



***Environmental and Social Management Plan (ESMP) of
Sibi Town Water Supply Scheme (STWSS)***



**Balochistan Integrated
Water Resources
Management and
Development Project
(BIWRMDP)
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(Final Version)**

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ABBREVIATIONS AND ACRONYMS

BCM	Billion Cubic Meters
B-EPA	Balochistan Environmental Protection Agency
BWPPCM	Balochistan wildlife protection, preservation, conservation and management Act, 2014.
CBOs	Community Based Organizations
CCA	Culturable Command Area
CESMP	Contractor Environmental Social Management Plan
CFS	Cubic Feet per second
Col	Corridor of Impact
Cusec	Cubic feet per second
dB	Decibel
EA	Environmental Assessment
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EMU	Environmental Management Unit
EPA	Environmental Protection Agency
ESMP	Environmental and Social Management Plan
ESS	Environmental Safeguard Specialist
FO	Farmers Organizations
GBV	Gender Based Violence
GCA	Gross Command Area
GoB	Government of Balochistan
GRM	Grievance Redress Mechanism
GW	Ground Water
HDPE	High-Density Polyethylene
HSE	Health Safety & Environment
HSP	Health and Safety Plan
ICR	Implementation Completion Report
IEE	Initial Environment Examination
IFC	International Finance Cooperation
IP	Inspection path
IUCN	International Union for the conservation of nature
MAF	Million-acre feet
M&E	Monitoring and Evaluation Consultants
NEQS	National Environmental Quality Standards
NGO	Non-Governmental Organizations
NIP	Non-Inspection Path
NSDWQs	National Standards for Drinking Water Quality Standards
OFWM	On-Farm Water Management
O&M	Operation and Maintenance
OP	Operating Procedure
PAD	Project Appraisal Document
PAP	Project Affected Person(s)
P&D	Planning & Development
PD	Project Director
PHE	Public Health Engineering
PMU	Project Management Unit
PPE	Personal Protective Equipment
PSIAC	Project Supervision and Implementation Consultants
RD	Reduce Distance
RoW	Right of Way
SEA	Sexual Exploitation and Abuse
SOP	Standard Operation Procedures
SSESMP	Site Specific Environment and Social Management Plan

SW	Surface Water
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
VRB	Village Road Bridge
WB	World Bank
WBG	World Bank Group
WDG	Women Development Group

Executive Summary

Background¹

Balochistan faces an acute water scarcity problem and compared to Pakistan's other provinces is most at risk from climate change and is least able to address and manage water-related development challenges. Floodwater generated by intense and irregular rainfall is the largest usable water resource in Balochistan. Extended droughts and destructive flash floods are common and are expected to get worse with future climate change. Rainwater is harnessed for irregular spate (or flood) irrigation. Spate irrigation in the province is generally poorly managed and reliant on poor infrastructure, making it both relatively inefficient and unproductive.

Groundwater is significantly over-extracted and this has led to major declines in groundwater levels in many parts of the province. Given the low frequency of rainfall events, groundwater recharge is limited. This also has major impacts on health and human development. Water is critical to the irrigation that underpins food security in semi-arid Balochistan. Most of the rural poor in Balochistan depend on unreliable surface water irrigation (either spate irrigation or rainfall harvesting), or livestock-based production across the extensive but relatively unproductive rangelands of the province. In the current context, improving rural livelihoods and stimulating economic growth require vastly improved management of the scarce water resources of the province.

Balochistan Integrated Water Resource Management and Development Project (BIWRMDP)

The Government of Balochistan (GoB) has received financial support from the World Bank for the BIWRMDP to strengthen capacity for water resource monitoring and management and to improve community-based water management for all related sectors such as irrigation, agriculture, forest, health, environment, and livestock.

The Sibi WSS will be implemented in Sibi district of NRB, and the water supply system will intake water from this basin. The proposed activities include the construction of a sump well and well room, an 11 km long conduit channel and crossing, sedimentation tanks and slow sand filters at the treatment plant, trenching & backfilling of HDPE pipeline, water reservoir, and overhead storage tanks, sub-engineer residence, restoration of defunct tube wells, guard and store-room. Further details of engineering interventions proposed under this scheme are provided in section

¹ Project Appraisal Document (PAD) BIWRMDP, pp. 2-3

3.1. The material required for construction includes earth fill material, spall, stones for stone pitching, aggregate, cement, steel, and sand. For the production of concrete, a batching plant will be installed by the contractor. Further details of construction material requirements are given in section 3.2.4.

Associated work activities include the construction of a contractor's camps, wherein one main and one sub-camp will be constructed by the contractor to carry out sub-project activities. It will accommodate a concrete batching plant, power generators, workshops, offices, and residences, storage of materials (i.e., fuel / mixed chemicals, other hazardous materials), sanitation and welfare facilities, waste disposal systems, and parking facilities for vehicles.

Environmental and Social Management Plan (ESMP)

This ESMP provides details about BIWRMDP, regulatory and policy reviews, engineering activities, environmental and social baselines, impact and mitigation, community, and stakeholder consultation, institutional and implementation arrangements, grievance redress mechanism, and budget. The ESMP has been completed in accordance with provincial and national legislation, and the World Bank's Operational Policies (OPs). It will be included in the tender/contract of this scheme as an integral part of the bid document.

Environmental and Social Baseline

During the baseline study, analysis of five water samples (02 surface water and 03 ground water samples) collected from the Sibi City and NRB showed that total coliform, fecal coliform, and escherichia coli were found above the permissible limit of NDWQs in all samples. In addition, water quality reports of 08 locations, testing carried out by the PHE department were also reviewed, wherein it was found that *color, odor, taste, turbidity*, total coliform, fecal coliform, and escherichia coli levels are also high in these surface and ground water samples. The project activities will not deteriorate the water quality of the scheme area as the mitigation measures proposed for the project will be adopted.

The ambient air quality pollutant testing carried out at the two locations showed that the tested pollutants were found within the permissible limits of NEQs and World Bank Group (EHS Guidelines) This reflects that ambient air quality in these areas is good.

The maximum average noise level recorded during the daytime was 64dB, while the maximum average noise level recorded during the nighttime was 53dB. It is evaluated that the average noise levels recorded are below the permissible limits of NEQs.

During the survey, it was found that 324 trees exist within the RoW of the conduit channel and will be cut. These five (05) different types of trees species include; Babur (*Acacia nilotica*), Khabar (*Salvadora oleoides*), Kandi (*Prosopis cineraria*), Shisham (*Dalbergia sissoo*), Beer (*ziziphus*

jujube). While the different types of scattered vegetation cover recorded during the walk-through survey are; Mundar (*Calotropis procera*), Sur ghaz (*Tamarix mactrocarpa*), Ghuzaira (*Stockia bruchica*), Thuar (*Euphorbia caducifolia*), Sargara (*Cymbopogon jwarancusa*), Kirri (*Tamarix sultanii*), Devi (*Prosopis juliflora*), Sabba (*Chrysopogon serrulatus*), Gazara (*Cousine athomosonii*).

There are no protected or sensitive areas in the RoW or COI of the engineering interventions. However, a Chinkara (*Gazella bennettii*) facility exists North of the NRB weir, and which is about 20 km away from the scheme area, it is beyond the corridor of impact and engineering interventions. Therefore, there shall be no impact during the execution of civil works.

The presence of fish at the location of the sub-project has not been observed, however, during the monsoon rains, it is reported by the local community (fisher-men) that two types of fish species Rahu (*Labeo rohita*) and Mahaseer (*Tor putitora*) are found, and that is coming from the upstream lagoon, other water bodies and ditches located in the mountainous region, as during the rainy season the water levels become high in these areas that bring fish species to the downstream side of the NRB.

Socio-economic profile (Baseline)

Societal institutions and Language: The Tribal system prevails in the scheme area and is the established and preferred mechanism in the coordination of the state systems for dispute resolution and grievance redress. The languages that are spoken are Pashto, Sindhi, Brahvi, and Balochi. While the Urdu language is also commonly spoken by all residents of the scheme area.

State of law and order: The law-and-order situation in the scheme area is under the control of the district administration, police, and Frontier Corps (FC). However, the security situation in the past was not good due to an incident of a landmine explosion on another sub-project site of BIWRDMP in Sibi City (Nari Gorge). The current security situation of Sibi City is better than in the past due to the presence of security forces but still, the security risks in the Balochistan Province are high.

Education: For boys, there are five primaries, three middle, two high schools, and one college available in the sub-project area. For Girls, there are five primaries, three middle, two high schools, and one college along with one University for both boys and girls available in the scheme area.

Health Facilities and Problems: One civil hospital, two rural health centers, three basic health units (BHUs), five dispensaries, three midwifery units, and two private maternity homes are available in Sibi City. It was observed that for serious, average, or minor treatments these health facilities are fulfilling all health requirements of the urban and rural population of Sibi city, however, for major treatments, in case of emergency or serious health care needs the patients are either shifted to Quetta City or Karachi City of Sindh Province.

Water supply and sanitation: The urban communities are deprived of water availability from the defunct canal and its PHE water supply system. Therefore, the communities are reliant to fetch groundwater from the closest private tube wells. In addition, the PHE department provided eight tube wells of which six tube wells are non-functional.

Transport and Roads: The scheme area is located within Sibi City. Community travelers use local transports like coaches, busses, mini-buses, or own cars, private taxies, and pickups. Individuals in the community often use their source of transport (mainly motorbikes and rickshaws) for local use. The Link roads of these wards, villages, and towns are metaled roads but in damaged condition, and are connected with the main national highway.

Cultural/community sites and properties: There are six graveyards and thirty-five mosques in the sub-project. These cultural properties do not fall in the Right of Way (RoW), and will not be impacted or disturbed by the proposed civil works

Community-based organizations: Different local and national NGOs are working in the scheme area. The overall goal of these organizations is poverty reduction, social mobilization of communities as a cross-cutting theme, and working education, livelihood, microcredit, and physical infrastructure schemes at the village, wards, and union council levels.

Land ownership: The 94% of houses ownerships, 04% are rented houses and 02% are state-owned houses. The record of this ownership is available in the revenue department. During the survey, it was revealed that the sale of land is common practice in all wards and if the house is sold, the house transfer of ownership is done formally and is recorded with the Revenue Department.

Environmental and Social Impacts and Proposed Mitigations Measures

The anticipated environmental and social impacts include the adverse impacts on air quality and noise levels may rise due to construction activities (i.e., movement and operation of machinery, sheet piling, and vehicles), waste generation, potential risk of contamination of surface and groundwater due to improper waste disposal and spills, occupational health and safety risks during construction activities and risk of COVID-19 as large number of workers will be living and working together. It is also anticipated that 324 trees are expected to be cut during the construction of the conduit channel. Five trees for one tree cut will be planted. The COI of this scheme does not fall in any of the wildlife habitats and no harmful impacts directly or indirectly are expected due to construction activities. All of these risks and impacts are localized and temporary in nature and will be addressed through the management of civil works, good housekeeping, and implementation of proposed mitigation measures. In addition, once the scheme is made operational, it will have long-term positive benefits due to an increase in clean water availability (03 cusecs) for drinking and domestic uses for the entire population of Sibi City. In addition to this, the project will develop the Operational and Maintenance manual of the Sibi

Water supply scheme which will be implemented by the PHE Department and communities together, once the construction works are completed.

The project has experienced two incidents of the explosion of a landmine on an ongoing World Bank-funded project site in the same district (Sibi city of NRB) in January and April 2021. Keeping this in view, the project conducted a detailed security risk assessment and management steps were proposed for the sub-project area sites (camp and work areas). The mitigation measures and security recommendation to be implemented are (i) The project shall hire a security manager (Individual Consultant) who will supervise the implementation of recommended security measures and will help the project to develop further plans policies and procedures related to security for the project. (ii) The project shall hire the services of a professional and efficient security guarding company with adequate number of armed private security personnel for protection of offices, contractor camps and work sites and will work under the supervision of security manager. (iii) A system of key performance indicators will be agreed with the guarding service provider and strictly enforced to ensure maintenance of service quality. (iv) Where possible it will be ensured that the locals or those conversant with the area and customs must be hired for the guarding duties and thorough background checks will be done by the security company before deploying any guards at site. (v) It shall be ensured that physical measures such as a fence, barriers, gates, warning signage, and surveillance system are in place to prevent access to or passage through work areas camps, and offices. (vi) The project shall ensure that the security personnel should be stationed at the entry and exit points of the sites, offices, and camps around the clock.

Due to the influx of labor, there is a risk of impact GBV and SEA and abuse among women and children and other vulnerable population groups. To mitigate all these risks, the contractor shall comply with the contractor's guidelines and agreement with labor to prevent and set clear boundaries for acceptable and unacceptable behaviors. The main camp and sub-camp will be constructed which will generate various waste (i.e. Domestic, sanitary, etc). To mitigate these issues, the camp will be constructed at least 500 m (1,640 ft) away from Sibi City/settlements, NRB and or any water body.

Community disturbance will also be created because of an expected increase in traffic volume passing through Sibi City towards construction sites and camp areas, this may result in congestion, causing delays to local traffic. As it also raises the risk of accidents (e.g., collisions with vehicles or construction machinery) resulting in injury to members of the public. Therefore, to mitigate this contractor shall avoid the transport of construction materials during peak hours and will coordinate with the local traffic police department to ensue there is no disturbance to traffic movement. In addition, three (03) temporary diversions of unpaved/katacha road adjacent to NRB at RD 0+020, RD 8+970, and RD 10+700 will also be constructed for the construction of conduit channel and crossing to avoid restriction to the community movement.

Stakeholders Consultation and Participation

The consultations were carried out to disseminate project information among the project stakeholders; record the perception of the community and their views on project interventions; and, obtain community feedback regarding the severity of impacts and recommendations for mitigation measures. The consultations were done at different times and dates. In this regard, two rounds of consultations were held with the communities. The first phase of a round of consultations was held from December 2020 to February 2021, while the second round of consultations with a male was held from March to May 2021, during the preparation of this ESMP. Further details of the consultations are provided in section 7.

The Environmental and Social Management Plan (ESMP) and Institutional Arrangements

This ESMP is to be implemented to ensure that the mitigation measures proposed in this document are implemented accordingly. It includes monitoring mechanisms and responsibilities. This ESMP is also to be supplemented by various plans which are to be submitted by the contractor, (i.e., Contractor Health and safety, and Contractor Environmental and Social Management Plan).

On behalf of the Balochistan Irrigation Department (BID), Project Management Unit (PMU) is led by a Project Director (PD) who will be responsible for the implementation of this ESMP. At the basin levels, there are Project Implementation Units (PIUs). The PMU and PIUs will be supported by Project Supervision and Implementation Assistance Consultants (PSIAC) and the team of Monitoring and Evaluation (M&E) at the PSIAC level. The Implementation Completion Report (ICR) of the project will rate and evaluate the performance of the implementing agency.

The contractor will be responsible for the implementation of this ESMP during the execution phase. The contractor will be required to submit to the PSIAC/PMU, the Contractor's Environmental and Social Management Plans (CESMP) and Health, Safety, and Environment Plan (HSEP) reflecting the contractor's various requirements and methodologies of implementation. Further details of these management plans are provided in sections 8.2 and 9.6. The Contractor is also required to appoint a safety supervisor, paramedic staff, health, and safety officer, human resource officer, and environmental officer. The detailed requirements from the contractor are given in Sections 8.2 and 9.6.

The PSIAC will be responsible for the supervision of the contractor's site activities and implementation of this ESMP. Each party will submit their monthly reports detailing the findings of their monitoring activities which will be distributed among each of the institutional stakeholders of this ESMP. The format of the monthly monitoring report (PSIAC) is given in Appendix C.

During the preparation of Contractor Health and Safety and CESMP, the guidelines of the environmental code of practices (ECOPs) given in Appendix B will be followed by the contractor to implement accordingly.

Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) for the project will be operational during the implementation of this ESMP. In this regard, WSCs and communities of all wards were given a detailed orientation about the project GRM and its procedures. An Urdu description of the GRM was also provided and the nomination of focal persons from the communities as the GRM committee noted and approved by the WSC's members themselves.

The contractor and concerned offices will adopt a grievance redressal mechanism for the project to resolve complaints of the public and project people. A public complaint center (PCC) and a grievance redressal committee had already been established for this sub-project. A Social complaints register will also be placed at the Contractor's office, PIU, and Engineer's offices to address social, environmental, and other aspects related complaints effectively. In addition, there is already a functional GRM mechanism established in the project which is accessible to all project beneficiaries including project staff and others. The GRCs are also established on each water committee, with two persons on each committee. The GRCs will be playing a vital role in the GRM mechanism. The capacity building of GRCs and involved stakeholders in the GRM mechanism will also be carried out to play their effective roles in the overall process. Further detail of GRM is given in section 10 of this ESMP.

Budget

The costs for the implementation of ESMP activities during the construction stage shall be included within the civil works contract for this sub-project and, therefore, ultimately borne by the client. The total cost of ESMP and GRM implementation is PKR 22,382,000 (135,648 US \$).

Conclusions

The overall interventions of this scheme will have major positive environmental and social impacts. Once the scheme will be completed, it will provide clean drinking water to the people of Sibi City with enhanced capacity of 3 cusecs. A separate community-based tree plantation plan has been made part of this scheme for the planting of 5,000 trees as an enhanced environmental measure. In addition, the scheme will also create skilled/unskilled job opportunities for local residents. The anticipated adverse environmental and social impacts will be managed by adopting and implementing necessary mitigation measures.

1 Introduction

1.1 General

The project development objectives of the Balochistan integrated water resources management and development project (BIWRMDP) is to strengthen the provincial government capacity for water resources monitoring and management and to improve community-based water management for targeted irrigation schemes in Balochistan.

The project will begin the transformation of water management in Balochistan from a narrow irrigation project focus, to an integrated multi-sector river basin planning and development approach. It will be achieved through institutional strengthening, investments in hydro-meteorological data and weather information systems, and priority infrastructure investments in irrigation, water supply, flood protection, and associated watershed and rangeland management.

It is expected that the BIWRMD Project would help in improving the livelihoods of the rural poor in Balochistan through local-level participation to build stronger and more resilient communities and to drive economic development through more efficient, productive, and sustainable management and use of water resources in a watershed context. The project combines technical assistance to the GoB to lay the foundation for a gradual transition to integrated water resource management with targeted investments to support the implementation of this project within a framework of community mobilization and participation in the Porali and Nari basins.

