation?	✓		Workers will be provided requisite PPEs to minimize such exposure related to occupational health effects
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	No such impacts is identified
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		Regular monitoring and GRM will help to minimize the impacts if any
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	No damages to any public amenity required for the project interventions

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	**Name:** Faraz Ahwaz	**Name:** Muhammad Asif Gillani
Designation: Environment Specialist	**Designation:** Municipal Officer Infrastructure (MOI)	**Designation:** Deputy Program Officer ESM
Organization: MM Pakistan	**Organization:** MC Jhang	**Organization:** PMDFC
Signature:	**Signature**	**Signature:**
Date: 20-02-2023	**Date:** 20-02-2023	**Date:** 20-02-2023

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INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

Sub-Project Title: Replacement of pumping machinery

Sub- Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by govt so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[96]?		✓		Ramps are not involved. No AED been conducted at the proposed location by the Government[1]
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		land owned by govt so no land acquired for this sub project
Others (specify in "remarks").		✓		

[1] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

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Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Name of owner/owners and type of ownership document if available.		✓		Already existing sewerage drainage and land is owned by govt.
If land is being acquired, describe any structures constructed on it		✓		No Land acquired for this sub project
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub project
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		No
Public utilities (specify in "remarks")		✓		land owned by govt so no land acquired for this sub project. No Ramps are ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub project
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Agriculture related impacts foreseen for this sub project
Crops and vegetables (specify types and cropping area in "remarks).		✓		Not anticipated during this sub project
Trees (specify number and types in "remarks").		✓		No tree cutting involved during this sub project
Others (specify in "remarks").		✓		No Land acquired for this sub project
Affected Persons (APs)		✓		No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No		✓		No Land acquired for this sub project
Number of APs		✓		No Persons Affected during this Project
Males		✓		No Persons Affected during this Project
Females		✓		No Persons Affected during this Project
Titled land owners		✓		No Land acquired for this sub project
Tenants and sharecroppers		✓		No Land acquired for this sub project
Leaseholders		✓		No Land acquired for this sub project

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Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Agriculture wage laborers		✓		Not involved in this project
Encroachers and squatters (specify in remarks column)		✓		No Land acquired for this sub project
Vulnerable APs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		No Land acquired for this sub project no one effected during this this intervention
Others (specify in "remarks")		✓		Not involved in this project
How will people be affected?		✓		There would be Temporary hindrances in movements of people/transport during the construction phase However, it will be hours based activity and alternate route will be provided in the main roads

Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq	Name: Mr. Aslam	Name: Muhammad Asif Gillani
Designation: Social Safeguards Specialist	Designation: Municipal Officer Planning (MOP)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature:	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Instructions:

(i) Environmental and Social Focal Persons (ESFPs)97 nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist It is to be attached with the main document98 of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

(ii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	**Faraz Ahwaz - MOI (I&S)** **Mr. Aslam – MOP**	
Name of MC:	**Jhang**	
Sub-Project Sector:	**Sewerage System**	
Sub-Project Title:	Rehabilitation of Sewerage System in Jhang City, Part II	
Sub- Project Categorization:	**E-1** **E-2** ✓ **E-3**	**S-1** **S-2** ✓ **S-3**
Date of Screening:	**20-02-2023**	
Anticipated Project Activities	Replacement of sewer lines.	
Estimated Cost of Subprojects	118.63 Million/- PKR	
Estimated Cost of Environment and social management and mitigation	PKR 1,212,500/-	
Completion Time/Duration	03 months	
Estimated Labor for Subproject	**5**	

	Screening Questions	Yes	No	Remarks
A	**Project Siting** Is the Sub-Project area adjacent to or within any of the following			
	Environmentally sensitive areas?		✓	

In all MCs, ESFPs are notified by Local government. MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors.

It is meant as PC-I and/or engineering estimates of sub-project

Legally protected Area		✓	No legally protected area lies within 500 meters jurisdiction of Sub-Project
Any surface water body (river, canal, stream, lake, wetland) within 250 meter of the proposed sub project[99]		✓	No water body exists there
Estuarine		✓	Not observed in Sub-Project area
Special area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops is not observed within the project interventions.
Socially sensitive /important areas/communities/ people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, *Gordwarah*, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject[100]		✓	No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meter of the proposed sub project[101]		✓	No such receptors observed within 100 meters of location of Sub-Project that are outside of construction limits.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[102] of the society and women or children)?		✓	It's a small-scale project regarding rehabilitation of existing disposal stations machinery. Hence no demographically or socio-economically vulnerable aspects of the sub-project were observed.
Already existing infrastructure[103] (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public infrastructure will be damaged/dismantled due to any Sub-Project interventions.
B. Potential Environmental Impacts Will the Sub-Project cause…			

[99] Ibid
[100] According to Environmental Assessment Guidelines adopted by Punjab EPA
[101] Ibid
[102] due to caste, creed, religion or gender e.g transgender
[103] Sewerage /Drainage system, Water supply lines, tube-wells, WAPDA/Telephone transmission lines/electric poles, Railway tracks, Gas pipelines, Roads, Shops/Plazas, Banks, Industry, Disposal stations etc

Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?		✓	No Waste water will be generated during replacement of machinery as this activity will be carried out in dry well
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?		✓	No impact
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		✓	No campsite establishment envisaged. Local labor will be engaged by the contractor.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of work.
Serious contamination of soil due to construction works?		✓	Not identified
Aggravation of solid waste problems in the area?		✓	Not identified
Generation of hazardous waste?		✓	Not identified
Increased air pollution due to sub-project construction and operation?	✓		Not identified
Noise and vibration due to sub-project construction or operation?		✓	No such impact is envisaged
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?		✓	No such impact is envisaged
Use of chemicals during construction?		✓	No chemicals will be used during machinery replacement activities
C. Potential Social Impacts Will the Sub-Project cause ..			

Impairment of historical/cultural areas, disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups [124](mentioned above)?		✓	There will be no direct/indirect impact on the poor women, children and or other vulnerable groups.
Temporary impediments in movements of people/transport and animals?		✓	No such impact is identified
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	✓		Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor by the contractor to avoid and conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to replacement of machinery. Contractor will hire local workers.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		To avoid any electricity hazard, it will be ensured that all the connections are switched off before replacement of machinery and valves from waste water are closed during the replacement work However, this activity will be completed in a short interval of time. Workers will be provided requisite PPEs during work and contractor will ensure the implementation of Occupational Health SOPs developed by the PMDFC.

[124] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	No Such risk is identified
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such risk is envisaged
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	No damages to any public amenity required for the project interventions.

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	Name: Faraz Ahwaz	Name: Muhammad Asif Gillani
Designation: Environment Specialist	Designation: Municipal Officer Infrastructure (MOI)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

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CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

Sub-Project Title: Replacement of sewer lines.

Sub- Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by govt so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[105]?		✓		Ramps are not involved. No AED been conducted at the proposed location by the Government[1]
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		No Land acquired for this sub project
Others (specify in "remarks").		✓		land owned by govt so no land acquired for this sub project
Name of owner/owners and type of ownership document if available		✓		Already existing sewerage drainage and land is owned by govt

[105] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure

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Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
If land is being acquired, describe any structures constructed on it		✓		No Land acquired for this sub project
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub project
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		No
Public utilities (specify in "remarks")		✓		land owned by govt so no land acquired for this sub project. No Ramps are ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub project
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Agriculture related impacts foreseen for this sub project
Crops and vegetables (specify types and cropping area in "remarks).		✓		Not anticipated during this sub project
Trees (specify number and types in "remarks").		✓		No tree cutting involved during this sub project
Others (specify in "remarks")		✓		No Land acquired for this sub project
Affected Persons (APs)		✓		No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No		✓		No Land acquired for this sub project
Number of APs		✓		No Persons Affected during this Project
Males		✓		No Persons Affected during this Project
Females		✓		No Persons Affected during this Project
Titled land owners		✓		No Land acquired for this sub project
Tenants and sharecroppers		✓		No Land acquired for this sub project
Leaseholders		✓		No Land acquired for this sub project
Agriculture wage laborers		✓		Not involved in this project
Encroachers and squatters (specify in remarks column)		✓		No Land acquired for this sub project

