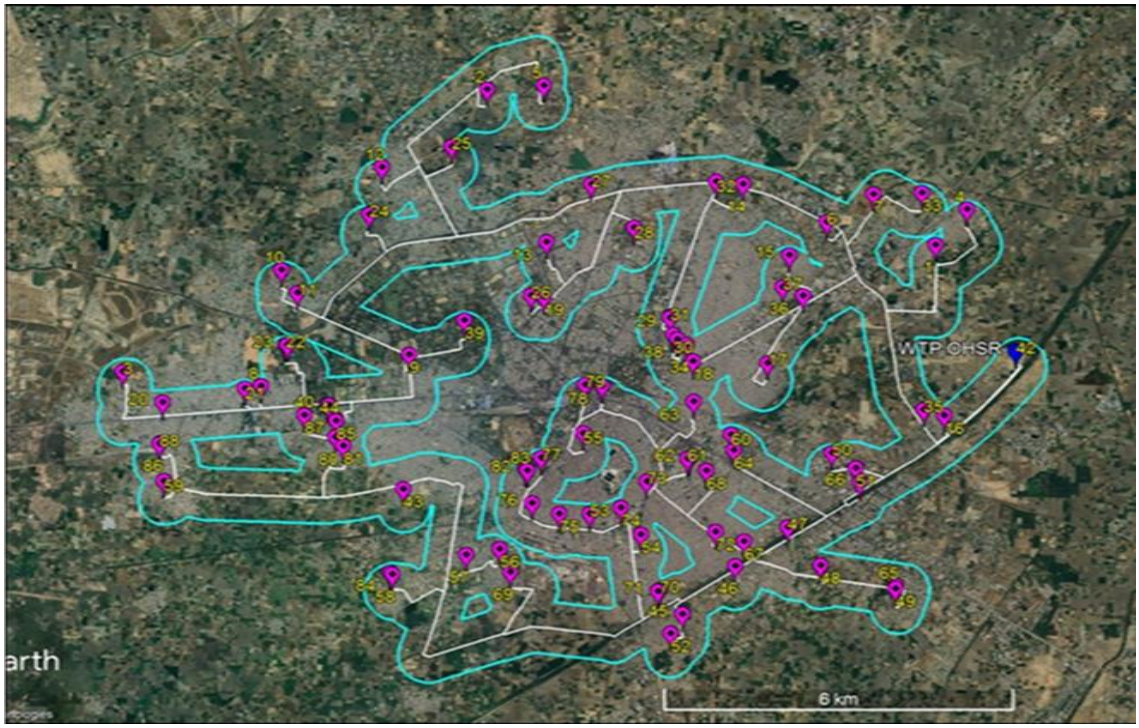
ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA)



For 24x7 Canal Based Water Supply Project for Amritsar City

Under Punjab Municipal Services Improvement Project
(PMSIP) – P170811

PMIDC
Enabling Urban Infrastructure

Punjab Municipal Infrastructure Development Company (PMIDC)
(Department of Local Government, Punjab)

May, 2024

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ABBREVIATIONS

ADA	**Amritsar Development Authority**
AC	Asbestos Cement
AE	Assistant Engineer
AIDS	Acquired Immune Deficiency Syndrome
AIIB	Asian Infrastructure Investment Bank
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AMSL	Above Mean Sea Level
AoI	Area of Influence
ASI	Archaeological Survey of India
bgl	Below Ground Level
BOCW	Building & Other Construction Workers
BOD	Biochemical Oxygen Demand
BPL	Below Poverty Line
BS VI	Bharat Stage (BS) VI emission standards
BSI	Botanical Survey of India
C&D	Construction and Demolition
C- ESMP	Contractor- Environmental and Social Management Plan
CBO	Community Based Organization
CCT	Chlorine Contact Tank
CEO	Chief Executive Officer
CGWA	Central Ground Water Authority
CGWB	Central Ground Water Board
CHMP	Cultural Heritage Management Plan
CHS	Community Health and Safety
CoC	Code of conduct
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organization
CPR	Cardiopulmonary Resuscitation
CPRs	Common Property Resources
cPVC	Chlorinated polyvinyl chloride
CR	Critically Endangered
CTE	Consent to Establish
CTO	Consent to Operate
Cum	Cubic meter
DAF	Dissolved air floatation
DAPCU	District AIDS and Prevention Control Unit
DBOT	Design-Build-Operate-Transfer
DBPs	Disinfection Byproducts
DDPO	District Development and Panchayat Officer
DEA	Department of Economic Affairs
DFO	District/Divisional Forest Officer

DG	Diesel Generator
DI	Ductile Iron
DMA	District Metered Areas
DMP	Disaster Management Plan
DO	Dissolve Oxygen
DWPE	Dewatering Polyelectrolyte
DWSS	Department for Water Supply and Sanitation
E&S	Environment and Social
EC	Electric Conductivity
ECO	Emergency coordinating officer
EHSGs	Environmental Health and Safety Guidelines
EIA	Environment Impact Assessment
EN	Endangered
ENT	Ear Nose Throat
ENE	East Northeast
EPA	Environment Protection Act
EPO	Emergency planning officer
ERP	Emergency Reponses Plan
ESCP	Environment and Social Commitment Plan
ESDD	Environmental and Social Due Diligence
ESF	Environmental and Social Framework
ESHS	Environment Safety Health and Security
ESIA	Environmental and Social Impact Assessment
ESIS	Employees State Insurance Scheme
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESS	Environmental and Social Standards
Etc.	Et cetera
FCA	Forest Conservation Act
FGDs	Focused Group Discussions
FI	Financial intermediaries
GAC	Granular Activated Carbon
GAP	Gender Action Plan
GBV	Gender Based Violence
GDM	Gaussian Dispersion Modeling
GHG	Green House Gas
GIIPs	Good International Industry Practices
GIS	Geographic Information System
GLC	Ground Level Concentration
GoI	Government of India
GoP	Government of Punjab
GPN	Good Practice Note
GPRs	General Packet Radio Service

GRC	Gender Resource Centre
GRM	Grievance Redressal Mechanism
GRS	Grievance Redress System
GSM	Global System for Mobile Communications
GT Road	Grand Trunk Road
H&S	Health and Safety
Ha	Hectare (one hectare is equal to an area of 10 000 square meters.)
HDD	Horizontal Directional Drilling
HDPE	High Density Poly Ethylene
HH	Household
HIV	Human Immunodeficiency Virus
HRG	High Risk Group
HSC	Hand Pumps and Stand posts
HWMP	Hazardous Waste Management Plan
i.e.	id Est
IARI	Indian Agricultural Research Institute
ICC	Internal Compliant Committee
IDU	Injecting Drug User
IEC	Information, Education and Communication
INR	Indian Rupees
ILO	International Labour Organisation
IPC	Indian Penal Code
IRC	Indian Roads Congress
IUCN	International Union for Conservation of Nature
JE	Junior Engineer
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
IVA	Independent Verification Agency
KM	Kilo Meter
KVA	Kilo Volt Ampere
KW	kilowatt
L&T	Larsen & Toubro
LA	Land Acquisition
LARR	Land Acquisition, Rehabilitation and Resettlement
LC	Least Concern
LHS	Left Hand Side
LMP	Labour Management Plan
LPG	Liquefied petroleum gas
LRP	Livelihood Restoration Plan
LS	Lump sum
M&E	Monitoring and Evaluation
MBL	Main Branch Lower
MCA	Municipal Corporation Amritsar
MLD	Millions Liter per Day
MoEF&CC	Ministry of Environment, Forests & Climate Change

MoM	Minute of Meetings
MS	Mild Steel
MSIHC	Manufacture, Storage and Import of Hazardous Chemicals
MSW	Municipal Solid Waste
NAAQ	National Ambient Air Quality
NABL	National Accreditation Board for Testing and Calibration Laboratories
NBC	National Building Code of India
NACO	National Aids Control Organisation
NDRF	National Disaster Response Force
NE	North east
NGOs	Non-Governmental Organization
NH	National Highway
NHAI	National Highway Authority of India
NoC	No Objection Certificate
NOx	Nitrogen Oxides
NPSHEW	National Policy on Safety, Health, and Environment at Workplace
NRSA	National Remote Sensing Agency
NRW	Non-revenue Water
NT	Near Threatened
NYU	Nephelometric Turbidity Unit
O&M	Operation and Maintenance
ODF	Open Defecation Free
OHS	Occupational Safety, Health
OHSWC	Occupational Safety, Health and Working Conditions Code
OHSAS	Occupational Health and Safety Assessment Series
OHSRs	Over Head Service Reservoirs
PAD	Project Appraisal Document
PAFs	Project Affected Families
PAP	Project Affected Person
PCC	Pollution Control Committee
PDFs	Project Displaced Families
PDO	Project Development Objective
PEP	Pre-Employment Plan
PF	Protected Forest
PHED	Public Health Engineering Department
PHTPB	Punjab Heritage & Tourism Promotion Board
PIU	Program Implementation Unit
PLC	Programmable Logic Controllers
PM	Particulate Matter
PMIDC	Punjab Municipal Infrastructure Development Company
PMSIP	Punjab Municipal Services Improvement Project
PMU	Project Management Unit
POM	Project Operation Manual
PPCB	Punjab Pollution Control Board

PPE	Personal Protective Equipment
PPP	Public Private Partnership
PRI	Panchayati Raj Institution
PSACS	Punjab State AIDS Control Society
PSERC	Punjab State Electricity Regulatory Commission
PSFDC	Punjab State Forest Development Corporation
PSPCL	Punjab State Power Corporation Limited.
PUC	Pollution under Control
PVC	Polyvinyl Chloride
PwD	Persons with Disabilities
PWD	Public Works Department
PWRDA	Punjab Water Regulation and Development Authority
QoL	Quality of Life
R&B	Road and Building
R&R	Rehabilitation & Resettlement
RAP	Resettlement Action Plan
RCC	Reinforced Cement Concrete
RF	Reserve Forest
RFCTLARR	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement
RFP	Resettlement Policy Framework
RHS	Right Hand Side
RMT	Running meter
RO	Reverse Osmosis
RoW	Right of Way
RPF	Resettlement Policy Framework
RSC	Residual Sodium Carbonate
SAR	Sodium Absorption Ratio
SC	Scheduled Caste
SCADA	Supervisory Control and Data Acquisition
SDM	Sub Divisional Magistrate
SDMA	State Disaster Management Plan
SEA	Sexual Exploitation & Abuse
SECs	Special Environmental Clauses
SEIAA	State Environment Impact Assessment Authority
SEP	Stakeholder Engagement Plan
SH	State Highway
SH	Sexual Harassment
SHGs	Self Help Group
SIA	Social Impact Assessment
SMS	Social Management System
SO2	Sulphur Dioxide
SOP	Standard Operating Procedure
SPCB	State Pollution Control Board

SPL	Sound Pressure Level
SSE	South Southeast
ST	Scheduled Tribe
STI	Sexually Transmitted Infections
TDS	Total Dissolve Solid
TIP	Targeted Intervention Project
TL	Team Leader
TL	Transmission Line
TMP	Traffic Management Plan
TSS	Total Suspended Solids
UBDC	Upper Bari Doab Canal
UNESCO	United Nations Educational, Scientific and Cultural Organization
ULBs	Urban Local Bodies
uPVC	Unplasticized polyvinyl chloride
VESCs	Valued Environmental and Social Components
VMT	Vehicle mile travel
VSPL	Voyants Solutions Private Limited
VU	Vulnerable
WB	World Bank
WHHs	Women Headed Households
WPR	Work Participation Rate
WSS	Water Supply and Sanitation
WTP	Water Treatment Plant

0 EXECUTIVE SUMMARY

1 The Punjab Municipal Services Improvement Project (PMSIP) is a collaborative effort between the Government of Punjab (GoP) and the Government of India (GoI), funded by the World Bank and the Asian Infrastructure Investment Bank (AIIB). This project comprises four main components: Strengthening Urban Service Delivery Systems, Improving Water Supply Infrastructure, COVID-19 Crisis Response, and Project Management. Within the PMSIP, the Amritsar Bulk Water Supply Project is a critical initiative aimed at transitioning the city's water supply from groundwater to surface water sources. This shift addresses concerns of groundwater over-exploitation and contamination. Key components of the project include constructing a water treatment plant (WTP) with a capacity of 440 MLD, laying transmission lines covering 112.7 kilometers, demolishing and rehabilitating overhead service reservoirs (OHSRs), and conducting environmental and social impact assessments (ESIA) and implementing environmental and social management plans. This ESIA evaluates potential environmental and social impacts throughout the project lifecycle, providing mitigation measures to address adverse effects. The project's scope encompasses assessing baseline environmental and socio-economic conditions, identifying stakeholders, and proposing measures for environmental and social management. The project aims to enhance water supply infrastructure while ensuring sustainable environmental and social outcomes for the city of Amritsar.

2 The project entails upgrading Amritsar's water supply system, transitioning from groundwater to surface water sources to mitigate contamination and over-extraction issues. Key components include, 1) Water Source Transition: Shifting from groundwater reliance to canal-based surface water from the Main Branch Lower (MBL) canal, 2) Water Treatment Plant (WTP): Constructing a 440 MLD capacity WTP in Village Vallah to treat raw water from MBL through a processes including aeration, coagulation, flocculation, sedimentation, filtration, and chlorination, 3) Transmission Network: Pumping treated water from WTP to Overhead Service Reservoirs (OHSRs) through a 112.7 km transmission network, through pipes with diameters ranging from 100 mm to 1728 mm, predominantly made of ductile iron (DI) and Steel, 4) Disinfection System: Implementing chlorination at inlet chambers to address microbiological concerns in raw water and ensuring standardized chlorination practices for consistent water treatment across the distribution network, 5) Overhead Service Reservoirs (OHSRs): Constructing 88 OHSRs with capacities ranging from 1 ML to 4 ML across North and South zones, demolishing about 17 OHSRs and enhancing storage capacity and staging height to ensure efficient water distribution., 6) SCADA Monitoring: Implementing a Supervisory Control and Data Acquisition (SCADA) system for real-time monitoring and control of water supply and utilizing GPRS/GSM wireless technology for data transfer and leakage detection. The project aims to meet growing water demand, improve water quality, and ensure sustainable water supply for Amritsar's residents through comprehensive infrastructure upgrades and advanced monitoring systems.

3 As per the Environmental Impact Assessment (EIA) Notification of 2006 issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC), all projects listed in Schedule 1 of the Notification necessitate prior environmental clearance. The proposed Bulk Water Supply Scheme in Amritsar, which involves the construction of Water Treatment Plants (WTP), laying of transmission lines, and construction of Overhead Service Reservoirs (OHSRs), does not fall under the purview of the EIA Notification 2006. Hence do not require Environmental Clearance However, since the project is being financed by the World Bank, it requires the preparation of an ESIA to be conducted in accordance with the World Bank's Environment and Social Framework (ESF) of 2018.

4 The baseline analysis concludes that insufficient water storage infrastructure and poor rainfall contribute to a diminished capacity for water supply. Limited access to surface water is attributed to decreased forest coverage, insufficient natural surface water resources, and local topographical challenges, resulting in constrained water supply. Excessive groundwater utilization, influenced by the region's topography and geology, leads to a growing dependency on groundwater. The quality of surface and groundwater is adversely affected by agricultural practices, urbanization, and climate variations, causing certain project areas to experience drinking water quality surpassing permissible limits. Additionally, intensified groundwater withdrawal is driven by the limited availability of surface water resources. The project does not involve any physical or economic displacement. Only 40 acres of land has been purchased for the construction of WTP on the basis of negotiated settlement. The OHSRs (88 nos.) and Transmission network of 112.7 kms have been proposed on Government land. Necessary permission has already been obtained for laying of transmission line network from respective government authority like PWD, NHAI, Railway, Forest Department etc. As per the Archaeological Survey of India (ASI), Ram Bagh Gate (0.72 km from W49-E1 and 0.89 km from W49-P1) has been identified in the nearby vicinity of the project area. As the project area is falling more than 300 m away from the protected monument as per Ancient Monuments and Archaeological Sites and Remains Act, 1958 and its amendments. There will be no impact on the monuments. .

5 The environmental impact assessment of the bulk water supply project in Amritsar identifies various impacts across its different phases, including pre-construction, construction, and operation and maintenance. During the pre-construction phase, impacts include vegetation clearance, utility shifting, and transportation of construction materials, which may lead to changes in land use, ambient air pollution, noise pollution, and disturbance to cultural heritage sites. In the construction phase, impacts such as site clearance, construction of water treatment plants (WTPs), laying of transmission lines, and construction and dismantling of overhead storage reservoirs (OHSRs) contribute to land use changes, ambient air pollution, noise pollution, vibration, groundwater and surface water contamination, soil erosion, disruption of ecological resources and health and safety impacts both on workers and community. During the operation and maintenance phase, impacts include sludge generation, waste and sewage generation, withdrawal of surface water, vehicular movement, and periodic maintenance activities, which may affect soil and water quality, contribute to ambient noise and air pollution, disrupt ecological balance and health and safety impacts both on workers and community. Overall, the project is categorized as having "Substantial Risk" due to its potential environmental consequences, but mitigation measures outlined in the Environmental Social Management Plan (ESMP) aim to reduce these risks to a "Moderate Risk" level. Despite the negative impacts, the project also aims to bring positive outcomes such as mitigating groundwater over-exploitation, enhancing water supply reliability, boosting revenue for Urban Local Bodies (ULBs), and providing access to clean drinking water, thus improving public health and quality of life for residents of Amritsar.

6 The social impact assessment of the water supply project in Amritsar delineates various impacts across its different phases. During the pre-construction phase, positive impacts include land acquisition through negotiated settlements, mitigating involuntary resettlement risks. However, negative impacts arise from community opposition to OHSRs construction in parks, potentially leading to aesthetic degradation and restricted recreational activities. Additionally, transmission line construction may disrupt daily activities and cause delays due to road clearance. In the construction phase, positive impacts include job opportunities for locals due to labor influx. However, negative impacts encompass strain on local resources, tensions with the community, occupational health and safety hazards for workers, gender-based violence within workforce camps, and community health and safety issues from construction-related disturbances. Transitioning to the operation phase, positive impacts include improved public health and household income from clean water provision. Nonetheless, concerns persist

regarding exposure to hazardous materials, health risks from water quality issues, and the threat of communicable diseases like COVID-19. Overall, while stakeholders support the project for its anticipated improvements in quality of life and health benefits, the effective implementation of mitigation measures is essential to mitigate adverse impacts throughout the project lifecycle.

7 The stakeholder assessment for the project extensively engaged various community members, officials, and organizations to gather insights and perspectives on social and environmental aspects. Stakeholders were categorized into affected parties, interested parties, and vulnerable groups. Consultations involved diverse participants from different localities and sectors, ensuring comprehensive input. Major findings from stakeholder consultations included support for the project alongside concerns about dust emissions, park aesthetics, and impacts on livelihoods during demolition and construction phases. Specific recommendations were made regarding construction schedules, safety measures, and compensation for affected vendors. Gender-based violence consultations highlighted risks to women and children, emphasizing the need for mitigation strategies and awareness programs. Overall, stakeholders expressed favorable sentiments towards the project's long-term benefits, though opposition arose at certain OHSR locations due to degradation of aesthetics at the existing parks. Socio-economic conditions in the area were generally favorable, but concerns raised during consultations must be addressed by project stakeholders to ensure successful execution and community integration.

8 As a part of the ESIA, an Environmental and Social Management Plan (ESMP) is prepared Environmental & Social Mitigation Measures duly identifying the responsible parties for each of the mitigation/ management action. The ESIA has also identified the various permissions and clearances to be obtained. The ESMP Monitoring Plan has measurable monitoring indicators with frequency of measurement and responsibilities. A training the capacity Building program is proposed for the environmental and social functionaries of the project. The ESMP Budget is pegged at about 1 to 1.5% of the project cost.

9 The Stakeholder Consultations Strategy and Participation Framework, aligned with the World Bank's Environment and Social Framework, emphasizes continuous engagement throughout the project cycle. It outlines a systematic approach to identify stakeholders and involves them in decision-making processes. Various stakeholders, including project affected parties (PAPs), vulnerable groups, and other interested parties, are targeted for engagement through consultations, focus group discussions, and information dissemination using various tools and modes. The strategy covers pre-construction, construction, and operation stages, ensuring transparency, information disclosure, and addressing concerns effectively.

10 The Grievance Redressal Mechanism (GRM) is an essential aspect of the project's implementation, aiming to promptly address concerns and grievances of affected parties related to environmental and social performance. It follows a structured procedure involving field-level resolution, Grievance Redress Committee (GRC) intervention, and escalation to higher levels if needed. The mechanism ensures accessibility, transparency, and timely resolution of grievances, with an option for legal recourse if dissatisfied.

11 Institutional and implementation arrangements are anchored with the Punjab Municipal Infrastructure Development Corporation (PMIDC) at the state level and the Municipal Corporation Amritsar (MCA) at the city level. The Project Management Unit (PMU) at the state level and Project Implementation Unit (PIU) at the city level oversee ESMP implementation. Various specialists, including Environment, Social Development, Health and Safety and Communications specialists, along with Superintending Engineers at PIU, are designated to manage different aspects of the project, ensuring compliance and effective implementation of the Environmental and Social Management Plan (ESMP). Overall, the

framework ensures stakeholder engagement, grievance redressal, and effective implementation of environmental and social management plans, contributing to sustainable project execution and community welfare. The overall responsibility for Environmental and Social Management aspects and submitting quarterly reports to the World Bank and AIIB is vested with PMU, PMIDC.

1 INTRODUCTION

1. The Government of Punjab (GoP), with the assistance of the Government of India (GoI), has obtained financial loan from the World Bank and the Asian Infrastructure Investment Bank (AIIB) for the implementation of the Punjab Municipal Services Improvement Project (PMSIP).

1.1 Components of the Project

2. The proposed project is organized into four components:
   1. Strengthening Urban Service Delivery Systems,
   2. Improving Water Supply Infrastructure,
   3. COVID-19 Crisis Response, and
   4. Project Management.

3.

4. The Punjab Municipal Infrastructure Development Company (PMIDC), a government-owned entity, plays a pivotal role in ensuring the project's alignment with environmental and social regulations. Working in close collaboration with the Municipal Corporation of Amritsar, designated as the Project Implementation Unit (PIU), PMIDC strives to facilitate the successful implementation of the project while minimizing adverse effects on the environment and local communities.

5. This Amritsar Bulk water supply project is part of component 2 under this PMSIP project. The project encompasses the construction of a head regulator cum cross-regulator on the Main Branch Lower of Upper Doab Bari Canal which takes off from Madhopur Barriage, Water Treatment Plant (WTP) with capacity of 440 million liters per day (MLD), laying of transmission lines for 112.7 kilometers (diameters ranging from 100 mm to 1728 mm), demolition of 17 Overhead Service Reservoirs (OHSRs) and the construction and rehabilitation of 88 OHSRs within the city of Amritsar.

6. In order to identify environmental and social impacts due to the project which includes DBOT works, an Environmental and Social Impact Assessment (ESIA) is conducted and an Environmental and Social Management Plan (ESMP) is prepared. Additionally, an abbreviated Resettlement Action Plan (RAP) has been prepared based on the assessment. The ESMP provides mitigation measures to address adverse impacts during the pre-construction, construction, and operational phases of the Amritsar Bulk Water Supply Project.

1.2 Project Background

7. The Municipal Corporation of Amritsar (MCA) currently relies solely on groundwater to meet the water needs of the city's residents. The Punjab Water Regulation and Development Authority (PWRDA) has classified Amritsar as "over-exploited," signaling an excessive use of groundwater driven by rapid urbanization, population growth, and increased agricultural activities. Quality of GW also one of the reasons to shift from Groundwater to Surface water as 72% of water samples tested by GoP’s Department for Water Supply and Sanitation (DWSS) labs in Amritsar was found contaminated with Arsenic, 27% of which had more than double the permissible limit

8. Presently, Amritsar generates 290 MLD (Million Liters per Day) of water for domestic consumption through 800 deep tube wells. This water is distributed through an extensive network of pipes spanning 1260 km. The supply is intermittent, occurring for 12 hours each day, with specific periods of 5 hours in the morning, 2 hours at noon, and 5 hours in the evening. In Amritsar, there are 37 existing Overhead Storage Reservoirs (OHSRs). Water from the existing 800 tube wells is sometimes pumped to the OHSRs and then directed to the piped water supply distribution network, while mostly being directly pumped from tube wells to the distribution network.

9. Due to constant overuse and pollution, the reliance on groundwater in Amritsar has raised concerns. As a result, the Punjab government sees the use of surface water, which can be naturally restored through the water cycle, as a sustainable solution. Therefore, the government plans to shift Amritsar water supply from groundwater to surface water.

1.3 Amritsar City and the Project

10. Amritsar, a city steeped in history and cultural opulence, serves as a vibrant testament to India's diverse heritage. Nestled in the north-western state of Punjab, Amritsar holds a special place in the hearts of both locals and visitors alike. Its name, signifying **"Pool of the Nectar of Immortality,"** captures the spiritual and cultural significance deeply embedded in its roots.
11. The project is underway in Amritsar, situated in the fertile plains of the Indo-Gangetic basin within the state of Punjab. The city itself is located on relatively flat terrain, with Amritsar maintaining a relatively low elevation—approximately 230 meters (750 feet) above sea level. This is attributed to the absence of significant hills or mountain ranges surrounding it. A visual representation of the project's location provided in Chapter 2**.**
12. The Water Treatment Plant (WTP) is strategically positioned in the village of Vallah, Amritsar, while the Overhead Service Reservoirs (OHSRs) and transmission lines span across the entirety of the city.

13. The city has experienced substantial growth due to rapid industrialization. However, recent trends indicate a deceleration in the growth rate. A noteworthy trend is the migration of the youth to Western countries in pursuit of better livelihood prospects. The anticipated future population and corresponding water demand are delineated in Table 1.11.

Table 1-1: The Estimated Future Population and Water Demand

Parameter	Unit	Amritsar
Projected Population		
Population 2019	Lakhs	13.15
Population Base Year 2025	Lakhs	14.51
Population Intermediate Year 2040	Lakhs	18.15
Population Ultimate Year 2055	Lakhs	22.11
Raw Water Demand		
Base Year 2025	MLD	304
Intermediate Year 2040	MLD	375
Ultimate Year 2055	MLD	454
Treated Water Demand	MLD	
Base Year 2025	MLD	289
Intermediate Year 2040	MLD	356
Ultimate Year 2055	MLD	431

14. Water Supply Arrangement: To meet the projected water demand for Amritsar, securing 200 cusecs of surface water is imperative. This supply will be drawn from the Upper Bari Doab Canal (UBDC)

15. The Irrigation Department has issued a No Objection Certificate (NOC) to extract a continuous supply of 200 cusecs (equivalent to 2.2% of UBDC capacity) of raw water from the UBDC canal. This canal is situated approximately 200 meters from the Water Treatment Plant (WTP). The intake structure for this purpose will be constructed at RD 86000 of the UBDC canal, and the Irrigation Department will undertake this construction on its own land.
16. It is concluded from the Environment and Social Screening of the WRD works that the extraction of 200 cusec (2.2% of total discharge, which is 9000 cusec) of raw water from the Main Branch Lower (MBL) will have no adverse impact on downstream irrigation or other activities. Subsequently, the water will be pumped to the 440 MLD Water Treatment Plant (WTP) located near Vallah village. Post-treatment at the WTP, the water will supplied to 88 Overhead Service Reservoirs (OHSRs) through a transmission pipelines of 112.7 km. This network will utilize pipes with diameters ranging from 100mm to 1728mm.

1.4 Need for Environmental and Social Impact Assessment (ESIA)

17. This Environmental and Social Impact Assessment (ESIA) study has been conducted to assess the environmental and social impacts due to the DBOT works under the project and provide for mitigation measures throughout pre-construction, construction, and the operational phases. The ESIA complies with requirements of the World Bank's Environmental and Social Framework (ESF) and Environmental and Social Standards (ESS).

[1]Source: Pre-Feasibility Report

1.5 ESIA Objectives

18. The primary objective of conducting an ESIA for the Amritsar Bulk Water Supply Scheme is to identify potential risks and impacts in accordance with the World Bank's ESF throughout the project lifecycle. The key objectives of the ESIA are:

- Assessing the existing environmental and social conditions, providing a comprehensive overview of the current status.
- Identifying environmental and social risks and impacts due to the project during its pre-construction, construction, and operational phases.
- Identifying the necessary clearances/ approvals required from relevant statutory authorities for the project.
- Preparing an ESMP and an RAP with mitigation measures to address the adverse risks and impacts; while suggesting measures to enhance positive outcomes duly indicating the roles and responsibilities of agencies in implementing these plans.

1.6 Approach and Methodology to this ESIA

19. The ESIA approach and methodology used for the conducting the ESIA and preparing the ESMP and RAP is given in **Figure 1-1**

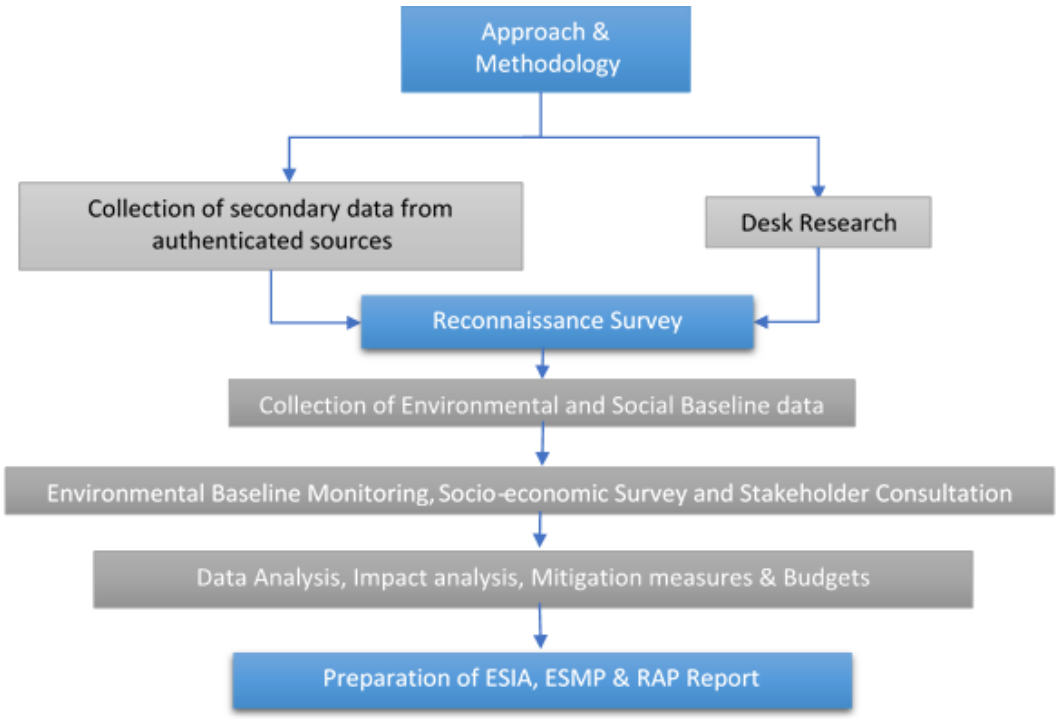


Figure 1-2: Approach and Methodology for Preparing ESIA

1.7 Scope of ESIA

20. The ESIA complies with regulatory frameworks of Government of Punjab (GoP), Government of India (GoI), and the World Bank's ESF. The ESIA scope is to:

- assess the existing baseline status of the environment within Project Influence Area
- assess demographic and socio-economic conditions
- identify potential adverse and positive E&S risks and impacts due to the project during its entire life cycle i.e., from preconstruction to construction to Operation & Maintenance (O&M);

- identify stakeholders and various groups/institutions who are either affected or have an interest or a stake in the project, with additional emphasis on disadvantaged and vulnerable groups and to carry out consultations with stakeholders to help elicit their concerns, suggestions and support;
- identity all Environmental Social Health and Safety (ESHS) issued due to the project and provide for mitigation in the ESMP and RAP
- identify capacity constraint of PMU/PIU in respect of E&S management and propose commensurate capacity enhancement measures
- budget estimate of the E&S management measures identified above.

21. The ESIA, report has been structured as hereunder:

Chapter 1: Introduction	Provides an overview of the project background, the necessity, objective and scope of the Environmental and Social Impact Assessment (ESIA)
Chapter 2: Study Area and Projec Description	Summarizes key project details and features
Chapter 3: Legislative, Regulatory & Policy Framework	Describes the environmental and social policies and regulations from the (GoI), (GoP), and the World Bank; required statutory clearances and various other applicable project policies.
Chapter 4: Baseline Environmental and Social Profile:	Gives details of baseline environmental and socio-economic profile of the project
Chapter 5: Assessment of Environmental Impacts	Lists likely impacts caused on various environmental parameters by activities proposed during pre-construction, construction and operation of the project for which suitable mitigation measures are suggested.
Chapter 6: Assessment of Social Impacts:	Lists likely social impacts and mitigation measures during project cycle.
Chapter 7: Stakeholders Assessment:	Describes the outcomes of stakeholder consultations conducted for the project, this section provides insights into the perspectives and concerns of various stakeholders.
Chapter 8: Environmental and Social Management and its Budget:	Provides Environmental and Social mitigation and management measures are and the budget.
Chapter 9: Stakeholder Consultations Strategy and Participation Framework:	Outlines the strategy for public participation, consultation, and information dissemination throughout the project.
Chapter 10: Grievance Redress Mechanism:	Describes the Grievance Redress Mechanism (GRM), for construction or operation-related complaints throughout project cycle.
Chapter 11: Institution and Implementation Arrangement:	Describes the key roles and responsibilities of Project Implementation Unit (PIU), Project Management Unit (PMU), and Design-Build-Operate-Transfer (DBOT) contractor

2 STUDY AREA AND PROJECT DESCRIPTION

2.1 Amritsar City and its Characteristics

22. Amritsar city is located in the northwest part of Punjab along the India- Pakistan border. Amritsar is home to Harmandir Sahib, popularly known as "The Golden Temple", one of Sikhism's most spiritually significant Gurudwara.

23. Amritsar district lies amidst River Beas (to the east) separating Amritsar from Kapurthala and River Ravi (to the west). The confluence of River Beas and Satluj occurs at Ferozepur.

24. Administratively, the district comes under Jalandhar division of Punjab state. The district is divided into six tehsils namely Amritsar - I, Amritsar - II, Ajnala, Majitha, Baba Bakala and Lopoke.

25. The district is sub divided into 9 community development blocks: Ajnala, Attari, Chogawan, Harsha Chhina, Verka, Majitha, Jandiala Guru, Tarsikka and Rayya.

26. The city has been divided into 85 wards. As per Census of India 2011, total population of the MCA area is 11,32,383 in which 6,01,008 (53.07%) are males and 5,31,375 (46.93%) are females. An average literacy rate of the study area is 84.19%. The literacy rate of male is 86.90% and of 81.16% female. An average house-hold size is 4.8 persons per family.

27. Amritsar, being a tourist and religious place and important from strategic point of view, is well connected with Rail, Road and Air network from major cities, towns of the state and India. Old Grant Trunk Road (G.T. Road or NH-1) formyl known as NH-44 connects Amritsar with Delhi through major cities like Jalandhar, Ludhiana, Ambala, Kurukshetra, Karnal and Panipat.