The project will support investments in two of the eighteen river basins in Balochistan. These river basins have been selected based on the current water resources development status and future development opportunities identified through prefeasibility studies, along with the consideration of security issues and a balanced approach to extending the development support of different tribal groups. These choices also reflect a desire to avoid the very arid and less populated western desert basins and avoid the canal-irrigated basins, but to focus on basins dominated by a mixture of perennial and spate irrigation and groundwater-dependent higher value agriculture. Groundwater in the basin is over-exploited in many areas, but considerable opportunities exist for the development of surface water resources.

The selection of two priority river basins is the first step in a long-term process of province-wide water sector strengthening and reform. Tackling two basins also provides an opportunity to learn from sequential implementation and will provide some flexibility to prioritize and expand interventions during implementation should the security situation change significantly.

The Balochistan Integrated Water Resource Management and Development (BIWRMD) project has three major and nine sub-components:

Component A: Institutions, Capacity, and Information: This component will support institutional restructuring, professional development, installation and operation of hydro-meteorological systems, and the establishment of multi-agency river basin information systems that provide public access to all available hydro-met data for a two-project basis. The Project will support the establishment of a hydro-met observation network in the two project river basins, including telecommunication equipment, software for data transmission and analysis, storage conversion of the data into the needed information, and training in network O&M.

Sub-component A1 will support institutional strengthening and restructuring; it will determine appropriate institutional arrangements for the initial stages of IWRM in Baluchistan.

Sub-component A2 will support hydro-meteorological data collection and management to provide the required information platform for improved water resource planning.

Component-B: Water Infrastructure and Management Investments: This component will support the implementation of IWRM sectorial investments in the Nari and Porali basins within a framework of community mobilization and participation.

The sub-component B1 will support six irrigation schemes: three each in the Nari and Porali basins, spanning approximately 69,300 ha. Development work will include remodeling the headwork and secondary canals. The Project will support the construction and rehabilitation of sixteen village water supply schemes.

Sub-component B2 will support a participatory approach to watershed management and rangeland management at the irrigation scheme level, to complement the new infrastructure investments under sub-components B1 and B3.

Sub-component B3 will support the improvement of on-farm and field irrigation water efficiency and farm productivity. On-farm infrastructure will include the construction/ rehabilitation of watercourses, water storage tanks/ponds, and farm access roads.

Component C: Project Management & Technical Assistance: This component will support, project management, monitoring and evaluation, and studies. The component will finance expenditures associated with overall project implementation costs, including incremental costs associated with the Project Management Unit (PMU) and the Project Implementation Units (PIUs), Project Supervision and Implementation Assistance consultants (PSIAC), M&E consultants, and implementation of Management Plans and Strategic Studies including the Environmental Management Plan (ESMP), the Social Mitigation Plan and the Gender Action Plan (GAP). Study tours will also be included with the piloting of new technologies

1.2 Sibi Water Supply Scheme

The Sibi Water Supply Scheme (WSS) will be referred to as a “sub-project” in this ESMP report. The main proposed civil works in this sub-project include the construction of a sump well and well room, conduit channel & crossing, sedimentation tanks, slow sand filters at the treatment plant, trenching & backfilling of HDPE pipeline, restoration of 06 defunct tube wells, overhead water storage tank of capacity 100,000 gallons. Further details of construction activities to be carried out are provided in section 3.1

1.2.1 Sub-Project Region

The Nari River Basin (NRB) is the largest in the Balochistan province. It includes Musakhel, Loralai, Beji, Khost, Chakr Lehri, Bolan-Mushkaf, and Mula sub-basins. It falls in Districts; Musakhel, Loralai, Duki, Ziarat, Hernai, Sibi, and Jhal Magsi. The areas falling in the river basins are connected to Quetta and other districts of Balochistan with metaled roads. The geographical area of the sub-project area lies in the Loralai sub-basin of the Nari River Basin and lies in district Loralai.

Figure 1: Map of Nari River Basins (NRB)

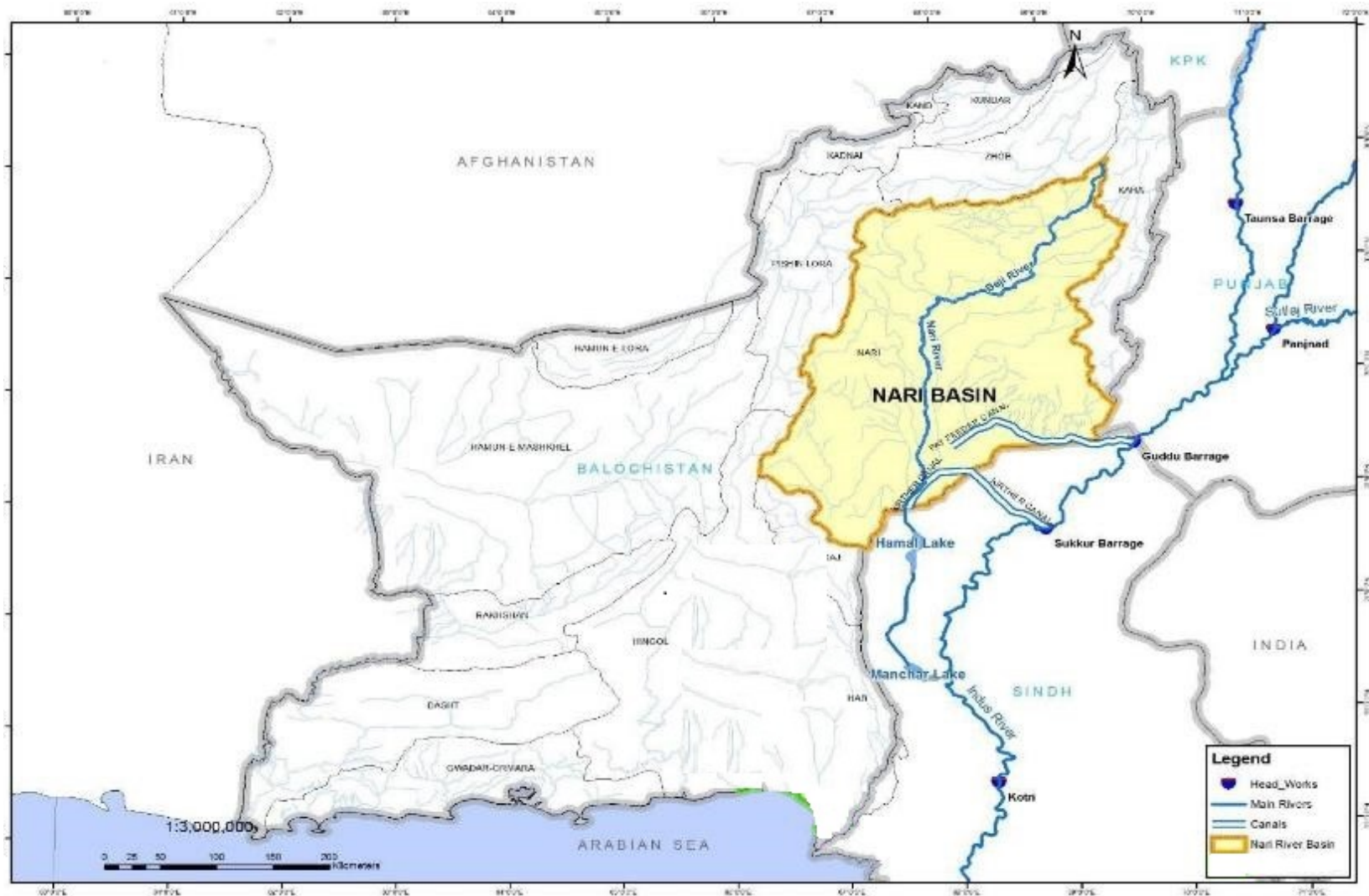


Figure 2: Location Map of the Sub-Project Area



1.3 Scope of the Environmental and Social Management Plan

The preparation of the present ESMP study is based on both primary & secondary data, information, and discussions held with stakeholders that cover:

- Anticipated environmental and social impacts due to sub-project interventions
- Proposed suitable mitigation measures for each adverse impact
- ESMP includes a monitoring plan, operational procedures, institutional responsibilities; and
- Integrate COVID-19 SOPs and guidelines in all the proposed civil works.
- Cost estimates of ESMP.

This ESMP will be made part of the bidding and contract documents to ensure its effective implementation at all stages as per requirements.

1.4 Justification and Need of the Sub-Project

The potable water is supplied to Sibi City from NRB. The existing water supply system was constructed before the independence of Pakistan by the British administration at the design capacity to supply 1.66 cusecs of water. Over time the condition of the existing water system deteriorated and also reduced its capacity to less than 1 cusecs. Therefore, this new scheme has been proposed to provide safe and clean drinking water to the people of Sibi City and which will have the capacity to provide 3 cusecs of water supply to the communities.

1.5 Water Balance

1.5.1 Surface Water Balance:

The total average annual water availability of NRB has been estimated as 12.275 billion m³ including water from the Indus basin. The total water abstraction is only about 3.987 billion m³-. There is a high potential for future utilization of balance surface water, estimated as 8.287 billion m³-, through the construction of water development and management schemes. After deducting the Indus water from the total balance surface water available in the basin it is around 1.315 billion m³ in an average year. It will increase by 3-fold in a wet year (20% probability). Thus ample resources of surface water are available for future development and management of water in the basin through integrated schemes².

1.5.2 Ground Water Balance

The total average annual ground water availability of NRB has been estimated as 874 million m³ against the total water abstraction of about 555 million m³. The overall basin level balance comes out to about 319 million m³-.

² Detailed feasibility Study of NRB-Volume Main Report (Revised), 5th October 2013.

However, the analysis at the sub-basin level shows that groundwater is extracted from storage from the Loralai and Beji sub-basins since the groundwater use in these sub-basins is higher than the groundwater recharge. However, this deficit can be met sustainably by pumping from storage only a very small fraction (less than 7%) of the storage component³.

1.6 ESMP Methodology

The methodology for assessing and mitigating the social and environmental impacts is summarized below:

- Desk review: Environmental Assessment (EA) and Social Impact Assessment & Management Plan (SIAMP), feasibility study reports, and engineering design were reviewed during the preparation of the site-specific ESMP for the Sibi Water Supply Scheme;
- Define the area covered under the ESMP;
- Review of planned civil works (design/alignment/scope of work);
- Review the legal framework (national and provincial) and World Bank policies and guidelines;
- Identify key available related infrastructure resources;
- Identify primary stakeholders including communities (vulnerable groups such as; women, ethnic groups, the poor, etc.), and secondary stakeholders (NGOs, CBOs, Government departments, local elected representatives, community leaders, and civil administration);
- Socio-Economic and Environmental baseline conditions;
- Assess temporary and permanent social and environmental impacts;
- Stakeholder consultations; and
- Development of risk mitigation strategy and social and environmental management plan.

The EA and SIAMP of the BIWRMD Project were completed in 2016 and the environmental approval by the Balochistan Environment Protection Agency (BEPA) was accorded on October 19, 2017, vide letter No. DG (EPA) /4762-80/2017-18.

1.7 Data Collection

1). The Primary data for this study was collected through field visits, walk-through surveys, quantitative household surveys, in-depth qualitative interviews during field visits, and community consultations. Women were also included in the quantitative household survey. In view of cultural norms, female enumerators were specially trained and then mobilized to interview female respondents in separate qualitative consultation sessions.

2). Secondary data about various environmental and socio-economic parameters were gathered through the literature review and from the approved project documents.

³ Detailed feasibility Study of NRB-Volume Main Report (Revised), 5th October 2013

1.8 Environmental and Social Baseline Sampling

1.8.1 Environmental Sampling

The baseline monitoring of Ambient Air Quality, Water Quality samples, Noise, and Meteorological parameters was carried out by the Quality Testing Service on behalf of the Project Management Unit of BIWRMDP in October 2020.

1.8.1.1 Analysis of Ambient Air Quality

The Ambient Air Quality analysis for 24-hour continuous monitoring at the sub-project area was conducted for the following parameters:

- Carbon Monoxide
- Nitrogen Dioxide
- Sulfur Dioxide
- Particulate Matter (PM 10)
- Noise Levels
- Ozone
- Total Suspended Particle (TSP)

1.8.1.2 Meteorological Parameters

The following meteorological parameters at each of the sites:

- Temperature
- Relative Humidity

1.8.1.3 Noise Level

During the ambient air monitoring, the 24 hrs. Noise level monitoring was also conducted at the same locations and was compared with World Bank EHS guidelines and National Environmental Quality Standards. The detailed result of each parameter analysis is provided in Section 4 of this ESMP.

1.8.1.4 Water Quality Testing

The eight water samples (02 SW & 03 GW samples) were collected from the NRB and Sibi City. The physical, chemical and microbiological parameters of surface and ground-water quality were analysed of the collected sample and compared with National Drinking Water Quality Standards (NDWQs). In addition, surface and ground water quality testing reports of 08 locations testing carried out by the PHE department were also reviewed.

1.8.1.5 Chemical Test

Alkalinity, Bio-carbonate, Chlorides, Hardness (CaCo₃), Magnesium, Potassium, Sulfate, Nitrate, Fluoride, Iron, Arsenic, Calcium, Copper, Zinc, Mercury, Copper, Ammonia, Nitrite, Selenium.

I. Microbiological Test

Total Coliforms, Fecal Coliforms, Escherichia Coli (E. Coli).

II. Physical Test

Color, Odour, Taste, Turbidity, Conductivity, pH, TDS, TSS

The detailed result of each parameter analysis is provided in Section 4.1 of this ESMP.

1.8.1.6 Soil Quality Test

The soil tests analysis of pollutants/chemicals were conducted of cadmium (Cd), Chromium (trivalent and hexavalent), Copper (Cu) total, Mercury (Hg) total, Lead (Pb), Nickel (Ni), Zinc (Zn), Arsenic (As) and Pesticides (Organo-chlorine).

1.8.2 Socio-Economic Baseline

Quantitative Sampling of Sibi WSS was carried out from August to November 2020. The sample size was 14.2%. Out of a total of 7,838 households, 1,130 households were included in the baseline survey; both male and female members of households were interviewed. The details of the socio-economic survey are provided in section 5 and consist of:

- Village profile;
- Household socio-economic profile.

1.9 Objectives of Environmental and Social Management Plan (ESMP)

The following are the objectives of the ESMP.

- i. Identify the social and environmental impacts of the subproject and related activities.
- ii. Suggest suitable measures for mitigation of identified impacts at the planning, design, and implementation stages of the sub-project and to avoid, eliminate, or reduce adverse impacts if any.
- iii. Propose an environmental and social monitoring program to ensure that mitigation measures are implemented during the subproject execution and timely corrective actions are taken where required.
- iv. In addition to adopting mandatory safety measures (SOPs) for laborers and workers in the event of a pandemic COVID19, as given by the government, World Bank, and WHO. Propose the institutional arrangements required to implement and monitor the ESMP.
- v. To carry out monthly social and environmental monitoring and ensure compliance and reporting non-compliance in accordance with this ESMP.
- vi. Appointment of full-time ESMP staff in the field, as given in section 8.2.1.
- vii. Capacity building of contractor and project staff.

The ESMP shall be kept with the Contractor so that he may comply with its requirements. Any work executed by the Contractor, or on behalf of the Contractor (including sub-contractors), shall be in accordance with the ESMP.

1.10 Study Team

The details of the team members involved during the preparation of this ESMP and in various activities are provided in Appendix A.

2 Regulatory and Policy Reviews

This chapter provides details of the national and provincial legislation, regulations, EPA guidelines, and World Bank Operational Policies and guidelines which are relevant and applicable to the project. Mainly, this chapter is divided into sub-sections as under;

Section 2.1: Provides the details of the World Bank Operational Policies

Section 2.2: Provides the details of the National and Provincial Legislative Framework

Section 2.3: International Conventions/Treaties

2.1 World Bank Operational Policies

The World Bank (WB) has approved a series of Operational Policies that define the conduct of WB operations. The safeguard policies provided in **Table 1** are triggered at the project level and in accordance with the Integrated Safeguard Data Sheet (ISDS). While a brief rationale of policies for each one on this specific sub-project which are triggered and not triggered is also summarized below:

Table 1: Assessment of World Bank Policies in accordance with ISDS & ESIA

Directive	Policy	As per ISDS & ESIA	
		Triggered	Not Triggered
Environmental Assessment	OP/BP/GP 4.01	✓	
Natural Habitats	OP/BP 4.04	✓	
Pest Management	OP 4.09	✓	
Indigenous Peoples	OP 4.10		X
Involuntary Resettlement	OP/BP 4.12	✓	
Forests	OP/BP 4.36		X
Safety of Dams	OP/BP 4.37		X
Projects on International Waterways	OP/BP/GP 7.50		X
Projects in Disputed Areas	OP/BP/GP 7.60		X
Physical Cultural Resource	OP 11.03/OP 4.11	✓	

2.1.1 Environmental Assessment (OP 4.01)

The World Bank (WB) requires that an environmental assessment of all WB-financed projects is carried out by the Borrower to ensure that a project is environmentally sound and sustainable. As such, this policy has been triggered by the Balochistan Integrated Water Resource Development Project (BIWRMDP). The environmental assessment for this project was completed by the team of Independent Advisors and consultants.

The proposed BIWRMD Project is classified as Category A which means the project has potentially significant adverse environmental impacts that are sensitive and diverse. These impacts may affect areas of bordering scheme sites. The EIA had been completed in accordance with the relevant Operational Policy (OP), to identify the extent and consequences of these impacts, and to develop an Environmental Management and Mitigation Plan. The OP 4.01 states that a range of instruments can be used to satisfy the Bank's EA requirement including:

- Environmental Impact Assessment (EIA)
- Regional or Sectorial
- Environmental Audit
- Hazard or Risk Assessment
- Environmental and Social Management Plan (ESMP)

In accordance with the requirement of the Environmental and Social Management Plan for the sub-project will be implemented accordingly.