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Involuntary Resettlement Checklist

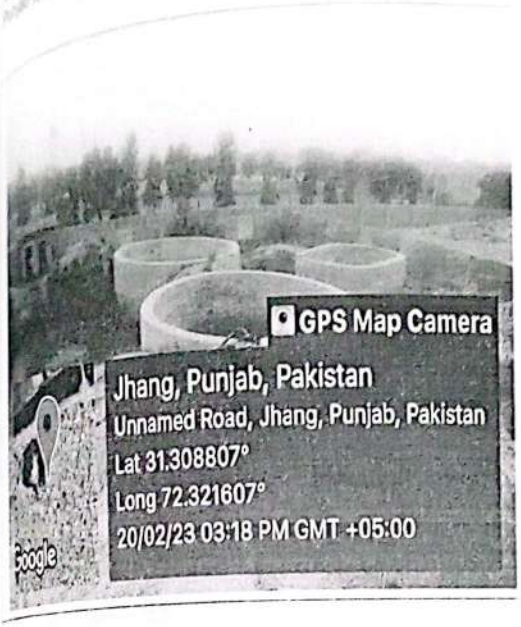
SECTION 1	Yes	No	Expected	Remarks
Vulnerable APs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		No Land acquired for this sub project no one effected during this this intervention
Others (specify in "remarks")		✓		Not involved in this project
How will people be affected?		✓		No affect on people is identified

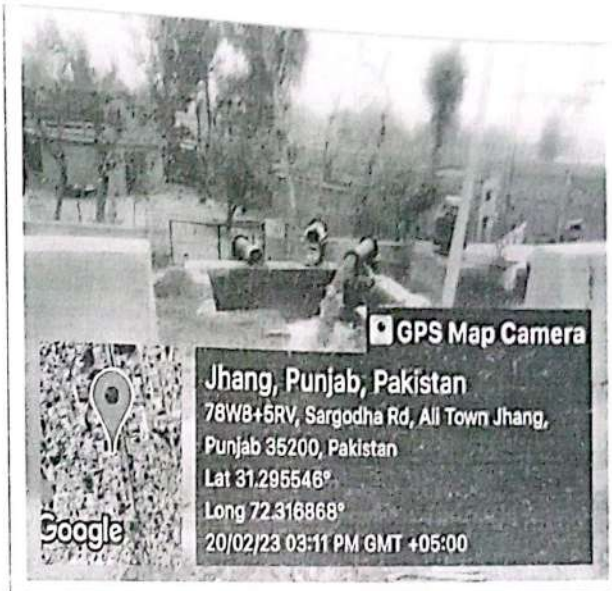
Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq	Name: Mr. Aslam	Name: Muhammad Asif Gillani
Designation: Social Safeguards Specialist	Designation: Municipal Officer Planning (MOP)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature:	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

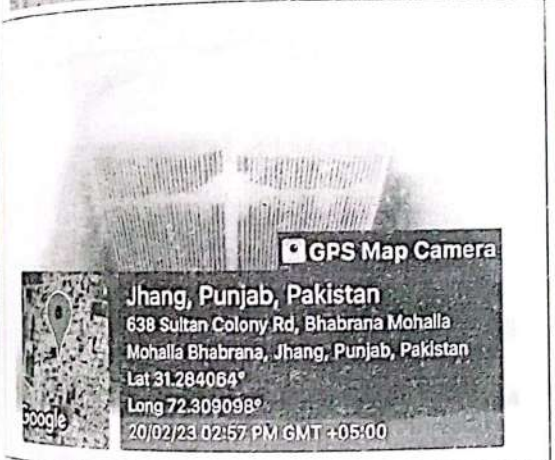
Site Pictures

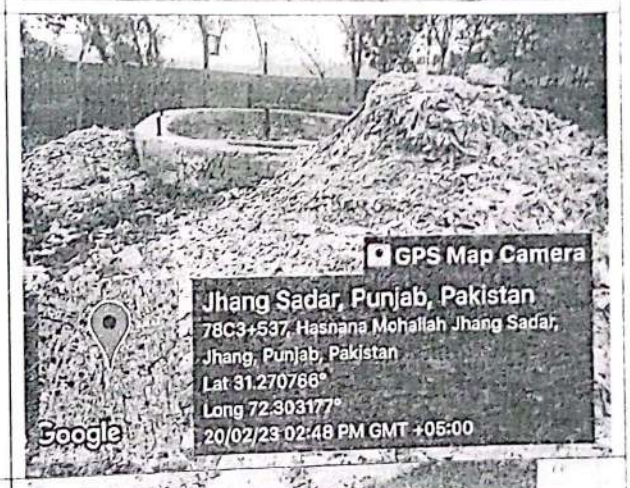
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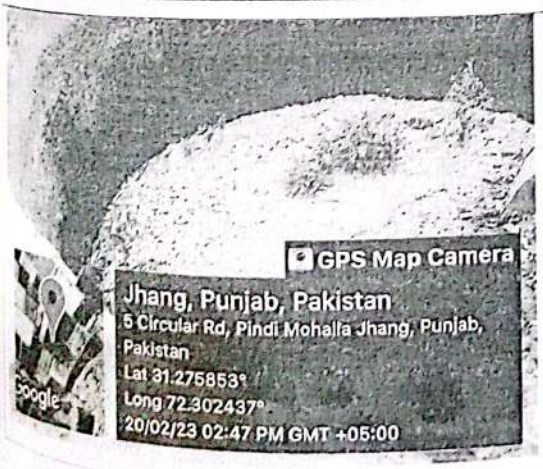
SAESIA of Improvement of Sewerage System in Jhang City and Construction of Waste
Water Treatment Plant (WWTP)
Punjab Municipal Development Fund Company (PMDFC)

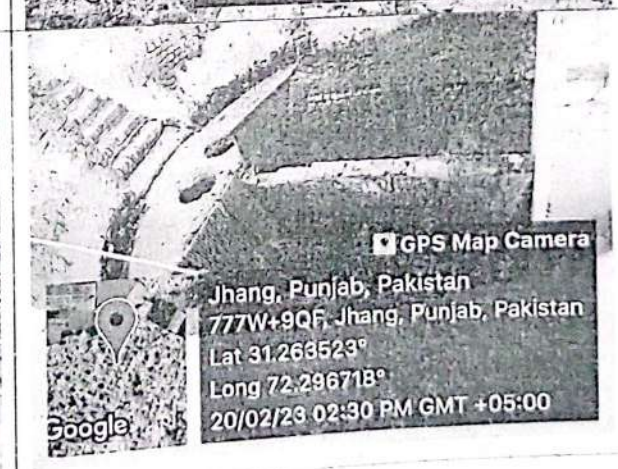












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ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Instructions

i) Environmental and Social Focal Persons (ESFPs)106 nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each and every sub-project proposed to be executed under the Program.

ii) Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs in filling in of this Checklist It is to be attached with the main document107 of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

iii) This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used

iv) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits. Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	Faraz Ahwaz - MOI (I&S) Mr. Aslam – MOP	
Name of MC:	Jhang	
Sub-Project Sector:	Sewerage System	
Sub-Project Title:	Rehabilitation of Sewerage System in Jhang City, Part II	
Sub- Project Categorization:	E-1 E-2 ✓ E-3	S-1 S-2 ✓ S-3
Date of Screening:	20-02-2023	
Anticipated Project Activities	Desilting of Existing Sewers	
Estimated Cost of Subprojects	118.63 Million/- PKR	
Estimated Cost of Environment and social management and mitigation	PKR 1,212,500/-	
Completion Time/Duration	03 months	
Estimated Labor for Subproject	5	

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Sub-Project area adjacent to or within any of the following			

i) In all MCs, ESFPs are notified by Local government. MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors

ii) It is meant as PC-I and/or engineering estimates of sub project

Environmentally sensitive areas?		✓	
Legally protected Area		✓	No legally protected area lies within 500 meters jurisdiction of Sub-Project
Any surface water body (river, canal, stream, lake, wetland) within 250 meter of the proposed sub project[108]		✓	No water body exists there
Estuarine		✓	Not observed in Sub-Project area
Special area for protecting biodiversity		✓	No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops is not observed within the project interventions.
Socially sensitive /important areas/communities/ people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, *Gordwarah*, Temple, Fort, archeological/historical site) within 100 m of the proposed subproject[109]		✓	No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meter of the proposed sub project[110]		✓	No such receptors observed within 100 meters of location of Sub-Project that are outside of construction limits.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments[111] of the society and women or children)?		✓	It's a small-scale project regarding rehabilitation of existing disposal stations machinery. Hence, no demographically or socio-economically vulnerable aspects of the sub-project were observed.
Already existing infrastructure[112] (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public infrastructure will be damaged/dismantled due to any Sub-Project interventions.