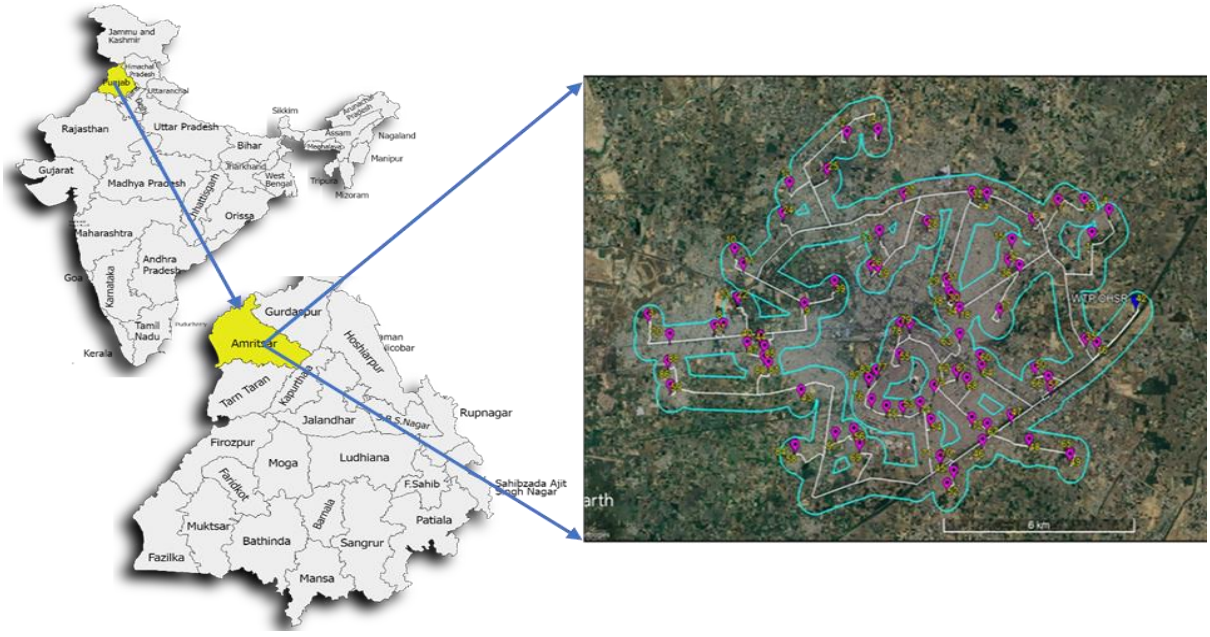


Figure 2-1: Location Map

28. Amritsar with its rich history of cultural heritage has immense potential to grow as a major tourist destination of the region. Golden Temple, Jallianwala Bagh, Attari Border, Tower of Baba Atal Rai, Akal Takhat, Durgiana Temple, Mosque at Fatehabad, Khalsa College & Guru Nanak Dev University, Tarn Taran, Ram Tirath etc. are the major religious and tourist places that attract people of not only from India but also all over the World.

2.2 Existing Water Supply and Sanitation System

29. Currently, the Municipal Corporation Amritsar (MCA) relies on groundwater for water supply in Amritsar city. According to the Punjab Water Regulation and Development Authority (PWRDA), Amritsar falls into the "over-exploited" category, due to excessive use of groundwater for irrigation, industry purpose, domestic use, and lack of proper groundwater recharge systems. Further, Amritsar water quality testing has been done by Department for Water Supply and Sanitation (DWSS) labs and found that the water is contaminated with Arsenic[2].

30. This over-use and contamination (Arsenic, nickel, mercury, aluminum) of groundwater threatens the city's water security and raises health concerns due to the poor quality of water. Surface water, on the other hand, is seen as a more sustainable alternative and can be replenished through the natural water cycle. Hence, Amritsar needs to shift contaminated groundwater sources to more sustainable surface water sources.

2.2.1 Water Source

31. Currently, Amritsar is utilizing 290 MLD (Million Litres per Day) of water through 800 deep tube wells. This reliance on groundwater extraction has led to a significant decline in the water table, ranging from 180 to 460 feet[3]. The extracted from the tube wells distributed to residents through an Overhead Service Reservoir (OHSR) network. All these tube wells are being operated three times a day and average running time of tube wells is 12 hours per day. The average discharge from the tube well is about 68.25 m3/ hour (i.e.15000 gallons/hour). As reported by corporation the average daily water extraction from the tube wells is about 290 MLD. But due to inequitable distribution and poor pipe network, average daily water consumption as per MCA is reported as 103 Million Litres only.

Table 2-1 Daily average water consumption

Particular	Detail
Exiting tub well	800
Depth of tube wells	500 to 600 ft
Water generated from Tub wells	290 MLD
Per day water supply to households	12 hr
Average water consumption as per MCA	103 MLD
Existing OHSR	37

Source: ESMF

2.2.2 Pumping System

32. The existing tubewells are connected with 20 to 30 HP submersible pumps. Water obtained from these tubewells sometimes pumped to the OHSRs & then fed to piped water supply distribution network while mostly direct pumping from tube wells to the distribution network is being done.

2.2.3 Service Reservoir

33. In the Amritsar[4], there are 37 existing OHSRs and total storage capacity of these OHSR is 28.66 million litres.

2 PMSIP ESMF Report, "https://pmidc.punjab.gov.in/projects/world-bank/"
3 PMSIP ESMF Report
4 PMSIP ESMF Report

2.2.4 Disinfection System

34. The city presently relies on water supply through tube well, where chlorination is implemented at certain locations and omitted at other location. This variation in chlorination practices underscores the inconsistency in water treatment across different areas of the city, prompting a need for standardized and comprehensive water treatment measures to ensure the delivery of safe and sanitized water to all residents.

2.2.5 Transmission System

35. There is almost 1411 km of existing water distribution network in the city[5].

2.2.6 Consumer Connections

36. Amritsar city has a total of 1.475 lakh domestic and commercial connections, with 12,500 of them are commercial which are having metered system. The majority of existing house connections lack meters, while some house connections have meters installed, but readings are not regularly recorded, leading to a lack of accurate billing for those particular connections. This highlights the need for improved metering infrastructure and billing practices to ensure fair and transparent accounting for water usage among residential and commercial consumers.[6].

2.3 Proposed Water Supply System

37. The Government of Punjab intends to change the drinking water supply source for Amritsar city from groundwater to canal-based surface water. Therefore, the Amritsar Municipal Corporation has identified Main Branch Lower (MBL) of UBDC as the surface water supply source to provide drinking water supplies to the residents of Amritsar city. Raw water diverted from the MBL will be treated in the Water Treatment Plant proposed under the project in Village Vallah. The treated water will comply with BIS Standards 10500 (2012). The treated water will be supplied directly to the proposed elevated service reservoirs through pumping.

38. This project involves construction of head regulator cum cross regulator for diverting water from the MBL. The water will be pumped to the planned 440 MLD Water Treatment Plant (WTP). Following treatment at the WTP, the water will be pumped to 88 planned OHSRs through a transmission network of 112.7 Km, with pipe diameters ranging from 100 mm to 1728 mm.

Table 2-2: Salient Features of sub-project Amritsar

Parameters	Details
Total Land Area for WTP	40 Acres
WTP Capacity	440 MLD
Total power requirement of pumping systems	6000 KW
Intake Source	Main Branch Lower (MBL) branch of Upper Bari Doab Canal (UBDC)
Cultivable Command Area	5.73 lakh hectare
Main Branch Lower Capacity	1350 cusecs
UBDC Capacity	9000 cusecs
Drawing capacity from MBL	200 cusecs
Length of Transmission Line	112.7 km
Number of OHSRs	88 out of which 51 are new, 13 are existing (constructed under AMRUT), & 24 to be reformed. In addition to this 17 OHSRs are under demolition.

5 Pre-feasibility report
6 Pre feasibility report

2.4 Water Source

39. Madhopur Headworks is a Barrage on Ravi River at Madhopur. The Upper Bari Doab Canal (UBDC) which takes off from Madhopur Barrage, has a cultivable command area of 5.73 lakh hectares. The UBDC presently has an authorized discharge of 9000 Cusec.

40. The Main Branch Lower (MBL) takes off from the UBDC near Aliwal village, precisely at Latitude 31°50'5.31"N and Longitude 75°6'38.56"E. MBL have water capacity of 1350 cusec.

41. Main Branch Lower (MBL) serves as the primary source of raw water for the Water Treatment Plant (WTP). WTP site is about 50m away from the MBL.

42. The irrigation department has provided No Objection Certificate (NOC) to abstract a continuous supply of 200 cusecs of raw water from MBL which is approximately 50m from WTP location (annexure 2.4).

Figure 2-2: Intake source

43. The head regulator cum cross-regulator is planned to be situated at RD 86000 of MBL. The irrigation department will be responsible for constructing the head regulator cum cross-regulator, off-take chamber, and laying underground DI (Ductile Iron) and MS (Mild Steel) pipes to WTP at the off take point. Drawing of head regulator cum cross-regulator is attached as **Annexure 2.1**.

2.5 Water Treatment Plant

Treatment process

44. The DBOT contract includes provisions for setting up a water testing laboratory after the commissioning of the WTP plant. All equipment will be purchased by the DBOT contractor under this DBOT contract.

45. The Water Treatment Plant (WTP) covering the area of 40 acres is under construction in Village Vallah. The design of the WTP considers not only the current usage levels but also account for projected population up to the year 2055. The plant will have a conventional treatment system, incorporating processes such as aeration, coagulation, flocculation, sedimentation, rapid gravity filtration, and chlorination for disinfection. Additionally, the plant's operations will be facilitated by PLC controls, for plant operation connected to SCADA system. Pumping systems using a total of 6000kw of electric power are proposed for pumping of raw water and treated water. The untreated raw water will be pumped from MBL to WTP. Subsequently, after treatment the water will be pumped to OHSRs. Layout of water treatment plant and schematic of treatment process is attached as **Annexure-2.2.**

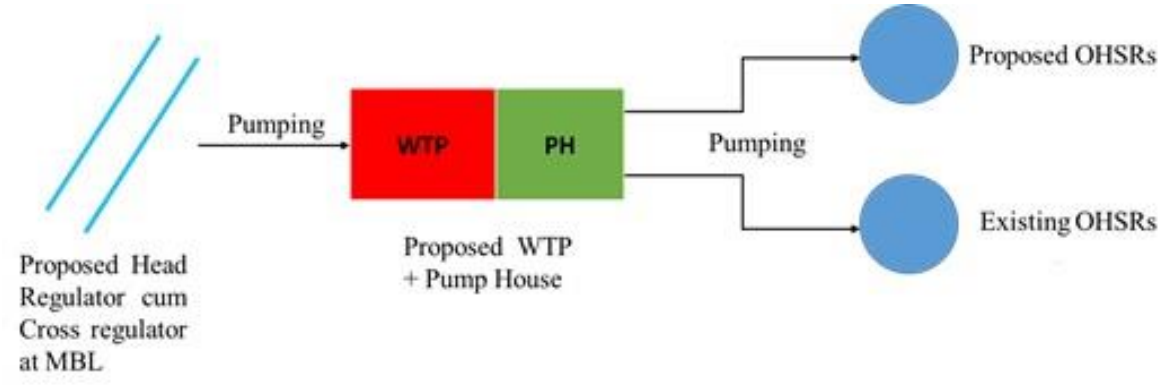


Figure 2-3: Single Line Diagram of Amritsar Bulk Water Supply Scheme

2.5.1 Disinfection System

46. Raw water extracted from MBL will be initially stored in a raw water storage cum pre-settling tank, ensuring a minimum retention period before its conveyance to the cascade aerator. The primary function of the cascade aerator is to remove/ reduce dissolved gases (such as carbon dioxide) and oxidizes dissolved metals such as iron, hydrogen sulfide, and Volatile Organic Chemicals (VOCs), if present, in the raw water. After that water will be let into inlet chamber and Pre-chlorination is envisaged in inlet chamber by injecting chlorine through bottom mounted diffusers to reduce the ammonia content and microbiological growth in raw water. Chlorine storage room will be constructed for providing pre-& post chlorination. Total 12 numbers of chlorinators have been considered that shall cater to pre and post chlorination activity.
47.

2.5.2 Clear Water Pumping System and Water Distribution Pumping Station

48. Pumping systems using 6000kw of electric power are proposed for raw water and treated water pumping with full electronic controls to enable remote operations. Water is pumped to various overhead service reservoirs of their respective zones.

Table 2-3: Water Supply Capacity

Description	Capacity /Area	Unit
Raw water Storage cum pre-settling tank	916,000	Cum
Raw water collection tank	8,100	Cum
Raw water pumping station	650	Sqm
WTP capacity	440	MLD
Treated water collection tank	18,333	Cum
Treated water pumping station North	520	Sqm
Treated water pumping station South	520	Sqm

Source: PMIDC

2.5.3 Overhead Service Reservoir (OHSR)

49. The water supply proposal under the PMSIP divides the city into North and South zones, with the railway line acting as the dividing boundary between the two zone. The details of OHSRs falling in North and south zones are provided in **Annexure 2.3**.
50. The water distribution network involves total 88 OHSRs out of which 42 OHSRs are in the North Zone and 46 OHSRs in South Zone. Among these OHSRs, 51 are as new construction, 13 are existing and 24 are under Rehabilitation. Also, 17 no. of OHSRs have been identified for demolition.

51. OHSRs capacity ranging from 1 ML to 4 ML. The staging height for these reservoirs will vary between 20 meters to 35 meters.

Table 2-4: OHSRs Details

OHSRs Details	Capacity (ML)	Nos.	Capacity (ML)
NORTH ZONE			
AMRUT	0.455	7	3.185
Sub-total 1		**7**	**3.185**
South East (SE) Scheme	0.455	0	0
Sub-total 2		**0**	**0**
Existing (Rehabilitation)	0.227	0	0
	0.455	6	2.73
	0.909	7	6.363
Sub-total 3		**13**	**9.093**
Proposed	1	3	3
	1.5	4	6
	2	15	30
Sub-total 4		**22**	**39**
Total		**42**	**51.278**
SOUTH ZONE			
AMRUT	0.455	6	0.91
Sub-total 1		**6**	**0.91**
Existing Rehabilitation	0.227	1	0.227
	0.455	8	3.64
	0.909	2	1.818
Sub-total 2		**11**	**5.685**
Proposed	1	7	7
	1.5	5	7.5
	2	17	34
Sub-total 3		**29**	**48.5**
Total		**46**	**56.915**
Grand Total (North and South Zone)	**-**	**88**	**108.193**

Source: Data availed from PIU, Amritsar

2.5.4 Transmission System

52. The laying of the transmission line involves the use of pipes with diameters ranging from 100 mm to 1728 mm. The predominant material used for the pipelines in the design is ductile iron (DI). The Right of Way (ROW) for the transmission line, accommodating both Ductile Iron (DI) and Mild Steel (MS) pipes, traverses through various areas including MCA, Forest land, Public Works Department, National Highway Authority of India, Railway, Amritsar Development Authority (ADA), Amritsar Improvement Trust and Cantonment Board.

53. During the laying of the transmission line, day-to-day temporary restoration will be undertaken, which will depend on the diameter of the pipe. Full restoration activities will be completed once a particular stretch of the transmission line is tested and approved by client. Compaction of the earth is diligently executed by baby roller or plate compactor. The Reclaimed Asphalt Pavement (RAP), will be used for roads under the sub-project or for roads in the City; this will be collected, stored and recycled and reused in various ways, contributing to sustainable road construction practices, such as Hot Mix Asphalt (HMA) production, Cold Mix Asphalt, Base or Subbase material, Stabilization, Aggregate for other uses, Clarified Bitumen for other uses, Soil Stabilization and other alternative uses.

Table 2-5: Transmission Line Details

Diameter (dia) in mm	Length (m)	Depth of Excavation (m)	Width of Excavation (m)	RoW (m)	Days for Restoration
100	6598	1.2	0.5	2	Day to day temporary restoration will be done depend upon the diameter of pipe. Fully restoration will be done once a particular stretch is completed, tested and approved by client.
150	12065	1.25	0.5		
200	16238	1.3	0.5		
250	10792	1.35	0.5		
300	10669	1.4	0.5		
350	10360	1.45	0.6		
400	5732	1.5	0.6		
450	7211	1.55	0.75	2.5	
500	5514	1.6	0.75		
600	5637	1.65	0.75		
700	4167	1.7	1.2	4	
750	4608	1.75	1.2		
800	1124	1.8	1.2		
900	2455	1.85	1.5		
1016	2565	2.3	2	5	
1118	1245	2.3	2		
1320	1755	2.5	2.3		
1422	517	2.7	2.5		
1524	53	2.9	2.5		
1678	2906	3	2.7	6	
1728	6730	3.2	2.8		

Source: *Data availed from PIU, Amritsar*

54. The transmission line system is crossing the canal, drain and railways at several locations details of the same is provided as **Annexure-2.5**.

2.5.5 SCADA (Supervisory Control and Data Acquisition)

55. The SCADA system is proposed for effective monitoring and control of water supply in the city. The water leakage will be checked through DMAs and SCADA monitoring, flow & pressure information will be measured and transferred through GPRS/GSM wireless technology. The SCADA system collects real-time data from sensors to provide an overview of the entire water distribution network.

2.5.6 Land requirement

56. The land required for the construction of WTP is approximately 40 acres that has been purchased through negotiated settlement with 49 landowners. The compensation for all PAPs has been paid for the land, but one dairy farm structure near WTP site is yet to be removed because compensation for the structure is pending. The PIU is in the process of paying the compensation to the aforementioned PAP.

57. The Head regulator cum cross regulator will be constructed on WRD land and OHSRs and Transmission line will be constructed, on Government land only, Hence, no land acquisition is involved. Copy of Land purchase advertisement, land details and rates of negotiations and copy of gazette notification is given in **Annexure 2.6, 2.7 and 2.8**.

58. The sale deeds of the land was done from May 2020 to July 2020 and the compensation paid to the landowners have been agreed by both the parties i.e. buyers and sellers under the direct purchase policy of state government (Gazette Notification No 24/109/2015-LR 1/9877 of August 2016).

59. The details of the land requirements, compensation based on negotiated rates as per the state policy (Gazette Notification No 24/109/2015-LR 1/9877 of August 2016) with landowners is given in Table 2.5. Notably, the negotiated amount for land was based on Collectors rate as per Section 26 of RFCTLARR Act 2013. The amount paid to the land owners surpasses the evaluation as per the legal provisions. The total amount disbursed to landowners, stands at Rs. 36.40 Crore for 40 acres of land.

Table 2.5: Rates comparison as per the RFCTLARR Act 2013 and negotiated rate

S. No.	Particulars	Compensation as per RFCTLAR Act 2013	Compensation as per Negotiated Rate
		Area/Amount	Area/Amount
1	Total Land required for WTP at Vallah village in Amritsar	40 Acres	40 Acres
2	Collector Rate as per Section 26 (1-a) of RFCTLARR Act 2013 (here in after to be called as the Act.	Rs. 4,50,686/-per Kanal	Rs. 4,50,686/-per Kanal
		Rs. 36,05,488/-per Acre	Rs. 36,05,488/-per Acre
3	Rate adopted per Acre after negotiation as per Punjab Government Policy No. 24/109/2015-LR 1/9877 dated 18.05.2016	-	Rs. 45,50,000/-per Acre
4	Multiplication Factors as per the Act and Punjab Government Notification No. 24/84/13-LR. 1/16196 dated 30.10.2014	1	1
5	Solatium @100% as per Section 30(1) of the Act and as per Punjab Government policy No. 24/109/2015-LR 1/9877 dated 18.05.2016	Rs. 36,05,488/-per Acre	Rs. 45,50,000/-per Acre
6	Total amount per Acre as per Schedule-II of the Act	Rs. 72,10,976/-per Acre	-
	Final Rate negotiated with land owners (per Acre)	-	Rs. 91,00,000/-per Acre
7	**Final Rate negotiated with land owners (per Acre)**	**-**	**Rs. 91,00,000/-per Acre**
8	Cost of 40 Acres of Land	**Rs. 28,84,39,040/**	**Rs. 36,40,00,000/**
9	**Amount paid by Municipal Corporation Amritsar for procurement of 40 Acres of land as per negotiation**	**-**	**Rs. 36,40,00,000/**

2.5.7 Utility Requirement

Water Requirement for construction

60. Total water requirement for the construction is 396 Million Litres (ML), out of which 121 ML will be required for WTP, 138 ML for OHSRs and 137 ML for transmission line. The required domestic water will be sourced from the bore wells and required construction water will be sourced from MBL. Detail of required water is attached as **Annexure 2.9.** WRD has allowed use of water from the canal. The same is as per Annexure 2.4.

Construction material requirement

Detail of construction material required for laying of transmission line are given below:

Table 2.6: Construction material details

S. No.	Description	Unit of Measurement	Quantity
1	DI Pipes	KM	80.64
2	MS Pipes	KM	32.05
3	Concrete	Cum	122,856
4	Sand	Cum	62,036
5	Aggregates	Cum	98,220
6	Reinforcement	MT	10,948
7	Cement	MT	44,228

Source: *DBOT contractor, L&T*

2.6 Study of Alternatives

61. The analysis of alternatives for the project site has been done by the Municipal Corporation of Amritsar. Various components like site location, Infrastructure, Water Source, Pumping Station and Transmission Line route and construction technologies have been compared for the finalization of the project. Various treatment Technologies were evaluated while conceptualizing the project. The alternative of the project "with and without project" condition has been evaluated. Detail of the alternate study is attached as **Annexure-2.10.**

2.6.1 Demand Projection

62. The population of Amritsar city is expected to reach 14.51 Lakhs by the year 2025 and 22.11 Lakhs by the year 2055. The treated water requirement of the city for the year 2025 is about 289 MLD and this demand will be increase to 431 MLD by 2055. The water supply to the city is from ground water source. Detail of the same already described in chapter 1 section 1.2.

2.6.2 Source Studies

63. PMIDC has identified three options for water sourcing that are Spring Fed System, Existing Groundwater Abstraction and Abstraction of Water from Canal. Option-3 of abstracting water from the canal and improving water treatment systems appears to be the most viable choice, as it addresses the issues of groundwater over-extraction, poor quality of ground water, poor service quality, and sustainability while also offering potential environmental benefits.

2.6.3 Water Treatment Plant

64. During the feasibility study, several options were explored for the construction of the Water Treatment Plant (WTP). Initially, four options were considered:

- **Option 1** – WTP at 40 *Khu* with off take at Tarowali Head Regulator.
- **Option 2** – WTP at 40 *Khu* with off take at near Vallah bypass over bridge.
- **Option 3** – 40 *Khu* & near Chhatiwind Regulator with off take at one near Vallah bypass over bridge & other at Chhatiwind Head Regulator.
- **Option 4** – Near Tarowali Regulator on irrigation land with off take at Tarowali Head Regulator.

65. These identified sites were not suitable due to a narrow strip of land. Subsequently, MCA team, in collaboration with Revenue Department officials, identified additional locations. Two options were presented.

- City side of canal (RHS side) Option-1
- Land on other side of canal (LHS side) Option-2

After a joint visit of PMIDC and PIU, the site located on the city side of the canal (Option-1) was finalized.

2.6.4 Clear Water Transmission System

66. Two alternatives for the transmission line system has been identified:

- **Option-1**, Zonal Reservoirs
- **Option-2**, Direct Pumping to Service Reservoirs

67. Option-2, which involves direct pumping to the service reservoirs, was preferred. This option was made to streamline the process and enhance efficiency for supply water to the service reservoirs. While no alternative transmission line routes were identified, the final decision on the transmission line route consider various technical, social, and environmental factors which includes:

- Existing road
- Presence of railway crossings
- Presence of canal crossings
- Presence of greenery, trees and vegetated patches.
- Technical feasibility.

3 LEGISLATIVE, REGULATORY & POLICY FRAMEWORK

3.1 Introduction

68. This chapter provides a review of legal and regulatory framework concerning environmental and social aspects, and their applicability to the project. The Government of India has several policy guidelines, acts, and regulations pertaining to environmental and social aspects. Additionally, the chapter incorporates the the World Bank's ESF and ESS.

3.2 Applicable Policy, Rules & Regulations to project interventions/activities: Environmental

3.2.1 EIA notification

69. As per the Environmental Impact Assessment (EIA) Notification of 2006 issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC), all projects listed in Schedule 1 of the Notification necessitate prior environmental clearance. The proposed Bulk Water Supply Scheme in Amritsar, which involves the construction of Water Treatment Plants (WTP), laying of transmission lines, and construction of Overhead Service Reservoirs (OHSRs), does not fall under the purview of the EIA Notification 2006. Hence do not require Environmental Clearance **However, since the project is being financed by the World Bank, it requires the preparation of an ESIA to be conducted in accordance with the World Bank's Environment and Social Framework (ESF) of 2018**.

3.2.2 Legal Framework of Government of India for Environmental Compliance

70. Ministry of Environment, Forests, and Climate Change (MoEF&CC) functions as the primary agency responsible for nationwide planning, promotion, formulation of environmental laws, and their enforcement. The comprehensive legal framework for environmental protection is established by the Environment (Protection) Act, 1986.

3.2.3 Key Environmental Laws and other related Regulations

71. The table below outlines the essential environmental laws and regulations pertinent to the project.

Table 3-1: Applicable Environmental laws Regulations

S. No	Act / Law	Description	Applicability to Project	Regulating Authority	Phase
1	National Environmental Policy (NEP) 2006	This policy advocates collaboration method of d**ifferent stakeholders to harness potential resources and strengthen** environmental management.	APPLICABLE Project shall adhere to the NEP principle, for conservation of environmental resources and abatement of pollution	MoEF&CC	Construction and Operation phases
2	Environment Protection Act, 1986 and its subsequent amendments	The Environment (Protection) Act is an umbrella legislation seeking to supplement the existing laws on the control of pollution (the Water Act and the Air Act) by enacting a general legislation for environment protection and to fill the gaps in regulation of major environmental hazards.	APPLICABLE The setup of a Ready Mix Concrete (RMC) Plant requires CTE from the SPCB. Furthermore, prior to initiating operations, it is essential to obtain Consent to Operate (CTO) under the pertinent Air and Water Acts.	PPCB	Construction and Operation phases

S. No	Act / Law	Description	Applicability to Project	Regulating Authority	Phase
3	Environmental Impact Assessment (EIA) Notification, 2006 and its subsequent amendment.	The EIA Notification set out the requirement for environmental assessment in India. The Schedule I of the notification defines threshold of activities which require to undertake an environmental assessment and obtain an environmental clearance from statutory bodies.	NOT APPLICABLE The Projects activities are not covered under the ambit of EIA Notification, 2006 dated 14.09.2006 and its amendment.	MoEF&CC/ State Environment Impact Assessment Authority (SEIAA)	-
4	Indian Forest Act 2002 Forests (Conservation) Act, 1980 and its subsequent amendment 2023	Objectives of this Act are to enhancement of conservation of natural resources and ensuring ecosystem stability through conservation of forest biodiversity, water catchments and soil fertility.	APPLICABLE The transmission line passes through the Right of Way (RoW) of roads such as National Highways (NH), State Highways (SH), Major District Roads (MDR), Canals, and Railway tracks, which are designated as protected forest areas	Forest Department	Construction phases
5	The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 & its subsequent amendment	The act vests forest rights and occupation in forest land to forest dwellers, including Scheduled Tribes and traditional forest dwellers.	NOT APPLICABLE Based on the reconnaissance survey and available data, there are no Scheduled Tribes or traditional forest dwellers in the project area	Ministry of Tribal Affairs. Tribal Welfare Department/ MoEF&CC	-
6	Wildlife Protection Act, 1972 and its amendment	The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental there to.	NOT APPLICABLE The project is not passing through Wildlife and Eco sensitive areas.	Chief Conservator Wildlife, NBWL/State Forest Department and MoEF&CC	-
7	Ancient Monuments and Archaeological Sites and Remains Acts, 1958, its Rules, Ancient Monuments and Archeological Sites and Remains (Amendment & Validation) Act 2010 and its amendment	Conservation of cultural and historical remains in India	APPLICABLE The Ram Bagh Gate (0.42 [W49-E1]) and the Summer Palace of Maharaja Ranjit Singh (0.66 [W49-E1]) have been recognized as cultural heritage sites. These locations are situated more than 300 meters away from the project site, thus indicating no impact. However, the acts related to chance finds are applicable	National Monument Authority	Construction and Operation phases

S. No	Act / Law	Description	Applicability to Project	Regulating Authority	Phase
8	Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and its amendment	This rule obligates hazardous waste generators, transporter and recycler of the hazardous waste for safe handling practices and its management.	APPLICABLE During both the construction and operation phases, the proposed project will produce waste oil from diesel generators. Additionally, chlorine will be used during the operational phase	PPCB/CPCB	Construction and Operation phases
9	The Air (Prevention and Control of Pollution) Act, 1981 and its amendments	This act provides the prevention and control of air pollution and all other related matters. The act through CPCB sets the standard limits for projects and takes care of the prescribed limits of emissions.	APPLICABLE The setup of a RMC Plant requires CTE from the SPCB. Furthermore, prior to initiating operations, it is essential to obtain Consent to Operate (CTO) under the pertinent Air and Water Acts.	PPCB	Pre-Construction for CTE Pre-Operation for CTO
10	The Water (Prevention and Control of Pollution) Act, 1974 and its amendments	This act provides the prevention and control of water pollution and maintaining or restoring water quality for any project.	APPLICABLE The setup of a RMC Plant requires CTE from the SPCB. Furthermore, prior to initiating operations, it is essential to obtain Consent to Operate (CTO) under the pertinent Air and Water Acts.	PPCB	Pre-Construction for CTE Pre-Operation for CTO
11	The Noise Pollution (Regulation and Control) Rules, 2000 and the Noise Pollution (Regulation and Control) Amendment) Rules, 2010	As per the Rules 3 and 4 of the Noise (Regulation & Control) Rules, 2000 as amended in October 2002, noise generation due to the project, in the project area should not exceed the standards specified in the Schedule.	APPLICABLE Noise generation is anticipated during both the construction and operation phases of the project. It is essential to ensure the noise levels due to the project do not exceed ambient noise level standards by implementing appropriate measures	CPCB/PPCB	Construction and Operation phases
12	Solid Waste Management Rules, 2016	As per the rule, waste generated need to be segregated into three separate streams namely bio-degradable, non-biodegradable and domestic inert waste and disposed off at designated sites for processing. The hazardous wastes should be stored in suitable bins and handed over to authorized vendors.	APPLICABLE The generation of solid waste from construction and operation activities of the project falls under the provisions of the relevant regulations	SPCB, Urban Local Bodies (ULBs)	Construction and Operation phases

S. No	Act / Law	Description	Applicability to Project	Regulating Authority	Phase
13	Construction and Demolition Rules, 2016	These Rules prescribe the methods to manage construction waste resulting from construction, and demolition waste. Rules define C&D waste as waste comprising of building materials, debris resulting from construction, re-modelling, repair and demolition of any civil structure.	APPLICABLE Waste generated during the laying of transmission lines, construction of WTP, and OHSR, as well as during the upgrading or demolition of OHSRs, must be appropriately reused, recycled and disposed of in accordance with the Construction and Demolition (C&D) Rules of 2016.	CPCB, PPCB, Urban Local bodies (ULBs).	Construction phases
14	Batteries Waste Management Rules, 2022	As per the rule, Consumers must responsibly deposit used batteries with dealers, manufacturers, importers, assemblers, registered recyclers, or at designated collection centers, avoiding any other disposal methods.	APPLICABLE Rules will be applicable during construction and operation phases, as the project will use batteries for machinery and other purposes.	CPCB, PPCB, Urban Local bodies (ULBs).	Construction and Operation phases
15	Plastic Waste Management Rules, 2022 and its amendment	These rules cover various aspects of plastic waste management, including collection, segregation, processing, recycling, and disposal. Waste generators are obligated to minimize plastic waste, segregate waste at the source, refrain from littering, and pay user fees for plastic waste management.	APPLICABLE Rules will be applicable during construction and operation phases for packaging material and use of plastic etc.	CPCB, PPCB, Urban Local bodies (ULBs).	Construction and Operation phases
16	E-Waste (Management) Rules, 2022	Bulk consumers of electrical and electronic equipment will ensure that e-waste generated shall be channelized through collection centers or dealers of authorized producers or dismantlers or recyclers or through the designated (take back) service providers of the producers to authorized dismantlers and/or recyclers.	APPLICABLE The e-waste generated from the project during construction and operation phase has to comply with the provisions of the rules and disposed through the prescribed channels only.	CPCB, PPCB, Urban Local bodies (ULBs).	Construction and Operation phase
17	Electricity Act, 2003 and its subsequent amendments 2022	Relevant sections of the Act pertaining to sub-stations, electrical equipment, motors, etc. to prescribe safety measures and standards, accident reporting, and investigation.	APPLICABLE The Section of Electricity Act is applicable on health and safety of the personnel involved and the community.	Contractor, Punjab State Power Corporation Limited (PSPCL).	Construction phases

S. No	Act / Law	Description	Applicability to Project	Regulating Authority	Phase
18	Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and as amended	These rules are aimed at ensuring the safe handling, storage, and importation of hazardous chemicals. The rules are designed to prevent and mitigate the risks associated with the manufacturing, storage, and import of such substances.	APPLICABLE Rules will be applicable during construction and operation phases, if any chemicals such paints, oils and grease, Chlorine etc. are stored at site and abide with the criteria laid down in the Rules.	PPCB	Construction and Operation phases
International Conventions and Treaties					
19	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	This international convention, to which India is a signatory category, lists the endangered flora and fauna and regulates trade of these species	NOT APPLICABLE During the field survey, no observations of endangered species were noted.	MoEF& CC	-
20	Ramsar Convention, 1971	The Ramsar Convention is an international treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.	NOT APPLICABLE There are no Ramsar sites in the project area	MoEF& CC	-
21	Convention on Migratory Species of Wild Animals (CMS), 1979 (Bonn convention)	CMS, which recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions and aims to conserve terrestrial, marine and avian migratory species throughout their ranges.	NOT APPLICABLE As no migratory species of wild animals are reported in the project areas	MoEF&CC	-
22	Montreal Protocol 1992	India is a signatory of this convention which aims to reduction in the consumption and production of ozone depleting substances (ODS), while recognizing differences in a nation's responsibilities.	NOT APPLICABLE As no ODS are involved in construction works	MoEF&CC	-
23	Basel Convention on Trans-boundary Movement of Hazardous Wastes, 1989	This convention came into force on 22 September 1992 which aims to reduce the amount of waste produced by signatories and regulates the international traffic in hazardous wastes.	NOT APPLICABLE As the project activities will not involve any trans boundary movement of hazardous wastes.	MoEF&CC	-

S. No	Act / Law	Description	Applicability to Project	Regulating Authority	Phase
24	International Union for Conservation of Nature (IUCN)	The international organization committed to the conservation and sustainable use of biodiversity. Its pivotal role in developing and influencing global environmental policies. Along with this, the organization maintains the IUCN Red List of Threatened Species, a comprehensive database assessing the extinction risk of thousands of species worldwide.	NOT APPLICABLE There is no threatened species as per IUCN Red List in the project area.	MoEF&CC and concerned forest department/ Wildlife	-
25	United Nations Educational, Scientific and Cultural Organization (UNESCO)	The specialized agency of the United Nations aimed at promoting world peace and security through international cooperation in education, the sciences, and culture. UNESCO is known for its World Heritage program, which identifies and protects cultural and natural sites of outstanding universal value.	NOT APPLICABLE As per World Heritage List, no sites have been identified.	Punjab Heritage & Tourism Promotion Board (PHTPB)	-

3.3 Applicable Policy, Rules & Regulation to project interventions / activities: Social

72. This section encompasses an overview of national policies and acts, as detailed below.

3.3.1 National Policies and Acts

73. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCTLARR, 2013): This Act repeals the Land Acquisition Act, 1894 and is applicable to all states in India. RFCTLARR, 2013 is a first National law that addresses land acquisition, and rehabilitation and resettlement. This Act provides enhanced compensation and resettlement & rehabilitation assistance as compared to earlier LA Act of 1894 and resettlement & rehabilitation assistance. However, this act is not applicable for the PMSIP Sub-project Amritsar as land required for the project has been purchased through negotiated settlement vide under Gazette Notification No 24/109/2015-LR 1/9877 of August 2016 of the Government of Punjab.