2.1.2 Natural Habitat (OP 4.04)

The following definition applies in this policy⁴:

- Natural habitats are land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions.
- Critical Natural Habitat were (i) existing protected areas and areas officially proposed by the government as protected areas, and (ii) sites identified on the supplementary list prepared by the Bank.
- Significant conversion is the elimination or severe diminution of the integrity of a critical or other natural habitat caused by a major, long-term change in land or water use.
- Degradation is a modification of a critical or another natural habitat that substantially reduces the habitat's ability to maintain viable populations of its native species.

As per the ESIA of the project, this policy is triggered because of the potential environmental impacts of project activities on the natural habitats and protected areas in the two river basins. Specific requirements of the policy have been adopted in this ESMP in case if any possibility. Namely, appropriate conservation and mitigation measures have been included such as the removal of adverse impacts to habitats; mitigation measures to minimize the ecological damage; and, restoration of degraded habitats (tree plantation, given in Section 6.2.8.1.

2.1.3 Physical Cultural Resource Plan (OP 4.11)

The objective of this policy is to avoid or mitigate adverse impacts on physical cultural resources. In accordance with this policy, the project has completed a baseline survey of the sub-project area to identify physical cultural resources. The sub-project activities will not cause an impact on the physical cultural resources; but the project activities include rehabilitation and construction works and it may involve excavations, which may have

⁴ <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1568&ver=current>

implications on chance finds. Therefore, this policy is triggered. A procedure to manage chance finds is also included in Appendix F. In case of any design changes which may harm, physical, cultural resources, a complete assessment of the potential impacts, and formulated mitigation measures shall be carried out.

2.1.4 Pest Management (4.09)

In assisting borrowers to manage pests that affect either agriculture or public health, the WB supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. In WB financed projects, the borrower must address pest management issues in the context of the project's environmental assessment.

However, for this specific sub-project, this policy is not triggered, as the interventions are only related to the drinking water supply scheme.

2.1.5 Involuntary Resettlement (OP/4.12)

The WB policy on involuntary resettlement is triggered in any project with the potential to result in the involuntary taking of land which results in the relocation or loss of shelter, loss of assets or access to assets, or loss of income sources as well as involuntary restriction of access to legally designate parking and protected areas resulting in adverse impacts on livelihood. This policy is triggered for the Project as a whole, and a Resettlement Planning Framework (RPF) has been prepared, consulted upon, and disclosed.

By using screening criteria involuntary screening checklist and VLD form, it is evaluated that there is no land requirements and physical relocation due to the activities to be carried out in the sub-project area, therefore, for this specific scheme, this policy is not triggered.

2.1.6 Labour Influx Guidance Note

It is a mandatory requirement in Bank-financed investment projects which often involve the construction of civil works for which the required labour force cannot be fully supplied locally for a number of reasons, among them worker unavailability and lack of technical skills and capacity. In such cases, the labour force (total or partial) needs to be brought in from outside the scheme area.

Labour influx for construction works can lead to a variety of adverse social and environmental risks and impacts such as; risk of social conflict, increased risk of illicit behaviour and crime, increased risk of communicable diseases, gender-based violence, child labour, and school dropout, child labour and school dropout, increased demand on freshwater resources, camp related land use,

The contractors will hire 25% of the skilled labour outside of the scheme area, therefore, to mitigate this labour influx guidance note shall be adhered by the contractor ⁵.

⁵ [labor influx guidance note 2016.pdf](#)

2.2 National and Provincial Legislative Framework

The national environmental and social relevant legislation, policies, and guidelines of Pakistan, applicable/not applicable to this sub-project are summarized in the table below.

Table 2: National and Provincial Legislative Framework

Name of the Act	Objectives under the Act	Supervising Responsibility and Monitoring	Time Frame
Hazardous Substance Rules 2003 (Draft)	The objectives of the Hazardous Substance Rules are to implement licensing requirements for the generation, collection, transport, treatment, disposal, storage, handling, and import of hazardous substances. The rule has not yet been notified ⁶ .	PSIAC and PMU	During the establishment of contractor's camps
Employment of Child Act, 1991	The objectives of the Employment of Child Act (1991) disallow child labor in the country. It also states that no child shall be employed or permitted to work in any of the occupations set forth in the Act (such as transport sector railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out ⁷ .	PSIAC and PMU	Entire Project Duration
Factories Act 1934	This Factories Act (1934) clearly defines the roles and responsibilities of the factories, aims to ensure the health and safety of workers, and defines the basic facilities to be provided. The Act also provides regulations for the handling and disposal of toxic and hazardous materials. As construction activity is classified as 'industry', these regulations will be applicable to the sub-project construction contractor.	PSIAC and PMU	Entire Project Duration
Protection of Trees and Brushwood Act (1949)	The Protection of Trees and Brushwood Act prohibits the illegal cutting or lopping of trees along roads and canals planted by the Forest Department. The matter of permission to remove any trees, their compensation, and plantation to replace the lost trees will be taken up with the Balochistan Forest authorities.	-----	-----
Forest Act (1927)	This federal Forestry Act of 1927 authorizes Provincial Forest Departments to establish forest reserves and protected forests. The Act prohibits any person to start a fire in a forest, quarry stones within a forest, remove any forest produce or cause any damage to the forest by cutting trees or clearing up the area for cultivation or any other purpose.	-----	-----

⁶ http://environment.gov.pk/PRO_PDF/HAZ-RU03.PDF

⁷ http://www.na.gov.pk/uploads/documents/1335242011_887.pdf

Name of the Act	Objectives under the Act	Supervising Responsibility and Monitoring	Time Frame
Balochistan Cultural Heritage and Preservation Act of 2010	This Act empowers the Provincial Government to protect cultural heritage in the Province. It empowers the government to compulsorily acquire any heritage that could be lost to various threats. It states punitive action for the willful destruction of protected cultural heritage.	-----	-----
Motor Vehicle Ordinance (1995)	The Motor Vehicle Ordinance deals with the powers of the Motor Vehicle Licensing Authorities and empowers other related agencies to regulate traffic rules, vehicle speed, and weight limits, and vehicle use, to erect traffic signs, and to prescribe special duties for drivers in case of accidents.	PSIAC and PMU	Entire Project Duration
The Land Acquisition (Act LAA) 1894	<p>The Land Acquisition Act (LAA) of 1894 is the key legislation that has direct relevance to resettlement and compensation in Pakistan. Each province has its own interpretation of the LAA, and some provinces have also passed provincial legislations. The Land Acquisition (Balochistan Amendment) Act 1985 having been passed by the provincial assembly of Balochistan on 9th October 1985. The LAA and its implementation rules require that before the implementation of any development project the privately-owned land and crops are compensated to titled landowners and/or registered tenants/users etc.</p> <p>Based on the LAA, only legal owners and tenants registered with the Land Revenue Department or those possessing formal lease agreements are eligible for compensation. Under this Act, users of the Rights of Way (RoW) are not considered "affected persons" and thus not entitled to any mitigating measure, compensation, or livelihood support.</p>	-----	-----
High Way Safety Ordinance (2000)	The Highway Safety Ordinance includes provisions for licensing and registration of vehicles and construction equipment; maintenance of road vehicles; traffic control agencies, penalties, and procedures; and the establishment of a police force for motorways and national highways to regulate and control the traffic as well as keep the highways clear of encroachments. No high way or motorways exists nearby to the sub-project area.	-----	-----
Balochistan Environmental Protection Act (2012)	<p>Balochistan Environmental Protection Act of 2012 provides the overarching provincial framework for the protection of the environment in Balochistan. It builds on the provisions of PEPA and localizes them in the provincial context and taking into account the following points:</p> <ul style="list-style-type: none"> • Provisions for integrated watershed management; • Regulation of sustainable abstraction of groundwater; • Measures to protect human health and ecosystems; • Any other provision necessary for the sustainable use and management of water resources. 	PSIAC and PMU	Entire Project Duration

Name of the Act	Objectives under the Act	Supervising Responsibility and Monitoring	Time Frame
	<ul style="list-style-type: none"> A landowner or individual who uses the land on which any activity or process is performed or undertaken which causes or is likely to cause significant pollution of a water resource must take measures to prevent any such pollution⁸. 		
Balochistan Wildlife preservation protection conservation and management Act 2014 (BWPPCMA)	This legislation is guided primarily by the principle of ensuring the protection, preservation, promotion, conservation, management, and sustainable development of wild animals in recognition of their position as key components of biological diversity with social, cultural, economic, and ecological significance for the present and future generations. It further encourages the active participation of local communities in the protection of wildlife resources in the Province. Community participation is further encouraged through economic incentives and benefit-sharing. The Act embraces the principle of co-management of protected areas and the promotion of livelihood activities in protected areas. The proposed project activities will be conducted in compliance with the requirement of this Act ⁹ .	PSIAC and PMU	Entire Project Duration
Canal and Drainage Ordinance (Amended 2000 & 2006)	The Balochistan Canal and Drainage Ordinance, entitles the Provincial government to use and control, for public purposes, the water of all rivers and streams flowing in natural channels, lakes, sub-soil, and other natural collection of still water. The Ordinance empowers the government to define, in identifying areas, a cropping pattern for controlling waterlogging and soil salinity. The government may also impose a ban on the cultivation of certain crops situated outside the canal command area and can, in the event of any violation, impose penalties in terms of punishment and fine.	PMU	BIWRMD Project duration ----- --
Balochistan Water and Sanitation Act, 1989	This Act provides for the establishment of the Water and Sanitation Authority. The Authority is responsible for providing an adequate supply of potable water and for eliminating waterborne diseases through the provision of effective sewerage and sanitation systems. The Act defines the composition of the Authority and its powers and functions. The Authority is empowered to issue licenses, set charges, and recover revenues for the services provided, authorize the discharge of industrial waste into sewerage or sanitation systems, and protect water resources and water supply systems from sources of contamination or pollution.	PSIAC and PMU	During the construction of contractor's camps

⁸ Environmental Assessment-BIWRMD

⁹ https://www.elaw.org/system/files/balochistan_environment_protection_act_2012-1.pdf

Name of the Act	Objectives under the Act	Supervising Responsibility and Monitoring	Time Frame
Minimum Wages Ordinance 1969	This ordinance provides support to the employee that each employer shall be responsible to paid minimum wages to all unskilled/unskilled workers employed, either directly or through a contractor, as per the prescribed rate of the government of Pakistan.	PSIAC	Through the sub-project
Workmen compensation Act of 1923	This law deals with the payment of compensation by the employer to work or workman (not an officer) when he meets with an accident during his working period. Natural disabilities are excluded from the compulsory payment of compensation. The occurrence of an accident after working hours outside the working premises is also excluded from the payment of compensation. Only such accidents are covered by this law that occurs due to the work for which the worker is employed.	PSIAC	Entire project duration
The Bonded Labor System (Abolition) Act 1992	<p>According to this act, forced labor is any type of work or kind of service in which someone engages involuntarily and under implied coercion a manifest threat of a party or oppression measures. Bonded labor can exist in the following forms under different situations:</p> <ul style="list-style-type: none"> • Bonded labor in exchange for advance/an amount of money given before services is rendered, received by a person or his family. • Bonded labor as a consequence of some social or customary obligations. • Bonded labor in exchange for an economic benefit/consideration received by a person or his family, • Bonded labor of a guarantor in exchange for a debtor who was unable to pay off his debt. <p>Bonded labor is prevalent in the agriculture sector, brick kilns, domestic work, and begging.</p>	PSIAC/PMU	Entire project duration
Balochistan Irrigation and Drainage Act of 1997	<p>The Balochistan Irrigation and Drainage Authority (BIDA) Act of 1997 transformed the Irrigation wing of the Irrigation Department into an autonomous Authority for the development and management of irrigation, drainage, and flood control infrastructure. BIDA exercises powers under the Balochistan Canal and Drainage Ordinance and the Balochistan Groundwater Rights Administration Ordinance to formulate and implement policy guidelines regarding water management and use. It is responsible for developing a sustainable irrigation and drainage network through equitable distribution of irrigation water to improve the efficiency of water utilization while minimizing drainage surplus.</p> <p>The proposed BIWRMD Project will need to be cognizant of BIDA (1997) regulations, especially for organizing and registering farmer organizations. The regulations for the registration of farmer</p>	PMU	During the formation and registration of FOs.

Name of the Act	Objectives under the Act	Supervising Responsibility and Monitoring	Time Frame
	organizations were approved and issued in 2000. A registrar appointed by BIDA is responsible for registering and maintaining the operations of registered farmer organizations ¹⁰ .		
The Protection Against Harassment of Women at the Work Place Act 2010	This act provides shelter to women working in any sector. Harassment” means any unwelcome sexual advance, request for sexual favours or other verbal or written communication or physical conduct of a sexual nature or sexually demeaning attitudes, causing interference with work performance or creating an intimidating, hostile or offensive work environment, or the attempt to punish the complainant for refusal to comply to such a request or is made a condition for employment.	PSIAC/PMU	Entire Project duration

2.3 International Treaties

Pakistan is a signatory to several Multilateral Environmental Agreements (MEAs). These MEAs set requirements and restrictions to varying degrees for the Member States in order to achieve the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and the institutional set-up is largely non-existent. The MEAs agreement is provided in the table below:

Table 3: International Treaties

S. No	International Treaties	Objectives of Treaties	Applicability
1	Convention on International Trade in Endangered Species (CITES)	CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.	Yes
2	The Ramsar Convention (the Convention on Wetlands of International Importance)	The Convention on Wetlands, called the Ramsar Convention, is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources.	Yes
3	Paris climate accord (Convention on Climate Change dealing with	Paris climate agreement is an agreement within the United Nations Framework Convention on Climate	Yes

¹⁰ Environmental Assessment-BIWRMD

S. No	International Treaties	Objectives of Treaties	Applicability
	greenhouse gas emission	Change (UNFCCC) dealing with greenhouse gas emissions mitigation.	
4	UN Framework Convention on Climate Change (UNFCCC)	The UNFCCC convention is an international environmental treaty negotiated at the earth summit in Rio de Janeiro from 3 to 14 June 1992, then entered into force on 21 March 1994. The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.	Yes
5	Kyoto Protocol	The Kyoto Protocol is an international treaty that extends the 1992 UNFCCC on climate change to fight global warming by reducing greenhouse gas concentrations in the atmosphere to "a level that would prevent dangerous anthropogenic interference with the climate system.	No
6	Montreal Protocol	The Montreal Protocol on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion.	No
7	Basel Convention	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	Yes
8	Convention on Biological Diversity	The Convention on Biological Diversity was the outcome of the 'Earth Summit' held in Rio-de-Janeiro in 1992, The convention has 3 main objectives: <ul style="list-style-type: none"> • The conservation of biological diversity • The sustainable use of the components of biological diversity • The fair and equitable sharing of the benefits arising out of the utilization of genetic resources 	Yes
9	Convention for the Prevention of Pollution from Ships (MARPOL)	It was developed by the international maritime organization in an effort to minimize pollution of the oceans and seas, including dumping, oil, and air pollution.	No
10	UN Convention on the Law of the Seas (UNCLOS)	This law of the sea convention defines the right and responsibilities of nations with respect to their use of the world oceans, establishing guidelines for businesses, the	No

S. No	International Treaties	Objectives of Treaties	Applicability
		environment, and the management of marine natural resources.	
11	Stockholm Convention on Persistent Organic Pollutants (POPs)	Stockholm Convention on persistent organic pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).	No
12	Cartagena Protocol	The Cartagena Protocol on Biosafety to the Convention on Biological Diversity is an international agreement on biosafety as a supplement to the Convention on Biological Diversity effective since 2003. The Biosafety Protocol seeks to protect biological diversity from the potential risks posed by genetically modified organisms resulting from modern Biotechnology.	No
13	UN Convention to Combat Desertification (UNCCD)	The UNCCD in those countries which experience serious droughts. The objectives of this convention to combat desertification in countries experiencing serious droughts and/or desertification are to combat desertification and mitigate the effort of drought with a view to contributing to the achievement of sustainable development in affected areas.	No
14	International Covenant on Economic, Social, and Cultural Rights	The International Covenant on Economic, Social, and Cultural Rights is a multilateral treaty adopted by the United Nations General Assembly on 16 December 1966 through GA. Resolution 2200A (XXI), and came into force from 3 January 1976. It protects the right to an adequate standard of living adequate, clothing, and housing (Article 11), the right to enjoy the 'highest attainable standard' of physical and mental health (Article 12), the right of everyone to education (Article 13), including free and compulsory primary education (Article 14), and the right to take part in cultural life (Article 15).	No
15	International Covenant on Civil and Political Rights	The International Covenant on Civil and Political Rights (ICCPR) is a multilateral treaty adopted by the United Nations General Assembly. Resolution 2200A (XXI) on 16 December 1966, and in force from 23 March 1976 in accordance with Article 49 of the covenant. The ICCPR recognizes the inherent dignity of each individual and undertakes to promote conditions within states to allow the enjoyment of civil and political rights, to protect and preserve basic human rights, and compelled to take administrative, judicial, and legislative measures in order to	No

S. No	International Treaties	Objectives of Treaties	Applicability
		protect the rights enshrined in the treaty and to provide an effective remedy.	
16	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides	The objective of this Convention is to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use. This currently covers the following pesticides: 2,4,5-T; aldrin; binpacryl; captafol; chlordane; chlordimeform; chlorobenzilate; DDT; dieldrin; dinitro-ortho-cresol (DNOC) and its salts; dinoseb and its salts and esters; 1,2-dibromoethane (EDB); ethylene dichloride; ethylene oxide; fluoroacetamide; HCH; heptachlor; hexachlorobenzene; lindane; mercury compounds; and pentachlorophenol, plus certain formulations of benomyl, carbofuran and thiram; methamidophos; methyl-parathion; monocrotophos; parathion, and phosphamidon. It also covers the following industrial chemicals: five forms of asbestos (actinolite, anthophyllite, amosite, crocidolite, and tremolite); polybrominated biphenyls (PBBs); polychlorinated biphenyls (PCBs); polychlorinated terphenyls (PCTs); tetraethyl lead; tetramethyl lead; and tris (2,3 dibromopropyl) phosphate	Applicable
17	Convention on the Rights of the Child	The Convention on the Rights of the Child and consists of 41 articles. It sets out the civil, political, economic, social, health, and cultural rights of children. The Convention defines a child as any human being under the age of eighteen. Considering that the child should be fully prepared to live an individual life in society, and brought up in the spirit of the ideals proclaimed in the Charter of the United Nations, and in particular in the spirit of peace, dignity, tolerance, freedom, equality and solidarity.	No
18	The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	The Convention on the Elimination of all Forms of Discrimination Against Women is an international treaty adopted in 1979 by the United Nations General Assembly. Described as an international bill of rights for women, it was instituted on 3 September 198. It is dibromo propyl an international legal instrument that requires countries to eliminate discrimination against women throughout their life cycle and in all areas and promotes women's equal rights. It is often described as the international bill of rights for women.	Yes
19	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous	The objective of this Convention is to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals, and pesticides in order to protect human health and the	No