[108] Ibid
[109] According to Environmental Assessment Guidelines adopted by Punjab EPA
[110] Ibid
[111] Due to caste, creed, religion or gender e g transgender
[112] Sewerage /Drainage system Water supply lines tube-wells WAPDA/Telephone transmission lines/electric poles Railway tracks Gas pipelines Roads Shops/Plazas Banks Industry Disposal stations etc

B Potential Environmental Impacts Will the Sub-Project cause...			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?		✓	No Waste water will be generated during replacement of machinery as this activity will be carried out in dry well
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?		✓	No impact.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		✓	No campsite establishment envisaged. Local labor will be engaged by the contractor.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping/pumping involved in scope of work.
Serious contamination of soil due to construction works?		✓	Not identified
Aggravation of solid waste problems in the area?		✓	Not identified
Generation of hazardous waste?		✓	Not identified
Increased air pollution due to sub-project construction and operation?	✓		Not identified
Noise and vibration due to sub-project construction or operation?		✓	No such impact is envisaged
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?		✓	No such impact is envisaged
Use of chemicals during construction?		✓	No chemicals will be used during machinery replacement activities
C Potential Social Impacts Will the Sub-Project cause...			

Impairment of historical/cultural areas, disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No impairment/damage to any PCR envisioned as per scope of construction activities
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope
Disproportionate impacts on the poor, women and children and or other vulnerable groups [13](mentioned above)?		✓	There will be no direct/indirect impact on the poor women, children and or other vulnerable groups.
Temporary impediments in movements of people/transport and animals?		✓	No such impact is identified
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	✓		Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor by the contractor to avoid and conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to replacement of machinery. Contractor will hire local workers.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		To avoid any electricity hazard, it will be ensured that all the connections are switched off before replacement of machinery and valves from waste water are closed during the replacement work However, this activity will be completed in a short interval of time. Workers will be provided requisite PPEs during work and contractor will ensure the implementation of Occupational Health SOPs developed by the PMDFC.

[13] Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	No Such risk is identified
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such risk is envisaged
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	No damages to any public amenity required for the project interventions.

Prepared By:	Endorsed By:	Reviewed By:
Name: Muhammad Imran	Name: Faraz Ahwaz	Name: Muhammad Asif Gillani
Designation: Environment Specialist	Designation: Municipal Officer Infrastructure (MOI)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Jhang

Sub-Project Sector: Sewerage System

Sub-Project Title: Desilting of Existing Sewers

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...ESIA of Improvement of Sewerage System in Jhang City and Construction of Waste Water Treatment Plant (WWTP)
...Municipal Development Fund Company (PMDFC)

Sub-Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by govt so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government[114]?		✓		Ramps are not involved. No AED been conducted at the proposed location by the Government
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub project
Private land		✓		No Land acquired for this sub project
Residential		✓		No Land acquired for this sub project
Commercial		✓		No Land acquired for this sub project
Agricultural		✓		No Land acquired for this sub project
Communal		✓		land owned by govt so no land acquired for this sub project
Others (specify in "remarks").		✓		Already existing sewerage drainage and land is owned by govt.
Name of owner/owners and type of ownership document if available.		✓		No Land acquired for this sub project
If land is being acquired, describe any structures constructed on it		✓		No Land acquired for this sub project
Land-based assets:		✓		No Land acquired for this sub project
Residential structures		✓		No Land acquired for this sub project
Commercial structures (specify in "remarks")				

[114] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure

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Sub-Project Categorization: E-3 & S-3

Date of Screening: 20-02-2023

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by go so no land acquire for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired fo this sub project
Has any AED been conducted at the proposed location by the government[114]?		✓		Ramps are not involved. No AED been conducted at th proposed location by the Government[1]
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired fo this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned b Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired fo this sub project
Private land		✓		No Land acquired fo this sub project
Residential		✓		No Land acquired fo this sub project
Commercial		✓		No Land acquired fo this sub project
Agricultural		✓		No Land acquired fo this sub project
Communal		✓		No Land acquired fo this sub project
Others (specify in "remarks").		✓		land owned by govt so no land acquired fo this sub project
Name of owner/owners and type of ownership document if available.		✓		Already existing sewerage drainage and land is owned by govt.
If land is being acquired, describe any structures constructed on it		✓		No Land acquired fo this sub project
Land-based assets:		✓		No Land acquired fo this sub project
Residential structures		✓		No Land acquired fo this sub project
Commercial structures (specify in "remarks")		✓		No Land acquired fo this sub project

[114] The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Community structures (specify in "remarks")		✓		No Land acquired for this sub project
Agriculture structures (specify in "remarks")		✓		No
Public utilities (specify in "remarks")		✓		land owned by govt so no land acquired for this sub project. No Ramps are ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub project
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub project
Agriculture related impacts		✓		No Agriculture related impacts foreseen for this sub project
Crops and vegetables (specify types and cropping area in "remarks).		✓		Not anticipated during this sub project
Trees (specify number and types in "remarks").		✓		No tree cutting involved during this sub project
Others (specify in "remarks").		✓		No Land acquired for this sub project
Affected Persons (APs)		✓		No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No		✓		No Land acquired for this sub project
Number of APs		✓		No Persons Affected during this Project
Males		✓		No Persons Affected during this Project
Females		✓		No Persons Affected during this Project
Titled land owners		✓		No Land acquired for this sub project
Tenants and sharecroppers		✓		No Land acquired for this sub project
Leaseholders		✓		No Land acquired for this sub project
Agriculture wage laborers		✓		Not involved in this project
Encroachers and squatters (specify in remarks column)		✓		No Land acquired for this sub project
Vulnerable APs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		No Land acquired for this sub project no one effected during this this intervention
Others (specify in "remarks")		✓		Not involved in this project
How will people be affected?		✓		No affect on people is identified

Prepared By:	Endorsed By:	Reviewed By:
Name: Ihsan Ul Haq	Name: Mr Aslam	Name: Muhammad Asif Gillani
Designation: Social Safeguards Specialist	Designation: Municipal Officer Planning (MOP)	Designation: Deputy Program Officer ESM
Organization: MM Pakistan	Organization: MC Jhang	Organization: PMDFC
Signature:	Signature:	Signature:
Date: 20-02-2023	Date: 20-02-2023	Date: 20-02-2023

Annexure: B: Design Criteria

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2. DESIGN CRITERIA

2.1. Design Period

The design period of the sewerage system including WWTP is 30 years i.e., up to 2050.

2.2. Design Life

Civil, Structural and Building Works shall be designed based on a 50-year service life. Design life for other components of the Contract is given in Table 2-1 below. Mechanical and electrical equipment shall be suitable for 24 hour per day continuous operation and under discontinuous operation under all local climatic conditions and be designed such that complete replacement shall not be required until at least the time period in years in Table 2-1 after the date of commissioning.

The Design of the Works shall be in accordance with best modern international practice and shall be such as to facilitate construction, operation, inspection and maintenance of all processes and equipment. All mechanical and electrical equipment to be supplied shall, wherever possible, have a proven reliability record in similar works. The style and finish of the Plant installation shall be consistent throughout the Works.