3.3.2 Other legislations in the social domain applicable to construction projects

74. The details of the laws and rules which will be applicable for the land, remuneration, safety, health and working condition of the labour is given in Table 3.2 below.

Table 3-2: Applicable Social laws Regulations

S. No	Act / Law	Description / Purpose	Applicability to Project	Authority
2	The Provision of the Panchayats (Extension to the	The Gram Sabha or the Panchayats at the appropriate level shall be consulted before making the acquisition of land in the Scheduled Areas for development projects	**NOT APPLICABLE** The Act is not relevant for this project as the site does	Deputy Commissioner Amritsar

S. No	Act / Law	Description / Purpose	Applicability to Project	Authority
	Scheduled Areas) Act, 1996	and before re-settling or rehabilitating persons affected by such projects in the Scheduled Areas. In areas classified under Schedule V, Panchayats are granted special powers over enforcing prohibition, regulating the sale of intoxicants, ownership of minor forest produce, prevention of land alienation in Scheduled Areas, and restoration of unlawfully alienated land to Scheduled Tribes.	not fall in Schedule V area or any notified Tribal Zone.	
3	The Indian Factories Act, 1948 and State Rules	This act is enacted for the welfare of workers.	**APPLICABLE** Comply with all requirements of Factories Rules and participate in periodic inspection.	Labour Department, Punjab.
4	The Bonded Labour System (Abolition) Act 1976	The Bonded Labour System (Abolition) Act, 1976, plays a crucial role in addressing issues related to bonded labor and promoting social justice. Its implementation involves the concerted efforts of government agencies, non-governmental organizations, and other stakeholders to ensure the effective abolition of bonded labour and the rehabilitation of those affected.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
5	The Code on Wages 2019	The Code focuses on simplifying the existing Labour laws dealing with payment of wages, overtime, bonus, minimum wages etc. by bringing uniformity in the definition of terms and reducing the burden of filing returns and maintaining the registers under different acts.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
6	The Code on Social Security, 2020	The Code amalgamates and replaces nine existing social security laws, bringing them under a single umbrella. This includes laws related to provident funds, employment injury benefits, health and maternity benefits, social security for workers, and other related provisions.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
7	The Workmen's Compensation Act, 1923	It provides for payment of compensation by employers to their employees for injury by accident i.e., personal injury or occupational disease.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
8	Payment of Wages Act, 1936 Minimum Wages Act, 1948	Lays down as to by what date, what wages are to be paid, when it will be paid and what deductions be made from the wages of the workers, if any..	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
9	Equal Remuneration Act, 1979	Provides for payment of equal wages for work of equal nature to male and female workers and not for making discrimination against female employees in the matters of transfers, training and promotions etc.	**APPLICABLE** Equal wages to male and female during construction and operation of the project	Department of Labour & Employment.

S. No	Act / Law	Description / Purpose	Applicability to Project	Authority
10	The Contract Labour (Regulation & Abolition) Act, 1970 and Rules	The contractors are also required to provide at minimum amenities like canteen, urinals, restrooms or alternate accommodation (if night halting labour), first aid, safe drinking water, etc.	**APPLICABLE** PIU (MCA) shall ensure compliance of the Act requirement as per agreement with DBOT Contractor.	Department of Labour & Employment.
11	The Child Labour (Prohibition and Regulation) Act, 1986	The Act prohibits employment of children in certain occupation and processes. The Act also specifies conditions of work for children, if permitted to work. There should not be any child labour (less than 14 years) in any project activity and adolescents (above 14 and less than 18 years) in any hazardous activity.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Social Security and Women & Child Development
12	The Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996	This Act provides for safety, health and welfare measures of buildings and construction workers in every establishment which employs or employed during the preceding year ten or more such workers. These measures include fixing hours for normal working day, weekly paid rest day, wages for overtime, provision of basic welfare amenities like drinking water, latrines, urinals, crèches, first aid, canteens and temporary living quarters within or near the work site.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
13	Public Liability and Insurance Act, 1991	The main objective of the Public Liability Insurance Act 1991 is to provide for damages to victims of an accident which occurs as a result of handling any hazardous substance. The Act applies to all owners associated with the production or handling of any hazardous chemicals.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Deputy Commissioner Amritsar
14	Maternity benefit Act 1961	The Maternity Benefit Act is aimed at safeguarding the health and well-being of women employees during pregnancy and providing them with adequate benefits during the maternity period. It contributes to the promotion of gender equality and women's rights in the workforce.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour & Employment.
15	The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013	This act aims to prevent and prohibit sexual harassment of women at workplace.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Social Security and Women & Child Development

3.4 Applicable Policy, Rules & Regulation at State level

75. Legislation and state-level regulations have been established to safeguards for environmental and social aspects, as outlined in Table 3.3.

Table 3-3: Applicable State laws Regulations

S. No	Act / Law	Description / Purpose	Applicability to Project	Authority
1	Punjab Ancient and Historical Monuments and Archaeological Sites and Remains Act, 1964.	A legislative enactment in the Indian state of Punjab aimed at the preservation, protection, and conservation of ancient and historical monuments, archaeological sites, and remains within the state.	**APPLICABLE** The Ram Bagh Gate (0.42 [W49-E1]) and the Summer Palace of Maharaja Ranjit Singh (0.66 [W49-E1]) have been recognized as cultural heritage sites. These locations are situated more than 300 meters away from the project site, thus indicating no impact. However, the acts related to chance finds are applicable	Director of Archaeology, Chandigarh
2	Punjab Panchayati Raj Act, 1994	The act gives powers to the Panchayats to resolve any grievances of the local people. There is Provision for application of consent from the respective panchayat body/village administrative officer etc.	**APPLICABLE** PMU should ensure that all grievances raised by locals related to the project, including access to agricultural fields are addressed through Grievance Redressal Mechanism.	Village Panchayat
3	Punjab Govt. Notification, Revenue Department (Forests) dated 3rd May, 1985 under Indian Forest act 1927	This notification detailed out for the management of the roadside strips, the land on either side of the canal, and the land along the railway track under forest department	**APPLICABLE** Project transmission line crosses canal, railway, and road strips which comes under the forest management.	State Forest Department
4	Punjab Water Resources Regulation and Management Act, 2020 Punjab Ground Water (Regulation and Control of Development and Management) Act, 2009	To regulate the water resources of the state for ensuring its judicious, equitable and sustainable utilization and management.	**APPLICABLE** Applicable during construction and operation phase for sustainable use of water. Borewells Drilled might be used for drinking water purposes at construction sites/labor camps. but Permissions yet to be obtained. However, the water for construction purposes shall be used from MBL.	Punjab Water Regulation & Development Authority
5	Gazette Notification No 24/109/2015-LR 1/9877, 18th August	The notification provides for departments/ government undertaking to purchase land directly from land owners through negotiation and submit their proposal to	**APPLICABLE** 40 acres of the land purchased from 49 landowners through negotiated settlement.	Deputy Commissioner, Amritsar

S. No	Act / Law	Description / Purpose	Applicability to Project	Authority
		deputy commissioner - consistent with the 2013 Act.		
6.	The Indian Forest (Punjab Amendment) Act, 1962	This Act consolidate and amend the laws relating to forests, transit of forest produce, sale of timber, firewood, protection and conservation of land and natural resources, duty levied on timber and other forest produce, joint forest management and participation of stakeholders, management of public, communal and private forests, environmental and biodiversity concerns, wildlife and ecosystem management.	**APPLICABLE** The project will include cutting of trees for construction of project components.. Project also attract the forest clearance.	State Forest Department
7.	Punjab public works department code	Public Works Department (Buildings and Roads) is a premier agency of the State Government for construction, up gradation and maintenance of roads, buildings and bridges in the State.	**APPLICABLE** The project activity will include construction of WTP, OHSRs and laying of transmission lines duly adhering to the PPWD code.	Public Works Department
8.	Punjab Irrigation Act 1935 and Punjab irrigation and drainage Act 2023	This Act has a provision for management and control of irrigation, drainage and rivers in the Punjab. It is necessary to provide for better and sustainable irrigation, drainage, and control and management of rivers, streams, lakes, ground water and navigation in the Punjab	**APPLICABLE** The source of water is MBL, a distributary of the UBDC Canal.	Punjab irrigation Department
9.	Punjab Building and Other Construction Workers (Regulation of Employment and Conditions of Services) (Amendment) Rules, 2023	This Act provides for safety, health and welfare measures of buildings and construction workers in every establishment which employs or employed during the preceding year ten or more such workers. These measures include fixing hours for normal working day, weekly paid rest day, wages for overtime, provision of basic welfare amenities like drinking water, latrines, urinals, crèches, first aid, canteens and temporary living quarters within or near the work site.	**APPLICABLE** PIU (MCA) shall ensure compliance, as per the applicability.	Department of Labour, Punjab.

3.5 World Bank ESF and Applicable Environmental and Social Standards

76. Section below (Table 3.4) present the relevance of WB's ESF Policy, 2016 along with each of the ten standards (ESS1 to 10), WBG's EHSG's IFC, 2007 to the project and requirements relating to other guidance notes of World Bank.

Table 3-4: World Bank ESF Policy, 2016 and World Bank Groups' EHSGs, IFC, 2007

S. No	World Bank ESS Policy & Standards	Description	Relevance to the sub- project	Requirement	Relevant phase
1	ESS-1 Assessment and Management of Environmental and Social Risks and Impacts	Identify, assess, evaluate, and manage environment and social risks and impacts in a manner consistent with the ESF. Adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable and they are not disadvantaged in sharing development benefits and opportunities.	**Relevant** The construction and operational stages of the Water Supply project has the potential environmental and social impacts. To address these impacts, the project requires the preparation of an Environmental & Social Management Plan (ESMP). Consequently, the applicability of ESS1 to ESS10 the project. The identification of environmental and social risks and impacts has been done through the ESIA.	• Conduct an environmental and social assessment of the proposed project, including stakeholder engagement, • Undertake stakeholder engagement and disclose appropriate information in accordance with ESS10, • Develop an ESCP, and implement all measures and actions set out in the legal agreement including the ESCP; and • Conduct monitoring and reporting on the environmental and social performance of the project against the ESSs	Pre-Construction and Construction Phases
2	ESS-2 Labour-and-Working-Conditions	Promote safety and health at work. Promote the fair treatment, non-discrimination, and equal opportunity of project workers.	**Relevant** The project will engage direct and indirect workers during construction and operation phase of the project. The ESS2 shall apply to all the workers directly or indirectly employed.	• Preparation of Labour Management Plan/Procedures applicable to the project, • Establishing Grievance Mechanism including anonymity and sharing with all the workers, • Design and Implement OHS measures.	Construction and Operation phase

S. No	World Bank ESS Policy & Standards	Description	Relevance to the sub- project	Requirement	Relevant phase
3	ESS-3 Resource-Efficiency-and- Pollution-Prevention-and-Management	Promote the sustainable use of resources. Avoid or minimize adverse impacts on human health and the environment caused by pollution from project activities. Avoid or minimize project-related emissions of short and long-lived climate pollutants. Avoid or minimize generation of hazardous and non-hazardous waste. Technically and financially feasible measures to improve efficient consumption of resources.	**Relevant** Identify practical measures for enhancing resource efficiency, including optimizing energy consumption, water usage, raw materials, recycled aggregates, and the adoption of innovative technologies to reduce the project's impact on finite natural resources. Construction vehicular movement and activities will generate air emissions, and the disposal of waste, including used oil and hazardous materials, may lead to soil, groundwater, and surface water contamination.	• Conduct primary surveys to gather information of baseline data on environmental parameters of the project study area, • Identify project impacts on the environmental parameters, • Suggest mitigation, management and monitoring plans, • Efficient muck and debris disposal plan.	Construction and Operation phase
4	ESS-4 Community-Health-and-Safety	Promote quality, safety, and climate change considerations in infrastructure design and construction. Avoid or minimize community exposure to project- related traffic and road safety risks, diseases and hazardous materials.	**Relevant** The implementation of project activities, including piling, trenching, chipping, operation of equipment, etc., carries the potential for accidents at the site. The transportation of heavy machinery or materials poses a potential threat to on-site workers. Additionally, unsanitary conditions at the site or labor camp may contribute to the spread of various diseases, posing significant health risks to the individuals affected.	• Conduct community interactions and discussions, • Identify risk involved on community during construction and implementation phase of the Project, • Suggest mitigation, management plans, • Measures to address labor influx, SEA/SH, traffic management plans etc.	Construction phase
5	ESS-5 Land-Acquisition-Restrictions-on-Land-Use-and-Involuntary-Resettlement	Avoid or minimize involuntary resettlement by exploring project design alternatives. Avoid forced eviction. Mitigate unavoidable adverse impacts from	**Relevant** The project does not involve involuntary land acquisition. The necessary land for constructing the Water Treatment Plant (WTP) has been purchased through direct negotiations with landowners.	• Vulnerable households will be identified by PIU/MC after conducting detail surveys of all PAPs before construction of	Pre-Construction Phase

S. No	World Bank ESS Policy & Standards	Description	Relevance to the sub- project	Requirement	Relevant phase
		land acquisition or restrictions on land use by providing compensation at replacement cost.	Nevertheless, street vendors who have established their businesses along the existing road and the proposed RoW of the transmission line may experience temporary disruptions due to the laying of pipeline.	WTP. If, there are any vulnerable PAPs and they will be compensated as per ARAP. • Prepare Resettlement Action Plan (RAP) to implement R&R measures as per the norms.	
6	ESS-6 Biodiversity-Conservation	Protect and conserve biodiversity and habitats. To promote the sustainable management of living natural resources.	**Relevant** The project activities within the RoW shall involve impact on flora and fauna for which adequate mitigation measures shall be implemented.	• Conduct primary ecology and wildlife surveys to gather information on ecology of the Project study area, • Identify Project impacts on the ecology, • Suggest specific mitigation, management, and monitoring plans. • Set out project's mitigation strategy will be described in a Biodiversity Management Plan	Pre-Construction and Construction Phases
7	ESS-7 Indigenous-Peoples	Ensure that the development process fosters full respect for affected parties' human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods.	**Not Relevant** Amritsar doesn't have any population of indigenous people. The project area or parts thereof also do not fall in any notified Tribal Zone. Therefore, ESS7 is not relevant for this project.	• Not Applicable	-
8	ESS-8 Cultural-Heritage	Protect cultural heritage from the adverse impacts of project activities and	**Relevant** Ram Bagh Gate {0.42 (W49-E1)} and Summer Palace of Maharaja Ranjit Singh have been identified {0.66 (W49-E1)} under cultural heritage.	• Conduct primary surveys for identification of existing Private	Pre-Construction and Construction Phases

S. No	World Bank ESS Policy & Standards	Description	Relevance to the sub- project	Requirement	Relevant phase
		support its preservation.	Chance find procedure will be adopted	and Community Property Resources (CPRs) on both sides of the proposed Project alignment. • Identify any potential conflict and impacts on cultural and religious structure due to the Project. Suggest mitigation, measures.	
9	ESS-9 Financial-Intermediaries	Sets out how Financial Intermediaries (FI) will assess and manage environmental and social risks and impacts associated with the subprojects it finances.	**Not relevant** There is no financial intermediary involved.	• Not Applicable	-
10	ESS-10 Stakeholder-Engagement-and-Information-Disclosure	Establish a systematic approach to stakeholder engagement that helps Borrowers identify stakeholders and maintain a constructive relationship with them. Assess stakeholder interest and support for the project and enable stakeholders' views to be taken into account in project design.	**Relevant** Construction of WTP, laying of water transmission lines and development of OHSRs site would benefit the locals but on the other hand might pose environmental and social impacts. Therefore, prior stakeholder engagements, public consultations, relevant approvals are required.	• Public Consultation and Focus Group Discussions and In-depth Interviews with stakeholders. • Identification of key stakeholders and preparation of Stakeholder Engagement Plan (SEP).	Construction phase
11	World Bank's Guidance note on managing the risks of adverse impacts on communities from temporary project induced labour influx, 2016	Applicable to the sub-project, as influx of skilled migrant labour in construction works is likely, even though in majority of the cases the construction workers would be housed within the project locations and therefore far away from habitations..	**Relevant** Migrant Labour is involved in the Project.	• Requires preparation of a SEA/ SH & GBV risks mitigation plan as part of ESS-1	Construction phase

S. No	World Bank ESS Policy & Standards	Description	Relevance to the sub- project	Requirement	Relevant phase
12	General EHS Guidelines, April 2007, IFC	The General EHS Guidelines contain information on environmental, health, and safety issues potentially applicable to all industry sectors	**Relevant** Adhere with the guidelines for environmental, health, and safety issue during construction and operation phase.	• Requirements on environmental, health, and safety issues during construction and operation of project.	Construction phase and Operation Phase
13	EHS Guide lines for Construction Materials Extraction, April 2007, IFC	The EHS Guidelines contain the performance levels and measures that are considered to construction materials extraction activities such as aggregates, sand, gravel etc.	**Relevant** Guidelines contain the performance levels and measures that are considered to construction materials extraction activities	• Requirements on the resource management of construction materials extraction activities such as aggregates, sand, gravel, clay, silica sands, and quartzite etc.	Construction phase
14	OP 7.50-Projects on International Waterways	This World Bank policy is applicable when works are proposed in any international waterways such as any river, canal, lake, or similar body of water that forms a boundary between, or any river or body of surface water that flows through, two or more states, whether Bank members or not	**Relevant** As per Indus water treaty 1960 signed between India and Pakistan. It was brokered by the World Bank., As per OP 7.50 identifies the Sutlej and Ravi rivers as international waterways. As such, India needed to inform other riparian countries about the project. Notifications were dispatched to both China and Pakistan; China expressed no objections while Pakistan has remained unresponsive. Based on the project's attributes and location, the World Bank holds the opinion that it won't negatively impact the water quality or quantity in the Ravi and Sutlej rivers, nor will it impede the water usage of other countries.	The rivers Sutlej and Ravi are considered international waterways for the purposes of the World Bank's Operational Policy regarding Projects on International Waterways (OP 7.50). In this instance, OP 7.50 requires that India notifies other riparian countries of the Project. Notifications were sent to China and Pakistan on April 1, 2020 with a request to respond with any comments by May 1, 2020. China responded on April 15, 2020 with no objection to the Project. Pakistan has not responded. Given the nature and location of the	Pre-Construction phase

S. No	World Bank ESS Policy & Standards	Description	Relevance to the sub- project	Requirement	Relevant phase
				proposed Project activities, these proposed investments would not adversely affect the quality or quantity of water flows of the Ravi and Sutlej rivers to other riparians or adversely affect other riparians' possible water use.	

3.6 Legal Monitoring Agency for Environmental Safeguards

77. The Punjab Pollution Control Board (PPCB) holds the authority for enforcing regulations, playing a more extensive role in environmental governance within the state than any other governmental body. Reporting to the Central Pollution Control Board (CPCB), the PPCB is tasked not only with monitoring and ensuring adherence to environmental standards but also with supervising various other environmental aspects. These encompass concerns such as municipal solid waste, hazardous waste, and biomedical waste.

78. The Amritsar Forest Division is entrusted with the responsibility of upholding forest management and conservation efforts. Additionally, it oversees the enforcement of laws related to environmental regulations, particularly those pertaining to compensatory afforestation

3.6.1 Other Line Agencies Involved

Table 3-5: Key Activities of Line Agencies

Department	Key Activities
Punjab State Pollution Control Board	Regulatory authority in the Indian state of Punjab that is responsible for addressing environmental issues and ensuring environmental protection.
Department of Water Resource	The management and regulation of water resources typically fall under the jurisdiction of government departments. Ensuring a reliable and sustainable water supply for domestic, industrial, and agricultural purposes.
Forest Department	The primary role of the department is to safeguard, preserve, and oversee the management of forests. Compensatory afforestation initiatives will be implemented to enhance vegetation cover. Additionally, the promotion of plants with ecological and economic significance is encouraged within the state. Collaborative efforts with the Forest Department are advocated, particularly concerning the preservation of natural habitats.
Punjab Town & Country Planning	This department notified the Punjab Urban Planning and Development Building Rules and also prepared the master plans of the towns in the State which are governed by the Zoning Regulations.

3.6.2 Clearances and Permissions required for the Project

79. Applicable Statuary Clearances to the project along with the role and responsibility of the concerns department is given in Table 3.6.

Table 3-6: Clearances and Permissions required for Project

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Current Status
1.	Cutting of trees at OHSR Located on forest land	Forest (Conservation) Act, 1980 and The Indian Forest (Punjab Amendment) Act, 1962	Forest department	PIU	PMU	Obtained
	Cutting of trees at OHSR Located on non-forest land	The Indian Forest (Punjab Amendment) Act, 1962	State department	PIU	PMU	Partially obtained
2.	Laying of transmission line network	Punjab Public Works Department Code	PWD	PIU	PMU	Obtained
		National Highways Act, 1956	NHAI		PMU	Obtained
		Indian Railways Act, 1989; Section 131	Railways		PMU	Obtained
		Cantonments Act, 2006	Cantonment Board		PMU	Obtained
		Local Municipal Regulations	Municipal Corporation Amritsar		PMU	Obtained
		Punjab Irrigation Act, 1935	Irrigation department		PMU	Obtained
3.	Forest Clearance (18.54 ha)	Forest (Conservation) Act, 1980 and The Punjab Forest Act, 1999	Forest Department	PIU	PMU	FC has been obtained.
	Forest Clearance (3.477ha)	Forest (Conservation) Act, 1980 and The Punjab Forest Act, 1999	Forest Department	PIU	PMU	Stage I clearance obtained
4.	Bore well: for the workers camps water supply. This water is treated through RO and used for drinking purposes as well.	Punjab Ground Water (Regulation and Control of Development and **Management**) Act, 2009 Punjab Water Resources (Regulation and Management) Act, 2020	Punjab Water Regulation and Development Authority (PWRDA)	DBOT contractor	PIU	Need to be obtained
5.	Source of water for WTP	Punjab Water Resources (Management and Regulation) Act, 2020 The Punjab Irrigation, Drainage and Rivers Act 2023	Irrigation	PIU	PMU	Obtained
6.	Source of water for construction work	Punjab Water Resources (Management and Regulation) Act, 2005 The Punjab Irrigation, Drainage and Rivers Act 2023	Irrigation	DBOT Contractor	PIU	Obtained
7.	Use of Kutcha Road	Local Municipal or Panchayat Regulations	Village Panchayat	PIU	PMU	Obtained
8.	Labour License	Contract Labour (Regulation and Abolition) Act, 1970	Labour Department	DBOT Contractor	PIU	Obtained

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Current Status
9.	Consent to Establish and Operate (CTE and CTO) for erection of batching plants, diesel generator, etc.	Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981	State Pollution Control Board	DBOT Contractor	PIU	CTE Applied for Batching plant CTO needs to be obtained
10.	Construction of labour camp	Contract Labour (Regulation and Abolition) Act, 1970	Municipal Corporation Amritsar	DBOT Contractor	PIU	Obtained
11.	Diversion of traffic	Local Traffic or Municipal Regulations	District traffic police	DBOT Contractor	PIU	Obtained
12.	Establishment of OHSR in park	Local Municipal Regulations	Amritsar Municipal Corporation	PIU	PMU	Partially Obtained
13.	Shifting of Electrical utility	Electricity Act, 2003 Punjab Municipal Corporation Act, 1976	Punjab State power corporation Limited	PIU	PMU	Partially Obtained
14.	Shifting of telecom utility services, within Right of Way (RoW).	Telegraph Act, 1885	Department of telecommunications	PIU	PMU	Partially Obtained
15.	Permission for sourcing building material such as stone and sand	Mines and Minerals (Development and Regulation) Act, 1957 State Mining Rules	Department of mines and geology/ District Magistrate	DBOT Contractor	PIU	Third party
16.	Permission for Establishing of labour camps	Contract Labour (Regulation and Abolition) Act, 1970	Municipal Corporation Amritsar	DBOT Contractor	PIU	Obtained
17.	Permission for Disposal of Construction and Demolition waste	Construction and Demolition Waste Management Rules, 2016	Municipal Corporation Amritsar	DBOT Contractor	PIU	Obtained
18.	Permission of storage of Chemical	Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and as amended; Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and amendment thereof	Pollution Control Board	DBOT Contractor	PIU	Needs to be Obtained
19.	Permission for Demolition of OHSRs	Local Municipal regulation	Municipal Corporation Amritsar	DBOT Contractor	PIU	Needs to be Obtained
20.	Permission/ NoC for Construction of OHSR within Institution/ hospital confinement	Local Municipal regulation	Education Department/ School Authority for private school Hospital Authority	PIU	PMU	Partially Obtained

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Current Status
21.	Implementation of project and operation of activities	Municipal solid waste management rules 2016	Punjab State Pollution Control Board	DBOT Contractor	PIU	Agreement required to be done with authorized vendor
22.		Batteries Waste Management Rules, 2022				
23.		Plastic Waste Management Rules, 2022 and its amendment	Punjab State Pollution Control Board	DBOT Contractor	PIU	Obtained
24.		E-Waste (Management) Rules, 2016 and its amendment				

4 BASELINE ENVIRONMENTAL AND SOCIAL PROFILE

4.1 Introduction

80. The collection of baseline data, both Environmental and Social, is a crucial component of the Environmental and Social Impact Assessment (ESIA) study. It serves as a fundamental tool to assess the anticipated impacts on the environment and social components. This chapter provides a detailed overview of the existing baseline status in the study area, focusing on key environmental and social attributes. The baseline environmental conditions are outlined, covering aspects such as the Land Environment, Climate & Air Environment, Water Environment, Forest & Biodiversity, and public health.

4.2 Land Environment

81. The land environment encompasses the physical attributes of an area, including its topography, geology, soil characteristics, and land use patterns.

4.2.1 Topography and Geology

82. Amritsar is situated at Latitude 31.63°N and Longitude 74.87°E, with an average elevation of 234 m (768 ft), in the Majha region of the state of Punjab, North India. It is positioned approximately 15 miles (24 km) east of the border with Pakistan.

83. The Amritsar district is located in the Punjab state of north-western part India and is characterized by its placement within the fertile Indo-Gangetic alluvial plains. The geology of the district is primarily influenced by the deposition of sediments from rivers like the Beas and Ravi, which significantly contribute to the region's agricultural productivity.

4.2.2 Soil Characteristics

84. Soils in the western district are characterized by being coarse, loamy, and calcareous. In the central part, they exhibit a fine loamy texture, are calcareous, and have good drainage characteristics. The soils fall under the Ustochrepts to Haplustalfs type[7].

4.2.3 Land Use

85. The existing land use of Amritsar city, as per the Draft Master Plan for Amritsar, is outlined in Table 4.1. The data reveals that 58.54 percent of the total municipal corporation area is developed, while the remaining 41.46 percent consists of agricultural land, plantations, or vacant land within the municipal area. Consequently, less than two-thirds of the municipal corporation area has been developed for various purposes, including residential, commercial, and industrial uses, among others.

Table 4-1: Land use Pattern of Amritsar City

Land use	Area (Hectare)	Percent of Developed Area	Percent of M.C. Area
Residential	4245.08	50.94	29.82
Mixed Land Use	66.48	0.80	0.47
Commercial	393.22	4.72	2.76
Industrial	445.73	5.35	3.13
Public\Semi public	738.22	8.86	5.19
Govt. Land	882.14	10.58	6.20
Utilities & Services	27.2	0.33	0.19

[7] http://cgwb.gov.in/AQM/NAQUIM_REPORT/Punjab/Amritsar.pdf

Land use	Area (Hectare)	Percent of Developed Area	Percent of M.C. Area
Traffic and Transportation	1388.67	16.66	9.75
Recreational	124.89	1.50	0.88
Special Area	22.42	0.27	0.16
Total Developed Area	**8334.05**	**100.00**	**58.54**
Total Municipal Area	**14237.22**		**100.00**

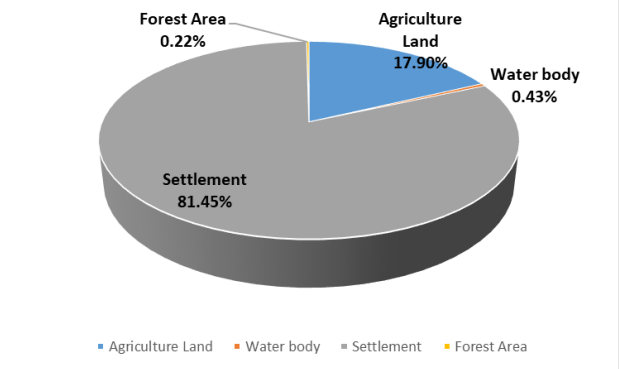
Source: Draft Master Plan for Amritsar- 2010-2031

86. For the study purpose, 500m buffer along the project activities has been considered as study area[8]. Land use of the project study area shows that the major land use land cover of the area is settlement i.e. 81.54 % followed by agriculture land (17.81 %). The land use pattern of the study area (500m buffer) is provided in Table 4.2.

Table 4-2: Land Use Pattern of the Study Area

S. No.	Land use category	Area in sq. km	Area in %
1	Agriculture Land	15.64	17.81
2	Water body	0.38	0.44
3	Settlement	71.17	81.54
4	Forest Area	0.19	0.22
Total		**87.18**	**100.00**

Source: Survey of India Toposheet, SRTM Data and Google Earth Satellite Imagery



4.3 Hazard and Vulnerability

4.3.1 *Seismicity*

87. According to the seismic zone classification of Punjab, the project site is categorized under Seismic Zone IV, indicating a High Damage Risk Zone (MSK VIII). Construction of buildings and infrastructure in this zone must adhere to the specifications outlined in the BIS IS 1893 (Part 1): 2016 standard[9]. This ensures that structures are designed and constructed to withstand the potential effects of earthquakes.

4.3.2 Flood[10]

88. According to the Flood Hazard Map of Punjab, the project location is situated in a flood-prone area. The state has faced significant floods in the years 1988, 1995, 2004, 2010, 2013, 2018, and 2019. In 1988, an unprecedented flood occurred due to the release of water from the Bhakra Dam when flood gates were opened to prevent danger from escalating water levels. These floods have resulted in substantial losses to crops, property, livestock, human lives, and industries located in low-lying areas.

89. Flood occurrences are typically recorded during the monsoon period, particularly from July to September, making these months especially vulnerable each year.

[8] https://environmentclearance.nic.in/writereaddata/Form-1A/HomeLinks/building-construction_may-10.pdf
[9] BIS IS 1893 (Part 1): 2016 standard "Criteria for Earthquake Resistant Design of Structures - Part 1: General Provisions and Buildings"
[10] http://ijrar.com/upload_issue/ijrar_issue_20543127.pdf

4.4 Climate and Air Environment

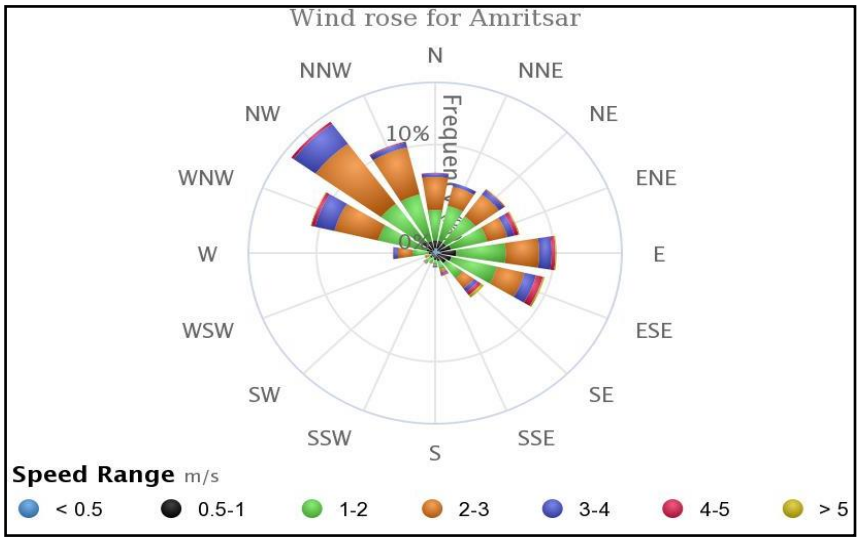
4.4.1 Climate and Rainfall

90. The climate of Amritsar city is characterized by general dryness except in the brief south-west monsoon season, a hot summer and bracing winter. The winter season starts from November to March. From middle of March temperature begins to rise, touches the highest point in May and June, the period from April to June is the hot season. The maximum daily mean temperature of 39°C has been recorded in the month of May and June while minimum daily mean temperature of 3.4° C has been recorded in the month of January as per IMD station i.e., Amritsar (Rajasansi).

91. The total annual average rainfall is 703.4 mm has been observed in the area as per IMD during 1981-2010. Maximum monthly total rainfall recorded is 210.1 mm which occurred in July and minimum monthly rainfall is 6.3 mm which recorded in month of November.

4.4.2 Wind Speed and Direction

92. The maximum mean wind speed is 3.6 km/hr recorded in the month of June while the minimum mean wind speed is 1.4 km/hr recorded in the month of November and December. The predominant wind direction is North West. The wind rose diagram is given in Figure 4.1.



Source: Climatological Tables 1981-2010, Indian Meteorological Department

Figure 4-1: Wind-rose of Amritsar City

4.4.3 Air Quality

93. Baseline data collection and analysis has been carried out by an NABL accredited and ISO/IEC 17025:2005 certified Laboratory. Monitoring stations were selected based on sensitive receptors and as per prominent wind direction. Monitoring was carried out at four (4) locations for assessment of ambient air quality in the study area (Table 4.3).

Table 4-3: Ambient Air Quality Monitoring Locations

S. No	Location Code	Monitoring Locations	Coordinates (Latitude & Longitude)	Direction	Selection Criteria
1	AAQ1	WTP Site	31°38'29.98"N, 74°56'58.26"E	ENE	Project Area
2	AAQ2	Mustafabad	31°39'3.09"N, 74°54'23.98"E	NE	Densely populated area, Near OHSR and Near sensitive receptor (Hospital)

S. No	Location Code	Monitoring Locations	Coordinates (Latitude & Longitude)	Direction	Selection Criteria
3	AAQ3	Sabzi Mandi Near Ram Bagh Chowk	31°37'55.56"N, 74°52'27.30"E	N	Upwind of predominant wind direction and near to multiple crossing of national Highway as well as sensitive receptor (School)
4	AAQ4	Near Kot Mit Singh	31°35'18.96"N, 74°53'6.86"E	SSE	Near to sensitive receptor (Vegetation area) and down wind direction of third predominant wind direction.