S. No	International Treaties	Objectives of Treaties	Applicability
	Chemicals and Pesticides	environment from potential harm and to contribute to their environmentally sound use.	
20	Convention for Safeguarding the Intangible Cultural Heritage	The Convention of the Safeguarding of the Intangible Cultural Heritage was adopted by UNESCO in 2003 in order to promote the identification, protection, and safeguarding of natural cultural heritage. The purposes of this Convention are: (a) to safeguard the intangible cultural heritage; (b) to ensure respect for the intangible cultural heritage of the communities, groups, and individuals concerned; (c) to raise awareness at the local, national and international levels of the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof; (d) to provide for international cooperation and assistance.	No

2.4 ILO Conventions – Ratifications for Pakistan

Pakistan has ratified 08 fundamental and 26 technical ILO conventions in which the following are relevant to the sub-project and summarized in the following table:

Table 4: ILO Conventions

S. No	ILO Conventions– Rectification for Pakistan	Objectives	Applicability
1	C029 - Forced Labor Convention, 1930 (No. 29)	Article 1 of the convention states each member undertakes to suppress the use of forced or compulsory labor in all its forms within the shortest possible period. Article 2 of the convention states that the term forced or compulsory labor shall mean all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.	Yes
2	C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	For the purpose of this Convention, discrimination includes any distinction, exclusion, or preference made on the basis of race, color, sex, religion, political opinion, national extraction, or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation.	Yes
3	C138 - Minimum Age Convention, 1973 (No. 138)	Article 1 of the convention states that Each Member which ratifies this Convention shall specify, in a declaration appended to its ratification, the minimum age for admission to employment or work within its territory and on means of transport registered in its territory; subject to Articles 4 to 8 of this Convention, no one under that age shall be admitted to employment or work in any occupation.	Yes

S. No	ILO Conventions– Rectification for Pakistan	Objectives	Applicability
4	C001 - Hours of Work (Industry) Convention, 1919 (No. 1)	The term industrial undertaking under this convention includes (c) construction, reconstruction, maintenance, repair, alteration, or demolition of any building, railway, tramway, harbor, dock, pier, canal, inland waterway, road, tunnel, bridge, viaduct, sewer, drain, well, telegraphic or telephonic installation, electrical undertaking, gas work, waterworks or other work of construction, as well as the preparation for or laying the foundations of any such work or structure; Article 2 of the Convention states that the working hours of persons employed in any public or private industrial undertaking or in any branch thereof, other than an undertaking in which only members of the same family are employed, shall not exceed eight in the day and forty-eight in the week. The limit of hours of work prescribed in Article 2 may be exceeded in case of an accident, actual or threatened, or in case of urgent work to be done to machinery or plant, or in case of "force majeure", but only so far as may be necessary to avoid serious interference with the ordinary working of the undertaking.	Yes

3 Description of Engineering Activities

This chapter provides the details of the engineering activities, construction schedule, and various construction phase activities to be executed at the Sibi (WSS).

3.1 Engineering Activities/Interventions

This scheme will include the construction of a sump well and well room, conduit channel and crossing, sedimentation tanks and slow sand filters at the treatment plant, trenching & backfilling of HDPE pipeline, overhead water tank (Capacity 100,000 gallons), water reservoir, restoration of 06 defunct tube wells, sub engineer residence, guard and store room. The details of engineering activities that are to be carried out under this scheme are provided in the table below.

Table 5: List of Construction Activities

S. No	Activity	List of Construction Activity
1	Pre-Construction - Activities	<ul style="list-style-type: none">• Joint Survey of sites with PMU and PSAC.• Selection of suitable sites for the establishment of camps.• Establishment of camps.• Relevant staff deputation for the start of work.• Mobilization of machinery and equipment.
2	Sump Well and Sump Well Room	<ul style="list-style-type: none">• Site Clearance• Excavation of foundation• Concreting of foundation• Concreting of columns• Construction of walls• Concreting of top slab/roof• Installation of mechanical equipment – (Penstock)
3	Conduit Channel and crossing	<ul style="list-style-type: none">• Site Clearance and cutting of 324 trees.• Completion of diversion activities• Excavation of conduit channel• Lean concrete• Concreting of sidewalls• Concreting of the top slab
4	Tube wells and Sedimentation Tanks at the Treatment Plant	<ul style="list-style-type: none">• Site clearance• Excavation of foundation• Concreting of foundation and floor slab• Concreting of walls• Concreting of inlet & outlet chambers

		<ul style="list-style-type: none"> • Installation of sluice valves and pipes • Installation of flow control system (regulating valves). • Restoration of 06 defunct tube wells. • Finishing works.
5	Slow Sand Filters at Treatment Plant	<ul style="list-style-type: none"> • Site clearance • Excavation of foundation • Concreting of foundation and floor slab • Concreting of walls • Concreting of lateral drains and main drains • Concreting of inlet & outlet chambers • Installation of sluice valves and pipes • Finishing works
6	Water Reservoir at Treatment Plant	<ul style="list-style-type: none"> • Excavation of foundation • Concreting of foundation and floor slab • Concreting of walls • Concreting of columns • Concreting of the top slab • Concreting of inlet & outlet chambers • Installation of sluice valves and pipes • Finishing works
7	Trenching & Backfilling of HDPE Pipe Line	<ul style="list-style-type: none"> • Excavation of Trench for Laying of HDPE Pipes
8	Over Head Water Tank (Capacity 100,000 Gallon)	<ul style="list-style-type: none"> • Site clearance • Excavation of foundation • Concreting of foundation • Concreting of columns • Construction of walls • Concreting of the top slab • Concreting of stairs • Concreting of inlet & outlet chambers • Finishing works
9	Sub Engineer Residence	<ul style="list-style-type: none"> • Site clearance • Excavation of foundation • Concreting of foundation • Concreting of columns • Construction of walls – • Concreting of top slab/roof • Implementation of mechanical, electrical, and plumbing works • Finishing works

10	Guard Quarter / Guard and Store Room	<ul style="list-style-type: none"> • Site Clearance • Excavation of Foundation • Concreting of Foundation • Concreting of Columns • Construction of Walls – • Concreting of Top Slab / Roof • Implementation of Mechanical, Electrical, and Plumbing Works • Finishing Works
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3.1.1 Dimension of Structures

The dimension of structures to be constructed under this scheme are provided in the table below:

Table 6: Dimension of Structures

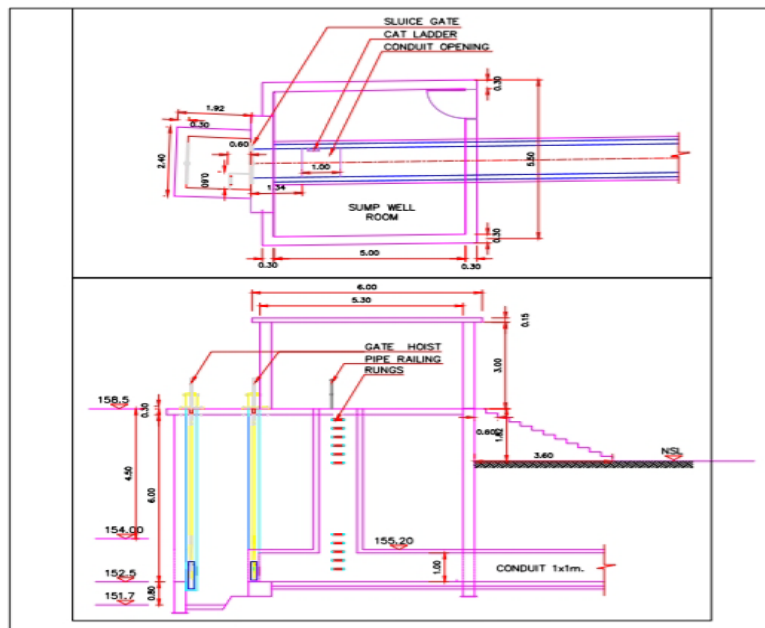
S. No	Structure	Dimensions		
		Length in meters (ft)	Breath in meters (ft)	Height in meters (ft)
1.	Sump Well	1.8 (5.9)	1.6 (5.2)	6 (19.6)
2	Sedimentation Tank	25 (82)	16 (52.4)	4 (13.1)
3	Conduit Channel	10,918 (35,820.2)	1.0 (3.28)	1.0 (3.28)
4	Slow Sand Filter	28 (91.8)	14 (45.9)	2.5 (8.2)
5	Water Reservoir	24 (78.7)	24 (78.7)	4 (13.12)
6	Overhead Water Storage tank	17 (55.7)	17 (55.7)	2 (6.5)

3.2 Construction Phase Activities

3.2.1 General

Presently, drinking water is supplied to Sibi City from NRB. Over the time, the condition of the existing system deteriorated and also reduced its capacity to carry and filter water to less than 1 cusec. Under this new scheme, the sump well/intake site will be constructed at an upstream side of the NRB Weir and adjacent to the Nari River Basin. The conduit channel will be constructed equivalent to the existing ground level and will be 1mX1m (3.26 ft X 3.26 ft) in size, and will be covered with a top slab. To increase the water storage capacity, a new overhead storage tank of capacity of 100,000 gallons is also proposed to be constructed. In addition, the water reservoir, sedimentation tanks, and slow sand filter will be constructed/installed at the filter and treatment plant. The new facility will have the capacity to carry and filter 3 cusecs of water.

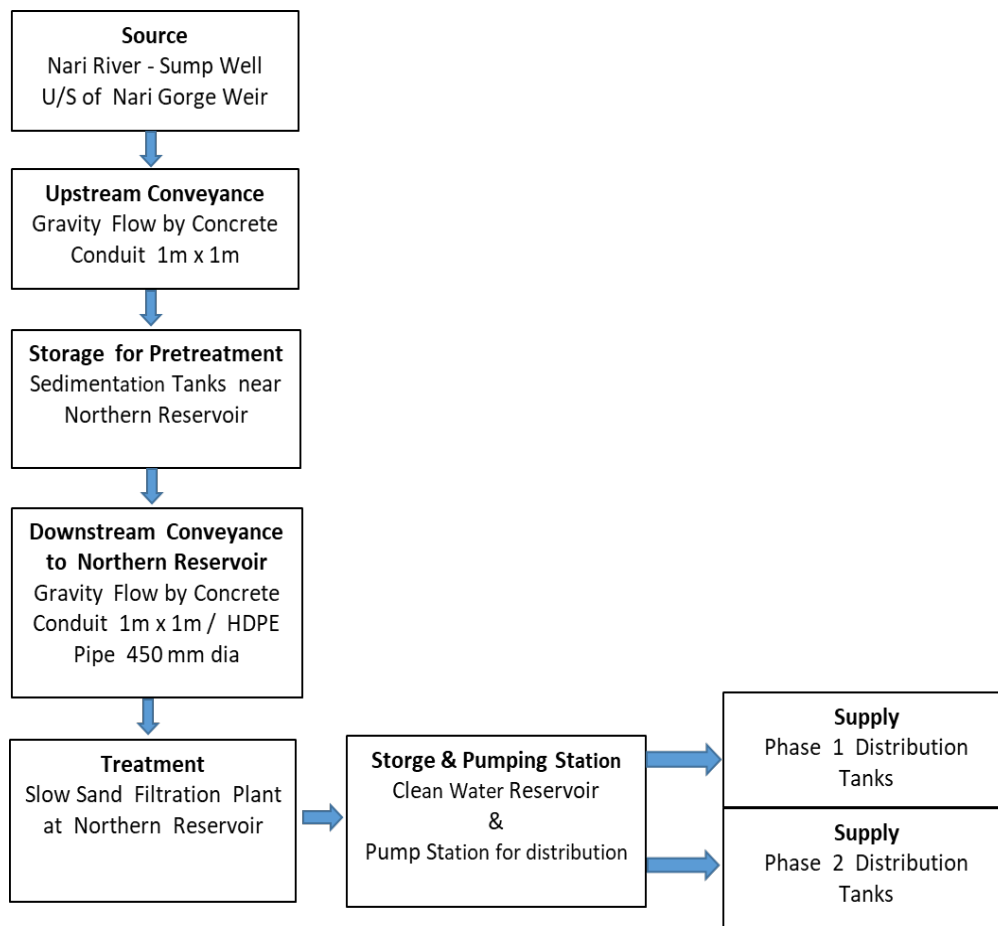
Figure 3: X-Section of Sump Well



3.2.2 Process Flow of Sibi WSS

The construction of an 11 km long conduit channel will start from the sump well site. Its construction will be further continued parallel to the Nari River Road and abandoned railway track. In the second stage, surface water shall be stored for the pre-treatment at sedimentation tanks. Following pre-treatment, water will be again discharged through gravity flow for further treatment at a slow sand filtration plant through a conduit channel and HDPE pipe of 450 mm diameter. Following the completion of the treatment process, water will be stored at reservoirs and pumping stations, from where clean water will be pumped out to existing phase 1 and 2 distribution tanks for further supply to Sibi City.

Figure 4: Process Flow Chart of Sibi WSS



3.2.3 Cleaning Process of Slow Sand Filter and Sedimentation tanks

The slow sand filter will be cleaned through the “wet harrowing method”. In the first stage, the outflow valve will be closed and then water will be agitated above the top of the sand filter until it becomes cloudy. During this step care will be taken to protect the top layers of the sand so that it is not disturbed. Following this step, the cloudy water will be drained off by opening the wet harrow drain valve and at the same keeping the sand surface covered with water by adding water to the filter input. This step will be continued until the wet harrow drain water is completely drained out. In the last stage, the wet harrow drain will be closed and output pipe will be opened, and the slow sand filter to be restarted.

While the sedimentation tanks will be cleaned through the following process.

1. The sedimentation tanks will be constructed in two segments. One tank shall be cleaned at a time, while another one will serve the water supply system.
2. In the first stage inlet valve at the toe of the sedimentation tank will be closed and then water in the sedimentation tank will be allowed to go to the chamber of the slow sand filter.
3. In the second stage, sand scraping sludge/ fine sediments in the tank will be removed by using either a long boom excavator or by using manual labor.

4. In the third stage, water will be allowed into the sedimentation tank through an inlet valve or from the adjacent tank with the help of a pump and pipe. Wherein walls and floor will be cleaned through showering. Once the water level reaches the height of 0.3 meters (1 ft) the sludge mixed water shall be pumped out with the help of a submersible pump. Following the end of the cleaning process water will be allowed to enter in cleaned sedimentation tank for further distribution. The same process will be followed and repeated for the cleaning of the second sedimentation tank.

3.2.4 Construction Material

The following table depicts the estimated quantities of the construction material to be used for the construction activities of the sub-project.

Table 7: List of Construction Materials Required

Concrete (Cum)*			Steel (Tons)	Earth Works	Excavation in soil	Block Masonry
C13 1:4:8	C21 1:2:4	C25 1:1:5:3				
1,933	5,150	10,833	812	21,111	38,363	696

The following will be the sources of construction material.

i. Earth-fill

Earth-fill will be required for the construction of the bund and temporary diversions of roads. The earth-fill will be obtained during excavation works of the conduit channel, foundation of the sump well, and filtration plant

ii. Cement and Steel

The cement and steel will be purchased from commercial sources.

iii. Concrete Production

The batching plant will be installed by the contractor to produce concrete for the construction works.

It must be ensured by the contractor that the commercial source of purchasing construction materials shall be registered with the District Administration and EPA Balochistan following the approval PSIAC engineer.

iv. Sand

Sand will be obtained from the commercial quarry or river bed material. The stone and concrete material will be brought from government-approved quarries and no quarry material shall be acquired from protected areas.

Selection of Quarry

The selection of the commercial quarry sources is primarily dependent on the availability of material nearest to the construction site and in accordance with the contractual requirements. The PSIAC Engineer will visit different material sources to determine which area would have specified material that satisfies the prerequisite

requirements for construction. The material available onsite is not homogeneous and after collection, grading is required to use in the construction. The potential quarry sites to be proposed under the scheme will be used for the mining of the required material.

The PSIAC engineer mainly uses the following criteria required for the selection of quarry areas.

- A field survey will be carried out by the engineer to find a suitable location where the material is present and can fulfil the requirements of the project. Sibi WSS lies adjacent to the NRB. The annual rainfall varies from 1.27 mm to 35.84 mm, whereas the average annual rainfall remains 6.3 mm. As mentioned in the ESIA report of the project, NRB falls under the perennial irrigated commands of the Nari River. The average width of the NRB is 400 meters (1,312 ft), and river base flow /receding in depressions remains about 0.5 to 1 meter (1.6 to 3.28 ft) deep, thus forming terraces of gravel and sand in the river width. And these terraces will be used for the extraction of sand material.
- As per estimates, the quantity of sand required is 5,972 cubic meters. A sufficient quantum of sand is available in the river bed. If we calculate an area of 400 m x 3000 m, the total quantity comes out to be 1,200,000 cubic meters, then it is easily possible to arrange the quantum of sand for this scheme within a depth of 1 m, the extraction of material from the river bed will only be 0.5% of the total volume available within the project boundaries which henceforth has a negligible effect on the behaviour of river. In addition, the contractor, along with PSAIC and PMU shall jointly assess and identify locations within above given mentioned area (400 m x 3000 m) and choose those locations which cause no or negligible impact on the behaviour of the river. The total surface and the excavated area will be restored after use. There will be minimal impact on the river ecology due to this extraction of material.
- The quantity of aggregate/bajri required for the scheme is 11,944 cubic meters. Any other material is not required from the river bed and for the arrangement of gravel material it shall be either from the commercial source or by collecting large boulders through surface scraping from up-lands within a radius of 3km (3,000 meters) of the project boundaries and construction site which will then be crushed in the crusher to produce crushed stone.
- The material is not excavated from the riversides as Mines and Mineral Department¹¹ does not allow as well as it does not fulfill the required specifications. The contractor will level the excavated material with adjoining material present in that location.