The requirements for design life shall govern the selection of materials. The requirements contained elsewhere in the specification represent minimum standards and are not necessarily sufficient to meet the design life.

Table 2-1: Minimum Design Lives

S/No.	Description	Years
A.	**Civil Works and Buildings**	
1.	Process Structures	50
2.	Buried Pipework	50
3.	Buildings	50
4.	Heating Ventilation and Air Conditioning (HVAC) equipment	20
5.	Building Services	20
B.	**Mechanical and Electrical Plant**	
6.	Process Plant – sewage	25
7.	Process Plant – sludge	20
8.	Pumps – sewage and sludge	15
9.	Valves and Actuators – sewage and sludge	20
10.	HV switchgear and transformers	30

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11.	LV Motor Control Centers	20
12.	Electrical Installations-Panels-Switchboards	20
13.	Instrumentation, Control and Automation equipment	12
14.	PLC systems	12
15.	Computers-Printers	8
16.	Flowmeters-Pressure Indicators	20
17.	Instrumentation for physical parameters	12
18.	Instrumentation for sewage and effluent quality	12
19.	Miscellaneous analytical and process instrumentation	12

All civil engineering structures shall be designed and constructed for at least the minimum design life with a minimum amount of maintenance. The design and materials of construction shall take account of the climatic conditions and different operational environments.

2.3 Effluent and Sludge Quality Standards

The STPs will be designed according to the National Environmental Quality Standards (NEQS) as shown in Table 2-2 below for wastewater flows of effluent at the outlet of the STPs.

Table 2-2: Effluent NEQ Standards for discharge from STPs

Sr. No.	Parameter	Existing Standards	NEQS Standards: Into Inland Water	Into Sewage Treatment	Into Sea
1.	Temperature or Temperatureincrease*	40°C	=<3°C	=< 3 °C	=<3°C
2.	pH value	6-10 pH	6 - 9	6 - 9	6 - 9
3	5-days Biochemical OxygenDemand (BOD₅) at 20°C¹	80 mg/l.	80	250	80**
4.	Chemical Oxygen Demand (COD)¹	150 mg/l.	150	400	400
5	Total suspended solids	150 mg/l.	200	400	200
6.	Total dissolved solids	3500 mg/l.	3500	3500	3500
7.	Grease and oil	10 mg/l.	10	10	10
8.	Phenolic compounds (as phenol)	0.1 mg/l.	0.1	0.3	0.3
9.	Chloride (as Cl)	1000 mg/l.	1000	1000	SC
10.	Fluoride (as F)	20 mg/l.	10	10	10
11.	Cyanide (as CN) total	2 mg/l.	1.0	1.0	1.0
12	An-ionic detergents² (as MBAS)	20 mg/l.	20	20	20
13	Sulphate (SO_4)	600 mg/l	600	1000	SC
14	Sulphide (S)	1.0 mg/l.	1.0	1.0	1.0
15.	Ammonia (NH_3)	40 mg/l.	40	40	40
16.	Pesticides, herbicides, fungicidesand insecticides³	0.15 mg/l.	0.15	0.15	0.15

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Sr. No.	Parameter	Existing Standards	Revised Standards Into Inland Water	Into Sewage Treatment	Into Sea
17	Cadmium[4]	0.1 mg/l.	0.1	0.1	0.1
18	Chromium[4] (trivalent and hexavalent).	1.0 mg/l.	1.0	1.0	1.0
19	Copper[4]	1.0 mg/l.	1.0	1.0	1.0
20	Lead[4]	0.5 mg/l.	0.5	0.5	0.5
21	Mercuy[4]	0.01 mg/l.	0.01	0.01	0.01
22	Selenium[4]	0.5 mg/l.	0.5	0.5	0.5
23	Nickel[4]	1.0 mg/l.	1.0	1.0	1.0
24	Silver[4]	1.0 mg/l.	1.0	1.0	1.0
25	Total toxic metals	2.0 mg/l.	2.0	2.0	2.0
26	Zinc	5.0 mg/l.	5.0	5.0	5.0
27	Arsenic	1.0 mg/l.	1.0	1.0	1.0
28	Barium	1.5 mg/l.	1.5	1.5	1.5
29	Iron	2.0 mg/l.	8.0	8.0	8.0
30	Manganese	1.5 mg/l.	1.5	1.5	1.5
31	Boron	6.0 mg/l.	6.0	6.0	6.0
32	Chlorine	1.0 mg/l.	1.0	1.0	1.0

Sludge shall be dewatered at the drying-bed field to a dry solids content of 40% in the dry season without the addition of lime.

The quantity of returned flow has been assumed 85% of the total water demand. An infiltration rate of 100 lpd/mm/km (350 gpd/inch dia./ mile) average daily sewage flow has been considered for sewerage system.



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10 MGD WWTP FOR JHANG-Zone-1

Main points to be noted Sir:

- It is a Waste stabillzation ponds technology merge with wetland concept.
- It required an area of 97 Acres approx. with design period till 2032.
- Main components are screening chamber, distribution chamber, Bypass channel, Anaerobic ponds, Facultative ponds with floating plants, sludge drying beds, Auxiliary Facilities and with optional facilities of Composting unit and solar system for whole plant power consumption.
- The mean temperature consider for design is 20° C.
- The boundary will cover 100 ft plantation buffer all around the boundary.
- Area utilized for different components is as

	@ Temperature	20	°C	for MGD
	Area at top		No. of ponds	10.0
	Top length (L) m	Top Width (W) m	n	Area (Acre)
Anaerobic ponds	85.6	53.4	4	5
Facultative ponds	334.7	170.5	4	56
Auxiliary Facilities including sludge treatment roads, composing, 100 feet plantation buffer along the boundary etc.				36
Total area				97

- The water will enter at 510 ft level and leave the plant at 506 ft level.
- Removal efficiency in term of BOD will be as:

BOD in	500	PPM
BOD after Aps	258.8	PPM
BOD after FP	60	PPM
Effluent BOD after FP with floating plantation	31.056	PPM

- Aps = Anaerobic Ponds
- FP = Facultative Ponds.

Details of WWTP as Requested.

DPOFT-1.01

(Dr. I. Faiz)

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TOOL FOR DESIGN OF STP BASED ON ANAEROBIC AND FACULTATIVE PONDS		
Capacity Average Flow : 45.5 : MLD		
Guidance: Yellow cells are the input information to be suitably filled. Green cells are to be reviewed and modified/updated if need be. Red letters to be suitably corrected.		
Average Flow	45.5	MLD
Average Flow	0.53	M^3/sec
Peak Flow : Peak Factor : 1.8	81.9	MLD
Peak Flow :	0.95	M^3/sec
Minimum Flow Factor : 2	22.75	MLD
Minimum Flow	0.26	M^3/sec
DESIGN OF INLET CHAMBER		
Peak Flow	81.9	MLD
Peak Flow	0.95	M^3/sec
Detention time	15	Sec
Volume required	14.22	cum
Liquid depth taken	0.8	Mtr
Area	17.77	M^2
Width taken	4.2	Mtr
Length	4.2	Mtr
DESIGN OF COARSE SCREEN		
Peak Flow	0.95	M3/sec
Coarse Screen Opening	50	mm
Depth of water in screen	0.9	Mtr.
velocity through screen	0.7	M/sec
Area of screen	1.35	M2
Angle of inclination with the horizontal	45	degree
Sin (Angle of inclination)	0.71	
Free Board	0.60	m
Length of screen	2.12	
Width of opening	1.50	mtr
No of opening	30	nos
Number of bars	29	nos
Let width of each bar be	15	mmx75 mm
Total width of channel	1941	mm
Let width of each side be	50	mm
Total width of channel: Provide	2042	mm
Openings	32	
No of bars	31	
Size of Coarse Screen-Width	2.0	m