94. The concentrations of PM10, PM2.5, SO2, and NOx in the study area exhibited a range from 154.0 to 111.0 µg/m3, 113.5 to 82.5 µg/m3, 22.7 to 17.2 µg/m3, and 17.1 to 15.7 µg/m3, respectively. Additionally, the concentrations of CO within the study area were observed to be 1.9 µg/m3. Graphical representations of pollutants are depicted in Figure 4.2 and Figure 4.3. Baseline Air Quality results are attached as **Annexure 4.1.**

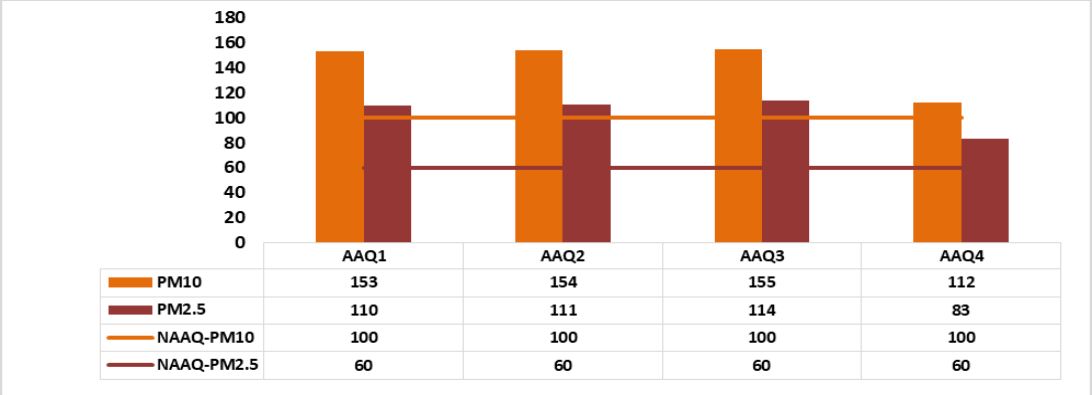


Figure 4-2: Graphical Representation of PM_{10} & $PM_{2.5}$

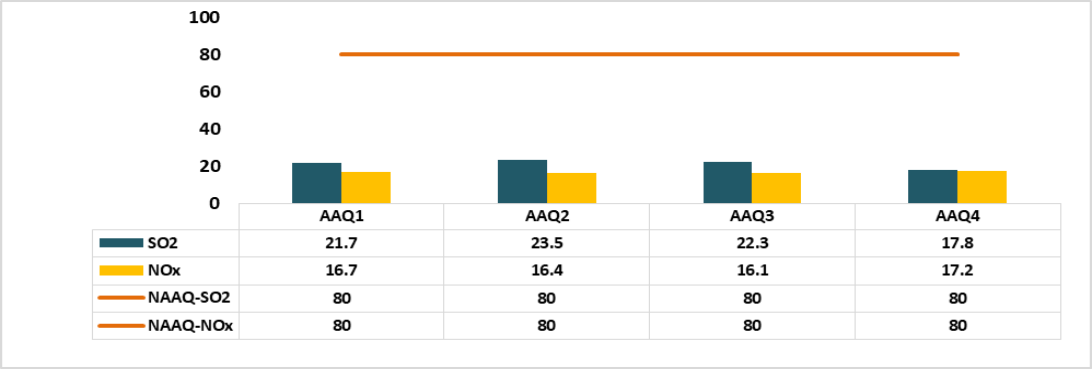


Figure 4-3: Graphical Representation of SO_2 & NOx

95. The AERMOD model has been setup and run to find out the cumulative maximum ground level concentration of PM10 and PM2.5 generated from different project activities. It can be concluded from model output that the maximum ground level concentration for PM10 and PM2.5 will increased by 4.48 µg/m3 and 2.41 µg/m3 respectively near AAQ 3. Cumulative ground level concentration for PM10 and PM2.5 will result 159.48 µg/m3 and 116.41 µg/m3 respectively. The modelling report along with the isopleths generated though AERMOD model is attached as **Annexure 4.2.**

4.5 Noise Environment

96. Noise monitoring was carried out at four (04) locations within the project area (**Table 4.4**) during day and night time and Leq values have been computed hourly. Day time & Night time monitoring were conducted from 6:00

AM to 10:00 PM and from 10:00 PM to 6:00 AM, respectively. The Noise monitoring was done using sound level meter which gives a direct reading of loudness.

Table 4-4: Ambient Noise Quality Monitoring Locations

S. No	Location Code	Monitoring Locations	Coordinates (Latitude & Longitude)	Direction	Selection Criteria
1	N1	WTP Site	31°38'29.98"N, 74°56'58.26"E	ENE	Project Area (WTP Site)
2	N2	Mustafabad	31°39'3.09"N, 74°54'23.98"E	NE	Densely populated area, Near OHSR and Near sensitive receptor (Hospital)
3	N3	Sabzi Mandi Near Ram Bagh Chowk	31°37'55.56"N, 74°52'27.30"E	N	Upwind of predominant wind direction and near to multiple crossing of national Highway as well as sensitive receptor (School)
4	N4	Near Kot Mit Singh	31°35'18.96"N, 74°53'6.86"E	SSE	Near to sensitive receptor (vegetation area) and down wind direction of third predominant wind direction.

97. The results are presented in the **Table 4.5** below.

Table 4.5: Noise Quality Monitoring Results

S. No.	Location Code	Leq Day	Leq Night	CPCB Standards		Environmental Setting
				Day	Night	
1	N1	55.39	46.63	65	55	Commercial
2	N2	59.14	46.41	55	45	Residential
3	N3	63.66	47.57	65	55	Commercial
4	N4	58.16	43.32	50	40	Silence

98. The noise quality levels recorded at N1 (WTP Site) and N3 (Sabzi Mandi near Ram Bagh Chowk) location during day time and night time are found well within the limits of CPCB. However, noise quality levels at N2 (Mustafabad) and N4 (Near Kot Mit Singh) were found above the limits of CPCB standards. Baseline Noise monitoring reports are attached as **Annexure 4.1**.

4.6 Water Environment

99. The water environment refers to the conditions, characteristics, and interactions of surface water bodies (such as rivers and lakes) and groundwater within a specific area. It involves assessing the quantity, quality, and ecological health of these water resources.

4.6.1 Surface Water Resources

100. Amritsar district falls in between Ravi River and Beas River. Ravi River flows in North West of the district and forms international border with Pakistan. Beas River flows in the eastern part of the district. There are three nalas which drains Amritsar district from north east to south west. Kiran Saiki nala flows in the northern part of the district. Hudiara nala and Kasur nala drains the central part of the district where as Patti nala drains south eastern part of the district. Upper Bari Doab canal is the main canal passing through central part of the district. Lahore branch and Kasur branch lower are the major distributaries of the Upper Bari Doab canal.

101. Main Branch Lower (MBL) a distributary of Upper Bari Doab Canal (UBDC) has been finalized as a source of raw water supply for the project.

102. **Upper Bari Doab Canal (UBDC):** A barrage was constructed at Madhopur after the weir type structure got damaged in the flood of 1955 and the UBDC system which off-takes from Madhopur Headworks was further developed by including additional areas. Main water abstraction in the system below Madhopur barrage water is diverted into 2 main canals, Upper Bari Doab Canal (UBDC) and Hydel Canal. UBDC is further bifurcated into (i) Ravi - Beas-Link Canal and (ii) Main line.

103. The UBDC system was remodeled during 2001-2005, to ensure full utilization of stored water of Ravi River, as a result of commissioning of Ranjit Sagar Dam in the year 2000. The UBDC presently, has an authorized discharge of 9000 Cusec. Seven branch canals off take from UBDC with 247 distributaries and minors, off taking from these branch canals. The UBDC system is spread over a length of 3119 Kms, having a cultivable command area of 5.73 lac ha.

104. **The Main Branch Lower (MBL),** located at Latitude 31°50'5.31"N and Longitude 75°6'38.56"E, is distinct from the UBDC near Aliwal village. MBL serves as the main raw water source for the Water Treatment Plant (WTP), located approximately 50m away, with a water capacity of 1350 cusec.

4.6.2 *Surface Water Quality*

105. For the environment baseline monitoring, three (3) samples have been collected from water source and downstream of the canal (**Table 4.5**). The location of surface water sampling and results of Surface Water Quality have been provided below:

Table 4-5: Surface Water Quality Sampling Locations

S. No	Location Code	Name of the monitoring location	Latitude and Longitude
1	SW1	Upper Bari Doab Canal (MBL)	31°38'28.75"N, 74°57'2.69"E
2	SW2	Transmission line crossing the Canal	31°35'57.12"N, 74°53'24.69"E
3	SW3	Canal near Kot Mit Singh	31°35'41.79"N, 74°52'59.90"E

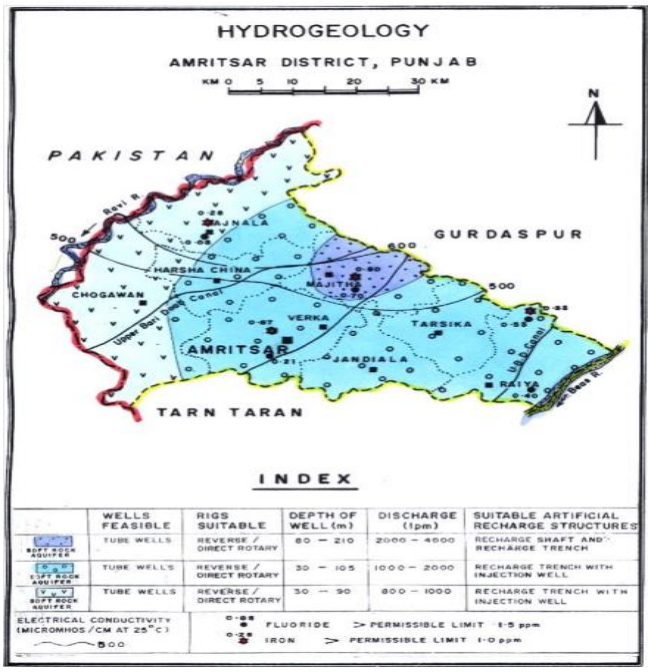
106. The pH levels ranged from 7.12 to 7.32. The levels for TDS ranged from 340.0 to 410.0 mg/l. Turbidity in the sample varies from 2 to 3 NTU. The values for Total Hardness ranged from 183.2 to 254.5 mg/l. The DO levels ranged from 5.7 to 6.0 mg/l. The Chemical Oxygen Demand and Biochemical Oxygen Demand is increasing towards the downstream ranging from 126 to 154 mg/l and 28 to 32 mg/l respectively. Baseline surface water quality reports are attached as **Annexure 4.1**.

107. As per Prefeasibility Report prepared for PMSIP Amritsar sub-project, The AMC has organized water quality testing of the canal water in the month of September near Vallah village, and the sample is found with turbidity level at 58NTU[11], which is above the acceptable limit (1NTU) as well as permissible limit (5 NTU) as per IS 2296: 1982. L&T Construction has conducted surface water quality testing at MBL Canal for the purpose of designing WTP. The results indicate a turbidity level of 12 NTU, pH levels of 7.32, ammonia concentration of 0.5 mg/l, total coliform count of 03 MPN/100ml, dissolved oxygen concentration of 7.1 mg/l, and a biochemical oxygen demand result of ND. The testing reports are attached as **Annexure 4.3**.

108. The baseline quality testing conducted by MCA and the Contractor indicates that the surface water quality at MBL canal falls within **Class C**, as per CPCB standards, confirming the criteria for Total Coliform, pH, dissolved oxygen, and biochemical oxygen demand. The proposed WTP is designed to supply water as per 10500:2012 water quality standards (pH- 7.0-8.0, Turbidity < 50 and ≤100 NTU, TSS <50 PPM, Colour <5 Hazen, TDS <200 mg/l, Hardness <150 mg/l, alkalinity <100 mg/l, iron <1 mg/l, Ammonia ≤2.5 mg/l and BOD ≤2.8 mg/l).

[11] Draft Final Report Volume-I by Jalakam Solutions

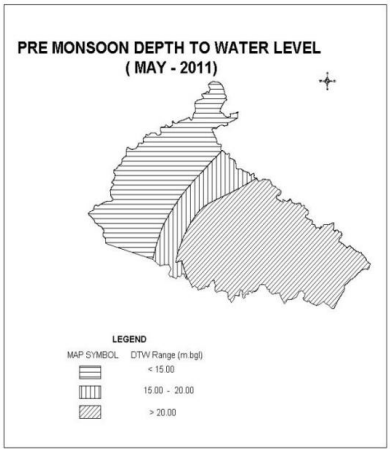
4.6.3 Hydrogeology[12] & Ground Water Resource

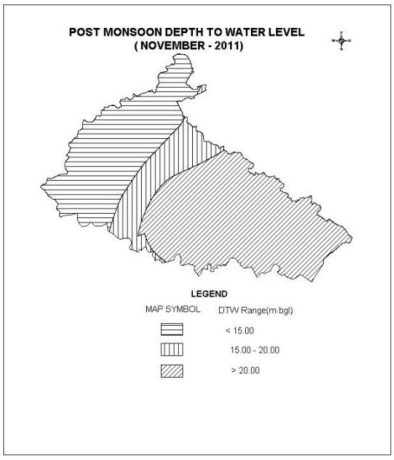


109. Amritsar district forms part of Uppar Bari Doab and is underlain by formations of Quaternary age comprising of alluvium deposits belonging to vast Indus alluvial plains. Sub surface geological formations comprise of fine to coarse grained sand, silt, clay and kankar. Gravel associated with sand beds occurs along the left bank of Ravi. The beds of thin clay exists alternating with thick sand beds and pinches out at short distances against sand beds.

110. Depth of water level in the district ranges from 11.61 to 24.30 m below ground level (bgl) during pre-monsoon period and between 12.26 to 24.04 m bgl during post monsoon period. Long term water level fluctuation (May 2002-May 2012) shows a decline of 0.27 m to 0.74 m in whole of the district. The decline in water levels is more in the central and eastern part of the district. The gradient of water table elevation is steep in the northeast part and gentle in the south west part of the district. In the area around Amritsar the ground water flow from all directions is towards city and a ground water trough has been formed in the central part of the city.

111. As per Ground Water Resources of Punjab State (As on 31st March 2022), Amritsar city falls under the overexploited category due to declining water levels. The fall of ground water level is 5-10 meter during June 1984 to June 2021.





Source: *http://cgwb.gov.in*

4.6.4 Ground Water Quality

112. The Amritsar Municipal Corporation conducted groundwater quality sampling at 29 locations within Amritsar city in February 2020. Among the 29 samples collected, Arsenic was detected at 14 sites, including Town Hall Amritsar, Krishna Square East, MGI flats, New Golden Avenue, Jahajgarh, Chamrang Road, 100 Feet Road, Marwadi Hospital East Mohan Nagar, Murgi Khana, Amrik Singh Fattianwala Azad Nagar East and Estate, and Focal Point 31. Nickel was detected at Gali Kamboj Bagh Jallianwala (central), Iron was detected at Town Hall Fire Brigade and Gali Kamboj Jallianwala, mercury was detected at East Estate and Focal Point 31, and Aluminium was also present in the Vallah Village tubewell. These findings highlight the diverse presence of various pollutants in different locations, emphasizing the importance of monitoring and addressing groundwater quality concerns in the city. The report is given as **Annexure 4.4**.

[12] *http://cgwb.gov.in/AQM/NAQUIM_REPORT/Punjab/Amritsar.pdf*

113. However, Ground water samples were collected from 4 locations as given in **Table 4.6** and analyzed for assessment of ground water quality to be used for labour and workers during the construction phase. Locations of Ground water samples (**Table 4.6**) and analysis results of ground water is as follows:

Table 4-6: Ground Water Quality Sampling Locations

S. No.	Location Code	Name of the monitoring location	Latitude and Longitude	Selection Criteria
1	GW1	WTP Site	31°38'29.98"N, 74°56'58.26"E	Bore well
2	GW2	Mustafabad	31°39'3.09"N, 74°54'23.98"E	Bore well
3	GW3	Sabzi Mandi Near Ram Bagh Chowk	31°37'55.56"N, 74°52'27.30"E	Bore well
4	GW4	Gilwali	31°35'18.96"N, 74°53'6.86"E	Bore well

114. The pH level in the ground water varies from 7.05 to 7.06. The levels of total hardness ranged from 264 to 346.6 mg/l, which is more than the desirable limit but within the permissible limits at all sampling locations. TDS levels were found to vary from 437 to 590 mg/l. All the locations have TDS values within the permissible limits but the TDS values for GW-2 (Mustafabad) & GW-4 (Gilwali) are more than the desirable limits. Chloride concentrations at all 4 locations were found well within the permissible limits. The levels for alkalinity at GW-4 (Gilwali) reflected higher levels of alkalinity i.e., 210 mgl, which is more than the desirable limit but well within the permissible limits; remaining all the three locations had alkalinity levels below the desirable limits. The levels for nitrates and Sulphates were found well within the permissible limits for all the locations. The levels for DO were found to range from 4.7 to 6.6 mg/l. Total coliforms and E. coli were absent in the samples analysed for ground water quality. Baseline ground water quality reports are attached as **Annexure 4.1**.

4.7 Soil Quality

115. In order to assess the possibility of contamination in the project area; soil samples were collected and analyzed for its physio-chemical and biological characteristics. Soil Quality sampling was carried out at four locations. The sampling location details (**Table 4.7**) and analysis results of soil quality given below:

Table 4-7: Soil Sampling Locations

S. No.	Location Code	Monitoring Locations	Coordinates	Selection Criteria
1	S1	WTP Site	31°38'29.98"N, 74°56'58.26"E	WTP Site/ Agricultural land
2	S2	Mustafabad	31°39'3.09"N, 74°54'23.98"E	Agricultural land
3	S3	Sabzi Mandi Near Ram Bagh Chowk	31°37'55.56"N, 74°52'27.30"E	Waste land
4	S4	Near Kot Mit Singh	31°35'18.96"N, 74°53'6.86"E	Plantation Area

116. The pH levels in the three samples ranged from 7.72 to 7.88. The soils have excellent Sodium Absorption Ratio (SAR) value in all samples, so far as the SAR value is less than 1. The Nitrogen levels ranged from 98 to 117 mg/kg. The concentration for phosphorous ranged between 0.38 to 0.41 mg/kg. Potassium content in the soil ranges between 24 to 28 mg/kg. Baseline lab reports are attached as **Annexure 4.1**.

117. According to Soil Survey Manual (IARI, 1970), the analysis of soil quality indicates that the soil is less fertile in nature. Geotechnical Investigation for 440 MLD WTP and associated Transmission Network & OHSR has been done and report of the geotechnical investigation is attached as **Annexure-4.5**.

4.8 Forest[13] and Biodiversity

118. The jurisdiction of Amritsar Forest Division coincides with that of revenue districts of Amritsar and Tarn Taran Districts. Out of the total geographical area, total forest area constitutes around 2.75 % of the total geographical area of these two districts. As per State of Forest Report 2011, there has been an increase in forest cover by 16 sq. kms in Amritsar Forest Division but this includes trees outside Government Forest areas also. The detail of the categorization of forest cover is given in **Table 4.8** below.

Table 4-8: Categorization of Forest Cover

Districts	Geographical Area (Sq. km.)	2011 Assessment				% of G.A.	Change	Scrub Forest
		Very Dense Forest	Moderately Dense Forest	Open Forest	Total			
Amritsar and Tarn Taran	5088	0	15	30	45	0.88	16	2

Source: *Working Plan, Amritsar Forest Division (2013-14 to 2027-28)*

4.8.1 Protected Areas

119. No Ecological Sensitive location (National Park, Wildlife Sanctuaries, Biosphere reserves) is located within the 10 km radius of the project activities i.e. Cross Regulator cum Head Regulator, WTP, OHSRs and Laying of Transmission Lines. Nearest Protected area is **Rakh Sarai Amanat Khan Conservation Reserve**, which is more than 10 km away from the project area. The project is 24x7 Bulk Water Supply Scheme and does not come under any protected areas. Therefore, no impact is anticipated due to project.

4.8.2 Wetlands[14]

120. There are total 20 wetlands in Punjab. Out of these, 12 are natural wetlands while 8 are manmade. Out of these 6 have been declared as Ramsar Site (Harike Lake, Kanjli Lake, Ropar Lake, Nangal Wildlife Sanctuary, Beas Conservation Reserve and Keshopur-Miani Community Reserve).

121. Apart from this, Jastarwal wetland is situated in the Block Harcha Chhina near Ajnala Township in the District Amritsar, and is spread over an area of 103 Acres. This is a low-lying site near village Jastarwal and mostly spread over the abandoned course of the Ravi River, the wetland is important for lotus cultivation point of view and is an important groundwater recharging system during monsoon. It is about 15 to 18 km away from Amritsar city[15]. The project does not come under any Ramsar wet land site or state wet land site.

4.8.3 Ecology and Biodiversity

122. The baseline study for the existing ecological environment was carried out in the study area. The assessment includes (i) secondary data collection through the review of available literatures (ii) on site data collection for identification of vegetation and wildlife in the study area

123. Secondary data was collected and an extensive review of available literatures (Books, authenticated websites, Scientific Papers, articles etc.) was conducted. The secondary data was appropriately supplemented by a field survey for primary data collection. The following surveys were conducted to analyze the different types of vegetation, type of forest, species of flora and fauna available in the study area.

- **Habitat survey:** Different habitats identified during desk review were surveyed. Data regarding the type and quality of habitat with reference to flora and fauna was collected.

[13] *The Working Plan, Amritsar Forest Division (2013-14 to 2027-28) is available at* https://forest.punjab.gov.in/media/documents/AmritsarForestDivision_OAx235l.pdf

[14] https://wiienvis.nic.in/Database/ramsar_wetland_sites_8224.aspx

[15] http://www.cgwb.gov.in/WQ/Punjab%20Book%20Final%20for%20Printing.pdf

- **Floral Survey:** Major floral species in different types of habitats was visually identified.
- **Faunal Survey:** Faunal species in the study areas were recorded based on direct sightings, indirect evidences such as dung, droppings, scats, scratch signs, burrows, nests etc.

124. According to the Working Plan, Amritsar Forest Division (2013-14 to 2027-28), one (01) mammalian species belong to Schedule-I, four (04) resident avifaunal species belong to Schedule-I, one (01) migratory/ water birds species belong to Schedule-I and two (02) reptile species belong to Schedule-I were found in Amritsar Forest division[16]. However, No schedule-I fauna was observed within the study area during the study period. Predominant habitats observed are Modified and natural habitats but no critical habitats are observed within the study area during the study period. Details of ecology and biodiversity study is given in **Annexure 4.6**.

4.9 Heritage

125. As per the Archaeological Survey of India (ASI), Ram Bagh Gate (0.72 km from W49-E1 and 0.89 km from W49-P1) has been identified in the nearby vicinity of the project area.

126. As the project area is falling more than 300 m away from the protected monument as per Ancient Monuments and Archaeological Sites and Remains Act, 1958 and its amendments. There will be no impact on the monuments. The aerial distance map is given below:

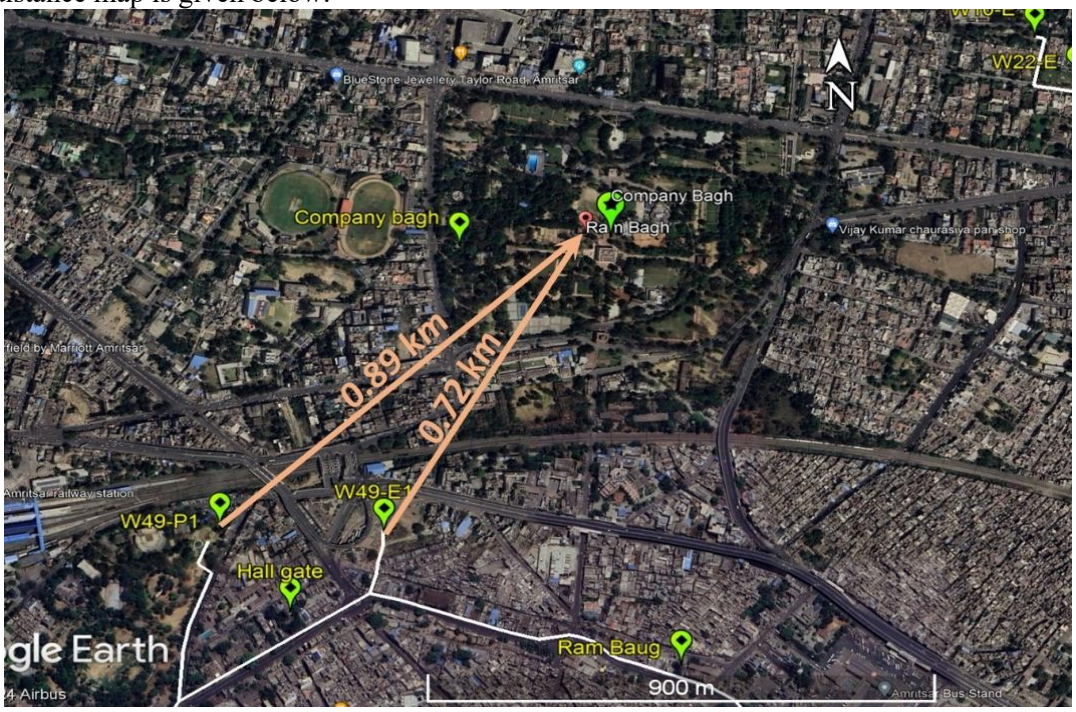


Figure: 4.4 Aerial distance Map

4.10 Social Profile

127. The study area for the Punjab Municipal Services Improvement Project (PMSIP) Sub-project Amritsar has been considered within municipal limit of Municipal Corporation Amritsar (MCA). As per the data collected during site visit and consultation conducted with local residents, the city has been divided into 85 wards which are also updated in the record of MCA while as per the Census of India 2011, it is divided into 65 Wards.

4.10.1 Socio-economic Profile of the State, District and MCA

128. Socio-economic profile of the study area (MCA), Amritsar District and Punjab state has been analyzed on the basis of Census of India 2011 and details is presented in **Table 4.9.**

[16] *Working Plan, Amritsar Forest Division (2013-14 to 2027-28)*

Demography

129. As per Census of India 2011, total population of the study area is 11,32,383 in which 6,01,008 (53.07%) are males and 5,31,375 (46.93%) are females. The average house-hold size of the study area is 4.84 that is lower than the district and the state. The average sex ratio of the study area is 884 females per thousand males that is poor than the district and the state. The share of Scheduled Caste population in total population of the study is 21.09% while there is no Scheduled Tribes population in the study area as well as also in the State. The population density in MCA area is 8326 while it is 928 and 551 in the district and the state respectively.

Table 4-9: Demographic Profile of the State, District and MCA

S. No.	Particulars	Unit	MCA	Amritsar District	Punjab State
1	Area	Sq. Km	136	2,683	50,362
2	Population	Numbers	11,32,383	24,90,656	2,77,43,338
3	Male	Numbers	6,01,008	1318408	14639465
4	Female	Numbers	5,31,375	1172248	13103873
5	Sex Ration	Nos. of Female /1000 Male	884	889	895
6	Average Household Size	Person/HH	4.84	5.09	5.03
7	Population Density	Per Sq. Km.	8326	928	551
9	Average Literacy Rate	Percentage	84.19	76.27	75.84
	Literacy Rate Male	Percentage	86.90	80.15	80.44
	Literacy Rate Female	Percentage	81.16	71.96	70.73
10	Scheduled Caste	Number	238872	770864	8860179
		Percentage	21.09	30.95	31.94
11	Scheduled Tribes	Number	0	0	0
12	Total Working Population	Number	418473	917856	9897362
	Work Participation Rate	Percentage	36.96	36.85	35.67
13	Work Participation Rate Male	Percentage	56.52	55.76	55.15
	Work Participation Rate Female	Percentage	14.83	15.58	13.91
14	Main Worker	Percentage	88.40	85.77	85.39
15	Marginal Worker	Percentage	11.60	14.23	14.61

Source: *Census of India, 2011*

4.10.2 Literacy Profile

130. The data presented in the Table 4.9, reveals that an average literacy rate of the study area is 84.19% while the literacy rate of male is 86.90% with respect to the male population and the literacy rate of female is 81.16% with respect to female population. There is a 5.73% of gap between literacy rate of male and female. Further the literacy rate of the study area has been analysed with respect to the literacy rate of Amritsar District. An average literacy rate of the district is 76.27% while the literacy rate of male in the same settlement is 80.15% and female is 71.96% with 8.19% of gap.

131. Therefore, as per the analysis made above, the literacy rate of the study area is much better than the literacy rate of the District Amritsar and Punjab which are 76.27% and 75.84% respectively.

4.10.3 Workforce Participation

132. Total working population in MCA is 418,473 in which 339,668 are male and 78,805 are female. In the District Amritsar, total nos. of workers are 917,856, out of which 735,195 are male and 182,661 are female. The data suggests that both areas have a higher percentage of male workers than female workers. However, District Amritsar has a

slightly higher percentage of female workers in comparison to MCA area. The work participation rate in the study area is presented in Table 4.9.

4.10.4 Ward-wise Analysis

Population: As per Census of India 2011, Municipal Corporation Amritsar has been divided into 65 Wards. Ward wise total population of MCA is 11,32,383, ranged from 10,752 (in Ward No. 22) to 26,938 (in Ward No. 38). Analysis of population distribution (ward wise) shows that ward numbers 38, 13, 18, 33, 59 and 61 are most populated while ward 22, 12, 24, 46, 27 and 52 are least populated. Detailed Ward-wise demographic analysis has been provided in **Annexure -4.7**.

Child Population: The child population [0-6 years] was reported to be 1,16,383 comprising 10.28 percent of the total population. The child population in the wards was found to vary significantly. Highest population (3452) found in ward 18 which was 12.84% of the total population while ward 22 have the least number of children (898) that is 8.35% of the total population in the Ward.

Scheduled Caste Population: The percentage of the Scheduled Caste population is 21.09% of the total population in MCA area. The lowest SC population found in wards number 47 and 24 while highest was in ward numbers 59, 15, 61, 31 and 62.

Literate Population: The percentage of literate population are found to vary across the different wards. The highest literacy rate is found in in Ward No. 50 (96.07%), 11 (95.51%), 45 (94.83), 21 (93.42%) and the lowest literacy rate is observed in Ward No. 59 (64.08%), 60 (65.15%), 37 (67.69%) and 17 (70.57%).

4.10.5 Slum Location, Spread and Details

133. As per Census of India 2011, total population of slum in Amritsar is 3,30,905 compounded into 68,040 households that is approximately 29.22% of the total population of the city. There are 2428 toilet facilities, 1365 safe & protected water connections and 2676 electricity connections in the slum area. As per the data presented on official website of MCA, there are 63 slum colonies in the city. Locations of the slum area has been prepared and attached as **Annexure-4.8.**

4.11 Socio-economic Profile of Project Affected Families

134. The detailed Census and Socio-economic survey have been conducted from October 10, 2022 to October 29, 2022 for families whose land has been purchased for the construction of WTP. Only 40 acres of land has been purchased from 49 land owners for the construction of WTP on the basis of direct negotiation. OHSRs and Transmission network have been proposed on Government land where no physical or economic displacements have been observed during the census survey. Out of total 49 land affected families, census and socio-economic survey of only 45 families were conducted whose land has been purchased for the construction of WTP. Remaining 4 affected families are settled in abroad and could not possible to carry out the survey.

135. The structured census and socio-economic questionnaire **(Annexure-4.9)** was used to collect detailed information on affected families/properties for understanding of impacts to develop the mitigation measure and action plan for the project affected persons. The detailed socio-economic profile of affected families is given in the Annexure 4.10.

4.12 Conclusion

136. As per the analysis made above it is concluded that insufficient water storage infrastructure and poor rainfall contribute to a diminished capacity for water supply. The reduction in forest coverage, currently at a mere 2.75%, is linked to alterations in land utilization. Limited access to surface water is attributed to decreased forest coverage, insufficient natural surface water resources, and local topographical challenges, resulting in constrained water supply. Excessive groundwater utilization, influenced by the region's topography and geology, leads to a growing dependency on groundwater. The quality of surface and groundwater is adversely affected by agricultural practices, urbanization, and climate variations, causing certain project areas to experience drinking water quality surpassing permissible limits. Additionally, intensified groundwater withdrawal is driven by the limited availability of surface water resources.

137. The project does not involve any physical or economic displacement. Only 40 acres of land has been purchased for the construction of WTP on the basis of negotiated settlement. The OHSRs (88 nos.) and Transmission network of 112.7 kms have been proposed on Government land. Necessary permission has already been obtained for laying of transmission line network from respective government authority like PWD, NHAI, Railway, Forest Department etc. As per the Archaeological Survey of India (ASI), two archaeological monuments i.e., Ram Bagh Gate (0.42 km) and Summer Palace of Maharaja Ranjit Singh (0.66km) have also been identified within the vicinity of the project.

5 ASSESSMENT OF ENVIRONMENTAL IMPACTS

5.1 Introduction

138. This chapter outlines the environmental impacts identified through the examination of primary and secondary information. This examination includes a review of available project documentation, discussions with project representatives and the local community, as well as consultations with sector-specific professionals and subject matter experts. The impacts expected during the pre-construction, construction, and operation and maintenance phases have been identified.

139. To assess these impacts comprehensively, an impact matrix has been developed, considering factors such as the extent of impact, duration, and intensity. These impacts are further categorized into pre-construction, construction, and operation and maintenance phases. This chapter evaluates the significance of each identified impact based on the collective severity of its spread, duration, intensity, and nature.

5.2 Associated and Potential Environmental Impacts

140. The bulk water supply project is associated with various environmental impacts, both positive and negative. These impacts include water quality changes, changes in land use, energy consumption, resource utilization, noise and air pollution, biodiversity effects, and workers and community health and safety concerns, among others.. These impacts stem from construction activities, alterations in water flow, and infrastructure development. It is imperative to identify and address these issues, proposing mitigation measures to minimize adverse effects.

5.2.1 Rating of Impacts

141. During the construction phase, impacts may be deemed temporary or short-term. These impacts are site-specific and associated with project activities such as the construction of WTP, OHSRs and the laying of transmission line network. The impacts have been categorized as per the World Bank's Environmental and Social Standards (ESSs) applicable to the project.