¹¹ All the potential sites are registered with Mines and Minerals Department, Balochistan and contractor (Not the sub-project contractor) pay the royalty on minor minerals per metric ton as per notification No.SOT(MMD)4-1/2017/748-68 issued by Mines and Mineral Development Department, Balochistan. The mines and minerals and license issuing authority have pre conditions and monitoring including NOC from EPA prior to get the license. Under section 16 Mines Act 1923, periodic inspection of mine is carried out to monitor ,maintain check & balance on mines and indicate the discrepancies in precautionary measures in all regards and for safety of mine workers. The license covers all site specific legal provisions regarding environment, site condition and area demarcation In addition, Minor Mineral Concession Rules 2000 stated under part VIII of Balochistan Mineral & Mines Rules 2002 are applied on the potential quarry sites. Wherein it is also obligatory for the applicant to get NOC from EPA for safe working environment and protection, conservation and rehabilitation of the environment for the promotion of sustainable activities at the site.

3.2.5 Construction Schedule & Work Plan

The following table provides the details and timeline of pre-construction and construction phase activities to be carried out at Sibi WSS.

Table 8: Construction Work Plan/Schedule

Sr. No.	Task Name	Duration
1	Pre-Construction Activities	90 days
2	Sump Well and Sump Well Room	45 days
3	Main Conduit Channel	365 days
4	Tube Wells and Sedimentation Tank	60 days
5	Slow Sand Filters	60 days
6	Water Reservoir	30 days
7	Pumping Station	30 days
8	Sub Engineer Residence	60 days
9	Guard Quarter / Guard	45 days

Figure 5: Work Plan for Executing Engineering Activities

Sr.No.	Activity	Timeline (Months)	Q4-2021												Q1-2022												Q2-2022												Q3-2022																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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3.2.6 Temporary Diversions

Three (03) temporary diversions of the Nari River (katacha road) shall be constructed at RD 0+020, RD 8+970, and RD 10+700 for the conduit channel and crossing. These temporary diversions are required to divert traffic passing through Katch road toward Sibi City. This katacha road is mainly used by the irrigation staff and security agencies for monitoring purposes. Whereas, one coffer bund will be constructed in NRB to provide the dry working area for the construction of the sump well. There is government land available in the foothills and at the immediate site of the proposed sump well site. After completing construction activities all temporary diversion and coffer bunds will be removed and the land shall be reinstated into its original condition. The temporary land required should be free from encroachment, economic and residential use

3.2.7 Use of Excavated Material

It is estimated that 38,363 cubic meters (1,354,777 cubic feet) of earth material will be excavated during the construction of the conduit channel, the foundation of the sump well, and the filtration plant. The excavated material acquired shall be reused for the construction of temporary diversions of roads and bunds for the sump well. While the cleared vegetation material will be reused by the contractor to backfill the abandoned portion of land, or to -close temporary diversions

3.2.8 Site Access

Once the contractor is mobilized is a site, the contractor shall use the existing Nari River Road (in between NRB Weir and filtration plant) to access the main construction sites and camps (sub-camp & main camp). During the movement, the contractor will be responsible to manage and make their arrangements to reach their workstations. It must be ensured by the contractor no other route is used by him to ensure that the mobility and access of the irrigation and security agencies are not restricted. The assessment along with mitigation on environmental and social aspects is further provided in Environmental and Social Impact and Mitigations Section 6.

3.2.9 Site Clearance Works

During the earthworks, trees will be cut and vegetation cover will be stripped during the construction of the conduit channel. During the survey, 324 trees were recorded which are anticipated to be cut. The species of these trees include Babur (*Acacia nilotica*), Khabar (*Salvadora oleoides*), Kandi (*Prosopis cineraria*), Shisham (*Dalbergia sissoo*), Beer (*Ziziphus jujube*). Before the commencement of earthwork activities, the contractor, along with PSIAC and PIU, will prepare and maintain an inventory of trees that are anticipated to be felled and the data to be recorded, including the name of the species and girth.

While terrestrial vegetation cover will be stripped from the RoW and which includes: Mundar (*Calotropis procera*), Sur ghaz (*Tamarix mactrocarpa*), Ghuzaira (*Stockia bruchica*), Thuar (*Euphorbia caducifolia*), Sargara (*Cymbopogon jwarancusa*), Kirri (*Tamarix sultanii*), Devi (*Prosopis juliflora*), Sabba (*Chrysopogon serrulatus*), Gazara (*Cousine athomosonii*). The lifeline of these different vegetation covers is dependent

upon rainwater. There are no invasive/indigenous species are found in the scheme area. During the site clearance works, the guideline of ECOPs on the protection of flora provided in section 6.2.8.1 and Appendix B shall be implemented by the contractor.

Figure 6: Scattered Vegetation Cover at Sub-Project area



Figure 8: Existing water-providing facility at Sibi City by Local Government Department

Figure 7: Scattered vegetation cover at Nari River Road and Abandoned Railway Track towards Sibi City

Figure 9: Location Side of Sump Well at NRB

3.2.10 Labor Requirement

At the peak of construction activity, up to 75 laborers are likely to be employed for the works to be carried out at Sibi (WSS). These laborers will be residents on-site for the construction period and in accordance with the contractor's work plan. It is anticipated that approximately 75% of the workforce will be from the sub-project area while some 25% of labor (skilled) will be hired from outside the sub-project area. The mitigation measures given in section 6.3.7.1 will be followed by the contractor. However, women will be

also encouraged to work and hired, if interested¹². It must be completely ensured by the contractor and all project staff that the guideline given in Section 6.2.3.1 on COVID-19 are completely followed at the site.

3.2.11 Use of Machinery and Equipment

It is estimated that the equipment given in the table below shall be required to complete the different sub-project engineering activities. It must be ensured by the contractor that all the required machinery or equipment deputed on site shall be fit for construction activities, i.e., no leakages of fuel or oil.

Table 9: Machinery and Tools/Equipment Required for Earthworks and Civil Work

Machinery Equipment	Estimated Quantity
Excavator	04
Dozer	02
Motor grader	02
Vibratory Rollers	03
Dump truck	10
Concrete pump / Transit mixers	04
Batching Plant	02
Tractors with various attachments like (blades, loaders, trolleys)	10.
Water Bowser	04
Electric Generator	04
Steel bar cutter	12
Steel bar bender	12
Concrete vibrator	20
Welding Machine	10
Oil tank	04

3.2.12 Right of Way (RoW)

The Right of Way (RoW) has been considered as the area along the centre line of the main conduit channel and sump well where the proposed engineering works are to be carried out. Following the general drawings of the bidding document, the RoW for the conduit channel is decided 05 meters (16.4 ft) from the centre on either side.

¹² The current cultural norms in the sub-project do not appreciate women working in the construction field.

3.2.13 Corridor of Impact (Col)

The corridor of Impact (Col) is considered the scheme command area, wherein there could be an impact when the water supply system is improved and expanded. Therefore, environmental, socio-economic, and other relevant surveys are conducted in this area.

3.3 Establishment of Contractor Camp

3.3.1 Siting of Contractor Camps

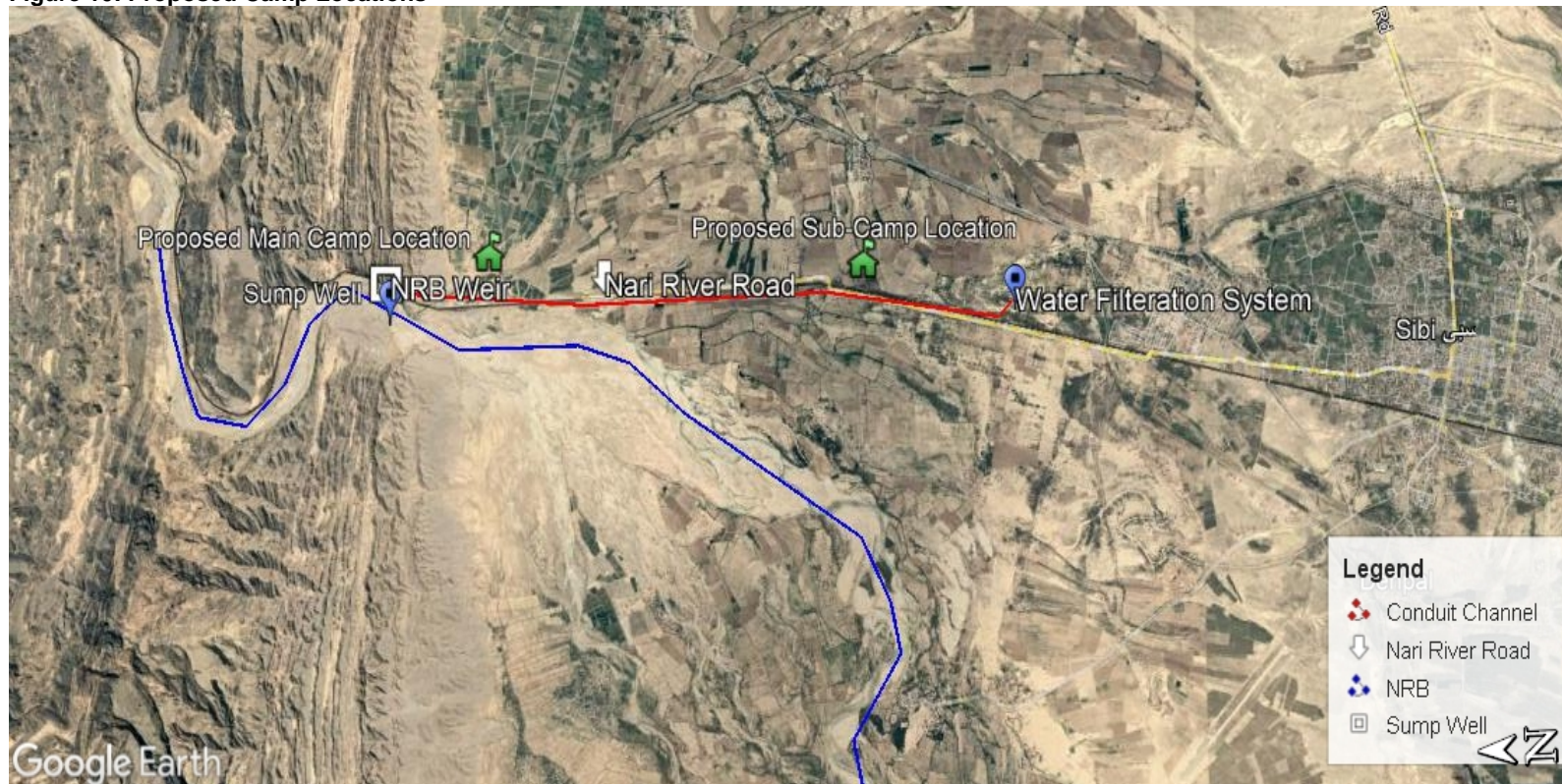
The contractor will establish one main camp and one sub-camp (both of approx. 10,000 sq. ft). The contractor is required to make arrangements for the use of the area with the landowner or the relevant government department. The contractor may propose the location of the main camp, as per his work methodology, and must meet the requirement of this ESMP and must ensure that the required land is free from encroachment, economic and residential use. The ECOPs guidelines for the construction and management of the contractor main camp are given in Table 12, Appendix B shall be implemented accordingly. These camp-sites will be used for the following facilities:

- Material storage
- Workshops
- Material testing laboratory
- Site offices
- Contractors' accommodation
- Labor camp, including welfare facilities such as kitchen and dining room: Labour in this camp may reside overnight and may belong to areas outside the sub-project area.
- Drinking water and sanitation facilities
- Medical facilities
- Sewage disposal system and power generators

The following conditions for contractor camps:

- Locate all construction camps at least 500m (1,640 ft.) away from communities to avoid social conflict overuse of natural resources such as water, and/or to avoid the possible adverse impacts of the presence of construction camps on surrounding/nearby communities.
- Where appropriate, the local authorities responsible for health, dispute resolution, religious, and security matters will be duly informed regarding the set-up of camp facilities to maintain effective surveillance of public health, social impacts, and security.
- Land required temporarily for the construction and establishment of the contractor camp will be organized by and be the responsibility of the contractor.
- The villagers shall be strongly involved in the identification of the camp location.
- In case the land is taken from a private individual or public entity the contractor has to sign a temporary lease agreement and will follow the RPF guidelines for meeting land needs. Once, the works are completed, the contractor will return the land to the owner in its original condition with no remnant of waste material, debris, etc.

Figure 10: Proposed Camp Locations



3.3.2 Standards for the Construction of Workers Accommodation

Following are the best practices for the construction of contractor labor/workers accommodation:

Table 10: General Camp Site Best Practice Guidelines

Activity	Guidelines
Provision of Camp Facilities	<p>Provide;</p> <ul style="list-style-type: none"> • Lined washing areas • In-house common entertainment facilities. • Septic tanks and soaking pits; Solid waste management. • Fire prevention and fire fighting equipment • Separate from living quarters, sheltered kitchen area. • Safe drinking water supply which meets the national standards • The minimum bed space allocated per person should be 4 feet in width and 6 feet in length. While observing Covid 19- social distancing SOPs, the distance from bed to bed shall be at least 06 feet. • Appropriate protection against heat, cold, damp noise, fire, and disease-carrying animals, in particular insects. • Lighting and electricity supply • Ventilation facility with availability of electricity, fans • Roads and paths • An adequate number of toilets and sanitary fittings shall be provided. (1 toilet, 1 hand wash basin, 1 bathroom with bench per 10 persons to be provided. • Provide plain cemented washable floor for easy cleaning in the kitchen and living areas • Hygienic sanitary facilities and sewerage system. Provide separate latrines and bathing places for males and females with total isolation by the wall or by location. Female toilets should be marked in a language understood by the persons using them to avoid miscommunication. • Treatment facilities for sewerage of toilet and domestic wastes • Pave the internal roads with at least haring-bond bricks to suppress dust and to work against possible muddy surfaces during monsoon.
Cooking	<ul style="list-style-type: none"> • Provide a sheltered and ventilated kitchen area that is separated from living quarters • Provide fuel to the construction camps for their daily purpose use, to discourage them to use fuelwood or biomass. • Make available alternative fuels like natural gas or kerosene to the workforce to prevent them from using biomass for cooking.
Health and Hygiene	<ul style="list-style-type: none"> • Provide adequate drainage facilities throughout the camps to ensure that disease vectors' habitats (stagnant water bodies, puddles) do not form. • Place display boards at strategic locations within the camps containing messages on the best hygienic • Provide initial health screening of the laborers coming from outside areas. • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work. • Provide adequate health care facilities within campsites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint a paramedic on site. • Provide a transport facility for the laborers during an emergency to be transported to the nearest hospitals • Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education, and communication for all workers regularly. • No handshakes and hugs.

Activity	Guidelines
	<ul style="list-style-type: none"> •The disinfection of all camp areas shall be carried out on regular basis. •Items like tissue papers, surgical masks, and gloves are made available and worn all the time while maintaining a physical distance of 2 m (6.5 ft). •Hand-washing areas shall be constructed with the facility of clean water soap, and hand-wash at least 20 seconds several times. •Use a face mask and latex gloves •Install alcohol-based sanitizer dispensers (sensor-based) in each room and kitchen area. Make sure these dispensers are regularly refilled. <p>Further guidelines and SOPs regarding Covid-19 shall be followed, as given in section 6.2.3.1 and Appendix G.</p>
Safety	<ul style="list-style-type: none"> •Availability of fire extinguishers inside the camps •Provide the appropriate type of fire fighting equipment suitable for the construction camps •Display emergency contact numbers clearly and prominently in strategic places in camps. •Encourage the use of flameproof material for the construction of the labor housing/site office. Ensure that these houses/rooms are of sound construction and capable of withstanding storms/cyclones •Communicate the roles and responsibilities of laborers in case of an emergency in the monthly meetings with contractors. •Provide appropriate security personnel (police /home guard or private security guards) and enclosures to prevent unauthorized entry into the camp area.
Drainage	<ul style="list-style-type: none"> •Regularly inspect and maintain drains •Provide a drainage system to transfer sewage effluent to the septic tank with a soakage pit of adequate capacity •Divert natural rainfall-runoff around the site location •Provide adequate stormwater drainage capacity to prevent the accumulation of stagnant water following heavy rains •Build new shallow v drainage lines as required for wastewater/rainwater run off to the nearby recipient water body •The presence of stagnant water is a factor in the proliferation of potential disease vectors such as mosquitoes, flies, etc., and must be avoided and away from campsites and the community.
Site Restoration	<ul style="list-style-type: none"> •Backfill waste and sewage pits •Consider seeding the area to provide an initial protective canopy •Give prior notice to the laborers before demolishing their camps/units •Maintain the noise levels within the national standards during demolition activities •Reuse the camp material to the maximum extent. Dispose of remaining debris at the designated waste disposal site. •To restore the site to its original condition or an agreed condition with the landowner defined before the commencement of the works (in writing). •Dismantle and remove from the site all facilities established within the construction camp, including the perimeter fence and lockable gates after the construction work. •Decommission and fill drinking water wells (unless otherwise arranged with the landowner) •If possible, dismantle camps in phases as the work decreases (do not wait for the completion of the entire work)

3.3.3 Storage of Materials

The materials to be stored at construction sites will include cement, sand, steel, crush, and other chemical drums (i.e. Admixtures), etc. All these materials shall be kept as per their nature or type and will store in separate compartments in accordance with their nature at each camp. The further ECOPs guideline on the storage of materials are provided in table 4, Appendix B shall be implemented accordingly.

3.3.4 Waste Management & Disposal

The main types of waste expected to be generated and requiring disposal include:

- Waste generated during construction;
- Fuel, oils, and chemicals;
- Sewage;
- Campsite waste;
- Medical waste;
- Demolition waste;
- Packing waste; and,
- Excess construction material.