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Size of Coarse Screen-Length	4	m
Velocity in Channal u/s of Screen	0.52	
Velocity through Screen	0.67	
Head Loss No Clogging	0.009	m
Velocity when 50% clogging	1.33	m/sec
Head Loss when 50% clogging	0.077	m
DESIGN OF FINE SCREEN		
Peak Flow	0.95	M3/sec
Nos of screen(Each for handling peak flow)	2	Nos
Velocity(taking) through screen, Assume	0.8	M/sec
Area	1.18	M^2
Depth of flow taken	0.7	Mtr.
Hence width of opening	1.69	Mtr.
No of Openings	113	
No of Bars	112	
Width of Channal	2811	
Angle of inclination with the horizontal	75	degree
Clear opening between adjacent bars of screen	15	mm
Bars thickness of screen	10	mm x50mm
Taking width of screen	2000	mm
Nos of opening will be	80	Nos
Nos of bars(10 mm thickness)	79	Nos
Free Board	0.6	m
Sin (Angle of Inclination with horizontal)	0.966	
Inclined length of Screen	1.35	m
Length of chamber before screen	1.5	m
Total Length of chamber	2.85	
Total width of channel	2	Mtr.
Velocity in Channal u/s of Screen	0.65	m/sec
Velocity through Screen	1.12	m/sec
Head Loss through screen	0.041	m
Velocity through screen when 50% clogged	2.246	
Head Loss when 50% clogging	0.234	
Size-2.85 (L)x2(W)x1.7(D)		
DESIGN OF GRIT CHAMBER		
GRIT REMOVAL SYSTEM		
Two grit removal tank (1 w +1 S) each capable of handling peak flow, will be provided		
They are designed to remove grit particle of size of 0.15 mm size and above with a specific gravity of 2.3		
$Q/A=V_s \times n/(1-\eta)^{n-1}$		
Where-η-Desired efficiency of removal of grit particle		

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V_s -settling velocity of minimum size of grit particle to be removed		
Q/A--Design surface overflow rate applicable for grit chamber to be designed		
n-an index which a measure of the basin performance		
Here n value taken	75	%
Say	0.75	
Here V_s value taken	1225	$m^3/m^2/day$
Here n value taken-1/8(for very good performance)	0,13	
Hence surface over flow rate(Q/A)=(Vs*n)/(((1-n)^-n)-1)	806.42	$m^3/m^2/day$
Say	810	$m^3/m^2/day$
This Q/A value has to be reduced to allow for deposition of sand during sand strom by	10.00%	%
Then design overflow rate	729	$m^3/m^2/day$
Peak flow(m^3/day)	102375	(m^3/day)
Hence area required for peak flow	140.43	m^2
Each side of square grit chamber	11.85	mtr.
Hence provide tank length	12.00	mtr.
Hence provide tank Width	12	mtr.
Detention time taken is	1	minute
Depth of tank will be	0.88	mtr.
However in order to provide adequate depth for the grit scraping mechanism, increase to	0.9	mtr.
This gives detention time is	1.03	minute
the detention time of 1.87(slightly higher) minute is Immaterial for mechanically cleaned grit removal tank		
Hence size of grit removal chamber is	9 x9x0.9	
Flow height above, H weir,Q=(2/3)*Cd*L*H^1.5*((2g)^.5),Cd=.6,L=9	0.13	m
DESIGN OF ANAEROBIC POND		
No of Anaerobic ponds to provide flexibility in O&M of these ponds	4	Nos
Each handling flow of(45.5000m3 per day/3)	11375	(m^3/day)
say	11375	(m^3/day)
Volume of anaerobic pond V=Li xQ/λ	500	mg/l
Li-Raw sewage BOD(1000 XB/q)	11375	(m^3/day)
Q- average flow		
λ- volumetric BOD loading(Range between 100-400 gm/m3/day)		
λ=20T-100(as per MEAFNRCD)		

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T=mean temperature in coldest month in °C (The manual by DANIDA ENRECA suggests T as mean in coldest month or quarter. In quarter it is 14.12)	14	
hence λ is	180	kg/ha/day
Hence Volume of tank(V)	31597	m^3
Detention time	2.78	day
Detention time of 2 days or more is desirable to achieve sufficient BOD removal	3.00	day
Hence Volume of each tank (V)	34125	m^3
Hence Volumetric BOD loading(λ) is	166.6666667	gm/m3/day
BOD removal efficiency(in %)=2T+20	48	%
For liquid depth	5.5	mtr.
Area at mid depth	6205	m^2
Length shall be L=2B		
Hence mid depth width B=(area/2)$^{1/2}$	55.7	mtr.
Hence mid length L-	111.4	mtr.
Side slope of pond is 1V :2.5 H	2.5	mtr.
Depth for Sludge	1	mtr.
bottom below Mid depth	3.25	mtr.
Free Board	1	mtr.
Top of embankment above mid depth	4.25	
Hence total top length(L)	132.6	mtr.
Hence total top width(W)	76.9	mtr.
Area at top	10207	m^2
Hence total bottom length (L)	95.1	mtr.
Hence total bottom width(W)	39.4	mtr.
Area at Bottom	3753	m^2
Provide four anaerobic pond each of 112.2mx66.7m at top surface and 74.7mx29.2 m surface at bottom		
[illegible]	4	No
Nomber of Tanks	11375	cum/sec
Average flow in each tank	260	mg/l
BOD enter at Facultative pond after 2 days detention period at anaerobic pond	14	
Minimum mean monthly temperature °c	160.32	kg/ha/day
Volumetric BoD loading:-	224.97	
λ_s=253 x(1.107-0.002T)$^{(T-20)}$ this value of BOD loading rate recommended as MEAFNRCD(Refer DANIDA)	160.00	
λs=60(1.099)^T (Refer Jodhpur design)	220.00	
λs=20 T-120	195.44	kg/ha/day
λs=20T-60		
λs=375-6.25L, where L-latitude(28.73), Refer manual		

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Annexure: C: Punjab Environmental Quality Standards (PEQS) 2016

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 (O3)	1 hour	130 µg/m^3	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m^3	High Volume Sampling, (Average flow rate not less than 1.1 m^3/min).
	24 hours**	500 µg/m^3	
Respirable Particulate Matter PM_{10}	Annual Average*	120 µg/m^3	Preferably B-Ray Absorption method
	24 hours**	150 µg/m^3	
Respirable Particulate Matter $PM_{2.5}$	Annual Average*	15 µg/m^3	Preferably B-Ray Absorption method
	24 hours**	35 µg/m^3	
Lead (Pb)	1 hour	15 µg/m^3	ASS Method after sampling using EPM
	Annual Average*	1 µg/m^3	

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Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
	24 hours**	1.5 µg/m^3	2000 or equivalent Filter paper
Carbon Monoxide (CO)	8 hours**	5 mg/m^3	Non-Dispersive Infra-Red (NDIR) method
	1 hour	1.5 mg/m^3	

Note:

*Annual anthmetic 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 year. 2% of the time, it may exceed but not on two consecutive days.

Punjab Environmental Quality Standards for Water Quality

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	
Total hardness as $CaCO_3$	< 5000 mg/l	–	
TDS	< 1000	< 1000	

Properties / Parameters	Standard Values	WHO Standards	Remarks
pH	6.5 – 8.5	6.5 – 8.5	
Essential Inorganic	**mg/Liter**	**mg/Liter**	
Aluminum (Al) mg/l	≤ 0.2	0.2	
Antimony (Sb)	≤ 0.0005 (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 most 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	
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			

Properties / Parameters	Standard Values	WHO Standards	Remarks
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	

Note:

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

** PSQCA: Pakistan Standards Quality Control Authority.

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Punjab Environmental Quality Standards for Noise

No.	Category of Area / Zone	Effective from 1st July, 2010		Effective from 1st 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; 6:00 am to 10:00 Pm
2. Night time hours; 10:00 pm to 6:00 am.
3. Silence Zone: Zones which are declared as such by the Competent Authority and are comprising not less than 100 meters around, educational institutions and courts.
4. Mixed categories of area may be declared as one of the four above mentioned categories by the competent authority.
5. dB(A) Leq: Time weighted average of the level of sound in decibel on scale A which is relatable to human hearing.