5.2.2 Impact Appraisal Criteria

142. The Criterion which has been employed to appraise impacts on various environmental components as presented in **Table 5.1.**

Table 5-1: Impact Appraisal Criteria

Criteria	Sub-Classification	Defining Limit
Spread: refers to area of direct influence from the impact of a particular project activity.	Within site	Impact is restricted within the Project site.
	Buffer area	Impact is spread up to 200 m from footprint boundary of the Project.
	Widespread	Impact is spread up to 500 m from the boundary of the Project.
Duration: based on duration of impact and the time taken by an environmental component to recover back to current state	Short Duration	Impact is likely to be restricted for less than 1 year.
	Medium Duration	Impact extends up to 3 years
	Long Duration	Impact extends beyond 3 years
Intensity: defines the magnitude of Impact	Low intensity	Changes in the baseline conditions up to 20%
	Moderate intensity	Changes in the baseline conditions for up to 30%
	High intensity	Change resulting in the baseline conditions beyond 30%

5.2.3 Determining the magnitude of impact

143. Significance assessment matrix has been developed to assess the impacts based on the appraisal criteria developed in Table 5.1, which is as given in **Table 5.2.**

Table 5-2: Impact Significance Criteria

Spread	Duration	Intensity	Impact Significance
Within site	Short	Low	**Low**
Within site	Short	Medium	**Low**
Within site	Medium	Low	**Low**
Within site	Medium	Moderate	**Low**
Within site	Long	Low	**Low**
Buffer	Short	Low	**Low**
Widespread	Short	Low	**Low**
Widespread	Long	Low	**Low**
Within site	Long	Medium	**Moderate**
Buffer	Short	Medium	**Moderate**
Buffer	Medium	Low	**Moderate**
Buffer	Long	Low	**Moderate**
Widespread	Short	Medium	**Moderate**
Widespread	Medium	Low	**Moderate**
Widespread	Medium	Medium	**Moderate**
Widespread	Long	Medium	**Moderate**
Within site	Medium	High	**Substantial**
Within site	Short	High	**Substantial**
Buffer	Short	High	**Substantial**
Buffer	Medium	Medium	**Substantial**
Buffer	Long	Medium	**Substantial**
Widespread	Short	High	**Substantial**
Widespread	Medium	High	**Substantial**
Within site	Short	High	**High**
Within site	Long	High	**High**
Buffer	Medium	High	**High**
Buffer	Long	High	**High**
Widespread	Long	High	**High**
			No Impact
			Positive Impact

5.2.4 Land Environment

144. The project requires 40 acres of land for the construction of the Water Treatment Plant (WTP). The land use of the project site will change from agricultural land to non-agricultural land, resulting in a permanent alteration of land use. The impact on top soil is envisaged as the land is agricultural in nature. However, the agricultural potential of the site is low, as determined from primary soil sampling analysis

145. The alignment of the transmission line is proposed in such a way that it will be laid along existing roads, canals, and railway lines. No change in land use will occur due to the laying of the transmission line. The laying of the transmission line may disrupt existing services such as water supply and power supply. Excavation and installation activities could potentially interfere with underground power cables, necessitating temporary disconnections.

146. During construction activities, soil compaction will occur due to the movement of vehicles, construction machinery, and workforce. If the soil is not covered or compacted during site clearances, it may be vulnerable to wind and water-induced soil erosion, which could be exacerbated by site clearing activities. Site clearance, excavation, drilling for foundations, and access road construction will significantly affect the top layers of the soil, resulting in temporary impacts that are short-term in nature. The soil may also become polluted or contaminated due to accidental spillage or leakage of hazardous chemicals, oil, or fuels.

5.2.5 Ecological Resources

147. The proposed project involves the diversion of 22.017 hectares of forest land during the laying of the transmission line. Out of this, diversion for 18.54 hectares of forest land, which encompasses a total of 679 trees (671 due to the laying of the transmission line and 8 due to the construction of OHSRs), has already been obtained vide letter no.9-PBB319/2023-CHA, dated 08.11.2023. However, the diversion of 3.477 hectares of forest land, involving 251 trees, is currently under process, and stage-I clearance has been obtained from the forest department vide proposal no. FP/PB/Pipeline/450496/2023 dated 11/01/2024. Additionally, 254 trees are required to fell due to the construction of OHSRs on non-forest land (76 trees have already been felled after obtaining prior tree cutting permission). Consequently, the overall development of this project will necessitate the felling of a total of 1184 trees. No tree felling or forest land diversion is proposed for the construction of WTP. Tree cutting around the project-associated facilities, such as the laying of transmission lines, will disturb flora and fauna. The species and girth-wise details of the trees are provided in **Annexure 5.1**.

5.2.6 Water Environment

148. There are no major water bodies in the nearby vicinity of the project area, except for the MBL, which passes approximately 50 meters away from the WTP. Water for construction works is being sourced from the MBL. There is a possibility of contamination in low-lying areas and surface water quality due to sediment runoff from construction activities and wastewater disposal from labour camps. The extraction of water from the MBL can potentially impact water quality, downstream agricultural activities, and aquaculture. Due to the operation of the WTP, the reliance of residents on groundwater extraction will be reduced, ultimately aiding in restoring the groundwater table of the affected area.

149. The planned alignment of the transmission line follows existing roads and canal strips, minimizing the potential for pollution in surface water bodies within the city. Therefore, no significant impacts on surface water quality are anticipated due to the proposed alignment.

150. The pipeline alignment is on relatively flat terrain, and neither the construction nor the operational activities of the project are expected to disrupt groundwater characteristics. Consequently, significant impacts on groundwater quality are not anticipated.

Downstream Impact: Water will be extracted from the MBL for both construction and operational purposes. Downstream users of the MBL may experience turbid water during construction of WRD works. The impacts on water availability is minor, as 2.2% of water is withdrawn for project purposes. This will not impact irrigation for agricultural lands downstream. ***Climate and Air Environment***

151. The impact of a bulk water supply project on climate encompasses various factors. Energy consumption during water treatment and distribution processes can contribute to greenhouse gas emissions. Land use changes for infrastructure construction and raw material extraction for project components may affect ecosystems and contribute to carbon emissions.

152. Fugitive dust emissions (PM_{10}, $PM_{2.5}$) and gaseous pollution (SOx, NOx, CO), resulting from the operation of construction machinery such as drilling, welding, concrete mixers, dumpers, operation of batching plant etc., during civil works, will contribute to air pollution. However, since the pipeline is planned to be laid in flat terrain along existing roads and canals, the impact on air pollution is expected to be relatively modest. On-site air quality impacts during construction at the WTP and OHSRs could be higher.

153. During the construction phase, the transportation and lifting machinery required for handling materials may contribute to air quality deterioration, particularly at OHSRs and WTP locations. However, no significant air quality impacts are anticipated during the operational phase of the project.

5.2.7 Noise Environment

Construction Phase: The movement of vehicles, transportation of construction materials, operation of machines and equipment, and noise-generating activities at the construction site are identified as primary sources of noise

pollution during the construction phase. The material movement and laying of transmission lines, which contribute to noise, will occur throughout the entire construction period. Activities involving the laying of transmission lines and construction of OHSRs in close proximity to residential areas may temporarily contribute to noise pollution, but the impact is confined to the construction phase only.

Operation Phase: During the project's operational phase, noise will be generated only at the WTP site and pump house which is at a distance of 2.5 from nearest habitat area. No noise-generating activities are anticipated along the transmission line, except during regular maintenance activities. Consequently, no significant noise impacts are predicted during this phase.

5.2.8 Archaeological / Cultural Properties

154. According to the Archaeological Survey of India (ASI), one archaeological monument has been identified in the nearby vicinity of the project area i.e. the Ram Bagh Gate (0.72 km from W49-E1 and 0.89 km from W49-P1).

155. Since the project activities do not fall within either the prohibited area (100mtr) or regulated area (300 mtr) in respect of protected monuments as per the Ancient Monuments and Archaeological Sites and Remains Act, 1958, and its amendments, there will be no impact on the monument.

5.2.9 Other Issues

156. The transmission line crosses Indian Railways at 4 locations, highways/roads at 27 locations, canals at 10 locations, and drains at 6 locations. Location details of crossing of transmission line is provided in previous section Chapter-2 (**Annexure-2.5)**. Prior permissions are being sought from concerned departments such as NHAI, Railways, PWD, MCA, and the Cantonment Board, etc., before laying the transmission line. Construction activities may cause damage or cracks to common property, roads, buildings, and religious sites. Additionally, construction activities may restrict access roads, causing inconvenience to the community.

5.3 Pre-Construction Phase Specific Impacts and their Rating (Activity specific impacts)

157. The details of the activities carry out during pre-construction phase of the project component and its impact along with applicable ESS is given in **Table 5.3**.

Table 5-3: Pre-Construction Phase Specific Impacts

Activity	ESS triggered	Impact
Site Clearance and tree cutting	ESS 1, ESS 3, ESS 4, ESS 6, ESS 10	Laying of transmission line and construction of OHSRs involve diversion of total 22.017 ha of forest land (18.54 Ha+3.477 ha) impacting 1184 trees, including 922 trees due to the laying transmission line and 8 trees due to construction of OHSRs (on Forest land) and 254 trees (non-forest land) due to OHSRs construction. This tree cutting poses a threat to flora and avi-faunal species. The clearance obtained from WRD for bulk water withdrawal (both for construction use and operations) from MBL canal is annexed as Annexure No.2.4
Statutory Clearances	ESS 1, ESS 3, ESS 6	. Establishment of Ready Mix Concrete (RMC) Plant also needs CTE from PPCB. In addition to this CTO needs to be obtained before the start of operation. Laying of transmission line and construction of OHSRs required permission from Forest department, MCA, PWD, NHAI, Railway, Amritsar Improvement Trust and cantonment board etc. Transmission line is crossing railways at 4 Location, Highway/Road at 27 Locations, Canal at 10 Locations and drains at 6 locations.

Activity	ESS triggered	Impact
Utility Shifting	ESS1, ESS2, ESS3, ESS 4, ESS 10	Telephone lines, electric poles and wires, electrical connection boxes, gas pipeline, water lines within the proposed project locations may require to be shifted in few cases (Map of underground utility is attached as **Annexure-5.2**).
Selection of Disposal Site	ESS 1	The project involves approximately 573,834 cubic meters of excavation of earth (WTP, OHSRs and Transmission), 318,580 cubic meters for backfilling, and disposal of balance 255,254 cubic meters needs to be done. Improper disposal sites can lead to soil and water contamination. Sites for solid Waste and C&D Waste. The municipal waste disposal site is at Bhagtawala. For C&D waste disposal site is at Fatehpur (about 6 Ac land). However, the MCA has a C&D recycling plant at Fatehpur, which was established as a part of Smart City Program.
Sources identification for construction materials	-	Selecting a suitable location for transportation of construction material and identifying the most efficient route for the same during the preconstruction stage

5.4 Construction Phase Specific Impacts and their Rating (Activity specific impacts)

158. The details of the activities carry out during construction phase of the project component and its impact along with applicable ESS is given in **Table 5.4**. Detailed analysis of impact due to construction, Rehabilitation and demolition of all OHSRs has been provided in **Annexure-5.3**.

Table 5-4: Construction Phase Specific Impacts

Activity	ESS triggered	Impact
Construction of Head regulator cum cross regulator	ESS 1, ESS 2, ESS 3, ESS 4, ESS 6, ESS 10	• The use of the existing "Kaccha road" along the MBL for transportation of construction material may result in dust pollution. This could lead to accidents due to mismanagement of approach roads and traffic congestion. • Traffic congestion may occur due to the movement of heavy vehicles used for construction activities on approach roads. • Excavated soil may lead to soil erosion. • Surface and groundwater contamination in the MBL may occur due to the construction of Head Regulator cum Cross Regulator. • Improper disposal of solid waste and muck may cause water pollution. • Accidents may occur during the construction phase due to machinery and vehicle operations
Construction of WTPs	ESS 1, ESS 2, ESS 3, ESS 4, ESS 6, ESS 10	• Risk of accidents particularly during construction of WTP, while working at height and depth. • Due to earth work activities at WTP site, approximately 381,147 cum of soil will be generated out of which 187,367 cum will be backfilled at site. However, disposal of balance 193,780 cum soil will lead to air water and soil pollution. • Amritsar falls under over exploited area as per Punjab Water Regulation and Development Authority (PWRDA). Extraction of

Activity	ESS triggered	Impact
		ground water for construction and domestic activity will impact the ground water. • Waste water disposal from labour camp may contaminate the ground water as well as soil. • The WTP site is situated in close proximity of MBL, Run-off from stockpiled materials and chemical contamination from fuels and lubricants during construction works can contaminate the natural drainage system of area. • The generated hazardous wastes like spent oil, oil-soaked cotton and back filter waste, waste containers/tins of paints, used lead/acid batteries, ferrous and nonferrous scrap etc. may cause the soil and water contamination. • Natural topography of the area may get affected due to the construction of WTP. • May cause accidents during construction phase due to machineries and vehicles. • The use of heavy machinery and construction materials will lead to dust and noise emissions, affecting the health of nearby residents, workers and labours.
Laying of Transmission Line (112.7 km) of 100 mm to 1728 mm pipe.	ESS 1, ESS 2, ESS 3, ESS 4, ESS 5, ESS 6, ESS 10	• Risk of accidents particularly during welding of pipeline, while working inside the pipeline. • TL route is passes through urban zones and inhabited areas, along roads, where tertiary types of ecosystems are already dominant, it is unlikely to expect significant negative impacts on flora and fauna from this project. A temporary loss of habitat along the working corridor could reduce the carrying capacity of the home ranges of the fauna, especially until vegetation cover is re-established. • Laying of transmission line near to the sensitive areas like, Hospitals, Schools, Religious places etc. is likely to affect their routine activities. • Traffic Congestion on Narrow Streets due to the excavation activity for the laying of transmission line and movement of construction machineries. • Laying of transmission line will generate 142,852 cum of muck, out of which, 92,342 cum will be backfilled at site and balance 50,510 cum waste disposal may cause air water and soil pollution. • Improper storage of excavated soil and other construction material may lead to accidents and erosion. • Surface water contamination may take place while laying of TL near MBL or another water body. • risks arise due to inadequate barricading along the trench and not closing the trench in time.
Construction of new OHSRs, Rehabilitation of OHSR*	ESS 1, ESS 2, ESS 3, ESS 4, ESS 6, ESS 10	• Risk of accidents particularly during construction of OHSRs, while working at height. • Construction of OHSRs will generate the 49,835 cum of muck out of which, 38,871 cum will be backfilled, balanced 10,964 cum waste will generate soil and water pollution. • Construction of OHSRs in the residential areas, Municipal Park will affect the aesthetic value, property value, view of the resident. This will also cause the shadow effect on the nearby residents. In addition

Activity	ESS triggered	Impact
		to this construction of OHSRs take up space that people use for walking. • Construction of OHSRs near to the sensitive areas like, Hospitals, Schools, Religious places etc. is likely to affect their routine activities. • Will lead to reduction in green areas of parks and common spaces. • Working at heights can be dangerous for workers' health. Falls from heights can lead to very bad injuries or even death. The use of heavy machinery and construction materials will also lead to dust and noise emissions, affecting the health of workers and labours. • Traffic issues and Disruption of Water supply
Dismantling of existing OHSRs*	ESS 1, ESS 2, ESS 3, ESS 4, ESS 6, ESS 10	• The demolition of 17 OHSRs would generate a total waste of 6856 cum waste will generate soil and water pollution. However, 04 no. of OHSRs are under reconsideration as these are in good condition. • The demolition activities will generate dust and particulate matter, adversely impacting air quality in the surrounding area. • The manual process generally quieter however it will lead in noise pollution, which can disturb nearby residents and wildlife. • Risk of accidents during dismantling of OHSRs. • Dismantling requires strict safety measures, including establishing safety zones to protect workers and the public. • Dismantling shall result the generation of debris, posing risks to nearby structures and environment. • Surface and ground water contamination due to improper disposal of C&D Waste.

159. *Detailed analysis of impacts and "Risk Categorization" for all OHSRs and Transmission line is provided in **Annexure-5.4 & 5.5.**

5.5 Operation & Maintenance Specific Impacts and their Rating (Activity specific impacts)

160. The details of the activities carry out during Operation & Maintenance phase of the project component and its impact along with applicable ESS is given in **Table 5.5**.

Table 5-5: Operation & Maintenance Specific Impacts

Activity	ESS triggered	Impact
Impact on environment attributes	ESS 1, ESS2, ESS 3, ESS 6	• Regular vehicular movement of employs will generate fugitive emissions. • Chemical/ oil spillage during regular maintenance work will contaminate the soil and ground water. • The regular operation of water-regulated gates, such as opening and closing mechanisms, may generate noise. Operation of machineries at WTP and OHSRs will also contribute in noise pollution. • Greenhouse gases emission due to high energy consumption in WTP and OHSRs Pumping
Sludge Generation	ESS 1, ESS 3, ESS 6	• Sludge generation during the operation may impact water quality, health of soil around the WTP.
Filter Backwash Water	ESS 1, ESS 3	• Waste residuals like Filter Back Wash Water (FBWW) and Clarified Sludge Water (CSW) will be generated during WTP operation. This water after settling need to be fed back to inlet to avoid wastage of water.

Health Hazard	ESS 1, ESS 2, ESS 3, ESS 4, ESS 6, ESS 10	Chlorine leakage may cause the health hazard to the worker in the WTP as well as residents of vicinity. Provision of adequate fire detection and firefighting systems at the site like extinguishers, sand buckets, fire blankets, usage of fire-resistant materials/wires, etc. The ESMP has measures related to fire safety. Over dosing of chlorine may cause chlorine intoxication, during the water treatment. The ESMP has measures related to chlorine handing. .

5.6 Environment Impact Matrix

161. The criteria for appraising impacts are detailed in **Table 5.1**, and its significance assessment matrix to evaluate impacts based on these criteria is provided in **Table 5.2**. Consequently, the environmental impacts associated with the project activities in each phase have been assessed for their significance. The Environmental Impact Matrix is given in **Table 5.6.**

Table 5-6: Environment Impact Matrix

S. No.	Main Activities	Environmental Impact											
		Land Use	Ambient Air	Ambient Noise	Vibration	Ground Water	Surface Water	Soil Resources	Ecology	Traffic	Cultural Heritage	Topography	Aesthetic and Visual impact
1	**Pre-Construction Phase**												
a	Vegetation Clearance	L	L					L	S				M
b	Utility Shifting	M	L	L	L		L	M	L	M			
2	**Construction Phase**												
a	Site Clearance and levelling	M	M	L	L			M	L			L	L
b	Strengthening of access road	L	P			L		M		L			
c	Transportation of construction material		M	L						M			
d	Storage and handling of construction materials	M	L	L		L		M	L				L
e	Establishment of Labour camp	L				M		L					
f	Construction of WTP	S	S	M	M	M		M	M	L			M
g	Construction of Head regulator cum cross regulator	M	M	M			S	M	S	L			
h	Laying of Transmission Line	L	M	M	M		L	M	S	H		L	L
i	Construction of new OHSRs	M	S	S	M		L	S	S	S	L		S
j	Dismantling of existing OHSRs	M	H	H	S			S	S	M	L		M
k	Rehabilitation of OHSRs	L	M	M	L			L	L	L			L
l	Operation of DG sets		M	L				L					
m	Operation of construction machinery		S	S	M	M	M	S	S	M			

S. No.	Main Activities	Environmental Impact											
		Land Use	Ambient Air	Ambient Noise	Vibration	Ground Water	Surface Water	Soil Resources	Ecology	Traffic	Cultural Heritage	Topography	Aesthetic and Visual impact
n	Generation and handling of muck	S	M			M		S	M	M			S
o	Waste and Sewage Generation					M	M	M	M				S
3	**Operation Phase**												
a	Sludge generation from WTP							M					
b	Waste and Sewage Generation					M	M	M	M				S
c	Withdrawal of Surface water					P	M		M				
d	Vehicular movement		L	L						L			
e	Periodic maintenance of project component	L						L		L			

Impact Significance:

Low:	L	Moderate:	M	Substantial:	S	High:	H	Positive:	P

5.6.1 Positive Impact

162. The project aims to mitigate the over-exploitation of groundwater, yielding positive environmental implications. It also targets enhancing water supply reliability in the region, thus minimizing the disparity between water demand and supply. By decreasing reliance on groundwater, it has the potential to ameliorate the declining groundwater table significantly. Additionally, the project is anticipated to boost annual revenue for Urban Local Bodies (ULBs) through water tariff and enhance service delivery. Access to clean drinking water will assist residents of Amritsar in safeguarding themselves against water-borne diseases and the challenges associated with consuming untreated water.

5.7 Conclusion

163. The project is not situated within any eco-sensitive areas nor in proximity to cultural heritage sites. However, the construction of the proposed project is expected to have environmental consequences for the neighbouring settlement, particularly concerning soil and noise during the construction phase. Although impacts on water quality and hydrology are anticipated to be minimal and temporary, the operation of construction machinery on-site is foreseen to significantly impact air and noise quality, mainly due to activities such as trench digging, construction, and demolition. Based on the above environmental impact analysis, the project is categorized as "Substantial Risk" which will be reduced to "Moderate Risk" after mitigation measures described in Environmental Social Management Plan (ESMP) (Chapter-8).

6 ASSESSMENT OF SOCIAL IMPACT

6.1 Introduction

164. This chapter delineates various social impacts identified throughout the planning, construction, and operation phases of the project. The identification of these impacts stems from experts' site visits, census and socio-economic surveys, a review of available project information, discussions with the local community, stakeholders, and representatives of the project proponents, DBOT, and other sector-specific professionals. The anticipated social impacts are categorized into pre-construction, construction, and post-construction phases.

165. The project will generate a range of social impacts in the project area. Many of these impacts will be beneficial, particularly the improvement in the availability of potable water in the city, a reduction in waterborne diseases, and the establishment of an environmentally sound, safe, and sustainable water sanitation system. However, some negative impacts are foreseen, albeit in the form of temporary inconveniences that will need to be effectively mitigated.

6.2 Social set up of WTP, OSHR and Transmission Line Network Area

166. In accordance with the project's requirements and evident from the design, the major components of the Project which include construction of Water Treatment Plant (WTP), construction/rehabilitation of Overhead Service Reservoirs (OHSR)s, demolition of OHSRs and laying of the transmission line network. The section below outlines the impacts specific to each project component, namely WTP, OHSRs, and the transmission line network.

a. Water Treatment Plant (WTP)

167. The WTP site is located at Vallah village in Amritsar, close proximity to the Main Branch Lower (MBL) canal which serves as the water source for the project. A total of 40 acres of land for the WTP has been purchased through negotiated settlements with 49 landowners. A comprehensive census and socio-economic survey were conducted from October 10, 2022, to October 29, 2022, specifically for families whose land has been purchased for the construction of WTP. It's important to note that beyond these 49 affected land owners, construction of WTP does not impact any private (residential, commercial, res-cum-commercial), government, religious, or community structures.

b. Overhead Service Reservoirs (OHSRs)

168. This project encompasses construction of 51 new OHSRs and the rehabilitation of 37 existing ones, totaling 88 OHSRs in Amritsar city. All 51 newly proposed OHSRs are planned on government land where no physical or economic displacements have been observed during the census survey. The social implications extend to the neighboring communities where disruptions related to construction are likely to be more noticeable, particularly affecting parks and leisure areas. The proposed construction of OHSRs within parks has raised concerns among residents who regularly use these spaces for recreational and leisure activities. The potential loss of park areas may deprive the community of valuable spaces for relaxation and exercise, leading to social stress and dissatisfaction among local residents, impacting their overall well-being.

169. Moreover, the project's economic impact may vary with job creation during the construction phase. However, potential resentment and conflicts among local residents who are apprehensive about the visual impact of the structures, shadow effects, and potential effects on property values, need to be addressed. The proposal to construct OHSRs in residential parks impacts recreational areas and accessibility during construction and demolition activities.

c. Transmission Line

170. This project also involves laying of transmission lines of 112.7 Km in Amritsar and proposed on government land. Construction activities, particularly in urban or residential areas, have the potential to disrupt the daily lives of local residents. The heightened construction-related traffic could lead to road congestion and delays may cause public nuisance and social unrest if not managed properly. Importantly, no permanent displacement or loss of livelihood has been observed in the areas designated for the transmission lines. However, during community consultation, 25 nos. of street vendors were observed at Chheharta and Majhitha road that may get affected temporarily.

6.3 Process for Social Impact Assessment

171. In order to ascertain social impacts and risks arising from the construction of WTP, OHSRs, and transmission lines network, a census and socio-economic survey of Project Affected Families (PAFs has been conducted. Further, to gather baseline information of the study area, relevant data from secondary sources has also been collected and analysed. Simultaneously, a thorough process of stakeholder identification and consultation has also been carried out. After review of all the information collected through primary and secondary sources, social risks & impacts have been identified and analysed. In order to determine magnitude of the actual impact; an impact appraisal criterion has already developed and provided in Chapter-5. However, the process of social impact assessment is explained in the **Figure 6.1**.

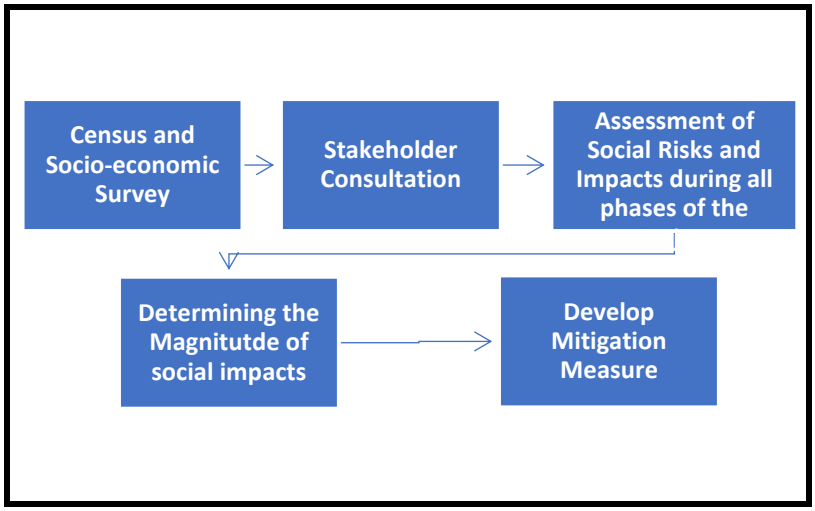


Figure 6-1 Process for Identification and Assessment of Social Impacts

172. The adverse impact anticipated on various social components are assessed for project phases and based on the activities an impact matrix has been prepared and presented in the Table 6.1 below:

Table 6-1: Impact Identification Matrix

S. N.	Main Activities	Social Components							
		Land Use	Livelihood	Cultural Heritage & Historical Places	Occupational Health and Safety	Community health and Safety	Labour and working condition	Grievance Redressal Mechanism (GRM)	Gender Based Violence (GBV)
1	**Pre-construction Stage**								
a	Requirement of Land	√						√	√
b	Right of way and its clearance work	√						√	√
2	**Project Construction Stage**								
a	Influx of Labour and Labour Engagement	√	√		√	√	√	√	√
b	Impacts due to labour camp	√			√	√	√	√	√
c	Impact on Cultural Heritage			√					
3	**Project Operation Stage**								
a	Labour Engagement		√		√	√	√	√	√
b	Community Health					√		√	√

6.4 Potential Social Impacts in different Phases of the Project

173. Social impacts are associated with different stages of project cycle and thus such impacts during pre-construction, construction and operation were identified. Operationally there will be minimal social impacts and these can be addressed through good management practice and good local communication by the Executing Agency.

174. The construction phase affects the maximum primarily because of the multiplicity of activities at different project sites linked with different components like:

- Construction of WTP,
- Construction of new OHSRs,
- Rehabilitation of Existing OHSRs
- Laying of pipe
- Dismantling or demolition of existing OHSRs

6.4.1 Impact During Project Pre-Construction, Construction and Operation Phases

Table 6-2: Impact During Project Pre-construction, Construction and Operation Phase

S. No.	Social Attributes	Project Component	Potential Impacts
A. Project Pre-Construction Phase			
1	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement (ESS-5)	WTP, OHSRs and Transmission line	**Positive Impact** • The private land purchase has been done through mutual negotiation. Hence, the risk of forceful acquisition or eviction of affected people for project construction is not involved. • The project does not attract involuntary displacement, restrictions on land use, access to natural resources, common property resources and access to livelihood. **Negative Impact** • Opposition has arisen within the community at certain[17] OHSR locations. These OHSRs are proposed in well-maintained and developed parks. Concerns include potential degradation of the park's aesthetic value and restrictions on its use for recreational activities. • Shall impact on daily activities of commuters where laying of the transmission line requires maximum of 6 m of Row. • Involvement of litigated land resulting delay in project development.
2	Cultural Heritage (ESS-8)	OHSRs and Transmission line	The identified archaeological site i.e Ram Bagh Gate is more than 300 m away from the construction sites and doesn't falls under prohibited area (100mtr) or regulated area (300 mtr). Hence, no impact will be envisaged.
3	Stakeholder's Engagement and Information Disclosure (ESS-10)	WTP, OHSRs and Transmission line	**Positive Impacts** • Carryout stakeholders/public consultations exercise to sensitize the inhabitants of project on the social safeguards components of the project. • It is important to consider the views and opinions of the stakeholders for site selection, design and implementation.

[17] The details of the OHSRs where public resistance is observed are given in Section 7.2, Table 7.1 and Annexure-7.1 (MoM) of Chapter-7

S. No.	Social Attributes	Project Component	Potential Impacts
			Negative Impacts • Failure to engage stakeholders can result in public nuisance and grievances, leading to delays and potential legal issues. • Concerns about accessibility of road, disruption to local businesses and issues of local residents for the use of park. • Limited participation and representation of women in project planning and decision-making processes.
B. Project Construction Phase			
1	**Labour and Working Conditions (ESS-2)**	WTP, OHSRs and Transmission line	**Influx of Labour** **Positive** • It is anticipated that once the construction work starts locals (labours) will be involved in formal & informal jobs at construction site; this will provide job opportunities to the local inhabitants. Approximately 1200 workforce will be required (i.e. skilled, unskilled and semi-skilled) for construction of WTP, OHSRs and laying of transmission pipeline • Employment of local skilled and unskilled labour will be promoted. **Negative** • Estimate labour workforce for the project is 1200 which may vary as per requirement. Majority of labour is Migrant labour, which is to be involved in the construction. The sudden increase in population can strain local resources, including housing, healthcare, education, and public services. • An influx of labour may result in tensions and conflicts with the local community. • Discrimination in employment (e.g., abrupt termination of the employment, working conditions, wages or benefits etc.) • Inadequate accommodation, sanitation and health facilities at labour camps • Non-payment, disparity of wages and/ or denial of benefits (compensation, bonus, maternity benefits etc.) • Engagement of child labour and trafficking of labour • Inadequate separate accommodation, sanitation and health facilities for female labour at labour camps • Safety, security of women workforce at work sites and within workforce camps • Lack/Inadequate facilities for pregnant women and lactating mothers and children at camp sites • Absence of a grievance mechanism for labour to seek redressal of their grievances/issues • Absence or inadequate or non-responsive emergency response mechanism for rescue of workforce, during natural calamities like cloud bursts, caving in/landslides, disasters due to earthquake/floods/fire outbreak etc. at operational sites and/or workforce camps

S. No.	Social Attributes	Project Component	Potential Impacts
			Occupational Health and Safety Hazards • Mishandling of construction materials can lead to injuries. • Construction activities may result in physical injuries from road accidents, construction accidents, and other hazards. • Elevated risks of accidents and injuries during construction activities. • Overexertion injuries and illnesses are common due to the physical demands of construction work. • Poor housekeeping, such as debris and liquid spills, can cause slips and falls, resulting in injuries and work disruptions. • Lack of proper training, Tool Box talks/PEP Talks Transportation and vehicle movement pose risks of road accidents and related injuries. • Lack/Inadequate facilities for pregnant women and lactating mothers and children at camp sites. • Sexual harassment and Gender Based Violence (GBV) issues within workforce camps or at work sites. • Health risks of labour relating to HIV/AIDS and other sexually transmitted diseases
2	**Gender Based Violence (GBV) (ESS-1 and 2)**	WTP, OHSRs and Transmission line	• Sexual harassment such as SEA/SH and Gender Based Violence (GBV) issues within workforce camps.
3	**Community Health and Safety (ESS-4)**	WTP, OHSRs and Transmission line	**Health Risks:** • Noise, dust and ambient air pollution due to Traffic congestion, • Influx of migrant workers and interactions with the local population may lead to the spread of health issues, including STIs, HIV/AIDS, Hepatitis B & C, tobacco chewing, tuberculosis and substance abuse. • Gender-Sensitive Health & Safety issues. **Likelihood of increased accidents:** • Traffic Disruption and diversion. • The diversion or closure of roads can disrupt the normal flow of traffic in the affected areas. This may lead to delays, congestion, and increased travel times for commuters. This can also affect both local residents and through-traffic, potentially causing confusion and inconvenience. • Emergency services, such as ambulances, school buses and fire departments, may experience delays in response times due to altered traffic patterns. This could have implications for public safety. • Pedestrians and cyclists may also be affected, especially if sidewalks or dedicated pathways are closed or altered. Safety concerns may arise, particularly if construction zones are not adequately marked.

S. No.	Social Attributes	Project Component	Potential Impacts
			• Proper communication about road closures, detours, and construction schedules is crucial. Inadequate communication may lead to confusion among residents and commuters. • Accidents due to over-speeding of construction vehicles. **Demolition of OHSRs** • Increase in Dust Level due to dismantling. • Accumulation of demolished waste. • Risk of damage to nearby existing property and human life.
5	**Land Acquisition, Restrictions on Land Use and Involuntary Resettlement (ESS-5)**	OHSRs and Transmission line	• Construction of the transmission line shall impact 25 street vendors and hawkers temporarily. Further, re-verification is required by the PIU at the time of laying of transmission line. • Aesthetic value of the park may get affected during construction activities of OHSRs. Access of local residence into the park may also restricted. • Construction activities may cause damage or cracks to private property, common property, roads, buildings, and religious sites. • Laying of the transmission line may disrupt existing services like water and power supply. Excavation and installation activities could potentially interfere with underground power cables or require temporary disconnections. • Construction activities may restrict access roads, causing inconvenience to the community.
7	**Cultural-Heritage (ESS-8)**	WTP, OHSRs and Transmission line	• Amritsar, having rich history and cultural heritage sites, there may be chance of finding of ancient monuments and artefact during excavation activities.
8	**Stakeholder Engagement and Information Disclosure (ESS-10)**	WTP, OHSRs and Transmission line	**Positive** • Frequent consultation will minimize potential opposition or resistance from the community towards the project. **Negative** • The community may face discomfort and inconvenience due to construction-related disturbances. • Lack of effective communication between project departments and stakeholders will results delay in project execution.
C. Project Operation Phase			
1	**Labour and Working Conditions (ESS-2)**	WTP, OHSRs and Transmission line	**Positive** • Generate local job opportunities aligned with skills and education levels. • Increase tax revenue for the project region, contributing to long-term economic growth and revenue generation. **Negative**

S. No.	Social Attributes	Project Component	Potential Impacts
			• Workers may be exposed to chemicals and hazardous materials such as chlorine during the water treatment process, posing risks to their health. • Continuous operation of WTPs often requires shift work, leading to potential challenges such as disrupted sleep patterns and impact on personal life. • The critical nature of water treatment services may result in stress levels for workers, especially during emergency situations or equipment failures. • The use of heavy machinery and involvement in complex processes increases the risk of accidents, posing a threat to the safety of workers.
2	**Community Health and Safety (ESS-4)**	WTP, OHSRs and Transmission line	**Positive** • The implementation of the project will directly contribute to improved public health. • There will be improved household income due to employment of local labour. It is generally anticipated that local labour will be employed especially for casual activities. • There will be improved household income due to increased purchase power within the project area. Household enterprises like shops, farmers, restaurants, housing rentals, etc. will benefit from the presence of project construction workers who will regularly purchase such items. • The new & improved water supply pipeline will provide good quality water & result in decrease in health problems. • An improved water supply system will lead to a reduction in instances of sexual violence related to water scarcity and inconsistent supply. Indirectly, this will lead to an improvement in public order and governance. **Negative** • The presence of COVID-19 and other communicable diseases poses a potential health risk to the community and project personnel. • Poor drinking water quality may lead to water-borne diseases among the residents of Amritsar. • Negative impact may arise from occurrence of chlorine intoxication, if water is over chlorinated during treatment.
4	**Stakeholder Engagement and Information Disclosure (ESS-10)**	WTP, OHSRs and Transmission line	• Meaningful consultation is a continuous process throughout the project cycle for the information dissemination among the project proponent and other stakeholders to know the status of project development.