Domestic waste and construction waste will be the main types of waste generated from camps and construction activities. Adopt a source waste segregation methodology and install separate bins using the 4Rs principle (Reduce, Recycle, Reuse, and Recovery). The following disposal techniques shall be adopted:

Table 11: Waste Management collection and disposal Techniques

Activity	Best Practice
Generation of Construction waste	<ul style="list-style-type: none">• Implement resource conservation, and encourage staff (through training) to reduce waste, reuse waste and recycle waste wherever possible.
Disposal of Covid Waste	<ul style="list-style-type: none">• All waste such as gloves, face masks, and tissue papers shall be disposed of in already placed separate top covered waste bins in different identified areas in the camp and as per the contractor waste management and disposal plan.• These waste bins shall be marked with Covid-19 waste.• All Covid-19 waste shall be collected with appropriate safety measures and be transported to the burning pit away from the campsite and community.
Disposal of bio-degradable domestic waste	<ul style="list-style-type: none">• Collect all bio-degradable domestic camp waste and dispose of it at the designated landfill area or compost area.
Disposal of non-biodegradable waste (non-recyclable)	<ul style="list-style-type: none">• Dispose of in a landfill.• Do not burn materials that may lead to the release of toxic or hazardous substances (see NEQS).
Disposal of recyclable waste	<ul style="list-style-type: none">• Sell recyclable waste to local vendors.
Generation of sanitary waste	<ul style="list-style-type: none">• Provide latrines at all camps.• Prohibits staff from fouling the site.
Collection of domestic waste	<ul style="list-style-type: none">• Provide garbage bins, at a radius of 50ft for the collection of domestic camp waste.• Arrange for regular collection of camp waste and transfer to a storage area/disposal.

Activity	Best Practice
	<ul style="list-style-type: none"> Collect non-biodegradable waste separately and dispose of it at a licensed waste disposal area. Enforce the use of garbage bins and prevent littering on the site.
Disposal of sanitary waste	<ul style="list-style-type: none"> Treat sanitary waste with septic tanks at main camps. Dispose of sanitary waste through burial at temporary and sub-camps.
Incineration of waste on-site	<ul style="list-style-type: none"> No fire is allowed in open. Do not burn materials such as plastics and polyethylene which may lead to the release of toxic or hazardous substances. Collected and disposed of the waste in municipal waste dumping points.
Generation of construction waste	<ul style="list-style-type: none"> Reduce construction waste by reusing waste as a fill material (before testing to confirm the suitability of the material).
Siting landfill	<ul style="list-style-type: none"> Site landfill in an area where groundwater is low. If possible and the base of the landfill is highly permeable, line the landfill base with an impervious layer (such as clay) to prevent groundwater contamination from leachate. Locate 500m away from residences. Provide fences and secure landfill areas to prevent unauthorized access.
Collection of construction waste	<ul style="list-style-type: none"> Collect construction waste separately from domestic waste. Collect and remove all construction waste from the sub-project area.
Disposal of construction waste	<ul style="list-style-type: none"> Reuse material as fill material or sell to local vendors. Sell or reuse gates removed from structures. Treat construction wastes water and dispose of after treatment. Do not burn materials that may lead to the release of toxic or hazardous substances.
Disposal of packaging	<ul style="list-style-type: none"> Request suppliers to minimize packaging where practical. Recycle or incinerate in a burn pit or incinerator. Do not burn materials that may lead to the release of toxic or hazardous substances.
Disposal of medical waste	<ul style="list-style-type: none"> All the medical waste shall be disposed of in burial pits. The burial site shall be identified away from community residents and camps sites. The burial site shall be identified on the barren land.
Disposal of hazardous waste (fuel, oils, admixture chemicals, batteries)	<ul style="list-style-type: none"> Handover to specialized and certified disposal contractor.

Further details on the best practices of waste management and disposal are provided in table 3, Appendix B.

3.3.5 Water Supply

During construction works, water will be required for both construction activities and consumption by all project staff. During the water quality testing, it is found that direct consumption of water is not suitable for drinking as the level of physical and biological parameters (color, odour, taste, turbidity, *total coliform*, *fecal coliforms*, *escherichia coli*) were found above the permissible limits in all samples. Therefore, the contractor shall make alternative arrangements for water supply (drinking) as well as test the quality of the water supply

before consumption. Further guidelines of ECOPs on water resource management are provided in Table 1, Appendix B shall be implemented accordingly. The community is made aware of and will be further consulted regarding all water supply requirements and arrangements through the contractor's community liaison officer. It will be ensured the community's water supply is not compromised or negatively impacted and requisite mitigation measures (if required) will be set in place.

4 Environmental Baseline

This chapter provides the details of the physical and biological environment present in the Sibi WSS. The description of the geology, climate, temperature, air quality, and groundwater quality are presented in this chapter. To establish the baseline conditions, samples of ambient air quality, noise, soil, and water were collected and are reflected here. The primary data was collected for baseline environmental monitoring (air, noise, water, and soil), socio-economic baseline, and public consultation, while the secondary data was collected for climate, flood, rainfall, and topography. Biological baseline data was collected through literature review and field confirmation.

4.1 Physical Environment

The baseline environmental monitoring (air, noise, water, and soil) for the scheme area was collected as primary data. In this connection, EHS Services JV Ever Green Environment (EGE) Laboratory, Karachi (Certificate of Conducting Tests is provided in Appendix H) was hired for data collection and testing. The ambient air quality and noise quality were tested. The table below presents the name of the locations where monitoring was conducted and the number of samples;

Table 12: Baseline Sampling

Ambient Air/ Noise/Water/and Soil				
Location	Ambient Air	Noise	Water Samples	Soil Sample
Sibi WSS	02	02	05 <i>"In addition, water quality reports of 08 water samples tested by the PHE department are also referred to in this document".</i>	02

Source: Baseline environmental monitoring conducted through EHS JV EGE Laboratory, Karachi

4.1.1 Water Resources

The peoples living in the Sibi City area are dependent upon both surface/irrigation and groundwater resources to meet their domestic needs. The affording communities also purchase drinking water cans from local markets i.e., Aquafina, nestle, and others. While the groundwater resources are extracted through tube wells and hand pumps. The water is fetched from wells through the use of ropes attached to the pulleys, pulled out either manually or mechanically.

The use of existing water resources that are in use by the local community is not possible by the contractor, as the main and sub-camp will be constructed at least 500m (1,640 ft.) away from Sibi City. Therefore, alternative arrangements adjacent to the camps areas shall be required by the contractor himself by

installing his tube wells or hand pumps to meet his need. Thus, the water resources of the local community will not be depleted and disturbed.

4.1.2 Water Quality

To check the water quality of the scheme area, 05 samples (02 SW and 03 GW) were collected from NRB and Sibi City. These samples were examined for physical, biological, and chemical parameters and accordingly were compared with the NDWQs. During the comparison, it was assessed that microbiological results (*total coliform*, *fecal coliform*, *escherichia coli*) were found above the permissible limit in all surface and groundwater samples. In addition, surface and ground water quality testing reports of 08 locations carried out and provided by the PHE department were also reviewed. The result showed that color, odor, taste, turbidity, and total coliform, fecal coliform, *escherichia coli* are also above the permissible limits in these samples¹³.

The contamination in all the surface and groundwater samples is due to the open surface reservoir ponds, storage condition of water, cross contamination of pipes, poor sanitation conditions, and direct discharge of sewerage waste into open surfaces which deteriorates water quality through continuous leaching. In addition, people living in the surrounding areas also come to these surface water bodies (i.e. NRB) to fulfill their daily needs (i.e. washing clothes, drinking, and taking a bath of farm animals). These factors also contribute to the contamination of water resources. The complete results of water testing carried out by PMU and PHE Department are provided in Appendix I.

As the ground and surface water quality is already found contaminated in the scheme area, therefore, the proposed interventions will not have a further negative impact on the existing water quality, as the mitigation measures proposed in section 6.2.9.1 will be adopted.

Table 13: Water Quality Sample Results Carried out by PMU

S.No	Biological Parameters Found High	NDWQs Limits/Units	Upstream	Downstream
Ground Water (Sibi City - Location 1)				
Total Coliform		0 Cf/100 ml	109	N/A
Fecal Coliforms		0 Cf/100	98	
Escherichia Coli (E-Coli)		0 Cf/100	57	
Ground Water (Sibi City - Location 2)				
Fecal Coliforms		0 Cf/100	120	N/A
Escherichia Coli (E-Coli)		0 Cf/100	101	
Fecal Coliforms		0 Cf/100	61	
Ground Water (Sibi City - Location 2)				
Total Coliform		0 Cf/100 ml	118	N/A
Fecal Coliforms		0 Cf/100	97	
Escherichia Coli (E-Coli)		0 Cf/100	65	
Nari River Basin (Surface Water)				
Total Coliform		0 Cf/100 ml	275	212

¹³ Reference: Water Quality Report (PHE Department, Sibi Town), Pakistan Council of Research in Water Resources Research Center, Quetta, dated: 10-11-2021

Fecal Coliforms	0 CfU/100	201	198
Escherichia Coli (E-Coli)	0 CfU/100	98	76

Source: Baseline environmental monitoring conducted through EHS JV EGE Laboratory, Karachi

4.1.3 Ambient Air Quality

The baseline study of ambient air quality has been carried out at two different locations in Sibi City. The pollutants monitored were sulfur dioxide, nitric oxide, nitrogen oxides, carbon monoxide, total suspended particulate, particulate matter (PM10), and lead. The results of these pollutant concentrations were compared with NEQs limit and WHO (World Bank Group EHS IFC) guidelines. The finding and the comparison showed that the pollutant concentrations are within the permissible limit. The major source of pollutants is the traffic movement within Sibi City and by-pass roads, resulting in localized peaks in emissions.

Thus, construction phase activities may cause in decline of ambient air quality of the scheme area, however, it will be maintained by implementing the mitigation set out in sections 6.2.4.1 and 6.2.5.1, then the impact shall remain low adverse during the entire sub-project duration. The finding of each location is provided in the below table.

Table 14: Ambient Air Quality Sampling

Pollutants Parameters	Minimum µg/m³	Maximum µg/m³	Average µg/m³	NEQs Limits	WB EHS Guidelines
Location 1					
Sulfur Dioxide (SO2)	24.3	34.1	41.35	120 µg/m³	125 µg/m³
Nitric Oxide	3.3	5.1	4.2	120 µg/m³	Not Available
Nitrogen oxides (NO2)	20.7	27.8	24.25	120 µg/m³	200 µg/m³
Carbon Monoxide (CO)	1.8	2.3	2.05	5 mg/m³	Not Available
Total Suspended Particulate (TSP)	352	385	369	500 µg/m³	Not Available
Particulate Matter (PM10)	101	105	103	150 µg/m³	150 µg/m³
Lead	Not Detected			50 µg/m³	Not Available
Location 2					
Sulfur Dioxide (SO2)	19.5	26.8	23.15	120 µg/m³	125 µg/m³
Nitric Oxide	2.8	4.6	3.70	120 µg/m³	Not Available
Nitrogen oxides (NO2)	18.5	24.2	21.35	120 µg/m³	200 µg/m³
Carbon Monoxide (CO)	1.6	2.3	3.9	5 mg/m³	Not Available
Total Suspended Particulate (TSP)	325	374	349.5	500 µg/m³	Not Available
Particulate Matter (PM10)	101	116	108.5	150 µg/m³	150 µg/m³
Lead	Not Detected			50 µg/m³	Not Available

Source: Baseline environmental monitoring conducted through EHS JV EGE Laboratory, Karachi

4.1.4 Noise Level

The 24hrs of monitoring of noise level was carried out separately similarly, to the result of ambient air quality monitoring, there is a direct correlation between noise levels and the volume of traffic passing by. The

average noise level recorded during the daytime was 64dB, while the maximum average noise level recorded during the nighttime was 53dB. It is evaluated that the average noise levels recorded are below the permissible limits of NEQs. However, during the construction phase activities, noise pollution is likely to be created due to increased traffic movement along haulage routes and other activities (i.e. sheet piling, operation of batching plant, and use of generators), subsequently resulting in increased noise levels. By implementing the mitigations set out in section 6.2.7.1 the impact shall be minor loss adverse and short-term in nature. The results of noise measurement at the monitoring sites are summarized in the following table:

Table 15: Noise Level Monitoring

Location	Minimum dB	Maximum dB	Average dB	Limits
Day Time				65 dB Day time as per NEQs (March 2010)
Location 1	58	70	64	
Location 2	59	69	64	
Night Time				
Location 1	46	59	52.5	
Location 2	46	60	53	

Source: Baseline environmental monitoring conducted through EHS JV EGE Laboratory, Karachi

4.1.5 Climate

The climate of the sub-project area is extremely hot in summer, whereas the winter season is mild. It is elevated at 190-363 m above sea level The summer season lasts long with temperatures ranging from 30.66 °C (87.19°F) to 47.57°C (117.6°F). June is the hottest month when maximum temperatures exceed reaches 48°C (118.4°F), however, the winter season is shorter than summer. There shall be no impact on the climate of the scheme area, as no anthropogenic activities are proposed during the construction or operation phase of the scheme, as the overall aim of these interventions is to improve the water distribution system for Sibi City.

Table 16: Climatic Conditions

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Record high °C (°F)	19.03 (66.25)	30.66 (87.19)	30.66 (87.19)	39.12 (102.42)	42.29 (108.12)	47.57 (117.6)	46.52 (115.74)	45.46 (113.83)	39.12 (102.42)	35.94 (96.69)	30.66 (87.19)	27.49 (81.48)
Record low °C (°F)	12.69 (54.84)	19.03 (66.25)	21.14 (70.05)	28.54 (83.37)	30.66 (87.19)	31.72 (89.1)	31.72 (89.1)	32.77 (90.99)	27.49 (81.48)	20.09 (68.16)	15.86 (60.55)	15.86 (60.55)
Average precipitation mm (inches)	35.84 (1.4)	5.92 (0.23)	10.78 (0.42)	4.02 (0.16)	0.32 (0.01)	0.0 (0)	0.21 (0.01)	14.91 (0.59)	0.0 (0)	0.0 (0)	1.27 (0.05)	2.33 (0.09)

During the baseline monitoring, the data on temperature and humidity levels were recorded from the scheme location. The means levels of these are provided in the table below.

Table 17: Average Temperature and Humidity Level

Locations	Average Temperature °C	Average Humidity %
Sibi City	26.3	76.9%

Source: Baseline environmental monitoring conducted through EHS JV EGE Laboratory, Karachi

4.1.6 Geo-physical Layout

The basin covers around 20 percent of Balochistan, making it the largest river basin in the province and hydrologically the most endowed river basin. About 61% of the river flow occurs during July and August. This water sometimes causes severe flood-like situations in the downstream areas of the river basin, causing severe loss of property and livestock. The water accumulated in the Kachhi plains during floods could damage the Pat Feeder canal of the Indus, which is in the command of the Sindh and Balochistan provinces. By implementing this scheme, the geophysical layout of the scheme area will not be disturbed or impacted nor it will provide benefit to control the flood-like situations.

4.1.7 Topography

The Sibi district consists of a perfectly level plain, lying respectively at the apex and base of Kachhi (Bolan). The remainder of the district area is mountainous, rising in a series of terraces from the lower hills of the Sulaiman Range. These hills include Zen (3,625 feet) in the Bugti area, Bambor (4,890 feet), and Dungan with Butur (about 6,000 feet). While the topography of NRB is quite complex and entails lateral variations in contemporaneous sedimentation. The alluvial deposits in the central and lower parts of the valleys consist of layers of clay, gravel, silt, sand, or an admixture of these materials. The unconsolidated deposits occur in the form of beds, layers, lenses, or irregular bodies. The soil quality analysis was also carried out of pollutants/chemicals and laboratory measurements of organo-chlorine pesticides. During the testing, it is found that the level of pollutants (cadmium, chromium-trivalent and hexavalent, copper, mercury, lead, nickel, zinc, and arsenic) and pesticides (Organo-chlorine) are below the permissible limits. The sub-project activities will not cause any topography changes, as the proposed activities are to be carried out side the mountainous region.

4.1.8 Floods

Severe monsoon rains in Sibi City and the NRB trigger heavy-scale floods. Heavy rains and bad drainage infrastructure in Sibi City, resulting flooding of streets, ultimately resulting in injuries and death due to electrocution, loss of livelihoods, and health problems (malaria, diarrhea, etc) due to stagnant water on streets for a longer time. Also, an indirect loss such as damage to crops due to uncontrolled flooding and disruption of irrigation supplies, and waterlogging of agricultural land. No activities under this scheme are proposed to control the flood like the situation of the area, as the proposed works only aim to provide safe and clean water to the communities of Sibi City

4.1.9 Archaeological and Cultural Heritage Sites

There is one archaeological and cultural heritage site known as Jirga Hall (Victoria Memorial Hall) in Sibi City. This Jirga Hall (Victoria Hall) is now converted into a museum which is known as Sibi Museum. In case of any discovery of other sites, the chance finds procedure, as given in Appendix F, shall be the contractor. No activities are proposed within Sibi City and this site is beyond the engineering activities, therefore there is no impact to Sibi Museum.

4.2 Biological Environment

This section of ESMP provides brief information on the biological aspects (i.e., Mammals, avifauna, reptiles, and amphibians), and land patterns present in the surrounding of the scheme area.

4.2.1 Land Pattern in Scheme Area

The different types of land use exist beyond the RoW of the sub-project area, such as; mountainous regions in the upper region of the NRB, trees, shrubs, grass mix, agricultural and barren land. The tree species found recorded in the RoW were Babur (*Acacia nilotica*), Khabar (*Salvadora oleoides*), Kandi (*Prosopis cineraria*), Shisham (*Dalbergia sissoo*), Beer (*Ziziphus jujube*). In addition, the different types of vegetation found in the scheme area include, Mundar (*Calotropis procera*), Sur ghaz (*Tamarix mactrocarpa*), Ghuzaira (*Stockia bruchica*), Thuar (*Euphorbia caducifolia*), Sargara (*Cymbopogon jwarancusa*), Kirri (*Tamarix sultanii*), Devi (*Prosopis juliflora*), Sabba (*Chrysopogon serrulatus*), Gazara (*Cousine athomosoni*). The lifeline of these different vegetation covers is dependent upon rainwater. While no invasive/non-indigenous species were found in the scheme area.