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Punjab Environmental Quality Standards for Industrial Gaseous Emissions

No.	Parameter	Source of Emission	Standard
1.	Smoke	Smoke opacity not exceed.	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate matter	(a) Boiler and furnaces:	
		(i) Oil fired	300
		(ii) Coal fired	500
		(iii) Cement Kilns	300
		(b) Grinding, crushing, clinker cooler and related processes, metallurgical processes, converters, blast furnaces and cupolas.	500
3.	Hydrogen Chloride (HCl)	Any	400
4.	Chlorine (Cl^2)	Any	150
5.	Hydrogen Fluoride (HF)	Any	150
6.	Hydrogen Sulphide (H_2S)	Any	10
7.	Sulphur Oxides (2x3)	Sulfuric acid / Sulfonic acid plants	5000
		Other plants except power plants operating on oil and coal	1700
8.	Carbon Monoxide (CO)	Any	800
9.	Lead (Pb)	Any	50
10.	Mercury (Hg)	Any	10
11.	Cadmium (Cd)	Any	20
12.	Arsenic (Ar)	Any	20
13.	Copper (Cu)	Any	50
14.	Antimony (Sb)	Any	20
15.	Zinc (Zn)	Any	200
16.	Oxides of Nitrogen	Nitric acid manufacturing unit	3000
		Other plants except power plants operating on oil or coal:	
		Gas fired	400

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No.	Parameter	Source of Emission	Standard
		Oil fired	600
		Coal fired	1200

Explanations:

1. Based on the assumption that the size of the particulate is 10 micron or more
2. Based on 1 percent sulfur content in fuel oil. Higher content of sulfur will cause standards to be pro-rated.
3. In respect of emissions of sulfur dioxide and nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to the Punjab Environmental Quality Standards (PEQS) specified above, comply with the following standards:

A. Sulfur Dioxide

Sulfur Dioxide Background levels Microgram per cubic meter (ug/m³) Standards				
Background Air Quality (SO_2 Basis)	Annual Average	Max, 24 hours Interval	Criterion 1 Max. SO_2 Emission (Tons per Day per plant)	Criterion II Max. Allowable ground level increment to ambient (ug/m³) One Year Average
Unpolluted Moderated Polluted*	< 50	< 200	500	50
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	> 100	> 400	100	10

* For intermediate values between 50 and 100 ug/m³ linear interpolations should be used

** No Projects with Sulfur dioxide emissions will be recommended.

B. Nitrogen Oxide

Ambient air concentrations of Nitrogen Oxides, expressed as NOx should not exceed the following:

Annual Arithmetic Mean 100 ug/m³ (0.05 ppm)

Emission levels for stationary source discharges before mixing with the atmosphere, should be maintained as follows:

For Fuel fired steam generators, as Nano-gram per joule (10^{-9} g/J) of heat input:

Liquid fossil fuel	130
Solid fossil fuel	300
Lignite fossil fuel	260

Note: Dilution of gaseous emission to bring them to the NEQS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

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...njab Environmental Quality Standards for Municipal and Liquid Industrial Effluents

No.	Parameter	Into Inland Waters	Into Sewage Treatment
1	2	3	4
1	Temperature or Temperate increase *	≤ 3° C	≤ 3° C
2	pH value (H*)	6-9	6-9
3	Biochemical Oxygen Demand (BOD_5) at 20° C (1)	80	250
4	Chemical Oxygen Demand (COD)	150	400
5	Total suspended solids (TSS)	200	400
6	Total dissolved solids (TDS)	3500	3500
7	Grease and Oil	10	10
8.	Phenolic compounds (as phenol)	0.1	0.3
9.	Chloide (as Cl)	1000	1000
10.	Fluoride (as F)	10	10
11.	Cyanide (as CN) total	1.0	1.0
12.	An-ionic detergents (as MBAs) (2)	20	20
13.	Sulfate (SO_4^{2})	600	1000
14	Sulfide (S^{2})	1 0	1.0
15.	Ammonia (NH_3)	40	40
16	Pesticides (3)	0.15	0.15
17	Cadmium (Cd) (4)	0 1	0.1
18	Chromium (Trivalent and hexavalent) (4) (1)	1 0	1.0
19.	Copper (Cu) (4)	1.0	1.0
20	Lead (Pb) (4)	0.5	0.5

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No.	Parameter	Into Inland Waters	Into Sewage Treatment
21.	Mercury (Hg) (4)	0.01	0.01
22.	Selenium (Se) (4)	0.5	0.5
23.	Nickel (Ni) (4)	1.0	1.0
24.	Silver (Ag) (4)	1.0	1.0
25.	Total Toxic metals	2.0	2.0
26.	Zinc (Zn)	5.0	5.0
27.	Arsenic (As) (4)	1.0	1.0
28.	Barium (Ba) (4)	1.5	1.5
29.	Iron (Fe)	8.0	8.0
30.	Manganese (Mn)	1.5	1.5
31.	Boron (B) (4)	6.0	6.0
32.	Chlorine (Cl_2)	1.0	1.0

Explanations:

1. Assuming minimum dilution 1:10 on discharge, lower ration would attract progressively stringent standards to be determined by the Provincial Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of water for dilution of this effluent.
2. Methylene Blue Active Substances; assuming surfactant as biodegradable.
3. Pesticides include herbicides, fungicides and insecticides.
4. Subject to total toxic metals, discharge should not exceed level given at S.N 25.
5. Applicable only when and where sewage treatment is operational and BOD_5=80 mg/l is achieved by the sewage treatment system.

The effluent should not result in temperature increase of more than 30^0 C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.

** The value for industry is 200 mg/l

PAK GREEN ENVIRO-ENGINEERING (Pvt) Ltd

ISO/IEC 17025:2017 Accreditated Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442344

EPA Certified

TEST REPORT

Ref. #: PGG/LAB/2023-1019/AA

Issue date: 06-Mar-23

Name of Project:	PMDFC
Site Location:	Jhang City
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Monitoring Location:	Industry Area Toba Road
Coordinates:	N 31° 14' 36.74" E 72° 19' 38.41"
Name of Sampling Person:	Mr. Adil
Monitoring Instrument:	AQMS
Monitoring Duration:	24 hours
Monitoring Date:	2-Mar-23 to 3-Mar-23

Results:

Sr. No.	Time	CO	NO	NO_2	SO_2	PM_{10}	PM_{25}	SPM	O_3
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1.	4:00 PM	2.943	1.63	18.05	25.59	178.1	113.4		
2.	5:00 PM	2.967	1.73	18.45	26.72	211.2	102.5		
3.	6:00 PM	2.924	0.81	19.87	28.69	217.7	121.1		
4.	7:00 PM	2.974	1.21	20.12	30.67	198.8	119.7		
5.	8:00 PM	3.072	0.61	21.14	30.08	174.2	105.3		
6.	9:00 PM	3.052	0.87	21.95	28.77	190.7	112.1		
7.	10:00 PM	3.101	0.40	20.18	32.87	209.9	130.5		
8.	11:00 PM	3.150	0.32	21.60	29.39	211.7	126.1		
9.	12:00 AM	2.992	1.58	19.40	27.91	211.2	124.7		
10.	1:00 AM	3.016	1.74	20.01	30.45	212.4	119.6		
11.	2:00 AM	3.041	1.58	19.66	31.96	193.9	113.4		
12.	3:00 AM	3.004	1.34	22.19	33.32	184.3	107.3		
13.	4:00 AM	3.053	1.79	22.43	33.57	216.8	131.0	457.79	80.2
14.	5:00 AM	3.004	1.46	19.51	33.67	217.2	127.4		
15.	6:00 AM	2.967	1.83	19.77	30.58	216.4	126.1		
16.	7:00 AM	2.918	0.41	20.99	29.80	191.9	110.0		
17.	8:00 AM	3.084	1.58	22.25	30.58	171.0	112.7		
18.	9:00 AM	2.998	1.23	22.29	31.80	154.8	109.6		
19.	10:00 AM	2.912	0.34	21.28	32.09	183.0	110.8		
20.	11:00AM	2.826	1.02	18.23	30.89	190.1	110.4		
21.	12:00 PM	2.752	0.65	12.34	31.21	203.6	113.5		
22.	1:00 PM	2.801	0.61	11.33	29.87	202.2	117.2		
23.	2:00 PM	2.887	0.62	14.41	21.69	216.6	94.0		
24.	3:00 PM	2.924	0.69	16.90	20.00	219.2	119.2		
Average (24 Hours)		2.973	1.09	19.35	29.68	199.01*	115.73*		
NEQS		5 8hours	40 24hours	80 24hours	120 24hours	150 24hours	35 24hours	500 24hours	130 1 hour

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
ISO/IEC 17025:2017 Accreditated Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
Doc # PGG/IMS-LF/063 | Rev. Date 27-Jan-... | Rev. 10
Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442334

EPA Certified
Ref. #: PGG/LAB/2023-1019/AA

Issue date: 6-Mar-23

PEQS: Punjab Environmental Quality Standards
Remarks: Parameters with * are exceeding with PEQS Limits.
Terms & Conditions:

- Analysis was conducted on the request of proponent for his own use or PEQS compliance.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced pas a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The left-over sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.