6.5 Conclusion

175. The identified social impacts, as assessed above, are temporary in nature and limited to the project construction phase. The project involves minimal land requirements (40 acres), which have already been purchased through mutual negotiation. It also does not directly impact community structures, except for minimal temporary livelihood loss during project construction, especially during the laying of pipelines. Construction phases may result in labor influx, occupational health and safety (OHS), and community

health and safety (CHS) risks, primarily during the construction stage Implementation of the suggested mitigation measures during different phases of the project will prevent or minimize adverse impacts.

176. Additionally, stakeholders are in favor of the project, and they believe that the water supply project will improve the quality of life, including health benefits. Impact assessment has been conducted in line with the World Bank ESF and ESS, and accordingly, the risk of the project is identified as falling within the "Moderate Risk" category.

7 STAKEHOLDER ASSESSMENT

177. Engaging in meaningful consultations with stakeholders has played a pivotal role in the social and environmental baseline assessment. The purpose was to gather insights and perspectives from stakeholders regarding social and environmental aspects related to the project. The overarching goal of these consultations was to pinpoint environmental and social issues, assess risks, identify impacts, and explore options for mitigating potential negative impacts. This section presents a thorough analysis of the viewpoints and suggestions expressed by stakeholders across all three project components—Water Treatment Plant (WTP), Overhead Service Reservoir (OHSR), and Transmission Line.

7.1 Stakeholder Analysis

178. Identification of stakeholders and conducting stakeholder analysis proves beneficial for prioritizing, analyzing, and assessing issues, facilitating the creation of management systems and strategies to address specific concerns. In alignment with the stakeholder analysis conducted for the project, the identified stakeholders have been categorized into three main groups: a) affected parties (landowners and vendors), b) interested parties (including residents near the Overhead Service Reservoirs (OHSRs) and the transmission line network, NGOs, MCA officials, etc.), and c) vulnerable groups (specifically, women's groups), as outlined in ESS10.

179. During the stakeholders' consultation, a diverse array of participants was engaged, representing various segments of the community. The consultations included participation from ordinary citizens, shop owners, vendors, and residents hailing from different localities such as Majitha Road, Mustafabad, Valmiki Mandir, Vallah, Chehharta Road in Amritsar, among others. Moreover, representatives from the Municipal Corporation Amritsar, Ward Councilors, and NGOs, including prominent organizations like All India Women's Conference, Sawera, and Shape India, were actively involved.

180. The survey team including local professionals actively collaborated with community members, landowners, and influential individuals. Importantly, the consultations were extended to the communities residing near each existing and proposed OHSRs, involving a total of 426 participants (353 men and 73 women). The list of individuals involved in the consultation is limited to those who were willing to allow their names to be included in the document. Overall, the stakeholder engagement process encompassed a comprehensive range of community members, local authorities, and organizations, ensuring diverse perspectives were gathered on the project.

7.2 Major Findings and Recommendations of the Consultations

181. The findings and recommendations of stakeholder consultations including corresponding locations, date and number of participants (gender-wise) are detailed in **Table 7-1**. Additionally, comprehensive Minutes of Meetings (MoMs) including photographs, list of attendees for each stakeholder consultation and Focus Group Discussion (FDG) is given as **Annexure-7.1, 7.2 and 7.3** respectively.

Table 7-1: Major Findings and Recommendations of Stakeholder Consultations

Components	Location and Date	No. of Participants (Gender-wise)	Major Findings and Recommendations
WTP	WTP Site Vallah, **Date:** 18.10.2022	**No. of Participant**: Total: 12 Male: 12 Female: 0	i. The participants including land owners and community of Vallah village expressed their full cooperation and support for the construction of WTP. ii. Water sprinkling at kachcha road from National Highway to WTP was suggested by the local residents. iii. It was also suggested the measure should be made to avoid any accidents during vehicular movement.
Existing, Rehabilitation and	All location of existing, proposed and	**No. of Participant**: Total: 336	i. Dust emission from the construction activities and traffic movement should be controlled.

Components	Location and Date	No. of Participants (Gender-wise)	Major Findings and Recommendations
Proposed OHSR	demolition OHSRs Date: 12.12.2023 to 29.12.2023	Male: 280 Female: 56	ii. As there is an existing OHSR at Near Govt. School Fatahpur and Kanwar Avenue; community is raising issues to avoid construction of new OHSR in the area. iii. Residents expressed concerns that the construction activities of OHSRs would adversely impact the aesthetics of parks, leaving limited space for recreational activities such as yoga, especially in areas with only one park. iv. Local community and nearby residents opposing for construction of new OHSRs such as Satnam Park, Sant Avenue Park-1 & 2, Golden Avenue near Ganesh Mandir, Kanwar Avenue, Lahori Gate (site is not yet clear), Opposite Shamford Little Star School-Ranjeet Avenue, ENT Hospital 1 & 2, Near Govt. School Fatahpur, Sultanwind Gate Opposite B Thana, Vallah Ground, Power Colony Mustafabad, Milk Point Kot Khalsa, Guru Ramdas Colony Kot Khalsa, Kot Khalsa Shamshan Ghat, Sohan Avenue Kot Khalsa and Varanium Park due to degradation of aesthetic quality of the park, small size of the park, shadow issue at nearby buildings, land and ownership issues. Regular consultations with community, local leaders and respective agency and authority is being conducted by PIU and MCA. In addition, alternative sites of such OHSRs are being explored by PIU and MCA.
Demolition OHSRs			i. OHSRs proposed for demolition at Gowal Mandi, Nehru Colony (Gopal Nagar), Azad nagar, Hall gate (Pink Plaza), Kesari Bagh, Lahori gate zonal office, Shakti Nagar, Tehsilpura, Ram Bagh and Islamabad are located near habitation and market area. Issue of community health and safety would be a major concern during demolition of these OHSRs. It would temporarily impact nearby residential and commercial buildings and other immovable assets. It was suggested by the community that special attention should be made by PIU/MCA and an experienced agency should be engaged for demolition work to minimise adverse impact (if any). ii. It was suggested that demolition should not adversely affect income streams and transformers supplying electricity. iii. Demolition of the Ajit Nagar OHSR may temporarily impacts the livelihood of the nearby shops owners. As the OHSR is in market area. iv. Challenges such as congested surroundings, lack of alternative access roads, and machinery access issues at Gowal Mandi OHSR are also suggested by the community. v. It was recommended by the community that demolition period should be between May and June

Components	Location and Date	No. of Participants (Gender-wise)	Major Findings and Recommendations
			during the school's summer vacation at Nehru Colony OHSR. vi. Challenges of limited space, single road at the back side and the preference for daytime demolition at Azad Nagar. vii. Public sentiment leans towards temporarily relocating residents for 1 to 2 days for safety. viii. Coordination with local businesses, consideration of sensitive receptors, and night hours for construction activity are crucial. ix. Residents willing to provide NOCs, and a suitable timeline proposed for minimal disruption during demolition.
Laying of the transmission Line	Majitha Road, Amritsar **Date:** 15.10.2022	**No. of Participant**: Total: 13 Male: 13 Female: 0	i. Construction schedule of transmission line should be planned considering local festivals, fairs (mela), rituals etc. ii. Construction schedule should be displayed at site in a week advance and shared to the community, shopkeepers and panchayat representatives, traffic police, MCA etc. iii. Construction activity of the proposed component may lead to temporary Loss of Livelihood of total 25 street vendors at Chheharta Road and Majhitha Road, however as per the consultation held with vendors they agreed to shift to the other side of the road during laying of the transmission line. iv. In case of loss of livelihood during laying of transmission line, local vendors should be compensated as per the provision made in RPF/ RAP (if they are not willing to move during construction period). Prior notice shall also be given to vendors so that they may shift their cart from the site. v. It was recommended by the locals that waste material/debris should be removed from the site immediately after the laying of pipe line. vi. Noise barriers should be erected at sensitive receptors like school, library, hospitals, religious places etc. vii. Necessary amendment shall be made in the design of transmission line so that impact on existing infrastructure/ Mazar/shrine avoided. iii. It was suggested by the community that sufficient distance between existing sewer line and proposed transmission line should be maintained. ix. Construction of transmission line near schools/colleges should be planned on holidays. Roads should be brought to normal and good condition after excavation and laying of pipe line at the earliest time.
	Mustafabad, Ward No. 19, Amritsar **Date:** 15.10.2022	**No. of Participant**: Total: 22 Male: 20 Female: 02	
	Valmiki Mandir, Vallah **Date:** 16.10.2022	**No. of Participant**: Total: 12 Male: 12 Female: 0	
	Chehharta Road, Amritsar, **Date:** 19.10.2022	**No. of Participant**: Total: 07 Male: 07 Female: 0	
	Vallah, Amritsar, **Date:** 17.10.2022	**No. of Participant**: Total: 06 Male: 0 Female: 6	

Components	Location and Date	No. of Participants (Gender-wise)	Major Findings and Recommendations
General	Municipal Corporation Amritsar, **Date:** 18.10.2022	**No. of Participant**: PMIDC Officials, Joint Commissioner, Superintending Engineer (O&M)	i. Traffic movement should be properly planned during the construction of transmission line and OHSRs. ii. Construction Schedule should be strictly followed. iii. Road side plantation should be done. iv. During consultation with local NGOs, hot spot locations of drug users have been identified. It is suggested that DBOT Contractor shall conduct continuous awareness programme with the help of NGOs in these areas.
	NGOs, **Date:** 15.10.2022	**No. of Participant**: Total: 18 Male: 03 Female: 15	

Source: Stakeholders Consultations during Social Survey

7.3 Discussions on Gender Related Issues

7.3.1 GBV Consultation Approach and Methodology

182. Community consultations were conducted with residents in the project vicinity to communicate and comprehend the various risks of Gender-Based Violence (GBV) prevalent in the community.

- Desk study through secondary source of information addressing GBV. Survey teams initially had done the reconnaissance survey prior to conduct of consultations in the project area and identified the hot spots, potential women groups, community women, NGOs working in the project area.
- GBV related consultations were carried out between 10th to 19th October, 2022 at different locations to assess risks associated with women, children and any other potential risk groups.
- Prior intimation was given to the members for informed participation and spirited discussions.
- Consultations with community members were carried out at identified Hot Spots to provide information on GBV, available redressal systems for incidents of sexual harassment and abuse, to identify key concerns and aspirations across gender and socio-economic groups in the community.
- Preparation of the GBV consultations report which includes identifying potential risks; mitigation measures; prevention and responses strategy; key actions have been taken.

Table 7-2 Gender Based Violence Consultation

Consultations and FGDs on Gender Based Violence	Discussion and Findings
Discussion	• Keeping in view of the previous experiences and worries during construction activities in other projects, participants were informed about the workers/labours, employees from outside states to work at the construction site. They reside in camps, nearby settlements or at rented accommodation within the city and are highly mobile on their day-to-day activities. Hence, women and children from the local community are at the risk of exploitation and abuse. • During the consultations, the local community members have expressed concerns about road safety for pedestrians, particularly for women and school going especially adolescent girls. Discussions also highlighted the issue of migrant labourers during the construction activities live and work in close

	proximity of hotspots where women and children are prone to high risks of exploitation and abuse.
Summary of GBV consultations:	• Women actively participated in the discussions related to the GBV. • They are very happy with the government initiative and assured to share this information with other women and girls in the community. • Participants indicated that they lacked information related to gender-based violence (GBV) risks, and no one had previously discussed this matter with them. • Some women members are not familiar with the complaint mechanism or helpline services addressing domestic violence or sexual harassment. In the consultation, participants revealed that there have been no reported incidents of gender-based violence (GBV) within their community among the women members of which community or group. • Women were made aware about the possible risks at the hotspots during the project construction stage due to discussions on GBV.

Source: Stakeholders Consultations during Social Survey

7.3.2 GBV Risk Mitigation Strategy/Action Plan

183. Although no incidents of Gender-Based Violence (GBV) were reported during the consultations, measures to mitigate GBV risks are imperative. These measures are to be implemented near all identified hot spots (Hotspot area is **attached as Annexure- 7.4)** and closely monitored throughout the entire project cycle. Migrant women labourers, in particular, may be vulnerable without adequate safety and security measures at work sites and within labour camps. Ensuring suitable working conditions for women's participation involves addressing various aspects, such as gender-equal wage rates, safety and security considerations through a Grievance Redress Mechanism (GRM), provision of child-care facilities, adherence to health and sanitary requirements, availability of separate toilets for female workers, and temporary housing for the families of labourers during construction at the labour camp site. Strict compliance is essential for the availability of water and sanitation facilities. Additionally, stringent adherence to child labour norms is crucial.

184. To facilitate monitoring and control of GBV, a Gender-Based Violence Toolkit has been prepared and is enclosed as **Annexure-7.5.**

7.4 Conclusion

185. Following consultations and discussions with landowners, the local community, PMIDC (PMU) Officials, DBOT Contractor, Municipal Corporation Officials, Panchayat Representatives, and other stakeholders, a consensus emerged. The majority of individuals in the study area expressed favorable sentiments towards the project, primarily due to the anticipated long-term benefits of providing continuous access to clean drinking water 24x7.

186. Similarly, the outcomes of the consultations indicate contentment among landowners, as the land acquisition process was transparently conducted through direct negotiations, ensuring no permanent physical displacement or Loss of Livelihood. The compensation for all PAPs has been paid for the land, but one dairy farm structure near WTP site is yet to be removed because compensation for the structure is pending. The PIU is in the process of paying the compensation to the aforementioned PAP.

187. However, opposition has arisen within the community at certain OHSR locations due to proposed construction in well-maintained and developed parks. Concerns include potential degradation of the park's aesthetic value and restrictions on its use for recreational activities.

188. Regarding the socio-economic profile, the consultations disclose that residents in the study area generally enjoy better socio-economic conditions compared to other parts of the state. This includes aspects such as education, income, employment opportunities, health infrastructure, sanitation and connectivity (Rail, Road and Air). Issues raised during the consultations should be addressed and mitigated by the Design-Build-Operate-Transfer (DBOT)

contractor and Project Implementation Unit (PIU). Additionally, PIU and DBOT shall conduct consultations with stakeholders to ensure seamless execution of the project and bridge the gap between project developer and local community.

8 ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP) AND ITS BUDGET

8.1 Environmental & Social Mitigation Measures

189. The Environmental and Social Management Plan (ESMP) is prepared based on the assessment of Environmental and Social Impacts (refer to Chapter 5 and 6 of ESIA) concerning Location impacts, Design impacts, Construction related impacts, and Operational and maintenance related impacts. The potential impacts due to the project are described in Table 8-1. ESMP also contains a detailed schedule for implementing each recommended mitigation measure, along with specifying primary responsibility for implementation which detailed out in Table 8-2. Additionally, this chapter covers the Monitoring Plan, Capacity building and training and Budget for executing the ESMP.

Table 8-1 List of Environment and Social Impacts

Sl. No.	Impacts	Reference
Environment:		
1.	Impact on Land Environment; Change in Land use, land/soil pollution, Soil erosion	E1
2.	Impact on Ecological Resources; Diversion of Forest land, Tree felling	E2
3.	Impact on water Environment; Impact on surface water, ground water, water pollution	E3
4.	Impact on Air Environment; dust pollution, air pollution	E4
5.	Impact on Noise Environment; During construction and operation phase	E5
6.	Statutory Clearances, NOCs and Reporting Requirements	E6
7.	Impact on Natural Resources- use of aggregate and sand etc.	E7
8.	Risk of Accidents/incidents including risks associated with work at height and depth, Accident from different project activities & natural disaster	E8
9.	Traffic Management during construction activities, movement of machineries, Materials carrying vehicles and construction vehicles (truck etc.)	E9
10.	Electrical Hazards risks	E10
11.	Impacts associated with the Waste generation (Solid and hazardous waste); C&D waste, Muck disposal, Sludge generation, sewerage waste, chemical spillages	E11
Social:		
1.	Impact on land; Purchase of 40 acres of private land with 49 land owners on negotiation basis, Opposition of community at certain OHSR locations, Change of Land use	S1
2.	Impacts like damage to residential buildings, establishments and common property/ public utilities due to road-cutting and trenching operations for laying pipelines, disruption to access of the houses may occur	S2
3.	Impact on livelihood; Temporary or permanent loss of livelihood/place of occupation for petty shop owners, hawkers and street vendors, impacts on squatters along transmission pipeline, disruption to access to road side shops	S3

Sl. No.	Impacts	Reference
4.	Occupational Health and Safety of Workers/labours; Accidents and Incidents, Poor housekeeping, Lack/Inadequate facilities at camp sites, Health risks of labour related to HIV/AIDS and other sexually transmitted diseases, Work at heights/ depths/ confined spaces risk during OHSRs construction	S4
5.	Labour and working conditions; high reliance on migrant labour for meeting labour requirements may lead to labour Influx affecting project areas- especially WTP and OHSR sites, adverse impacts in the form of additional burden on public infrastructure such as health services, utilities (i.e. water and electricity), sanitation facilities/ housing and social conflicts are likely to occur, increased risk of communicable diseases, increased cases of GBV and risks of SEA-H of female labourers.	S5
6.	Community Health and Safety; Heavy machinery and materials will generate dust and noise, affecting nearby residents and workers, impacts of the WTP construction and operation on adjoining communities	S6
7.	Direct and Indirect impacts on cultural heritage	S7
8.	Disruption to utilities/ services such as existing water supply, power supply due to trenching and laying of pipeline, Utility shifting for transmission line laying may affect respective services.	S8
9.	Risk of gender-based violence on local community arising from influx of migrant laborer's Risk of sexual exploitation and abuse of female laborer's, especially female migrant laborers who are intersectional disadvantaged groups	S9
10.	Stakeholder's Engagement and Information Disclosure; Failure to engage stakeholders can result in public nuisance and grievances, disruption to local businesses and issues of local residence	S10
11.	Security; conflicts with local community at site, Risk of materials theft by local community, Conflicts within workers at workmen habitat, Illegal entry of unauthorized persons at site	S11

8.2 Proposed Environmental and Social Management Plan (ESMP)

190. The Environmental and Social Management Plan has been developed for the project listing out the potential adverse impacts associated with different project activities, mitigation measures, implementation responsibility and monitoring. This management plan is prepared for WTP, OHSR (Demolition, New and Rehabilitation), transmission lines and Cross Head regulators (where applicable). There is no separate ESIA for WRD works, as they are too small. The environment and social management Plan is given in the below Table 8-2.

Table 8-2: Environment and Social Management Plan

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
Statutory Clearances/ NOCs	E6	List of all the statutory clearances and NOCs to be obtained are given in the Table No. 8-3.	Contractor, PIU	PIU & PMU