4.2.2 Protected Areas

A Chinkara (*Gazella bennettii*) facility exists North of the NRB weir. It spreads at 200 acres and was established and is being maintained by the joint support of the forest and wildlife department, GoB. It is located about 20 km away from the sub-project area.

4.2.3 Fauna

The details of faunal species along with their status in BWPPCM, Act 2014, and IUCN red list.

4.2.3.1 Conservation Status of Fauna

This section provides brief information about the fauna which were present in the surrounding mountainous areas that are 2 km away from the sump well site which is the start point of the Sibi WSS. These Key species are classified according to the following criteria.

- Listed as Least Concern, Near Threatened, Vulnerable, Endangered, or Critically Endangered, Extinct in Wild Life, in the IUCN Red List.
- Listed as protected species in the Balochistan wildlife protection, preservation, conservation, and management Act, 2014 (BWPPCM).

4.2.3.2 Mammals

The mammals identified are listed below. The identified species are classified in accordance with the IUCN list and the Balochistan wildlife protection, preservation, conservation, and management Act, 2014.

Table 18: List of Mammals

S.No	Common Name	Scientific Name	IUCN conservation Status	Protected under BWPPCM Act, 2014	Survey Field/Public Consultation	Literature Review
1	Hill fox	<i>Vulpes vulpes</i>	Least Concern	Protected	X	X
2	Long-eared Hedgehog	<i>Hemiechinus auritus</i>	Least Concern	No	X	
3	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	Least Concern	No	X	
4	Afghan Pika	<i>Ochotona rufescens</i>	Least Concern	No		X
5	Desert Cat	<i>Felis Libyca</i>	Least Concern	Protected	X	X
6	Chinkara	<i>Gazella bennettii</i>	Least Concern	Protected	X	
7	Five Stripped Palm Squirrel	<i>Funambulus pennant</i>	Least Concern	No	X	
8	Indian Crested Porcupine	<i>Hystrix indica</i>	Least Concern	No	X	X
9	Cape Hare	<i>Lepus capensis</i>	Least Concern	No	X	X
10	Balochistan Gerbil	<i>Gerbillus nanus</i>	Least Concern	No	X	

4.2.3.3 Key Species

The following key mammals are reported and declared as protected by the BWPPCM Act, 2014 and classified as near threatened, endangered, and vulnerable in IUCN red list.

Table 19: List of Key Mammals

Protected in BWPPCM Act, 2014	IUCN Classification
<ul style="list-style-type: none"> Hill fox (<i>Vulpes vulpes</i>) Chinkara (<i>Gazella bennetti</i>) Desert Cat (<i>Felis Libyca</i>) 	All mammals list above are the least concern under IUCN classification

4.2.3.4 Avi-Fauna

The details of the birds identified during the survey and literature review are given below. The below table also provides the details of avi-fauna species with respect to status in BWPPCM Act, 2014, and IUCN red list.

Table 20: List of Avi-Fauna

S. No	Species	Protected under BWPPCM Act, 2014	IUCN Classification	Survey Field/Public Consultation	Literature Review	Occurrence		Habitat
						Resident	Migrant	
1	White-tailed Lapwing (<i>Chettusia leucura</i>)	-----	Least Concern			X		Terrestrial and grassland

S. No	Species	Protected under BWPPCM Act, 2014	IUCN Classification	Survey Field/Public Consultation	Literature Review	Occurrence		Habitat
						Resident	Migrant	
2	Black-tailed Godwit (<i>Limosa limosa</i>)	-----	Near threatened	X	X	X		Grass lands and terrestrial
3	Grey francolin (<i>Francolinus pondicerianus</i>)	-----	Least concern	X		X		Grasslands and terrestrial
4	Bank myna (<i>Acridotheres gingianus</i>)	-----	Least Concern	X	X	X		Terrestrial and tree thickets
5	Griffon Vulture (<i>Gyps fulvus</i>)	-----	Least Concern	X	X	X		Shrubland, grassland, and rocky areas
6	White yellow Wagtail (<i>Motacilla flava</i>)	-----	Least Concern	X	X		X	Shrubland, terrestrial and grassland
7	Cettis Warbler (<i>Cettia cetti</i>)	-----	Least Concern	X		X		Shrubland, grassland, and terrestrial
8	Plain leaf Warbler (<i>Phylloscopus neglectus</i>)	-----	Least Concern	X		X		Tree covers, grasslands, and terrestrial
9	Red-wattled Lapwing (<i>vanellus indicus</i>)	-----	Least Concern	X		X		near fresh or brackish water: rivers, forests
10	Little Stint (<i>Calidris minuta</i>)	-----	Least Concern	X			X	Grassland and aquatic
11	Houbara bustard (<i>Chlamydotis undulata</i>)	Protected	Vulnerable	X	X		X	Terrestrial and grass and agriculture lands
12	Rose-ringed Parakeet (<i>Alexandrinus krameri</i>)	-----	Least Concern	X		X		Trees, shrubland, and grassland
13	See-see partridge (<i>Ammoperdix griseogularis</i>)	-----	Least Concern	X	X	X		Shrubland, rocky areas (inland cliffs and mountain peaks)
14	Eurasian Magpie (<i>Pica Pica</i>)	-----	Least Cocern	X	X	X		Tree thickets and mountainous peaks
15	Grey Partidge (<i>Perdix Perdix</i>)	-----	Leaset Concern	X			X	Grassland and terrestrial

S. No	Species	Protected under BWPPCM Act, 2014	IUCN Classification	Survey Field/Public Consultation	Literature Review	Occurrence		Habitat
						Resident	Migrant	
16	Cattle Egret (<i>Bubulcus ibis</i>)	Protected	Least Concern	X				Tree covers, grassland, and terrestrial
17	Yellow Wagtail (<i>Motacilla flava</i>)	-----	Least Concern	X			X	Terrestrial; Freshwater low vegetation
18	Greter Spotted Eagle (<i>Aquila clanga</i>)	Protected	Vulnerable	X		X		Tree covers, shrubland, and grassland

From the above-listed avifauna species, the following table provides the list of Key species that are protected in the BWPPCM Act, 2014, and classified as vulnerable and near threatened in IUCN red list.

Table 21: List of Key Avi-Fauna Species

Protected in BWPPCM Act, 2014	IUCN Classification
<ul style="list-style-type: none"> •Cattle Egret (<i>Bubulcus ibis</i>) •Greter Spotted Eagle (<i>Aquila clanga</i>) •Houbara bustard (<i>Chlamydotis undulate</i>) 	<ul style="list-style-type: none"> •Black-tailed Godwit (<i>Limosa limosa</i>)-Near Threatened •Houbara bustard (<i>Chlamydotis undulata</i>)-Vulnerable •Greter Spotted Eagle (<i>Aquila clanga</i>)-Vulnerable

4.2.3.5 Reptile and Amphibians

The following reptile and amphibians were identified during the ecological surveys.

Table 22: List of Reptiles and Amphibians

S.No	English Name	Scientific Name	Status in IUCN Red List	Protected in BWPPCM Act, 2014	Field Survey/Public Consultation	Literature Review
1	Diadem Snake	<i>Spalerosophis diadema</i>	Least Concern	Yes	X	X
2	Saw scaled Viper	<i>Echis carinatus</i>	Not Assessed	Yes	X	X
3	Black Agama	<i>Laudakia melanura</i>	Not Assessed	No	X	
4	Tortoise Afghan	<i>Testudo horsfieldii</i>	Vulnerable	Yes	X	X
5	Bengal Monitor	<i>Varanus bengalensis</i>	Near Threatened	Yes	X	
6	Skittering Frog	<i>Euphlyctis cyanophlyctis</i>	Least concern	No	X	
7	Three-toed snake skink	<i>Ophiomorus tridactylus</i>	Least Concern	No		X
8	Marbled toad	<i>Duttaphrynus stomaticus</i>	Least Concern	No	X	

From the above-listed reptile and amphibians, the following table provides the list of Key species that are protected in the BWPPCM Act, 2014, and classified as vulnerable and near threatened in IUCN red list.

Table 23: List of Key Reptiles and Amphibians

Protected in BWPPCM Act, 2014	Status in IUCN Classification
<ul style="list-style-type: none"> • Eastern Diadem Snake (<i>Spalerosophis diadema</i>) • Saw scaled Viper (<i>Echis carinatus</i>) • Tortoise Afghan (<i>Testudo horsfieldii</i>) • Bengal Monitor (<i>Varanus bengalensis</i>). 	<ul style="list-style-type: none"> • Bengal Monitor (<i>Varanus bengalensis</i>)- Near Threatened • Tortoise Afghan (<i>Testudo horsfieldii</i>)-Vulnerable

4.2.3.6 Fish Species

The presence of fish in the NRB and at the location of the sub-project area has not been observed, however, during the monsoon rains, it is reported by the local community and as per EA of the BIWMDP, that two types of fish species Rahu (*Labeo rohita*) and Mahaseer (*Tor putitora*) are found, and that is coming from the upstream lagoon, other water bodies and ditches located in the mountainous region, as during the rainy season the water levels become high in these areas that bring fish species to the downstream side of the NRB. The project will also hire the services of a limnologist to assess the presence of fish and other aquatic species in the scheme area.

5 Socio-Economic Baseline

5.1 General

During the preparation of the SIAMP document in 2016, a detailed socio-economic baseline study was conducted, which provides detailed information regarding the socio-economic status of the proposed different schemes of the project. However, this Sibi City Water Supply Scheme was not incorporated since the beginning of the project whereas due to the partial cancellation of greed loan from \$200 million to \$110 million the two new schemes were included in the project vis: Sehan Flood Irrigation Scheme, District Loralai and Sibi City Water Supply Scheme in the scope. Therefore, the social teams of the project have started the social safeguard activities on both schemes in parallel and developed ESMPs for each scheme.

To determine the current situation and socio-economic impacts in the specific areas near the Sibi City Water Supply Scheme, a socio-economic baseline sample survey with a 14.42% sample size has been conducted from August to November 2020. In this regard, 744 male and 386 female members of households were interviewed separately. The survey was held in 1,130 out of 7,838 total households and for females, it was 5%.

5.2 Language

Sindhi, Pashto, Brahvi, Balochi, and Urdu are the major languages spoken by all the communities living in the sub-project area.

5.3 Education Facilities

There were 10 primary boys' and girls' schools provided by the GoB for the beneficiaries of the scheme area. From which there are 10 primaries, six middle, and four high schools, and two colleges each for girls and boys are available for their education. The dropout ratio in girls is partially high than boys as girls get marriages in the early stages. It was also observed that for higher and those studies in which facilities are not available in these institutions such as a doctorate, a large number of people prefer to send their children to Quetta, Sindh, and other provinces of Pakistan. The details of available education facilities for both boys and girls are given in the table below;

Table 24: Education Facilities

Gender	Educational Institutes				University
	Primary	Middle	High	College	
Boys	5	3	2	1	01
Girls	5	3	2	1	0

Source: Socio-economic survey by PMU/PSIAC teams

5.4 Health Facilities

There is one civil hospital, two rural health centers, three basic health units (BHUs), five dispensaries, three midwifery units, and two private maternity homes available for all 35 scheme wards in the Sibi City of district Sibi areas. It was observed that for serious, average, or minor treatments these health facilities are fulfilling all health requirements of the urban and rural population of Sibi district however, for those major treatments or in case of emergency and better health treatment for serious health care needs, patients are either need to be transported to Quetta City or Karachi of Sindh province.

Table 25: Health Facilities

Sub-Project Area	Hospital	Rural Health Centre	Basic Health Unit	Dispensary	Midwifery Units	Private Maternity Centre
	1	2	3	5	3	2

Source: Socio-economic survey by PMU/PSIAC teams

5.5 Water Supply and Sanitation

The urban communities are deprived of water availability from the defunct canal and its PHE water supply system. Therefore, the communities are reliant to fetch groundwater from the closest private tube wells operated from solar panels to meet their drinking and other domestic needs. In addition, the PHE department provided eight tube wells in a row from Nari bank to Sibi city with a distance of approximately 1,000 ft each along with eight km long-distance pipelines with the PHE system. In the present situation, out of eight, six tube wells are non-functional. The affording communities also purchase water from the local market or private tube wells. There are sewerage and sanitation systems in the scheme area but in a very bad condition which required complete rehabilitation.

5.6 Communication and Electricity

Telephone landline and mobile services of different companies are available in the sub-project area; including Sibi City as it is the district headquarters of the Sibi District. The houses in all wards have electricity supply from the national grid, while some households installed UPSs or solar panels (China-made) as a secondary source of generating electricity for their domestic purposes. A natural piped gas supply is also available in all wards. Some residents of these wards also use gasoline and LPG to meet their domestic needs in absence of a gas supply during the winter season.

5.7 Means of Transport

The scheme area is located within Sibi City (a Headquarters of the district) and 135 km away from the border of Sindh province, and 120 km from Quetta City. The community travels to these cities using local transports like coaches, busses, mini busses, or own cars, private taxis, and pickups. Individuals in the community often use their source of transport (mainly motorbikes and rickshaws) for local use. The Link roads of these wards, villages, and cities are metaled roads and connected with the main national high way.

5.8 Social Conflicts

There are no reported tribal conflicts in the scheme area as different tribes and communities are living in the city peacefully and they obey the orders of the district administration and JIRGA (a group of notables), who remained active if any conflict will arise. It is anticipated that this local tribal system which is led by the tribal elders, notables of the area, village, and ward heads will play an active part to mediate and resolve conflicts if any arise in the future. It was revealed that the coordination between tribal and district administration to control the law-and-order situation together if any occurred. The private/tribal system and district administration jointly have, in many cases, proved to be more effective in conflict resolution than the individual ones.

5.9 Household Information

The socio-economic baseline survey revealed that due to the proposed scheme a positive impact will be expected on the overall population of the entire Sibi City area comprised of 7,838 households. The details are illustrated in the following table:

Table 26: Number of households and total population

Wards	Households	Population
Ward-1	169	1,350
Ward-2	188	1,500
Ward-3	225	1,800
Ward-4	188	1,500
Ward-5	250	2,000
Ward-6	150	1,200
Ward-7	213	1,700
Ward-8	238	1,900
Ward-9	175	1,400
Ward-10	188	1,500
Ward-11	231	1,850
Ward-12	275	2,200
Ward-13	250	2,000
Ward-14	225	1,800
Ward-15	175	1,400
Ward-16	213	1,700
Ward-17	188	1,500
Ward-18	313	2,500
Ward-19	225	1,800
Ward-20	200	1,600
Ward-21	188	1,500
Ward-22	225	1,800
Ward-23	275	2,200
Ward-24	213	1,700
Ward-25	175	1,400
Ward-26	250	2,000
Ward-27	238	1,900
Ward-28	313	2,500
Ward-29	350	2,800
Ward-30	225	1,800

Ward-31	188	1,500
Ward-32	213	1,700
Ward-33	238	1,900
Ward-34	250	2,000
Ward-35	225	1,800
Total	7,838	62,700

Source: Socio-economic survey by PMU/PSIAC teams

5.9.1 Age of Respondents (Male and Female)

The male and female respondents for the socioeconomic baseline survey are classified in accordance with the age groups as detailed in the table below.

Male: The survey revealed that 04% of respondents were between 20 and below age group, 31% of the respondents were between 21-30 years, 24% were between 31-40 years, 17% were between 41-50 years, 14% were between 51-60 years, 08% were between 61-70 years and 03% were 70 years and above of age group.

Female: The survey revealed that 01% of respondents were between 20 and below age group, 32% of respondents were between 21-30 years, 29% were between 31-40 years, 22% were between 41-50 years, 12% were between 51-60 years, 03% were between 61-70 years and 01% were 70 years old.

Table 27: Age of Respondent

Responds' Age	35 Wards of Sibi City
No out of 744 Male Respondents	
< 20	32
21- 30	249
31- 40	181
41 – 50	124
51 – 60	103
61 – 70	41
70 and above	14
No out of 386 Female Respondents	
< 20	05
21- 30	124
31- 40	111
41 – 50	85
51 – 60	47
61 – 70	12
70 and above	02

5.9.2 Religion

Different religions are settled in the Sibi City water supply scheme area such as Muslim, Hindu, Sikh, and Cristian communities who are living in the area before being born in Pakistan. Generally, 95% population of the area is Muslim and 5% are non-Muslims and living peacefully.

5.9.3 Respondent's Relationship with Head of Household

During the survey, 55% of the respondents or heads of households were personally available for an interview, 11% of the respondent were fathers, 03% were sons, 06% were brothers, 02% were mothers, 02% were sisters, 01% daughters and 21% were wives of the heads of the households.

5.9.4 Education Level of Respondents

Male: The socio-economic baseline survey revealed that 31% of the respondents were uneducated, 29% have a primary level of education, 24% have completed secondary education (Matric), 07% education have higher secondary school qualification (Intermediate), and 08% have completed university-level education (Graduation and Masters).

Female: The socioeconomic baseline survey revealed that 57% of the respondents were uneducated, 27% have a primary level of education, 08% have completed secondary education (Matric), 06% education have higher secondary school qualification (Intermediate), and 02% have completed university-level education (Graduation and Masters). The details of male and female respondents are illustrated in the following table.

Table 28: Education Level

Education Levels	35 Wards of Sibi City
No out of 744 Male Respondents	
Un-educated	229
Primary (up to 5 Years)	217
Secondary (up to 10 years)	181
High Secondary School (up to 12 Years)	55
University	62
No out of 386 Female Respondents	
Un-educated	219
Primary (up to 5 Years)	105
Secondary (up to 10 years)	34
High Secondary School (up to 12 Years)	24
University	04

Source: Socio-economic survey by PMU/PSIAC teams

5.9.5 Family Size

The survey data revealed that the family size of 35% of households has between 1-5 persons, 32% of households have between 6-10 persons; 20% of households have between 11-15 persons and 13% were 15 and above, as provided in the table below.

Table 29: Average Family Size

Family Size	35 Wards of the Sibi City
1 to 5	398
6 to 10	362

Family Size	35 Wards of the Sibi City
11 to 15	224
15 & above	146

Source: Socio-economic survey by PMU/PSIAC teams

5.9.6 Family System

Approximately 66% of the households were living in a joint family arrangement while 34% were part of the nuclear family system. In the joint family system, the eldest male member takes care of all the family members and has the final decision-making authority, particularly for issues regarding the public domain. This system also provides social security for family members during periods of individual unemployment and financial crisis, especially to poor women, the elderly, the infirm or ill, orphans, etc. These communities believe that the joint family system is a more economical way of living as they often work together in different trades, government employment, and businesses, and can share their joint incomes to support the entire family, including the elderly, orphans, single women living alone, and infirm or ill who are unable to work. The family arrangements (nuclear and joint) are illustrated in the table below.