The report is not valid for any negotiations

Field Analyst	Chief Analyst	Laboratory Incharge

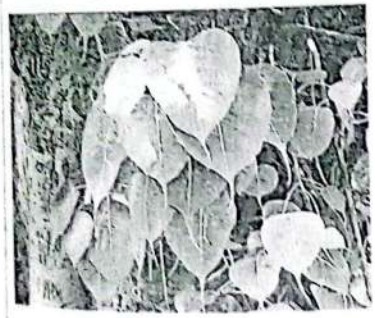
...nexure: G: Land Ownership Documents

...nexure: H: Plantation Plan

Table 15 Tree Plantation plan for Buffer zone

S#	Scientific Name of Pollutant Absorbent Plants[115]	Other name	Family	Details[116]
1.	Acacia modesta Wall 	Phulahi	Mimosaceae	A deciduous, thorny moderate-size tree, 3 to 9 m tall A moderate intolerant, drought resistant tree that grows on a variety of soils, including dry shallow soils. It prefers a semi-arid, sub-humid climate within a temperature range of -5 to 40 °C
2.	Acacia nilotica (Linn.)Delile. 	Desi Kikar		An evergreen, thorny, moderate-size tree, 6 to 13 m tall. An intclerant, drought resistant tree that grows on a variety of textured soils It will tolerate saline sodic sites if adequate soil moisture is available. Also Having ability to fix nitrogen makes it good farm forestry tree. It prefers Subtropical/ tropical environment
3.	Albizia lebbeck (Linn.) Benth.	Siris		A fast-growing deciduous tree 12 to 30 m tall. A moderately intolerant, tree that grows on a variety of moist sites t prefers a sub-humid, cool, warm, subtropical and tropical

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				climate with a temperature range of 4 to 40 °C The wood is very strong, resilient. The flowers are yellow or greenish white appear in April and May.
4	Morus nigra Linn. 	Tut siah		A medium size, deciduous tree, 9 to 15 m tall. It is monecious. Reproduced both from seed and by vegetative means. The berries are white to pinkish to purple to red to black. Fruiting period is between March and Jun
5	Ficus religiosa Linn. 	Peepal	Moraceae	A large deciduous tree that is leafless for a short period during hot seasons t grows well within a temperature range of 0 to 40 °C in a semi-arid, warm, subtropical climate. The growth rate of this tree is fast. Height growth of 1 m/yr has been reported T
6	Melia azedarach Linn. 	Bakiain	Meliaceae	A medium to small size, 97 deciduous tree, 6 to 12 m tall. The wood is light, moderately hard, resilient Flowers are small, lilac colored and fragrant appears between March and May
7	Azadirachta indica (Linn.) A. Juss.	Neem		A medium to large, usually evergreen tree, 12 to 25 meter tall. It grows on soils which vary from rich loams

			to nutrient deficient sites which are not saline or waterlogged and where the water table is above 18 m. The wood is heavy, hard and resilient. Flowers are small, white and with the fragrance of honey, appear between March and April.
Pongamia pinnata (Linn.) Merrill 	Sukhechain	Fabaceae	A medium size glabrous evergreen tree with a short bole and spreading crown up to 18 m high.

...exure: I: Emergency Response Preparedness Plan

Emergency Response Plan

1. Introduction

Emergency management can be defined as the organization, coordination and implementation of a range of measures to prevent, mitigate, respond to, overcome and recover from the consequences of emergency events affecting the community, its assets and the environment.

2. Purpose of Plan

This plan intends to provide a framework for safety and security to infrastructure, people and vehicles. It assigns responsibility to organizations and individuals for carrying out specifications at projected times and places in an emergency situation that exceeds the capability or routine responsibility of anyone agency.

The emergency response plan provides guidance to;

- Prevent any potential sources causing hazard to the resources during all stages of the project;
- Coordinate between various organizations to take actions in case of emergencies;
- Protect people and property in emergencies and disasters;
- Develop procedure stores pond to the emergencies efficiently;
- Identify and ensure availability of personnel, equipment, facilities, supplies, and other resources for use in order to provide timely and efficient response and recovery operations; and
- Confirm that measures taken in an incident are adequate to recover the affected resources or further improvement sare needed.

3. Planning

i. Emergency Response Team

A group/team shall be dedicated to identify and control potential emergencies during the construction and operation of the project. The roles and responsibilities of the group members shall be clearly defined.

The primary responsibilities of the group are described below:

- Identify the potential hazard or risk sources that can lead to emergency situations; Ensure availability of adequate resources, procedures and communication system to deal with the identified emergency situations;
- Ensure awareness and training of the staff to facilitate implementation of the emergency response plan;
- Maintaining the records of any previous incidents; and
- Post-event analysis to bridge the gaps of the existing risk prevention procedures

The emergency response team shall include but not limited to the following.

1. Team Leader
2. Safety Engineer
3. Reporting officer/Inspector

Team Leader

- Approve/ modify devised measures to prevent or mitigate the risks associated with the identified risk sources

- Arrange resources for dealing with potential emergencies including, financial, equipment's and personnel required to deal with emergencies.
- Assure that the Emergency Response plan is adequate, effective and can be implemented practically.