C-ESMP and Reporting requirements	E6	• Contractor shall prepare site specific C-ESMP for all works and submit the same for employer's approval.
		• The C-ESMP shall include but not limited to the following plans:
		  • Noise Monitoring and Control Plan
		  • Water Resource Protection Plan
		  • Hazardous Materials Management Plan
		  • Pollution Prevention and Control Plan
		  • C&D, Domestic Waste and Wastewater Management Plan
		  • OHSR Demolition Methodology and Strategy
		  • Hazardous Waste Management Plan
		  • Bio-medical Waste Management Plan
		  • Tree Cutting, Transplantation and Translocation Action Plan
		  • Boundary Marking and Protection Plan
		  • Worksites Management Plan
		  • Sensitive Receptors Identification and Protection Plan
		  • Traffic Management Plan
		  • Emergency Action Plan
		  • Worker Accommodation and Welfare Plan
		  • Community Interaction plan
		  • ESHS Monitoring Plan
		  • Any other plan as required by the contract works
		• Monthly and Quarterly Environmental and Social Progress Monitoring Reports shall be submitted to the Employer.
		• The Contractor shall prepare C-ESMP of each individual site where OHSR will be dismantled. This will be approved by PIU&PMU prior to the execution of work. No OHSR dismantling shall be commence without approval of C-ESMP for each OHSR.
			Contractor	PIU & PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
Testing of Environmental Parameters	E6	• The contractor shall test all the environmental parameters as indicated in the environmental monitoring plan, before the start of any construction activity, to establish a baseline and incorporate these testing results into the C-ESMP • Thereafter the contractor shall test the environmental parameters on a regular bases as indicated in the environmental monitoring plan and incorporate the results into monthly and quarterly Environmental and Social Progress Monitoring Reports	Contractor	PIU & PMU
Site Clearance	E1, E4, E5 and E9	• Excavated earth/ stock piles shall not be piled at construction site and shall regularly be removed. They shall be stored in covered condition to prevent erosion due to wind and water action. High and very close stock piles shall be avoided. Drainage facility shall be provided in the stock pile area to prevent erosion/washing away of stock piles • Top soil from the WTP and OHSR sites shall be removed up to the depth of 15 cm and shall be stored for later usage for landscaping and dressing of the temporarily affected areas at the time of restoration • Top soil shall be stored in the form of stock piles. Slope and height of the stock pile shall be maintained as per the angle of repose of the material. Minimum distance of 250 m shall be maintained between two stock piles to allow for proper access. These stock piles shall be sprinkled with water to minimise the erosion • Site clearance only where it is required.	Contractor	PIU and PMU
Establishment of Batch mix plant for Concrete	E6 and S6	The project will require approximately 123, 000 cum. of concrete. The contractor shall establish a Ready-Mix Concrete Plant. • Consent to Establish (CTE) shall be obtained before establishment and Consent to Operate (CTO) shall be obtained before start of for operation from the State Pollution Control Board. The Contractor shall obtain permissions from Punjab Pollution Control Board (PPCB) before any shifting of Batching Plant. • Compliance with relevant emission control legislation at the State level must be ensured for all equipment, machine, engines, generators and vehicles which are involved in the crushers, and concrete batching plants and material transfer. • At least 500 m, distance must be maintained between these plants and the human settlements/ sensitive receptors/ forest land/ water bodies in the downwind direction.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• All suggested mitigation measures for air and dust pollution, noise pollution, water pollution etc. shall be strictly implemented • Compliance report to the condition of these consents shall be prepared and submitted to the PPCB • For the establishment of the labour camps, storage yard, garages, site offices, etc. permissions shall be obtained from PPCB and Municipal Corporation of Amritsar (MCA).		
Labour Camp Management	E10 and S5	• Camps sites shall preferably be established on waste and barren land so as the vegetation removal and tree cutting can be minimized. Camp locations should be carefully selected to avoid the land use categories: residential, sensitive and Eco sensitive areas. Distance of minimum 500 m shall be maintained between the said land use and labour camp locations. • Camps shall also be established at approx. 500 m distance from the water bodies to prevent any impact on the water body. • Agreement of Lease and NOC shall be obtained from the land owner and the concerned authority prior establishment of the labour camp. All lease agreements made for the labour camps and other facilities with land owners need to be submitted to the employer. • Land shall be restored back to its original condition immediately after the completion of construction works and prior handing over the land back to the land owner. All waste materials, temporary/permanent structures, etc. shall be removed from the camp site and the site shall be re-vegetated with the native species of trees. • Training and awareness shall be provided to the labour to not indulge in quarrels with surrounding communities and in any unfair practices/acts. • Labour camp should be enclosed with boundary wall/ fencing. • Movement of the workers should be monitored by providing adequate security checks, CC TV Cameras and all the workers shall be checked for availability of valid ID cards issued by contractor. • A cooked food canteen on a moderate scale shall be provided for workers so that they can have their meal at a definite place. All the wastes generated from the canteen shall be treated/disposed of as detailed in the other sections of the waste disposal. The labour need not to depend the nearby facilities for food and so interaction with the nearby community will be minimized.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Firewood and other conventional fuels like dung cakes, paper, waste materials, etc. shall not be used for cooking and camp fires. Contractor must provide only clean fuel for cooking like LPG gas. • Health problems of the workers should be taken care of by providing basic health care facilities through a health center set up at the construction camps. The health center will have at least a doctor, nurses, duty staff, medicines and minimum medical facilities to tackle first-aid requirements for minor accidental cases and other illnesses. Some arrangements need to be made with the nearest hospital to refer patients of major illnesses or critical cases. The health center will carry out quarterly awareness programme of HIV-AIDS with the help of AIDS control society. Posters will be exhibited in the health care clinic for awareness. This will not only be beneficial for the labours/workers health but also very significant to protect the health of the nearby communities especially against the contagious diseases. Similarly, COVID-19 and other such infectious diseases awareness will also be provided to the workers, Facilities at the camp sites shall be provided as per BOCWA, 1996 and BOCWA Rules 2023 so as to establish proper sanitation facility and waste management system at the site to prevent impact on air, water and soil quality of the area. Details are presented below: • The contractor must arrange for separate accommodation for female workers with separate latrines and bathrooms marked as "For Female Only", in the languages of the workers and pictorially. • Labour camps shall be provided with all the facilities as per BOCWA, BOCWR including drinking water facility, sanitation facility, waste management facility, bedding, ventilation, lighting, drainage, toilets etc. • All the labourers shall be provided with proper beds with adequate space in properly ventilated rooms and adequate private storage space with locks. The rooms shall have provision for charging points for each of the worker. • Construction camps shall be provided with sanitary latrines and urinals with the water facility. Closed drainage systems and the proper sewage treatment system according to the local conditions should be provided for proper disposal meeting the standards as prescribed by CPCB. If sewage generation is more than 10 KLD then STP shall be provided if less than 10 KLD then		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		sewage can be disposed through septic tank/soak pit. Soak pits shall not be provided within 100 m of the water body or any water source to prevent impact on water quality • The DBOT contractor will inform nearby piggeries to collect; when they do not collect the food waste will go to Vermi-Composting. All the municipal waste shall be disposed of through the authorized local waste management agencies only if any in-house treatment facility is not available • A Waste disposal and management plan will be prepared by the contractor before start of construction works and submitted to employer for their review and approval. • There must be proper sewage and solid waste handling and management for the labour camps. The drainage must be proper in the camp area with no stagnancy of the water. Also, the drainage from the camps must not affect the domestic supply of the public water. • Labour camps shall be inspected on monthly basis and reports submitted to employer. • All the non-compliances pointed out during the inspections shall be closed at the earliest The Contractor must establish a Worker Grievance Redress Mechanism (shall include worker representatives and Employer representatives) for redressal of grievances		
Occupational Health and Safety	S4	Contractor shall have Occupational Health and safety management system for all the construction activities to control and prevent any OHS related issues and accidents as per the Indian Labour Acts and Codes, and EHS Guidelines of the World Bank Group/ IFC and ILO Labour Standards. Health Related Measures • Contractor shall implement workers health awareness and surveillance program including health check-ups, regular health monitoring systems for the workers, vaccination drives for prevention of diseases and awareness programs. • Contractor shall establish occupational health clinics and ensure availability of adequate first aid kits, first aiders, nurses, doctors on 24X7 basis. • Workers shall be provided with the hydrating drinks like ORS as required to prevent heat stress/exhaustion • Provision of covered rest areas at regular intervals with proper facilities like resting desks, drinking water facility, toilets etc. at construction site. These rest shelters shall be inspected on monthly basis and the non-compliances shall be monitored regularly.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Ambulance with all the required facilities as per BOCWA, 1996, should be provided at all work sites to take injured persons to hospitals. • Full time medical facility should be provided at each labour camp with first aid kits & first aider. Emergency contact details (including nearest hospitals and health centers) should be displayed at appropriate locations at construction sites & labour camps. The Contractor shall have tie-up arrangements with these for any emergencies and serious incidents. • Workers shall be provided proper training to handle any health-related emergency if any. • Contractor shall provide all the facilities such as potable drinking water, toilets with water facility, kitchen area, clean cooking fuel, proper bedding, adequate number of toilets and bathing areas, maintenance of cleanliness and sanitation, etc. at the labour camp site. Labour camp establishment shall strictly follow the BOCWA, 1996 and the WGB EHS Guidelines. • Sufficient supply of potable water should be ensured for all workers and employees on-site. Conducting regular monitoring of drinking water quality at site and labour camps • Provision of dust and noise shields and maintenance of adequate distance between the workers and noise/dust generation activities as applicable • Drinking water quality, air quality and noise level shall regularly be monitored at all the labour camps sites as per CPCB guidelines in regular intervals as suggested in EMoP • Contractor shall implement administrative controls like practicing job rotation, maintaining work hours of labour, implementing work permit system, implementing LOTO, for the workers to prevent continuous exposure to dust, noise, heat, etc. • All workers and staff should be provided with Personal Protective Equipment (PPE) appropriate to their job on site to minimize exposure to the dust and noise like masks, ear plugs etc. • Environmental Management Plan for dust and noise control shall strictly be followed as suggested. • Framing and implementation of a drugs/ intoxicants prohibition policy by contractor during the entire contract is needed. • Ensuring availability of snake charmers at the site 24X7 for catching the snakes and contacts details of the snake catching organizations shall be provided at the site to handle the situation in case of sighting of a snake. Anti-venoms shall be kept at the nearest hospitals/ PHCs to treat the snake bites if any.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		Safety Related Measures • Safe work method statement including HIRA shall be prepared and implemented for all the construction activities. This should be approved by the employer, • Provision of adequate fire detection and firefighting systems at the site like extinguishers, sand buckets, fire blankets, usage of fire-resistant materials/wires, etc. • Contractor shall prepare emergency preparedness plan to handle any contingency due to construction accidents and natural or man-made disasters like earthquakes, floods, cyclones, dust storms, etc. • Contractor shall develop traffic management plan to prevent any traffic related accidents at or outside the site. Contractor shall provide defensive training to the drivers to minimize the accidents. • Contractor shall fence all electric equipment, and other areas to minimize electrocution risk and shall also provide proper earthing, proper warning signs and conduct security patrols. • Contractor shall ensure provision of safe work environment, provision of competent supervision, provision of safe equipment & machinery and provision of proper training to ensure safety at work site. • Contractor should appoint an agency to provide awareness about the prevention of STDs among the workers. The agency shall work in close coordination with NACO and SACS for organizing the awareness campaigns. Workers shall be provided with the condoms and diaphragms as required for minimizing spread of STDs. • Regular home visit holidays shall be given to the workers to ensure their proper mental health. • All workers shall be provided with job specific training, behavioural based safety training and awareness for ensuring the safety. • Smoking shall be prohibited at the site to prevent health and fire hazards. • All construction sites should be barricaded with proper tamper proof fencing & security lighting and conduct regular security patrols and other security measures. All the construction activity and storage of material shall be strictly within the work site premises/ stores/ yards. All hazardous chemicals & waste and explosives (if any) shall be stored as per the guidelines in the respective laws.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Avoiding usage of the chemicals or paints which may impact the health of the workers or community and shall encourage use of the VOC free paints, etc. No banned material like asbestos shall be used at the construction site. • All workers and staff should be provided with Personal Protective Equipment (PPE) like safety jackets, helmets, gloves, googles, life jackets, in case of work on/near water body appropriate to their job on site to minimize exposure to the hazards • Coordination with local police to curb anti-social activities and usage of drugs & narcotics is needed. • Contractor will have regular monitoring and audits/ inspection system for ensuring effective implementation of safety management system and shall ensure continuous improvement of its safety management system. • All the workers shall be tested for vertigo prior to assigning working at heights. Workers working at height shall be provided with the adequate PPEs like Harness with lifelines, Safety Jackets, Goggles and helmets. • Proper safe and wide working platform with railing shall be provided for the workers working at heights. These working platforms shall be anti-slipping type. • A safety expert shall always be available at the site to supervise works being carried out at height. • All the ladders, platforms shall be inspected prior to installation and shall regularly be inspected for fitness. • Manlifts shall be avoided and if required all precautions shall be taken to ensure the safety. • Electrical safety inspections shall be conducted on daily, weekly and monthly basis. Scores for the monthly electrical audits shall be checked and improved every month to achieve the higher safety score. External electrical safety audits shall be conducted Half-Yearly to ensure electrical safety. Findings of all the inspections and audits shall be closed with satisfactory requirements within given time frames by auditors/safety experts/electrical engineers. Follow up audits/inspections for electrical and general safety shall be performed for verification of closure of the findings of inspections and audits. • All workers and staff should be provided with Personal Protective Equipment (PPE) to work in disinfected unit to minimize exposure of chemicals.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
Work at Heights, Depths and Confined spaces	E8 and S4	• The project involves working at heights of about 40 metres (on OHSRs) and at depths of about 10 metres and in confined spaces. The work also involves working at confined spaces during transmission pipe laying. • The Contractor shall conduct Hazard Identification and Risk Assessment (HIRA) of the activities to be carried out at Heights, Depths and confined spaces. The HIRA needs to be approved by the employer. The Contractor needs to take the following precautions, wherever the works are at height/ depth: • Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area. • Proper use of ladders and scaffolds by trained employees • Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines. • Appropriate training in use, serviceability, and integrity of the necessary PPE. • Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall. • Prior to initiating work, the equipment and location must be verified for safety and appropriateness. • For all work of more than 1 day in duration, a systematic verification of the satisfactory implementation of this procedure must carried out by Competent Person, at a frequency appropriate the duration and risk of the task. • On completion of the work, it must be formally verified by a Competent Person, that the work place has been left in a satisfactory condition and that all persons have safely returned from the workplace. • Records to be maintained at site offices. PPEs and Tools associated with the procedures to be stored at Site Offices. • Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. • Fall prevention / protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Emergency preparedness and Response should include the following: a) Install fall protection devices such as full body harnesses, b) Usage of the approved (type and rating) fall protection equipment is mandatory, c) Fall Protection Equipment must be inspected by the user & trained person daily, d) Double hook full body Safety harnesses that have been used in a fall arrest situation must be withdrawn from service and not reused/issued until after a full examination. - Records of the results of thorough examinations must be kept on site, e) Lifelines fall arrestor used for the attachment of Double hook full body Safety harnesses must be 1) Horizontal lifelines must be made of steel rope 12 mm diameter (min), 2) Installed at waist height or above, 3) Tensioned by use of a turnbuckle or similar, 4) Designed to support the maximum number of workers, 5) Securely anchored at both ends with triplicate wire rope clamps at points able to withstand the dynamic load generated by a fall, 6) All lanyards must be made of flame-resistant materials. Inertia reels may be used to enable more safe movement around certain areas, and f) Emergency response plan, emergency information and signal types and meaning, emergency response and control provisions on site. • The contractor must conduct Monthly Safety Audits at all project sites. • The contractor must encourage and practice Buddy system for working at heights/ Depths. • Signages for workers and public during the work and maintenance should be strictly maintained. • Training to Site Staff and environment Personnel on Inspection Procedures, Discussions & format instructions for Contractors Personnel, Safety procedures for working at confined spaces/ heights/ depths, safety procedures for handling of hazardous materials. • Use of suitable masks for reducing exposure to dust emissions and toxic fumes on site. • When working in confined spaces, the contractor shall arrange for measuring oxygen content in the air and provide for air blowers, if required. • Providing training to the workers for handling hazardous material and exposure to toxic gases. • The inspection of procedures, PPEs, Usage and Trainings on site to be conducted weekly and daily where required. • Incident Reporting Records, Event Logs, PPE inventory, Work plan, Manpower details need to be maintained by the contractor’s safety officer. • Good housekeeping: Many accidents occur because floor gratings have been removed and not replaced, or superfluous materials are left in elevated positions causing slip, trip and fall hazards. The Contractor shall clean all areas of site and structure (exterior and interior) involved in its		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		respective contract work immediately before final inspection. The contractors shall take Protection and Control measures through a) risk areas demarcation, and b) follow the safe work procedures and close out. The contractor needs engage sufficient supervisors as observers during the work at heights/ depths/ confined spaces.		
Housekeeping	S4, S5 and E10	The project has work sites at 1 WTP, 105 OHSR sites, approximately 113 KM of transmission lines, 1 labour camp, about 17 porta cabins for labour, 1 batching plant, 1 vehicle yard etc. which shall be kept in good condition through proper housekeeping. Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defence against accidents and injuries. • The Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of housekeeping is always maintained. Indeed "Cleanliness is indeed next to Godliness". • Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity. • General Housekeeping shall be carried out by the Contractor and ensured at all times at Work Sites, Construction Yards, Batching Plant, Labour Camp, Stores, Offices and toilets/urinals. Towards this the Contractor shall constitute a special group of housekeeping personnel. This group shall ensure daily cleaning at work sites and surrounding areas and maintain a register as per the approved format by the Employer. • Adequate time shall be assigned to ensure that good housekeeping is maintained. This shall be carried out by team of housekeeping squad. • The Contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same. • Full height fence, barriers, barricades etc. shall be erected around the work sites in order to prevent the surrounding area from excavated soil, rubbish etc., which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• The structure dimensions of the barricade, material and composition, its colour scheme, project logo and other details shall be in accordance with specifications laid down in tender documents. • All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits passageways, exits fire doors, break-glass alarm points, firefighting equipment, first aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order. • Lumber with protruding nails shall be either bent / removed and properly stacked. • All surplus earth and debris are removed/disposed of from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact shall be covered while moving. The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists. • No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement. • Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic. • Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the Contractor shall be penalized as per relevant clause. • Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner. • Flammable chemicals / compressed gas cylinders shall be safely stored. • Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s). • All wooden scrap, and other combustible packing materials, shall be removed from work place to identified location(s). Empty cement bags and other packaging material shall be properly stacked and removed. • The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to housekeeping.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
Gender Based Violence (GBV)	S9	The contractor shall prepare a GBV risk mitigation strategy plan and implement, which include identifying potential risks; mitigation measures; prevention and responses strategy; key actions/SOPs to receive complaints, maintaining confidentiality, handling procedure of complaints, resolution of complaints with survivor centric approach, commensurate to different construction phases of project. Some of the generic measures, which shall be included in the risk mitigation and key action plan are summarized hereunder: • Creating awareness about GBV related issues among workers during engagement and/or during Induction • Mandatory consent signing of Code of Conduct (CoC) by all workforce • Create awareness to labour supply contractor about labour laws as well as GBV risks and mitigation strategy as part of contractor's C-ESMP • Provision of separate rest areas and toilets for both men and women with adequate privacy, lighting, water and sanitation facilities. • Sensitization of workforce to avoid any type of potential conflicts with local communities, particularly women at market areas, settlement areas, grocery shops, liquor vend and eateries, community water source points etc. at all times during project implementation phase, • Establishing a committee for grievance redressal mechanism especially for matters related to sexual harassment and GBV matters. • Woman workers will be informed of helpline numbers such as 'One Stop Centre' in Amritsar (0183-5051702), Punjab Women Helpline No. 181, and the National Commission for Women helpline (011-26942369). • GBV shall be integrated into the existing strategy, Grievance Redressal Mechanism (GRM), safety talks, tool box meetings, and regular worker trainings. • GBV focal points shall be identified through community consultations. • Training and awareness programme shall be organised at periodic intervals (at least once in quarter) through external specialized NGOs/ social workers about Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Acts, 2013" and consequences of violations. • Integrate briefings on GBV into existing project IEC strategy.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• The GBV risk mitigation and key action plan shall also include institutional linkages with Women and Child Welfare Department (WCD), and other various schemes of GoP/GoI. • Linkages with the Police Department for any such cases if related to the project. • Identify hotspots for GBV within the project, including construction sites, labour camps, local communities, schools, vocational training centres etc.		
Security	S11	• To prevent unauthorized entry a security system shall be established. • Deployment of 24x7 Security guards at all sites • Installation of CCTV cameras at suitable locations at all sites and labour camps • Contractor shall maintain detailed record of all persons that enter the Sites • GBV training to be provided to all workers & staff • The Contractor shall deploy round the clock security personnel at entrance of premises and in the compound for the safety • The contractor shall maintain a grievance register for each site as prescribed by the employer. The contractor shall submit a list of total grievances received and redressed on weekly basis as prescribed by the employer. • The contractor shall form an internal committee for addressing Gender Based Violence-Sexual Exploitation Abuse and Harassment, as required by the POSH Act, 2013. The contractor shall submit Monthly reports on grievances and redressal related to GBV-SEA&H. • The contractor shall ensure minimum involvement of labour with local community	Contractor	PIU and PMU
Material Sourcing and Transportation	E6 and E7	• Material such as aggregates and sand are sourced from authorized suppliers having valid licenses only. • All quarries and crushers from which construction material are sourced need to have necessary permissions and approvals (EIAs conducted under CTE and CTO obtained and in force; the contractor shall submit these documents to client on a regular basis). • All sand and aggregates transported to be watered and covered with tarpaulin to avoid spillage of material. • Where required some moisture content may be increased adequately in the material to reduce dust during loading and un loading.	Contractor	PIU and PMU
Storage and Handling of Hazardous Material	E11 and S4	Project is likely to use fuel such as diesel, petrol, lubricating oils, grease, paints including Anti-Corrosive, Bitumastic, Synthetic enamel paint, batteries and chlorine.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Fuel and all hazardous materials and hazardous waste on-site should be stored on paved surface having the provisions of containments • Permission should be obtained for handling and use of the POLs under Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016 and Petroleum Rules 2002. • Any spillage of oil and lubricant must be immediately cleared. • Oil spill kits shall be provided at the site and the staff shall be trained to use these kits during emergency • Any hazardous materials to be used will also need to be stored and handled correctly to prevent spills and pollution. Hazardous material shall be stored in covered conditions only in the confined locations and shall be provided with the adequate containment facilities for any risk of spillage. Hazardous waste containers shall properly be marked and kept in isolated locations only. Hazardous waste transportation shall be carried out only through the authorized transporters and Transport Emergency Card (TREM) card shall be maintained for the whole duration of transportation. • Hazardous waste shall be sold only to authorized vendors • Fuel/ waste oil shall be stored in covered HDPE containers only on paved surface having provision of containment of spillage. Oil interceptors shall be provided with the drains near the fuel/ waste oil storage. Oil spill management kits shall be available at the site to manage the spill, if any. • All the workers engaged in waste management shall be provided with the adequate PPEs like jackets, gloves, masks, face shield etc. • The Contractor should ensure that the chlorine storage and handling area in the water treatment plant must have chlorine neutralization facility; neutralization pit as well as scrubber system. The neutralization pit should be constructed close to chlorination site and chlorine storage area. • In addition, the following personal protective clothing should be worn by the operators; full face shield and non-ventilated chemical goggles, chemically-resistant rubber gloves, apron or jacket, long sleeves, long pants, and closed-toe shoes. • Never store chlorine near flammable materials. Chlorine is especially dangerous to place next to gasoline or other combustibles. It can spontaneously explode and create a toxic fire. • Install safety wash stations nearby. Ensure emergency showers and eyewash stations are located near chlorine equipment.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Use at least two people when handling chlorine. It is wise to use a buddy system when changing or handling chlorine. If one operator falls victim to hazardous vapors, the other can call for help. • Avoid spraying water on leaking chlorine containers. • Water and chlorine can create hydrochloric and hypochlorous acids. This mixture is corrosive and potentially oxidizing, which can make the leak worse. • When exposed to , the workers and those exposed shall take shallow breaths. When entering an equipment area, breathe shallow breaths around the containers until sure a chlorine leak is not present.		
Utility shifting	S2, S8 and E9	The project may need to shift existing utilities such as existing water supply, sewerage, drainage, gas pipelines, electric poles, underground cables, etc. There is a possibility of utility disruptions during the project works including damages to properties. • The contractor shall map all the utilities including all the underground and hidden utilities using utility detectors. • Plan for shifting and reconstruction of utilities to be impacted shall be prepared prior start of construction. The plan shall be discussed and agreed upon with all the concerned agency and employer. • Utility shifting shall preferably be carried out through the concerned agency only and the compensation amount shall be paid as requested for the same. This compensation amount shall also be included in the project cost to prevent any impact • Utility shifting shall preferably be carried out while minimizing the disturbance to the community and its dependents. New facility shall be provided before dismantling the old facility. In case that is not possible, dependents/community shall be pre-informed about the discontinuation of the utility with the timeline of its restoration. Also, an alternative shall be provided to community in the blockage period. All such kind of work need to be carried out in consultation with employer and communities. • Affected utilities like electric poles, water pipe lines, hand pumps, etc. shall be relocated with prior approval of the concerned agencies. • Any private, government or property of any party got damaged during construction shall be repaired/restored to its original condition.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the Contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the Contractor. • If any vendors are affected due to and during utility shifting, utility disruptions and damages to properties, they shall be compensated adequately after due consultations with them. Such compensation needs to be provided by the employer. • Grievances related to utility shifting utility disruption and damages to properties need to be redressed by the contractor using the Grievance Redress Management system in place.		
Earth Works	E1, E4, E5, E9 and S4	• Before any excavation work, the area to be excavated shall be watered to prevent dust pollution. • Excavated pits/trenches shall be provided with proper strutting/ sheeting/ shoring to prevent collapse of soil from the sides. Where required the contractor shall provide for dewatering. • The contractor shall provide cut slopes to a safer angle to prevent slips/ slides of soil. Workers working in trenches should be under supervision and be provided with safety harnesses. • All the excavated earth to be stock piled away from the excavation site and shall be barricaded properly. • The contractor should, depending upon the height of the stock pile, provide protection to the stock piled earth from slipping • Sufficient slope/gradient shall be given to the sides of excavations so as to prevent them from slides and slips. • The contractor shall regularly spray water on the earth work to prevent any dust pollution. • Stock pile earth if not used shall be removed regularly to disposal sites, to prevent heavy stock piling. • Stock pile should be covered to prevent erosion due to wind and water action. Heights of stock piles to be maintained to avoid slips. • Drainage facilities shall be provided in the stock pile area to prevent any erosion or washing away off stock pile left.	Contractor	PIU and PMU
Water Consumption	E3	Municipal Corporation Amritsar conducted groundwater testing across 29 locations:	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Arsenic was detected at 14 sites; Town Hall Amritsar, Krishna Square east, MGI flats, new golden avenue, Jahajgarh, Chamrang Road, 100 feet road, Marwadi Hospital East Mohan Nagar, Murgi khana, Amrik singh Fattianwala azad nagar, east and estate and Focal Point 31. • Nickel was found at Gali Kamboj Bagh Jallianwala (central), • Iron was detected at Town Hall Fire Brigade and Gali Kamboj Jallianwala. • Mercury was detected at East Estate and Focal Point 31 • Aluminium was detected in Vallah Village tubewell Presently the water requirement is about a) 120,000 liters per day for construction purposes and b) 260,000 liters per day for labour and staff use including cooking, washing, vehicle cleaning and other uses. • The priority shall be given to use surface water wherever surface water source is available. • Ground and Surface water may be used only after obtaining necessary permissions from the respective Government authorities. Any drilling of borewells require permissions to be obtained from Punjab Water Regulation and Development Authority (PWRDA), as any groundwater extraction with an existing borewell or digging a fresh borewell for use by industries and other establishments will need permission from PWRDA. The extraction needs to be metered and charges paid as per Punjab Guidelines for Groundwater Extraction and Conservation, 2020 regulations. All groundwater, when used for labour and staff, shall be tested for potability; and used only when fit for drinking. All water used for construction purposes, shall be tested and used only if fit for the intended use. • The contractor shall obtain permission from Water Resources Department for any surface water extraction and pay according to their regulations. • Rain water harvesting provisions shall be incorporated into the design of all permanent and temporary structures. • The Sewage from the Labour Camps and site offices and worksites, shall be treated by the contractor and the treated water shall be used preferably for sprinkling and landscaping. If the sewage is carted to MCA's Sewage Treatment Plant (STP) for treatment, proper log books shall be maintained at both Contractor and MCA level. • Minimizing water requirement by using water conservation measures such as covering the water tanks, providing visual notice for water conservation, low flow taps in toilets, etc.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Regular inspection to detect leakage in water pipelines and water tanks shall be conducted by the contractor.		
Water Pollution (surface water and groundwater)	E3	• No water from the construction sites/ labour camps/ site office be discharged into any surface water body without adequate treatment and obtaining prior approval from the employer and concerned agency. • STP treated water shall be precured from nearby STPs, if available, and shall be used preferably for sprinkling and landscaping. This should be done after testing the treated water quality and if in allowable limits for spraying • Labour camps, plant sites, casting yards, parking area, workshops, material and fuel storage areas should be located at minimum 500 m distance from the water bodies. • All applicable water quality standards should be complied with, at all construction sites along the proposed alignment route during the entire period of construction activity; • It should be ensured that no liquid is discharged from any construction site/ activity/ labor camp without treatment; • Site drainage should be retained in purpose-built lagoons for enough time to allow most sediment to settle out before discharge to natural or urban drains • Suitable drainage at construction site/camp should be provided to avoid formation of stagnant pool of water that leads to water logging and breeding of mosquitoes. • Excavation activities shall not be undertaken during monsoon season. All excavated pits and borrow area sites shall be covered with tarpaulins during rains. Garland drains shall be provided around the excavated pits and borrow sites to prevent entry of run-off from surroundings into the excavated pits. • Stockpiled soil and other loose material should be stored in covered areas or shall be covered with tarpaulin. Drains with sedimentation tanks shall be provided in these areas to facilitate drainage of run-off and arresting the silt from run-off. • Sewage from toilets at labour camp and construction sites shall be disposed of complying to the guideline of CPHEEO and PHED. Sewage shall be disposed of through septic tanks and soak pits. Septic tanks shall be evacuated through authorized agencies only. Soak pits shall be not be provided anywhere within 100 m from any water body or where ground water table is less than 4 m. If sewage generation at one site is more than 10 KLD, then preferably STP shall be provided.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		Sewage shall be treated upto tertiary level and shall meet the discharge standards as specified by CPCB. Treated water shall be used at site for water sprinkling and landscaping. • Proper sanitation facilities (toilet with water facility) at the construction sites and labour camps shall be provided as per PHED norms. • Oil and grease interceptors shall be provided with the drains at construction site, material storage area, parking sites and workshops		
Solid waste generation, collection, and disposal	E11, S4	The Contractor shall follow and comply with all the rules pertaining to the management and disposal of wastes as per Solid Waste Management Rules 2016, and Punjab Solid Waste Management Policy 2018. • There are approximately about 1200 persons working on the project (Labour and Staff). The solid waste generated by these persons would be approx. around 300 Kg per day. Apart from this there will be other C&D waste, muck etc. would also be generated. The C&D waste shall be transported to C&D plant of MCA at Fatehpur for further process. The domestic/municipal waste shall be transported to Bhagta wala disposal site for further processing every alternate day. • The municipal solid waste will be collected daily or alternate days. The C&D waste will be disposed when there is sufficient quantity to transport in a truck. • The excess earthwork will be disposed off at Sultanwind and Vallah disposal sites • Contractor is responsible for management and disposal of all kind of waste generated to identified sites given by PIU. • The demolition of 17 OHSRs would generate a total waste of 6,856 cu.m. The contractor should handover all the steel recovered from demolition to the PIU; in turn the PIU would sell this to rebar rolling mills. The contractor should make use of the concrete waste, after obtaining approval from PIU, as blocks, paving material, metal for concrete, etc. The contractor should handover any balance concrete waste to C&D Waste processing unit at Fatehpur. If any concrete waste is remaining after this, the contractor should dispose this at the designated waste disposal sites, approved by PIU. The PIU should conduct an Environmental Assessment of these disposal sites before approval. • Likewise, a location specific Demolition Plan for each of the OHSRs to be demolished is under preparation by DBOT Contractor. However, considering the densely populated areas around these OHSRs, blasting is not proposed.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Contractor shall follow and comply with the conditions of the NOC obtained pertaining to the waste generation. • Waste generated at the site shall be segregated at source and treated or re-used at site to the extent possible. Recyclable materials shall be segregated and sold to the authorized recyclers. Reject fraction of waste shall be disposed of through the authorized local waste management agencies in the area or at a designated location. • If agencies/ facilities for waste collection and disposal are not available for municipal and C&D waste in the project area, then contractor shall identify the sites for waste/ construction debris disposal in consultation with the employer. An Environmental Impact Assessment of these sites shall be conducted by an independent authority paid for by contractor. This EIA needs to be approved by PMIDC. The debris disposal sites shall be selected prior to start of construction and approval shall be obtained from MCA prior to the start of construction. • Effort shall be made to re-use C&D waste to the possible extent such as filling material for excavations, filling low lying areas (only with approval of PMIDC) or can be given to other local construction projects. Surplus shall be sent for recycling to the recyclers or for disposal at MCA approved sites. • Excavated soil shall be used for backfilling excavations and surplus shall be given to the other construction projects in vicinity or disposed of to the C&D waste disposal sites of MCA. • No dumping should be carried out outside the work sites, including private and government land, road side, low lying areas, wetlands, water bodies, forest area, ecologically sensitive areas, etc. • Waste generation shall be minimized by providing adequate material storage and covering facility and providing training to the workers for proper handling of the material and machinery. • Any hazardous materials to be used will also need to be stored and handled correctly to prevent spills and pollution. Hazardous material shall be stored in covered conditions only in the confined locations and shall be provided with the adequate containment facilities for any risk of spillage. Hazardous waste containers shall properly be marked and kept in isolated locations only. Hazardous waste transportation shall be carried out only through the authorized transporters and Transport Emergency Card (TREM) card shall be maintained for the whole duration of transportation. • Hazardous waste shall be sold only to authorized vendors		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Fuel/ waste oil shall be stored in covered HDPE containers only on paved surface having provision of containment of spillage. Oil interceptors shall be provided with the drains near the fuel/ waste oil storage. Oil spill management kits shall be available at the site to manage the spill, if any. • All the workers engaged in waste management shall be provided with the adequate PPEs like jackets, gloves, masks, face shield etc.		
Construction Vehicles, machinery and Equipment	E4, E5 and E6	• All construction machinery shall be provided with the drip trays and collected fuel shall be disposed off through authorized vendors only. • All the construction vehicles and machinery shall regularly be serviced and maintained. • PUC shall be procured for each of the construction vehicles. Construction vehicle shall be inspected on regular basis. • All construction vehicles shall be parked only in designated locations. • Wheel washing facility shall be provided at the exit point at site and the water from the wheel washing facility shall be channelized into sedimentation tank through proper leak proof drainage system. This water shall be re-used for sprinkling purpose as required. • All the heavy machinery shall be inspected prior installation and shall be inspected on regular basis. The heavy machinery shall be inspected internally as well as through a third party. • Proper color coding, SLI, etc, shall be maintained for the cranes/lifting machinery. • The operator, helpers, riggers and the support staff shall properly be trained for handling heavy machinery. • All the operations with heavy machinery shall be undertaken in presence of qualified supervisor and safety expert. • All drivers shall be provided induction training, defensive driving training, training for providing first aid and handling fire in vehicle. Drivers shall be instructed to follow the traffic rules, respect the designated speed limit and follow the designate routes	Contractor	PIU and PMU
Air Pollution	E4	According to ESIA report four locations were tested for Ambient Air quality; WTP Site, Mustafabad Sabzi Mandi, Near Ram Bagh Chowk, Near Kot Mit Singh. All locations were found to be having concentration of PM10 and PM2.5 more than the National Ambient Air Quality (NAAQ) permissible limits. • the contractor will source the materials from approved and authorized quarries/ vendors	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Construction materials shall be stored in covered condition to prevent the fugitive emissions. Construction materials and debris shall be transported in the covered conditions. • Proper and prior planning and appropriate sequencing and scheduling of all major construction activities will be done, and timely availability of infrastructural supports needed for construction will be ensured to shorten the construction period vis a vis reduce pollution. • If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented. • In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional/ alternative equipment by the Contractor or maintenance/ modification of existing equipment of the Contractor. • In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract. For such non-compliances, penalties as per the Appendix 4 of the contract agreement will be applicable. • The Contractor shall take all necessary precautions to minimize fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer. • During construction period, all applicable clearances for air quality management and approvals such as 'Consent to Establish' and 'Consent to Operate' for batching plant, stone crushers area, stone quarry shall be obtained from the Punjab Pollution Control Board and complying all the conditions. All vehicles operating for the Contractor shall obtain Pollution under Control (PUC) certificate and other fitness certificates. It will be ensured that all the construction equipment & vehicles are in good working condition, and maintained to keep emissions within the permissible limits. Idling of the vehicles shall be minimised and engines should be turned off when not in use to reduce pollution. Provision of wheel wash facility will be installed to contain project site dust within the site.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads, stone quarry, batching plant and stone crushers sites & fugitive dust during material handling, loading/unloading & other activities at haul road particularly at vulnerable areas near habitation shall be controlled especially in the dry seasons • Dust during loading and unloading will be controlled with careful handling and by following measures, a) Increasing moisture content: In some cases, slight moisture may be added to the material to reduce dust during loading, b) Reducing falling distance: Shortening the falling distance between the material discharge point and the material pile will slow material velocity and reduce particle impacts, lessening dust generation, and c) Adding physical barriers at the loading point: Create walls or areas where personnel are removed from the affected area to avoid dust exposure could occur. • DG sets shall be provided with stack of adequate height as per CPCB norms (H= h+0.2√KVA, where H= total height of the stack, h=height of the building in meters, KVA=total generator capacity of the set in KVA). • Only clean fuel shall be utilized for all cooking purposes at labour camps. • Raw materials shall be procured from nearest local sources. • Recycled construction materials like fly-ash and sludge from cement plant for construction purpose may be utilized, if approved by employer. • Temporary Electricity connections at the sites will be obtained to minimize usage of DG sets, etc. • Siting of stone quarry plant, batching plant, stone crushers plant should be done in down wind direction. • When required and permitted, the Contractor shall design and implement his blasting techniques so as to minimise dust, noise, vibration generation and prevention fly rock. If the contractor is permitted to use Blasting technique, it should be consistent not only with nature and quaintly of rock to be blasted but also the location of blasting. The Contractor shall give preference to explosives with better environmental characteristics. • The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Site Environmental Plan to guide construction activity insofar as it relates to monitoring, controlling and mitigating air pollution. Testing will be done on monthly basis.		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
Noise Pollution	E5	Noise levels at Mustfabad and Kot mit singh are above the permissible limits (Both Day and Night) of CPCB. The following mitigation measures are suggested for above locations and at any other locations where noise levels are exceeding the CPCB permissible limits: For Workers: • All the workers will be hearing tested before deployment and thereafter every six months. • Ear plugs/muffs etc. to be provided to all workers. • Workers working with the high noise equipment will be rotated. • All construction equipment be maintained in good condition and regularly checked for noise levels; if excessive noise levels are found, then the equipment will be serviced/repaired/replaced. • Stationery noise generating equipment such as DG sets shall be provided with the acoustic enclosures. • All noise causing equipment be fitted with silencers/noise mufflers etc. to minimize operational noise. For Community: • Temporary barricading shall be provided at the construction site to minimize noise levels outside the boundary. • The contractor shall manage the construction traffic to minimize noise. • The contractor shall place restrictions on honking at construction sites. • Heavy noise generating activities shall not be carried out at the above sites and at sensitive areas during night time (10PM-6AM). • Noise barriers shall be installed at sensitive receptors such as hospitals, schools, places of worship, libraries, Baby care centre/crèches etc.	Contractor	PIU and PMU
Community Health and Safety	S6	• All construction sites should be surrounded with secure tamper proof fence, with security lighting, regular security patrols and other security measures to prevent trespassing. Only authorised person shall be allowed to enter into the construction camps/sites.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Contractors shall have health and safety management system to effectively prevent any accidents happening at construction sites. • All materials and components should be stored and stacked safely in dedicated secure areas in side of the sites/ stores. • Avoid use of any paints containing lead or its compounds as well as high VoCs and any banned material like CFC, asbestos etc. • Public health system capacity relies on detecting, testing, contact tracing, and isolating those who are or might be sick, or have been exposed to known or suspected communicable diseases. It is important to stop broader community transmission and prevent communities from having to implement or strengthen further community mitigation efforts. This can be done by organizing regular community health check-ups. Awareness program and vaccination camps will be organized in the nearby settlements/villages. • Ensure that first aid kits are available in all working areas, supplied with adequate material and medicine as per the BOCWA 1996. Facility of ambulance needs to be ensured. • Record of all nearest hospitals and health centers should be kept at each construction sites. • Environment Management Plan for dust and noise control shall strictly be followed as suggested. • Labour camps shall preferably be established at minimum distance of 500m from the residential/institutional areas. • Framing and implementation of drugs/intoxicants prohibition policy by contractor during the entire contract duration. • Minimise interruptions to utility services through proper planning and scheduling of activities and inter-departmental co-ordination. Construction of temporary road/access and diversion of traffic. • Aesthetic enhancement through proper housekeeping of construction sites. Disposal of construction wastes at the approved disposal sites. Immediate closure of the trenches after pipe laying/ completion of work. Complete construction activity by removing all temporary structures, restoring the sub-project and surrounding areas as near as possible to the pre-construction condition. • Unpaved haul roads near/passing through residential and commercial areas to be watered thrice a day. Trucks carrying construction material to be adequately covered. All earthwork will be		

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		protected in a manner acceptable to the Client to minimise generation of dust. The contractor will take every precaution to reduce the level of dust along construction sites involving earthworks, by frequent application of water. • Noisy construction operations in residential and sensitive areas (hospitals, schools and religious places) should be restricted between 7.30 a.m. to 6.00 p.m. Preventive maintenance of construction equipment, and vehicles would be done to meet emission standards and to keep them with low noise. Provision of ear plugs to operators of heavy machinery and workers in near vicinity. During night, material transport should be uniformly distributed to minimize noise impacts. • The contractor shall have in place a Grievance Redress Mechanism for workers and community which addresses the community related grievances.		
Traffic Management	E9	• The Contractor shall prepare a Traffic management plan and submit the same to the employer for approval. Traffic management plan shall also consist of HIRA for traffic diversion. Site specific traffic management plans shall be prepared detailing about the traffic diversions measures required at various locations. • Adequate number of traffic marshals shall be deputed at diversion sites, construction yards and construction sites for management of traffic. • Traffic control measures like signages, cautionary notices, etc. shall be provided for managing the traffic and diversion as required. • Plan transportation routes so that heavy vehicles do not use narrow local roads, except nearby delivery sites. • Schedule transport and hauling activities during non-peak hours. • Locate entry and exit points in areas where there is low potential for traffic congestion. • Keep the site free from all unnecessary obstructions. • Drive vehicles in a considerate manner. • Provide free access to households and businesses/ shops during the construction phase • Parking of transportation/ construction vehicles/ machinery on road shall not be allowed on public roads. • All activities including stockpiling of materials/debris, etc., shall be exclusively undertaken within the work sites.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Proper traffic safety measures like provision of adequate barricading and safety signages shall be provided at all the roads to be blocked/diverted to prevent any accident. Site specific traffic diversion/management shall be prepared • Drivers shall be instructed to take only designated route for transportation of material and shall avoid peak traffic hours		
Tree cutting	E2 and E9	• Total 1184 trees to be fell in OHSR and TL. Necessary permissions from forest and other departments such as MCA, improvement trust, PMIDC, Education Department, PUDA, PSPCL, PWD Cantonment Board, for tree felling to be obtained. • Identify trees suitable for translocation and translocate them at suitable locations. • Stage –II Forest clearance of 18.54-ha forest land consisting of total 679 trees (671 trees in transmission line and 8 trees in OHSRs) along the UBDC canal has been obtained vide letter no 9-PBB-319/2023-CHA, dated 08.11.2023, covering a length of 12.511 km of transmission line and three OHSRs (Sultanwind Chowk along UBDC Canal 1, Sultanwind Chowk along UBDC Canal 2, Sultanwind Chowk along UBDC Canal 3). • Further, stage I clearance for 3.477-ha forest land (consisting 251 trees) along the National Highway (NH-3, Old NH-1) has been obtained vide letter no FP/PB/Pipeline/450496/2023 dated 11/01/2024. Compensatory afforestation for the forest land diverted needs to be done by the forest department as per Forest Conservation Act, 1980. • For trees in the forest area, the Forest department is responsible for cutting and auctioning. For other government area, the DBOT Contractor is responsible for cutting and the respective department is responsible for auctioning. • To mitigate the impact, due to the felling of 254 trees located on non-forest land, it is recommended to plant the sampling in 1:10 ratio after discussion with the DFO to comply the Punjab Plantation and Maintenance of Trees Act 1974. • Some trees can be saved, translocation should be done.	PIU	PMU
Cultural heritage and Chance finds	S7	According to Archaeological survey of India (ASI) one archeologic monument i.e. Ram Bagh Gate has been identified. • If construction works are carried out in the limits of prohibited area (within 100 meters) or regulated area (100-200 meters) of any designated heritage or archaeological sites and remains, permission should be obtained from the relevant authorities.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Prescribed procedures for taking permission from the local authority should be done before excavation of any burial ground, graveyard or 'Idgah' if identified during construction. • If fossils, coins, articles of value or antiquity, structures, and their remains of geologic or archaeological interest are found, local government shall be immediately informed of such discovery and excavation shall be stopped until identification of cultural relics by the authorized institution (ASI) and clearance is given for proceeding with work. All the above discovered on site shall be the property of the Government, and shall be dealt with as per provisions of the relevant legislation. • When such findings are made, then a) Work area shall be barricaded with hard barricading of appropriate height to prevent any accident in vicinity to such site, b) Adequate lighting shall be provided in the construction area during night time, c) No unauthorized entry shall be allowed within construction zone, d) No machinery shall be staged, no material or debris shall be stored and no project facility/utility shall be located outside the site especially in vicinity to buildings of heritage, cultural and historical importance, e) Noisy activities shall be scheduled during night time (when the facility is closed for visitors) to minimize disturbance to tourist or shall be done on closure day, f) The area shall be restored back to original condition after completion of construction, and g) All waste material including redundant material, debris, material, excavated muck, other waste, etc., shall be left in the area after construction is completed. • The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing. He shall, immediately upon discovery thereof and before removal acquaint the Client of such discovery and carry out the Client's instructions for dealing with the same, awaiting which all work shall be stopped. • The Client shall seek direction from the Archaeological Society of India (ASI) before instructing the Contractor to recommence work on the site.		
Stakeholder's Engagement and Information Disclosure	S10	The contractor along with the employer shall conduct consultations much in advance before start of work in any locality. During these consultations together with the employer the contractor shall explain the nature of works to be taken up, the duration and timings of the work and the likely temporary impacts/inconveniences caused to them. The stakeholder feedback shall be noted and construction plans/schedules be revised accordingly where appropriate.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		The contractor shall erect Public Information Boards at prominent locations giving project details, start and completion dates, telephone numbers of GRM committee, etc. The contractor together with the employer shall arrange for frequent interactions with the stakeholders in the locality and provide them information on the progress of the works. conduct		
Disinfection	ESS1, ESS2, ESS4	• Regulatory compliance will be ensured for storage and handling of Chlorine. • Disinfectants such as chlorine and alum have a potential for inhalation, skin, and eye irritation to the workers. Required PPEs and respiratory protection will be ensured to prevent exposure. • Safe Handling and Storage of disinfectants will be ensured with proper labelling to prevent accidental spill and leakage. • A leak detection system will be implemented for detecting any leakage and a spill response procedure will be established to manage any spills quickly and effectively. • An emergency response plan will be developed, and regular drills will be conducted to ensure all workers are familiar with emergency procedures, evacuation routes and first-aid measures.	Contractor	PIU and PMU
Barricading	ESS1, ESS4	• A boundary wall around the WTP to be constructed to prevent unauthorized entry and theft inside the WTP construction premises, enhancing its security. • Hard barricades around all the OHSR locations to be ensured for controlling unauthorized access and public interference creating a physical barrier inside the site. Hard barricades should be fixed to a certain height to reduce noise and dust exposure to the public during construction activities. • Excavation and pipe laying sites to be cordoned off by providing the barricade boards for public safety, manage the vehicular movement and traffic, prevent the unauthorizes entry and helping drivers navigate safely around the work area.	Contractor	PIU and PMU
Sludge Management	ESS1, ESS2, ESS4	• Exposure to Pathogens: Sludge may contain pathogens such as bacteria, viruses, and parasites, posing health risks to workers. Personal Protective Equipment (PPE) including gloves, masks, and protective clothing will be provided. Workers will be properly trained in handling procedures and hygiene practices.	Contractor	PIU and PMU

Nature of Work/ Activities	Impacts*	Mitigation measures	Responsibility	
			Implementation	Monitoring
		• Inhalation of Hazardous Gases: Adequate ventilation in sludge handling areas and transport vehicles will be ensured. Gas levels will be monitored regularly using gas detectors. Respiratory protection for workers will be provided as needed. • Soil and Water contamination due to spills or leaks: Leak-proof containers and vehicles will be used for transporting sludge. Regular inspections of storage tanks and transport vehicles for leaks or damage will be conducted. • Unpleasant odors causing nuisance to nearby communities: Transportation routes will be planned to minimize exposure to residential areas.		

Note: *List of Impacts is given in the Table no. 8-1

8.3 Clearances and Permissions required for the Project

191. Applicable Statuary Clearances to the project along with the role and responsibility of the concerns department is given in Table 8-3.