Safety Engineer

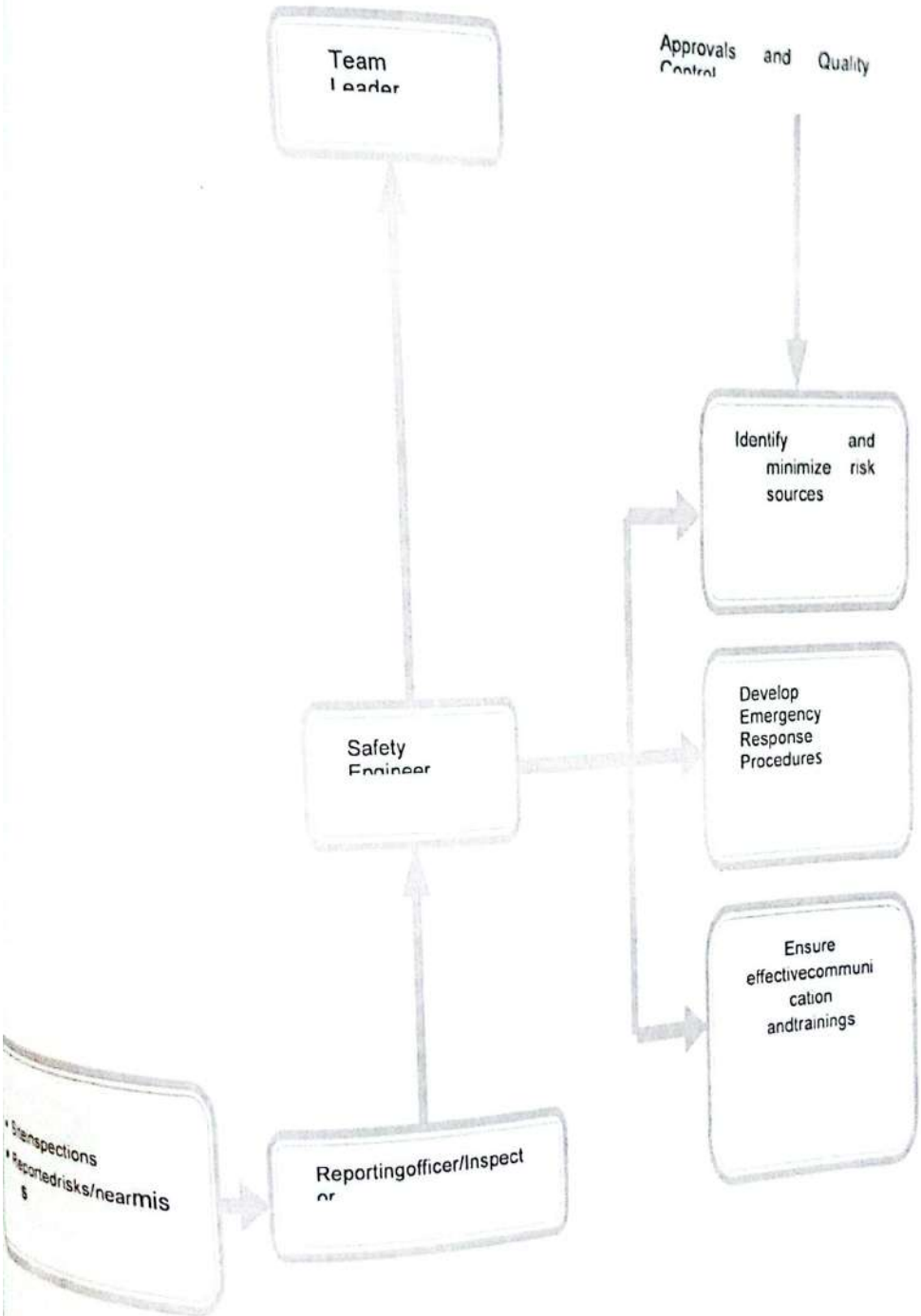
- Analyze the Identified risk sources and devise measures to prevent or mitigate the risks in close consultation with the Team Leader;
- Develop and implement the Emergency Response Procedures, in case of the possible emergencies arise;
- Ensure effective internal and external communication; and
- Provide regular trainings and arrange drills to make people aware of dealing with emergencies.

Reporting officer / Inspector

- Regular in sections of the site, to identify potential risks associated with equipment's, materials and work practices;
- Anybody from the site can notify the reporting officer about potential risk and/or near misses on the site;
- Recordanyidentifiedrisksandmitigationmeasurestocontroltheidentifiedrisk; and
- Notify the issue and control measures taken there by to the safety engineer.

The designation, roles and responsibilities of each member shall be clearly defined and communicated to the employees. An outline of the framework of responsibilities is presented in the following organizational chart:

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Team
Approvals and Quality
Identify and minimize risk sources
Develop Emergency Response Procedures
Safety
Ensure effectivecommuni cation andtrainings
Reportingofficer/Inspect
Stenspections
Reponedrisks/nearmis

ii. **Hazard Identification**

A comprehensive identification and evaluation of the hazards /risks likely to cause an emergency shall be done by Emergency Response Team (ERT). Major potential emergencies identified in road projects are as follows:

- Structural failure
- Disruption of Utility (Power, Water, Telecommunications, Gas, etc)
- Accidents
- Vehicle accident
- Fog
- Smoke
- Power/equipment failure or Vandalism
- Fire
- Earthquake
- Terrorism including bombing
- Disease Outbreak

iii. **Prevention and Mitigation**

TheERTshallworktoeliminateorreducetheimpactofidentifiedemergenciesandincreasingthe resilience of an affected community to recover from the consequences of such events. These activities include:

- Design considerations to control flooding, earthquakes and adequate lightening for fog etc.;
- Regular in section and maintenance of construction machinery and the structural integrity;
- Review of work schedules based on weather updates; and
- Security controls based on political situations.

4. Emergency Preparedness

The ERT shall be prepared withal necessary resources and the personnel's shall be trained regularly

i. Resources

Finance and administration

The financial resources shall be reserved for dealing with any emergencies arising onsite during construction and operation. Responsibilities of the person managing there sources in case of emergencies shall be clearly defined and the required resources shall be adequate and updated regularly.

Equipment

All the necessary equipment needed in an event of emergencies shall be made available, as a minimum, the equipment needed include;

- Personal Protective Equipment
- Alarms/Warnings
- Fire extinguishers
- Crowd control, flashlights, signs, barricades
- First Aid Facility
- Detection instruments, e.g. personal alarmkits, smoke detection instruments
- Tools to fix minor vandalism

Communication

All external and internal communication systems shall be made available. Local emergency numbers shall be clearly posted and communicated to the personnel involved in construction and during operation. The local emergency numbers are given below, which shall be regularly updated.

Emergency Numbers

	Service	Islamabad(051)
1	Ehdi Services	251191
2	Ambulance	115
3	Emergency Police	15
4	Bomb Disposal	9222362
5	Rescue	1122
6	Fire Brigade Center	16
7	Hospital Civil(casualties)	556311

Trainings

Personnel shall be made aware of the importance of safety, potential emergencies and how to respond in case of emergencies. One day training and mock exercise shall bed one to prepare, the personnel to deal with emergencies.

5. Emergency Response

Response includes actions taken to reduce the impacts of an emergency event, and to limit the threat to life, property and the environment.

The emergencies can be dealt with:

- On- Site Management of the situation
- Off-site coordination to arrange necessary resources to support the on-site management
- Providing advice and reports of the situation to stake holders

i. Emergency Response Procedure:

Any person can report about an emergency, an on-site worker, an outside agency, or the public. Circumstances change during the course of an emergency in different events, thus, the procedure will vary as per the specific situation on ground. However, a basic action plan to be followed in an emergency is discussed below. This order of response is applicable to almost any emergency and should be followed in sequence.

Assess the situation:

The most important thing to do in case of emergency is to stay calm and avoid panic. Assess the situation, the cause and most immediate requirement to control, limit and/ or manage the immediate, ongoing, or further damage.

Immediate control:

The most senior person on the scene should take control and contact, or delegate someone to contact emergency services as posted and communicated by ERT and inform the reporting officer of ERT and explain the situation. The area of emergency shall be restricted by barricades, tapes and adequate signage, if and as required.

Protection from further losses:

CamScanner

1. Once the site is restricted, to provide protection and reduce further losses, the source causing the emergency shall be controlled including equipments, materials, environment and accident scene from continuing damage or further hazards to the area and people. e.g ;suppress fire, prevent objects from falling, shutdown equipment or utilities, and take other necessary measures as required depending upon the type of emergency

2. Provide first aid if required or in doing so.

3. Designate people to emergency duties. e.g.: assign personnel to guide emergency services on arrival.

4. Head count People/personnel to identify any missing persons

5. People/personnel shall be directed to safe location

6. Arrange diversions for the traffic to reduce disturbance to the flow of traffic, if and as far as possible.

7. Preserve the accident scene until experts mark it safe; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses.

ii. Communication:

Emergency service providers:

The emergency service providers 'need to be kept informed of the situation. On site, personnel from the emergency services shall be guided towards the emergency scene, brief about the event, on going and potential hazards and cause(s),if known.

Emergency Response Team and Management:

Members of ERT shall be immediately informed and the management shall also be kept informed.

Public:

Timely notifications to public shall be disseminated through electronic and print media depending upon the requirement and urgency of the emergency so that they can adopt alternate routes and avoid the hazards associated with the emergency encountered.

Utilities:

In case of disruption of utilities, the utility control authorities shall be immediately contacted to control the situation.

iii. Recovery:

Emergency affected individuals, communities and infrastructure shall be restored in terms of emotional, economic, and physical well being including the following as a minimum

- A detailed analysis and assessment of causes of emergency, extent of damage and gaps if any, in managing the emergency,
- Recovery/replacement of the assets and infrastructure;
- Rein statement of disrupted services;
- Road and bridge repairs;