Table 8-3: Clearances and Permissions required for Project

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Status as on February, 2024
1.	Cutting of trees at OHSR Located on forest land	Forest (Conservation) Act, 1980 and The Indian Forest (Punjab Amendment) Act, 1962	Forest department	PIU	PMU	Obtained
	Cutting of trees at OHSR Located on non-forest land	The Indian Forest (Punjab Amendment) Act, 1962	Forest department	PIU	PMU	Partially obtained
2.	Laying of transmission line network	Punjab Public Works Department Code	PWD	PIU	PMU	Obtained
		National Highways Act, 1956	NHAI		PMU	Obtained
		Indian Railways Act, 1989; Section 131	Railways		PMU	Obtained
		Cantonments Act, 2006	Cantonment Board		PMU	Obtained
		Local Municipal Regulations	MC, Amritsar		PMU	Obtained

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Status as on February, 2024
		Punjab Irrigation Act, 1935	Irrigation department		PMU	Obtained
3.	Forest Clearance (18.54 ha)	Forest (Conservation) Act, 1980 and The Punjab Forest Act, 1999	Forest Department	PIU	PMU	FC has been obtained.
	Forest Clearance (3.477ha)	Forest (Conservation) Act, 1980 and The Punjab Forest Act, 1999	Forest Department	PIU	PMU	Stage I clearance obtained
4.	Bore well	Punjab Ground Water (Regulation and Control of Development and **Management**) Act, 2009 Punjab Water Resources (Regulation and Management) Act, 2020	Punjab Water Regulation and Development Authority (PWRDA)	DBOT contractor	PIU	Borewells Drilled at labour camps/ work sites. but Permissions yet to be obtained.
5.	Source of water for WTP	Punjab Water Resources (Management and Regulation) Act, 2020 The Punjab Irrigation, Drainage and Rivers Act 2023	Irrigation	PIU	PMU	Obtained
6.	Source of water for construction work	Punjab Water Resources (Management and Regulation) Act, 2005 The Punjab Irrigation, Drainage and Rivers Act 2023	Irrigation	DBOT Contractor	PIU	Obtained
7.	Use of Kutcha Road	Local Municipal or Panchayat Regulations	Village Panchayat	PIU	PMU	Obtained
8.	Labour License	Contract Labour (Regulation and Abolition) Act, 1970	Labour Department	DBOT Contractor	PIU	Obtained
9.	Migrant Labor	Inter State Migrant Workmen Act 1979	Labour Department	DBOT Contractor	PIU	Yet to be obtained
10.	Consent to Establish and Operate (CTE and CTO) for erection of batching plants, diesel generator, etc.	Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981	State Pollution Control Board	DBOT Contractor	PIU	CTE Applied for Batching plant CTO needs to be obtained
11.	Construction of labour camp	Contract Labour (Regulation and Abolition) Act, 1970	MC, Amritsar	DBOT Contractor	PIU	Obtained

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Status as on February, 2024
12.	Diversion of traffic	Local Traffic or Municipal Regulations	District traffic police	DBOT Contractor	PIU	Obtained
13.	Establishment of OHSR in park	Local Municipal Regulations	Amritsar Municipal Corporation	PIU	PMU	Partially Obtained
14.	Shifting of Electrical utility	Electricity Act, 2003 Punjab Municipal Corporation Act, 1976	Punjab State power corporation Limited	PIU	PMU	Partially Obtained
15.	Shifting of telecom utility services, within Right of Way (RoW).	Telegraph Act, 1885	Department of telecommunications	PIU	PMU	Partially Obtained
16.	Permission for sourcing building material such as stone and sand	Mines and Minerals (Development and Regulation) Act, 1957 State Mining Rules	Department of mines and geology/ District Magistrate	DBOT Contractor	PIU	To be Obtained from Third party suppliers
17.	Permission for Establishing of labour camps	Contract Labour (Regulation and Abolition) Act, 1970	Municipal Corporation Amritsar	DBOT Contractor	PIU	Obtained
18.	Permission for Disposal of Construction and Demolition waste	Construction and Demolition Waste Management Rules, 2016	Municipal Corporation Amritsar	DBOT Contractor	PIU	Obtained
19.	Permission of storage of Chemicals	Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and as amended; Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and amendment thereof	Pollution Control Board	DBOT Contractor	PIU	Yet to be Obtained
20.	Permission for Demolition of OHSRs	Local Municipal regulation	MC, Amritsar	DBOT Contractor	PIU	Needs to be Obtained
21.	Permission/ NoC for Construction of	Local Municipal regulation	Education Department/ School	PIU	PMU	Partially Obtained

S. No	Activities involved	Applicable legislation	Department	Implementing Agency	Supervising Agency	Status as on February, 2024
	OHSR within Institution/ hospital confinement		Authority for private school Hospital Authority			
22.	Implementation of project and operation of activities	Municipal solid waste management rules 2016	Punjab State Pollution Control Board	DBOT Contractor	PIU	Agreement required to be done with authorized vendor
23.		Batteries Waste Management Rules, 2022				
24.		Plastic Waste Management Rules, 2022 and its amendment	Punjab State Pollution Control Board	DBOT Contractor	PIU	Obtained
25.		E-Waste (Management) Rules, 2016 and its amendment				
26.		Bio-medical/ clinical waste disposal	Punjab State Pollution Control Board	DBOT Contractor	PIU	MOU with vendor agency to be signed.

8.4 ESMP Monitoring Plan

8.4.1 Monitoring Indicators

192. The Environmental Monitoring Plan is formulated to ensure and demonstrate compliance with the regulatory and Institutional Agency's EHS requirements. Monitoring of environmental and social parameters and comparing them with benchmarks set for monitoring indicators by regulatory authorities will help to assess in the environmental performance and identify gaps or non-conformance (if any) ensuring immediate actions to bring it into compliance. To ensure the same, the following environmental parameters will be monitored. The Environment Monitoring Program is depicted in table below:

Table 8-4: Environment Monitoring Programme

Environmental indicators	Location	Means of monitoring	Frequency	Reporting	Responsibility	
					Implementation	Monitoring
Pre-Construction Phase						
Environment Monitoring (Air, Noise, Soil, Surface Water and Ground Water) (Parameters as per CPCB Standards)	At Project site and sensitive areas nearby the project site	By NABL accredited Lab	Once before the commencement of construction work	Once	DBOT	PIU
Construction Phase						
Ambient Air Monitoring (Parameters as per CPCB Standards)	On WTP site, Transmission line or OHSR and nearest habitation/ sensitive areas	By NABL accredited Lab	Monthly	Monthly	DBOT	PIU
Surface and Ground Water Sampling (Parameters as per CPCB Standards)	Surface Water: Water source site and transmission line crossing the water body Ground Water: Sensitive Areas around the Project Site	By NABL accredited Lab	Monthly	Monthly	DBOT	PIU
Soil Quality (Parameters as per CPCB Standards))	WTP site, OHSR and TL network	By NABL accredited Lab	Monthly	Monthly	DBOT	PIU
Noise Quality (Parameters as per CPCB Standards)	WTP site, OHSR and TL network	By NABL accredited Lab	Monthly (during peak of works)	Monthly	DBOT	PIU

Environmental indicators	Location	Means of monitoring	Frequency	Reporting	Responsibility	
					Implementation	Monitoring
Vehicular Emissions	At WTP, OHSR, TL and construction sites	Inspection of PUC Certificate	Monthly	Monthly	DBOT	PIU
Gaseous Emissions	At WTP, OHSR, TL and construction sites	By NABL accredited Lab	Monthly	Monthly	DBOT	PIU
Solid waste management	Construction Sites, Labour Camp, Storage yard	By Observation	Weekly	Weekly	DBOT	PIU
Inspection of waste disposal sites	All sites	Contractor and Employer	Monthly	Monthly	DBOT	PIU
Inspection of third-party vendors (Bio-medical waste, Hazardous waste, etc.)	All sites	Contractor and Employer	Monthly	Monthly	DBOT	PIU
Inspection of labour camps	All Camps	Contractor and Employer	Weekly	Weekly	DBOT	PIU
Inspection of Labour Records	All Camps/ sites	Contractor and Employer	Weekly	Weekly	DBOT	PIU
Inspection of GRM Records	All Camps/ Sites	Contractor and Employer	Weekly	Weekly	DBOT	PIU
Inspection of Vehicles/ Garages/ Yards	All Camps	Contractor and Employer	Monthly	Monthly	DBOT	PIU
Operation of WTP						
Ambient Air Monitoring (Parameters as per CPCB Standards)	On WTP site, TL Sites and OHSR Site near habitation/ sensitive areas	By NABL accredited Lab	Quarterly	Quarterly	DBOT	PIU
Waste Water Quality Testing (Parameters as per CPCB Standards)	At WTP Site	By NABL accredited Lab	Quarterly	Quarterly	DBOT	PIU

Environmental indicators	Location	Means of monitoring	Frequency	Reporting	Responsibility	
					Implementation	Monitoring
Surface and Ground Water Quality (Parameters as per CPCB Standards)	Surface Water: Water source site water body Ground Water: Sensitive Areas around the Project Site	By NABL accredited Lab	Quarterly	Quarterly	DBOT	PIU
Water Quality (Inlet and Outfall) of WTP	At Intake Structure and WTP	By NABL accredited Lab	Daily	Weekly	DBOT	PIU
Soil Quality (Parameters as per CPCB Standards)	On WTP site and OHSR Site near habitation/ sensitive areas	By NABL accredited Lab	Quarterly	Quarterly	DBOT	PIU
Noise Quality (Parameters as per CPCB Standards)	On WTP site, TL Sites and OHSR Sites near habitation/ sensitive areas	By NABL accredited Lab	Quarterly (during peak of works)	Quarterly	DBOT	PIU

8.5 Capacity Building and Training

193. The Project Implementation Unit (PIU) is primary responsible in identifying job-specific training and workshops, as well as induction sessions on Environment, Social, Health, and Safety (ESHS) tailored to the needs of environment and social personnel, including contractors and subcontractors. To fulfill this responsibility, both government-approved and private agencies/organizations will be engaged to provide capacity-building training in ESHS aspects. These agencies/organizations possess significant expertise in their respective fields and are well-equipped to provide specialized training programs aimed at enhancing competencies in environmental stewardship, social responsibility, and health and safety standards.

194. The following organizations can be approached (but not limited to) to conduct training sessions and seminars:

- Mahatma Gandhi State Institute of Public Administration, Chandigarh
- Punjab State Pollution Control Board
- Punjab Water Regulation and Development Authority (PWRDA)
- Punjab Water Supply and Sewerage Board
- District Disaster Management Authority, Amritsar
- Engineering Staff College of India, Hyderabad

195. The primary objective of the training is to enhance general environment and social safeguard knowledge among the project team. This proactive approach is geared towards minimizing adverse environmental and social impacts and achieving performance levels. Before the project commences, contractors and subcontractors will undergo comprehensive training to ensure they share the same level of awareness and commitment. Furthermore, environment and social management training programs will be conducted to ensure the effective implementation of ESMP during both the construction and operation phases of the project. Below table presenting the different training programs along with their respective details.

Table 8-5 Tentative Training Programs

S. No.	Trainings	Purpose of the Training	Participants	Schedule	Course content
1.	**Training on World Bank Environmental & Social Framework**	• The training focuses on the World Bank Environmental & Social Framework (ESF). • To familiarize stakeholders with ESF principles, standards, and requirements. • To enhances the understanding of environmental and social considerations in project planning and implementation. • To ensure environmental and social sustainability in World Bank-funded projects. • To provides knowledge to the stakeholders about policies and procedures for compliance with ESF.	PMU, PIU, DBOT Contractor and Persons directly related to project	3 days training before project effectiveness	ESF and ESS1 – ESS10
2.	**Legal and Regulatory requirements**	• To clarify roles and obligations within the legal framework. • To Provides guidance on compliance and risk mitigation. • To Enhances awareness of legal risks and liabilities. • To Strengthens capacity to ensure project success.	PMU, PIU and Persons directly related to project	1 day seminar	legal and institutional responsibilities
3.	**Implementation of Environmental and Social Management Plan**	• To ensure Social and Environmental impacts, risks and liabilities identified during the ESIA process are effectively managed throughout project cycle. • Effective implementation and monitoring of Environmental and Social Management plan.	PMU, PIU, DBOT Contractor, EHS Officer and Persons directly related to the project	1 day Workshop (Half Yearly)	ESIA and ESMP, National and International good practices and guidelines on ESMP
4.	**Occupational Health and Safety and Public Health and Safety**	• To raise awareness, provide training, and promote a safety culture. • To Equips participants with knowledge and skills to mitigate workplace hazards.	PMU, PIU, Local NGOs, DBOT Contractor, EHS Officer and Persons directly	4 Workshops, each of 1 day duration	PPE, Workplace EHS, Prevention of accidents at work sites, Solid and liquid waste management, Hazardous waste

S. No.	Trainings	Purpose of the Training	Participants	Schedule	Course content
		• To Enhances compliance with OHS/PHS regulations and reduces accidents. • To Educates workforce on labour laws and regulations. • To Provides training on fair treatment, safety, and conditions. • To promote compliance and enhance worker well-being.	related to project		management, Emergency Preparedness and Awareness campaign on HIV/AIDS National working laws and regulations, Contractor and sub-contractor codes of conduct, Worker's organizations and Child labour
5.	**Grievance Redress Mechanism and Module**	• To train participants in handling grievances effectively. • To establishes fair and accessible processes for addressing concerns. • To enhances understanding of grievance resolution importance. • To equips participants to implement and manage GRM effectively. • To promotes accountability, transparency, and stakeholder satisfaction.	PMU, PIU, Civil Society, Local NGOs, DBOT Contractor, EHS Officer	1 day Workshop (Half Yearly)	Registration and processing procedure, Grievance redress procedure, Documenting and processing grievances, Use of the procedure by different stakeholders
6.	**Construction Waste Management**	• To raise awareness about environmental impacts and regulations. • To provide guidance on waste reduction and proper disposal. • To enhance understanding of health and safety. • To equip participants with skills for sustainable waste management. • To promote compliance with regulations and best practices.	ES Specialists, EHS officer, PIU, DBOT Contractor	1 day Workshop (quarterly)	Guidance on managing construction waste, Waste handling procedures, risk management using protective equipment, Waste sorting, Waste management, Hazardous waste handling and soil spillage management
7.	**GBV and SEA/SH Risk Module**	• To raise awareness about GBV and SEA/SH risks and impacts.	PMU, PIU, Local NGOs, DBOT Contractor,	1 day Workshop (Half Yearly)	Raising awareness and measures to prevent and mitigate GBV risks

S. No.	Trainings	Purpose of the Training	Participants	Schedule	Course content
		• To provide training on identifying and responding to GBV and SEA/SH incidents. • To enhance understanding of risk management strategies. • To equip participants with skills to create safe environments. • To promote gender equality and human rights. • To foster collaboration to address GBV effectively.	EHS Officer and Persons directly related to project		
8.	**Stakeholders Engagement Procedures**	• To improve and facilitate in decision making that actively involved PAPs and other stakeholders in timely manner. • Identify appropriate modes of engagement and prepare plans for engagement and meaningful consultation.	PMU, PIU, DBOT Contractor, EHS Officer and Persons directly related to the project	1 day Workshop (Half Yearly)	Stakeholders Engagement Plan

8.6 ESMP Budget

196. The tentative budget for the Environmental and Social Management Plan (ESMP) for the project is estimated to be between 1% to 1.5% of the total project cost. This budget does not include expenses related to land purchase, forest clearance/diversion, tree felling, and associated activities. The detailed item wise budget of ESMP will be included in the Contractor's Environment and Social Management Plan (C-ESMP).

9 STAKEHOLDER CONSULTATIONS STRATEGY AND PARTICIPATION FRAMEWORK

197. As per the World Bank's Environment and Social Framework, Stakeholder Engagement needs to be carried out throughout the project cycle. Environment and Social Standard (ESS-10) lays a systematic approach and framework to identify the stakeholders and engage with them in a continuous process.

198. Stakeholder Consultation Strategy and Participation Framework is a part of Stakeholder Engagement Plan (SEP) will be incorporated through the project cycle based on the experience gathered on the effectiveness of the existing methods of engagement strategy. This participation framework shall be a sub-set of the overall communication strategy of the project. The consultation strategy is prepared as per outcome of extensive field consultations. The following table presents the proposed strategy for stakeholder engagement and information disclosure. It also spells out the timing of the intervention, target audience of the engagement and the parties responsible for it at various stages of the project cycle.

Table 9-1: Stakeholders Engagement Strategy in Project Life Cycle

Improving Water Supply Infrastructure– WTP construction, Transmission Lines and construction of OHSRs/ESRs				
Target Stakeholders	**Information to be Disclosed**	**Tools of Engagement & Mode of Disclosure**	**Frequency**	**Responsibilities**
PRE-CONSTRUCTION STAGE (PLANNING AND SURVEY)				
Project Affected Parties (PAPs) • Land Owners	✓ Project scope and design details, designalternatives for impact minimization ✓ Environmental and social risk of the Project ✓ Land acquisition and Compensation process and timelines for completion ✓ Impact mitigation and enhancement measures ✓ Suggestions on Resettlement and Rehabilitation Provisions and conveying to PAPs the final provisions as approved by Government ✓ Grievance mechanism process ✓ Community and Occupational Safety measures planned for WTP, OHSR & Transmission line	✓ Census & Socio-economic surveys, consultations, focus group discussions ✓ written information (one pagers/flyers) in local language Punjabi ✓ Project details on MCA/PMIDC website ✓ GRM Helpline number through display at project locations and on ✓ flyers	✓ At least once for preliminary screening, ✓ Survey at least twice for household level census & socio-economic survey and 2-3 round of consultations towards preparation of ESIA, RAP and other safeguard reports	✓ PIU/PMIDC through MCA ✓ DPR Consultants ✓ ESIA-RAP Consultants ✓ Revenue Department
Project Affected Parties: • Impacted by temporary economic or physical displacement- Tenants/ Hawkers/ Vendors along alignments	✓ Project design details, alignments and their impacts ✓ Provisions for compensating economic and physical displacement, timelines for completing rehabilitation ✓ Communication on final rehabilitation/ compensation approved by Government ✓ Grievance mechanism process	✓ Census & Socio-economic survey ✓ FGDs and small group consultations ✓ Print-Newspaper, Newsletter / leaflets/ Pamphlet ✓ Radio information	✓ At least twice for census & socio-economic survey ✓ At least twice- before & after compensating ✓ Multiple	✓ PIU/PMIDC and MCA ✓ DPR consultants ✓ ESIA-RAP Consultants

Improving Water Supply Infrastructure– WTP construction, Transmission Lines and construction of OHSRs/ESRs				
Target Stakeholders	**Information to be Disclosed**	**Tools of Engagement & Mode of Disclosure**	**Frequency**	**Responsibilities**
			times during alignment/ OHSR works ✓ Weekly insertions on project and grievance mechanisms	
• People/ households/ general community residing along alignment of Transmission lines and proximity to OHSR sites	✓ Project scope and design details, finalized alignment & impacts ✓ Design alternatives for impact minimization ✓ Accidents and road safety issues, natural calamities and proneness to risks; ✓ Disruption to services and arrangement during construction ✓ Management of air and noise pollution; ✓ Community Safety measures ✓ Community and Occupational Safety measures planned for WTP/ OHSR constructions and transmissions; ✓ Excavation works-sludge/ earth disposal plans ✓ Labour management plans/ proposed camp sites ✓ Grievance mechanism process	✓ Consultations, Focus Group Discussions ✓ TV-Radio-Print-Digital based information dissemination ✓ Newsletters/ pamphlets/ flyers ✓ GRM Helpline number through display at project ✓ Suggestion boxes at site offices	✓ At least twice during pre-construction phase	✓ PIU/PMIDC along with MCA ✓ DPR Consultants ✓ SIA-RAP Consultant
Other Interested Parties: • Resident Welfare Associations (RWAs) • Elected Representative of Municipal Corporation • Civil Society Organisations • Print and Tele Media • Staff of Line departments • Staff of Municipal Corporations	✓ Project scope and design details, design alternatives for impact minimization; ✓ Land acquisition and Compensation process, Secondary baseline information on environmental and social aspects; ✓ Environmental and social risks of the Project; ✓ Impact mitigation and enhancement measures; ✓ Resettlement and Rehabilitation ✓ Grievance mechanism process ✓ Gender related issues. ✓ Involvement of women Self-help groups	✓ Face-to-face meetings/One-to one meetings	✓ Once during pre-construction phase ✓ As and when required ✓ as per requirement for obtaining necessary clearances/ permissions	✓ PMIDC along with MCA ✓ DPR Consultants ✓ ESIA-RAP Consultant

Improving Water Supply Infrastructure– WTP construction, Transmission Lines and construction of OHSRs/ESRs				
Target Stakeholders	**Information to be Disclosed**	**Tools of Engagement & Mode of Disclosure**	**Frequency**	**Responsibilities**
• Community / Religious leaders • Regulatory agencies •	✓ Shifting of utility and temporary arrangement ✓ Community Safety measures during WTP, OHSR & Transmission Line constructions-option and measures			
Vulnerable Groups • Women and women households	✓ Project design details, alignments and their impacts ✓ Provisions for compensating economic and physical displacement, timelines for completing rehabilitation ✓ Land acquisition and Compensation process ✓ Special Provisions for WHHs ✓ Impact mitigation and enhancement measures ✓ Suggestions on Resettlement and Rehabilitation Provisions and conveying the final provisions to PAPs as approved by govt. ✓ Grievance mechanism process ✓ Gender related issues ✓ GBV related issues and LMP Implementation Procedures ✓ Specific design interventions for WHHs ✓ Discussions on involvement of women Self- help groups for maintenance works	✓ Census & Socio-economic surveys, consultations, focus group discussions ✓ Wall paintings/slogans, notice boards and signage ✓ Telephone helpline	✓ Once during the pre-construction phase	✓ PIU/PMIDC through ESIA and DPR consultants ✓ Additional specialized support from World Bank on GBV issues
CONSTRUCTION/OPERATION STAGE				
Project Affected Parties (PAPs) • Land Owners	✓ Land acquisition and Compensation process ✓ provisions of eligible entitlements work opportunities ✓ Grievance mechanism process	✓ RAP implementation NGO by holding of meetings & FGDs	✓ Continuous – till completion of all ESIA/RAP implementation activities	✓ PIU/PMIDC through RAP implementation NGO
Project Affected Parties: • Impacted by temporary economic or physical displacement- Tenants/ Hawkers/	✓ Process for compensating economic and physical displacement, timelines for completing rehabilitation ✓ Grievance mechanism process	✓ RAP implementation NGO by holding of meetings & FGDs	✓ Continuous – till completion of all ESIA/RAP implementation activities	✓ PIU/PMIDC through RAP implementation NGO

Improving Water Supply Infrastructure– WTP construction, Transmission Lines and construction of OHSRs/ESRs				
Target Stakeholders	**Information to be Disclosed**	**Tools of Engagement & Mode of Disclosure**	**Frequency**	**Responsibilities**
Vendors on alignments				
• People/ households/ general community residing along alignment of Transmission lines and proximity to OHSR sites	✓ Project scope and design details, construction schedule if revised ✓ Contractor establishment details i.e. labour camps, plants area, Muck disposal locations etc., ✓ Management of air and noise pollution; ✓ Disruption to services and arrangement during construction ✓ Grievance mechanism process ✓ Community Safety measures during construction	✓ Consultations, Focus Group Discussions ✓ Meetings with communities involving police departments for safety aspects ✓ Safety sign boards ✓ GRM Helpline number through display at project locations and on flyers	✓ Bi-monthly	PIU/PMIDC through: ✓ Police department ✓ Power supply and PHED department ✓ District administration ✓ Civil works contractor
• DBOT Contractor, workers, & sub contractors and their workers	✓ Orientation on ESHS provisions; ✓ Sexual harassment provisions, ✓ Labour related aspects as provided in the Labour Management Procedures ✓ ESMP requirements and other management plans	✓ Provisions in Bid/Contract documents & also through Pre-bid conference	✓ During contract signing ✓ Periodic as part of worker's joining	✓ PIU/PMIDC & Civil Works Contractor
Other Interested Parties– • Resident Welfare Associations (RWAs) • Elected Representatives of Municipal Corporation • Civil Society Organisations • Print and Tele Media • Staff of Line departments • Staff of Municipal Corporations • Community / Religious leaders • Regulatory agencies •	✓ Project information: scope and rationale and E&S principles ✓ Training in RPF, RAP, ESMP requirements and other managementplans ✓ Grievance mechanism process ✓ ESHS, GBV, SEP, Labour Management procedures ✓ Feedback on consultant/ contractor reports	✓ Face-to-face meetings ✓ Trainings/workshops	✓ As per requirement	✓ PIU/PMIDC

Improving Water Supply Infrastructure– WTP construction, Transmission Lines and construction of OHSRs/ESRs				
Target Stakeholders	**Information to be Disclosed**	**Tools of Engagement & Mode of Disclosure**	**Frequency**	**Responsibilities**
Vulnerable Groups • Women and women households	✓ Project information - scope and rationale and E&S principles ✓ Project status ✓ Health and safety impacts ✓ Employment opportunities ✓ Environmental concerns ✓ Grievance mechanism process ✓ Gender and GBV related issues ✓ Involvement of women Self-help groups for maintenance works	✓ Public meetings, open houses, trainings / workshops ✓ Disclosure of written information: brochures, posters, flyers, website, Information boards in villages ✓ Notice board(s) at construction sites ✓ Grievance mechanism ✓ RAP implementation ✓ NGO with ✓ Gender/GBV Expert ✓ FGDs with women SHGs	✓ As per requirements ✓ Continuous – till completion of all ESIA/RAP activities	✓ PIU/PMIDC ✓ Supervision and RAP consultants ✓ Contractor/sub-contractors ✓ Civil Works Contractor ✓ Panchayati Raj Institution (PRI) department and Women Welfare department ✓ Additional specialized support from WB on GBV issues

10 GRIEVANCE REDRESSAL MECHANISM

199. **Introduction**

200. Grievance Redressal Mechanism (GRM) is an important component of any project's implementation. As per grievance mechanism & accountability of WB's ESF, the role of grievance redress mechanism is to receive, evaluate and facilitate the resolution of affected parties concerns, complaints, and grievances during project implementation and opeartion. For this purpose, the project will propose and implement a Grievance Redressal Mechanism that will respond to the to concerns and grievances of project-affected parties related to the environmental and social performance of the project in a timely manner. The GRM serves as an effective tool for early identification, assessment, and resolution of complaints/ queries of all affected parties promptly and transparently during project implementation and operation.

10.1 Grievance Redress Mechanism

201. The grievance redress mechanism and procedure are depicted in **Figure 10.1** below. The project specific GRM is not intended to bypass the government's own redress process; rather it is intended to address affected parties concerns and complaints promptly, making it readily accessible to all segments of the affected parties , and is scaled to the risks and impacts of the project.

202. Existing GRM of Punjab Municipal Services Improvement Project (PMSIP) has been used for Sub-project Amritsar which is accessible through phone calls, WhatsApp/ Message and m-Seva portal. It is an online portal on which citizen have an excess to raise their grievances.

203. Grievances of PAPs shall first be brought to the attention to the field level (contractor's staff) which shall be redressed within 7 working days from the receipt of complaints. Grievances not redressed by the staff at field level, shall be brought to the Grievance Redress Committee (GRC) at PIU level supported by Assistant Engineer (AE), Junior Engineer (JE) & E&S Experts which shall be redressed the grievances within 15 working days from the date of receiving the complaint. If again not redressed, it shall be brought to PMU at state level. It is expected that grievances shall be redressed within 15 days from the receipt of the complaint. Alternatively, the aggrieved person will have the right to go to the Court of law in case they are not satisfied with the outcome of their appeal.

10.2 Grievance Redress Committee (GRC)

204. The main responsibilities of the GRC are: (i) provide support to PAPs on problems arising from land/property acquisition; (ii) record grievances, categorize, and prioritize grievances and resolve them; (iii) immediately inform the PMU of serious cases; and (iv) report to PAPs on developments regarding their grievances and decisions of the GRC and the PMU. Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost and other assistance, including those of the vendors and others who will be impacted by the construction activities.

205. It is proposed that a PIU level Grievance Redress Committee (GRC) needs to be formed with the following members:

- Superintending Engineer
- Social Development Specialist
- Environmental Specialist
- Civil Society representative
- PAP representative
- A community leader/ RWA office bearer, and
- Representative from Land and Revenue Department (in cases related to land)
- Representative from Women Groups

206. It is mandatory that GRC constituted at the city and project level for grievance management have at least one-third women members.

10.3 Grievance Procedure

207. As the GRM works within existing frameworks of PMSIP, it is recognized that the GRM shall comprise project level redress mechanisms. Most project related grievances could be minor and site-specific.

208. The grievances can be register through online at https://mseva.lgpunjab.vov.in or Toll Free No. 1800-1800-0172 between 8:00 am to 5:00 pm or WhatsApp Chatbot and Contact No. 8360118925. One can also register one's grievances after scanning QR Code and downloading Mobile Application, displayed at every construction site and designated place. The contact number of Grievance Redressal cell is displayed at WTP location, Transmission line and OHSRs construction sites.

209. On receipt of each complaint, the representative will note the date, time, name and contact details of the aggrieved person and the nature of the complaint in the Complaints Register. The format of registering the grievances are annexed as **Annexure-10.1**. The designated person shall register and inform the aggrieved person about the timeframe for expected response and resolution. In case the representative is not able to redress the grievance within the project specified timeframe, it will be his/ her responsibility to escalate it to the PIU Amritsar. If the PIU is not able to resolve the complaint to the satisfaction of the aggrieved persons, it will then refer directly to the PMU at PMIDC.

210. The steps for Grievance Redressal Mechanism is given as follows:

Step-1: Receive, register, and acknowledge the Grievances
Step-2: Develop resolution and respond to Aggrieved Person
Step-3: Scale up the grievance if the Aggrieved Person remains dissatisfied
Step-4: Recourse to legal and other formal recourse
Step-5: Record Keeping

211. Record of the above process should be maintained in the format attached as **Annexure-10.2.**

11 INSTITUTION AND IMPLEMENTATION ARRANGEMENT

11.1 Introduction

212. The project's institutional and implementation arrangements are anchored with PMIDC at the state level (PMU) and MCA at the city level (PIU). All land related impacts emerging from the project will be managed by the project implementing agencies, namely, Punjab Municipal Infrastructure Development Company and Municipal Corporation Amritsar with due support from the district administration. The overall institutional structure proposed for implementation of ESMP is as follows.

11.2 Project Management Unit (PMU)

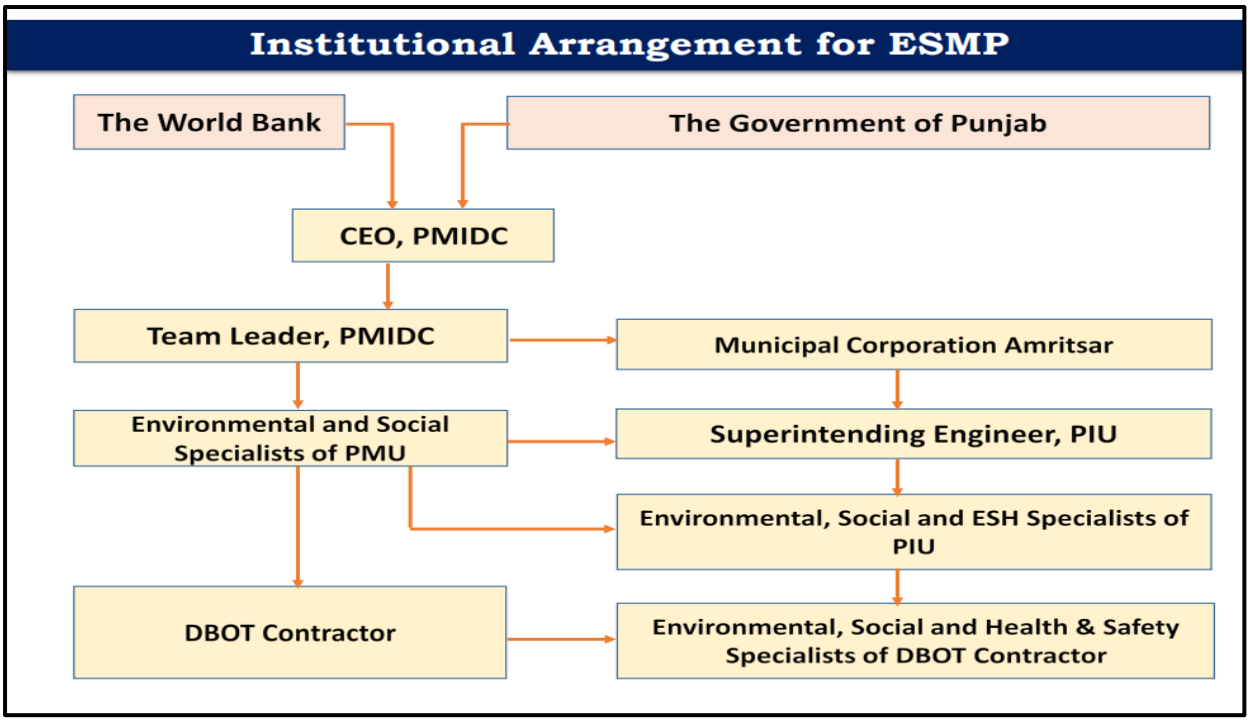
213. **Punjab Municipal Infrastructure Development Company (PMIDC)** is the State Level Apex Institution that implements urban reforms and investment programs and will act as the nodal agency and Project Management Unit (PMU) for this Project. It will be responsible for integrating actions under the current program at the state level and across the city to support PIU and MCA in implementing ESMP for Sub-Project Amritsar. PMIDC has an Environment & Social Safeguard Unit headed by a Manager (Environment & Social Safeguard) for management and implementation of safeguard policies of PMSIP.

11.3 Project Implementation Unit (PIU)

214. City level implementation will be the responsibility of the Municipal Corporation Amritsar (MCA) with capacities housed in their PIU and eventually the proposed water utilities will take over after its commissioning.

215. However, considering the likely creation of a PMSIP entity at the state level, this part of the Program (Program Implementing Unit- PIU) will be housed within the Municipal Corporation, responsible for Operations and Maintenance (O&M) and for meeting the deliverables with support from PMIDC.

216. In light of this overall institutional structure planned for the program, the following institutional arrangement is proposed for the implementation of Environmental and Social Management Plan (ESMP) in Amritsar:



Source: Consultation with PIU and PMIDC

Figure 11-1: Institutional Arrangement for ESMP Implementation

11.4 Field Level Responsibility

217. As per ESS1, if multiple agencies are involved in implementation (as is the case in this project), the PMIDC/MCA has overall responsibility for their coordination, laying down the process of implementation of ESMP, regular monitoring & evaluation - accountable for overall ESMP implementation. In line with this, the primary responsibility for implementation of the ESMP will be with PMIDC.

Social Development Specialist located in city level PIU will be responsible for handling of all social, resettlement and land related issues at the city level, with the help of competent land and revenue department for the purpose. The overall coordination and guidance will be provided by the Social Development Specialist in the State level PMU. This will include review of the preparation of sub- project level ESIA/ESMP/RAP, facilitating and monitoring the ESMP including meaningful and informed stakeholder consultations, socio-economic surveys/ census, coordinating the preparation and implementation of ESMP/RAPs. The specialist also ensures functionality and awareness about the GRM set up for PAPs and mandatory disclosure of ESIA/ESMP/RAP and prepare periodic safeguards reports. Support to PIU in reviewing contractors’ site specific C-ESMP including follow up with DBOT Contractor.

Environmental Specialist located in city level PIU will be responsible for handling all environmental related matters. The overall coordination and guidance will be provided by the Environmental Specialist at the State level PMU. Also review Sub-project specific environmental documentation and give recommendation as needed. During implementation, Environmental Specialist will undertake regular environmental monitoring and supervision of the project. This will include review of Environmental and social documents including Environmental & Forest clearances, permits required by the contractors from different Government agencies. Support to PIU in reviewing contractors’ site specific C-ESMP including follow up with DBOT Contractor.

Health & Safety Specialist located in city level PIU will support the implementation of the provision of ESMP and provide oversight to contractor for ensuring compliance with Occupational Health & Safety and Work Zone Safety requirements during execution of DBOT contract. The specialist will prepare monitoring report and also provide training and capacity building of relevant stakeholders on health and safety issues.

Superintending Engineer (SE) will be assisted by Environment, Social and HS Specialist, who further will have support from Manager (Environment & Social Safeguard) at the PMU office.

218. SE through the PMU will be responsible for the implementation of ESMP in coordination with different agencies of Municipal Corporation Amritsar.