Table 30: Family System

Family System	35 Wards of the Sibi City
Joint	66
Nuclear (Single)	34

5.9.7 Marriage

Data from the below table shows that residents of the scheme area prefer marriages within families. The trend of marriage outside of the family but within the same tribe is also increasing. The percentage of marriages inside and outside of the families is presented in the table below.

Table 31: Marriages

Marriage System	35 Wards of the Sibi City
Outside family marriage	70%
Inside family marriage	30%

Source: Socio-economic survey by PMU/PSIAC teams

5.9.8 Health Problems

The most common diseases in the sub-project included Malaria, Flu, Typhoid, diabetes, heart diseases, TB and chickenpox, and nowadays COVID-19. There are three reported COVID cases in the sub-project area but during the survey however due to a lack of testing facilities the numbers of COVID cases were not reported properly which may arise more. The rest of the cases are referred to the reputed hospitals of Karachi or Quetta. These diseases largely occur due to a lack of awareness, unhygienic living conditions, poor sanitation systems, and safe drinking water facilities, malnutrition, and lack of proper health care facilities, including preventive health care facilities.

5.9.9 Money Lending

In the scheme area, capital is borrowed from the banks for business purposes, and money is borrowed from middlemen (arthis) for health treatment, (i.e., illness). In times of need, community members take loans from relatives and friends as well.

5.10 Common Needs to Visit Nearest City

Family members visit the nearest city for various purposes. A significant percentage of 84% of family members visit the nearest cities for business, trade, and market purposes, and 16% visit for health services, family relations, and educational purposes.

Table 32: Purpose of the Visit to the nearest City

Purpose of Visit	35 Wards of Sibi City	
	In numbers	In %
Family relations	393	35
Marketing/Business/Agriculture	202	18
Educational	209	18
Health	174	15
Others	154	13

Source: Socio-economic survey by PMU/PSIAC teams

5.11 Livestock

The average number and type of livestock owned in Wards are given in the following table:

Table 33: Average No & Type of Livestock Ownership

Livestock Ownership	35 Wards of Sibi City (In numbers)
No. of Camels	06
No. of cows	02
No. of Goats	84
No. of chicken	294
No. of Donkey	30
No. of Camels	06
No. of cows	02

5.11.1 Cost of Livestock

The average cost of livestock commonly found in the area is given in the following table.

Table 34: Average cost of Livestock

Name of Livestock	Average Cost/unit (in PKR)	Expenses in USD ¹⁴
No. of Camels	120,000	727

¹⁴ The exchange rate 1 USD = PKR 165

Name of Livestock	Average Cost/unit (in PKR)	Expenses in USD ¹⁴
No. of cows	80,000	485
No. of Goats	9,500	58
No. of chicken	900	5
No. of Donkey	18,000	109

Source: Socio-economic survey by PMU/PSIAC teams

5.11.2 Source of Fodder

The animal owners purchase fodder from the open market of Sibi City to meet their livestock feeding needs. In addition, some community members have their agricultural lands in the nearest rural areas and cultivate fodder on agricultural lands. Straw is also used as fodder. Generally, 95% of community members are purchasing fodder from the market.

5.12 Source of Livelihood and Income

The baseline survey indicates that laborer is the primary source of income in these wards. The average monthly income ranges from PKR 16,000 to PKR. 20,000. All the households also have a secondary source of income, including agriculture, livestock, transportation, business, and salaried employment, and earn between PKR 14,000 to PKR 30,000 every month as a secondary source of income. The type source of income is provided in the below table;

Table 35: Type of Source of Income and its percentage

Source of Income	Numbers of Sources of Income	% age of Source of Income
Agriculture	11	01
Livestock	13	01
Business	23	02
Transport	14	01
Jobs	265	23
Share of Forest	31	03
Labor	391	35
Others (please specify)	382	34

5.13 Anticipated Losses due to the Project

The potential losses in terms of physical and economic displacement are not expected due to the proposed intervention. However, 324 trees are expected to be felled, as shown in the following table.

Table 36: Anticipate Losses due to Project

Anticipates	Results
Loss of Residence	No
Loss of cultivated/uncultivated	No
Loss of trees	Yes (324 nr of trees) (The further details of trees species, cutting, and

Anticipates	Results
	mitigation measures are provided in section 6.2.8)
Loss of Livelihood	No
Loss of Other infrastructure	No

Source: Socio-economic survey by PMU/PSIAC teams

It is important to note that laborer is the main source of income for all households and they will be benefitting from the improvement and construction activities after which the required water will be equally shared to these without losses. As such, therefore, the community will have the net benefit and no long-term loss with irreversible impacts.

5.14 Housing

The baseline survey reveals that houses are 91% of houses are owned by the community members, 04% are rented and 02% are other houses occupied by the government or state properties.

5.14.1 Average Number of Rooms

The number of rooms owned by the target communities in the project area is 1-5 in 92% of homes, 5-10 in 08% of homes, and 10 and above in 0% of homes. The details are given in the following table.

Table 37: Ownership of Rooms

Room Ownership	35 Wards of the Sibi City (In %age)
1 to 5 rooms	92
5 to 10 rooms	08
10 and above	0

Source: Socio-economic survey by PMU/PSIAC teams

5.14.2 Pit Latrines and Toilets

In all wards, 100% of houses have toilet facilities and they are connected to a sanitation system which is in very poor condition.

5.14.3 Type of Housing

In the sub-project area, 40% of the houses were pucca (Brick mercenary), 28% semi pucca (Brick mercenary and mud), 14% of houses were Katcha (mud-houses), 04% were Wood houses, and 15 were other houses such as Tier Guarder, etc.

Table 38: Housing Type

Type of House	35 Wards of the Sibi City (In Numbers)
Pucca (bricks mercenary)	452
Semi pucca (Brick mercenary and mud)	311

Katcha (Mud houses)	156
Wood	46
Others	171

5.14.4 Residential Plot Size

The baseline survey revealed that 1,039 participants responded that their average plot size in the sub-project area is between 2000 ft. to 3500 sq. ft. whereas 91 participants responded that they live in houses of range size between 3500 and above sq. ft.

Table 39: Plot Size

Plot Size in sq. ft. (Approx.)	Sibi City (In %age)
2000 to 3500	109
3600 to 5000	73
5000 & Above	11

Source: Socio-economic survey by PMU/PSIAC teams

5.15 Land Ownership

The 94% of houses ownerships, 04% are rented houses and 02% are state-owned houses. The record of this ownership is available in the revenue department. During the survey, it was revealed that the sale of land is common practice in all wards and if the house is sold, the house transfer of ownership is done formally and is recorded with the Revenue Department.

5.16 Community-Based Organizations (CBOs) and NGOs

Different local and national NGOs are working in the sub-project area. The overall goal of these organizations is poverty reduction, social mobilization of communities as a cross-cutting theme, and working education, livelihood, microcredit, and physical infrastructure schemes at the village, wards, and union council levels. They are implementing different donor-funded projects covering rural and urban development including raising awareness on the COVID-19 outbreak and have also provided Hand washing Tanks in different places, printed awareness material, sanitizers, soaps for hand washings, and masks at the households level, and government offices to facilitate the local population and government departments to minimize the spread of coronavirus.

5.17 Local Government and Administration

The elected members of provincial and national assemblies are now actively involved in the overall development works in their constituencies. Before these arrangements, the local government representatives such as Chairman, Vice-chairman, and their Councillors were operating under the Balochistan Local Government Act 2013; and were responsible for the development works at the village, union councils, and district levels respectively. At the village and union council level, the union council Chairman and councillors were responsible for village and union council level development activities. At the district council level development works were the responsibility of the district council led by the Chairman.

However, now this system is no longer prevailing in the area but because of being political workers, these councillors and chairmen are now jointly working with the members of national and provincial assemblies and supporting them to improve the development of their areas. The district-level bureaucracy is also part of this development process, which consists of the Deputy Commissioner, Additional Deputy Commissioner, assistant commissioners, officers-in-charge of line departments, and revenue officials.

5.18 Law and Order Situation

The law-and-order situation in the scheme area is under the control of the district administration, police, and Frontier Corps (FC). The security situation is better than past due to the presence of security forces, but still, the security risks in the Balochistan Province are high.

5.19 Community Cultural Properties

The following community cultural properties are found in the scheme area. These cultural properties do not fall in RoW or the alignment area of the Sibi City Water Supply Scheme and its proposed conduit channel. The details are illustrated in the following table.

Table 40: Community Cultural Properties

Location	Grave Yard	Mosque	In RoW
Sub-Project area	06	35	No

Source: Socio-economic survey by PMU/PSIAC teams

5.20 Community Awareness about Scheme Works

The communities of 35 wards in the sub-project area were made aware of the proposed civil works to be carried out in the sub-project and their implementation schedule. This awareness was provided during repeated cycles of public orientations, community consultations, and formation processes of the Water supply committees by the project PSIAC staff and other related planned activities. In addition, separate women and men consultation meetings were organized in all wards from the period of November 2020 to May 2021.

5.21 Community Demands

During public consultations and baseline data collection activities in the scheme area, the basic priority needs of the communities were determined. These are as follows:

1. Provision of sewerage system as old one is in bad condition;
2. High load shedding of electricity;
3. Provision and rehabilitation of Drinking-Water Supply;
4. Livelihood enhancement and skill training program for the youth

Further details are available in the section on stakeholder consultations.

6 Environmental and Social Impacts and Mitigations Measures

6.1 Overview

This Chapter assesses the impacts on the environment (physical and biological) and social aspects of the Sibi (WSS). The significant impacts and mitigation measures to be implemented by the contractor during the execution phase of the sub-project are illustrated as follows:

6.1.1 Screening of Environmental and Social Impacts

As part of the environmental and social impact assessment process, a screening matrix focusing on environmental and social impacts was developed specifically for the proposed sub-project. The matrix examined the interaction of project activities with various components of the environment and society. The impacts were broadly classified as physical, biological, and social. Each of these broad categories was further divided into different aspects. The potential impacts thus predicted were characterized as:

- High negative (adverse) impact,
- Medium (adverse) impact,
- Low Adverse Impact
- High positive (beneficial) impact,
- Medium positive impact, and
- Low Positive

Appropriate mitigation measures are recommended in this chapter. These measures are set in place to reduce the occurrence or possibility and severity of potential adverse impacts.

6.1.2 Impact Characterization

Once potentially adverse impacts were identified, they were characterized as follows:

- **Nature:** Direct/Indirect
- **Duration of impact:** Short term (less than 5 years of the project), Medium-term (5 to 15 years), and long term (15 Years and above)
- **Reversibility of impact:** Reversible/Irreversible
- **Likelihood of impact:** Certain, Likely, Unlikely, Rare
- **Consequence of Impact:** Severe, Moderate, Mild/Minor.

6.1.3 Impact Assessment and Mitigation

An impact assessment was completed based on the impact characterization above. All the attributes of an impact, particularly the likelihood of occurrence and consequence severity, were used to assess the impact either as 'high', 'medium', or of 'low' significance. Each environmental and social impact identified during the screening stage was assessed according to this criterion.

6.1.4 Determination of Mitigation Measures

Following the impact of characterization and assessment, appropriate mitigation measures were identified. These measures are set in place to minimize, if not eliminate, the adverse impacts associated with sub-project activities.

6.1.5 Assessment of Residual Impacts

Mitigation measures cannot always eliminate the adverse impacts associated with project activities. In many cases, there are residual impacts even after the implementation of mitigation measures. The final step of the entire impact assessment process is to determine the residual impact. These residual impacts are monitored during project implementation and it is ensured that they become insignificant.

6.2 Environmental Impacts and Proposed Mitigation Measures

6.2.1 Construction of Sibi (WSS)

The existing water supply system was constructed before the independence of Pakistan by the British administration at the design capacity to supply 1.66 cusecs of water. Over time condition of the existing water system is deteriorated, and its capacity to filter water is also reduced to less than 1 cusecs. This new scheme will have the capacity to supply 3 cusecs of water, ultimately meeting the clean and current water requirement of Sibi City. The construction conduit channel from NRB (sump well) will provide continued surface water to the filtration system. While the construction and installation of sedimentation tanks, a slow sand filter will clean raw surface water into drinkable water.

Table 41: Impact Characterization- Rehabilitation of Irrigation Structures

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Long Term	Irreversible	Certain	Severe	High-Positive (Beneficial)

6.2.1.1 Mitigations

Once the new water supply scheme is made operational, the testing of physical, biological, and chemical parameters testing of the filtered water is to be carried out on weekly basis by the Project Management Unit. till the defect notification period to ensure that the water supply system is working efficiently. In case, if the water is not found safe for drinking, then chlorination/disinfection, mineralization, and ozone treatment

shall be carried out as per requirement by district administration and PHE department to ensure water is safe for drinking.

6.2.1.2 Residual Impact

Due to an increase in clean water availability for the people of Sibi City and through the implementation of the mitigation measure, the impact significance will be highly positive in the long term.

6.2.2 Dismantling of Associated Facilities

Following the completion of construction activities, the contractor will also dismantle and remove from the sub-project area all temporary facilities associated with the works, including the main and sub-camps and batching plant. These dismantling and demolition may have some environmental impacts such as; the risk due that improper solid waste handling and disposal poses to human health and environmental degradation, surface and groundwater pollution, and the waste is eaten by faunal species while in search of food. The proposed waste disposal system is summarized in the table below.

Table 42: Proposed Waste Disposal System

Type of Waste	Description	Disposal Method
Workshop waste including solid and fluid	Used oil, ferrous /nonferrous materials, batteries, etc	Handling by certified recycling Contractor.
Excess construction material	Sand, aggregate, cement, bricks, reinforcement steel bars, paints, and other construction materials.	To be sold back or given to the supplier or other users.
Medical waste	Syringes, glass bottles, bandages, blood sampling tubes, expired drugs, dressing, etc.	To be incinerated at a nearby hospital incinerator, if any, or an equivalent facility.
Packing waste material	Paper, plastic, textiles, cardboard, rubber, wood, glass, tin cans, etc.	Recyclable waste is to be handed over to recycling contractors. Combustible waste is to be burned in a burn pit or incinerator.
A campsite domestic waste	Biodegradable: Foodstuffs, fruits, and vegetables, wood, bones, grass, etc.	Biodegradables: Composting/burying in the ground
Non-Biodegradable Waste	Paper, metals, glass, plastic bottles, scrap metal, textiles and shoes, bottles and jars, fluorescent tubes.	Non-Biodegradable: Recycling or Incineration. Non-recyclable or non-combustible waste should be buried in a designated sanitary landfill to be built by the Contractor as per the design approved by the Engineer
Sewage and grey water	Kitchen and washing areas sewage	Sewage and grey water are to be disposed of after treatment.

The impact has been characterized in the following table.

Table 43: Impact of Characterization-Dismantling and Demolition of Structure and Facilities

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Certain	Low	Low Adverse

6.2.2.1 Mitigation

The following mitigations shall be adopted during the demolition and dismantling operations:

- Excess construction material waste shall be minimized through careful planning by the Contractor;
- Construction waste could be reused as fill material or construction material. However, testing should be undertaken to confirm the suitability of any material before its use in construction.
- Demolition waste shall be reused in construction activities (such as for aggregate, landscaping, road formation of katcha routes, and filling of ditches or low-lying areas).
- Wastewater from the construction site shall be collected and treated as per the Contractors Pollution Control Plan before being released in a manner and after the approval by the Engineer.
- The contractor shall comply with air quality requirements as set by law (NEQS) and shall not burn any materials which may lead to the release of toxic or hazardous substances.
- All scattered leftover construction material shall be removed from the construction area and disposed of properly as early as possible in consultation with the engineer.
- The mitigations given in section 6.2.6.1 shall also adhere to sites.

6.2.2.2 Residual Impact

Through the implementation of these mitigation measures, the impact significance will be reduced to neutral after dismantling and demolition activities.

6.2.3 Coronavirus disease (COVID-19)

During the implementation of the Sibi (WSS), it is anticipated that the Covid-19 Pandemic (Corona Virus) will have a negative impact on the health and life of sub-project staff, as the implementation phase will require staff at various levels (Consultants, PMU, and Contractor). This will involve large several workers working together for different construction activities, carrying out site inspections, living together in the campsite and dormitory, preparing, serving, and having food together.

COVID-19 disease can spread easily from an infected person to others through small droplets by the nose or mouth during cough or exhaling. These droplets can also land on objects and surfaces around the person and if other persons touch these objects or surfaces, then touching their eyes, nose, or mouth can also spread the disease. The project staff can also easily contract COVID-19 if they are sitting together and inadvertently, inhale droplets from a sick person¹⁵.

¹⁵ Studies have shown that the COVID-19 virus can survive for up to 72 hours on plastic and stainless steel, less than 4 hours on copper and less than 24 hours on cardboard (<https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>).

The viral disease may become dangerous when the infected worker or project staff with a strong immune system may not show any symptoms or signs of Covid-19, while that patient will infect other staff easily with a low immune system, including the elderly, children, pregnant women, and ill persons.

Table 44: Impact of Characterization-Covid-19

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Long term	Variable	Certain	Severe	High negative (adverse)

6.2.3.1 Mitigations

The coronavirus pandemic was first reported in Pakistan on February 25, 2020, and presently the positivity ratio of covid-19 cases is less than 1%¹⁶. However, SOPs and mitigations provide guidelines in the context of COVID-19 and describe preventive measures, and contingency actions for preventing measures at camps, offices, and worksites to be followed.

It is estimated up to 75 laborers will be required for carrying out construction activities. Out of the total, 75 % of laborers will be residents and will return to their homes at night, while 25% (skilled) will have overnight stay at campsites. All the laborers will carry out their activities as per their project work plan given in section 3.2.5. To implement these mitigation measures, the project has nominated the following person at the PSIAC level for ensuring the Covid-19 guideline adheres to at the site.

Table 45: Name of Focal Person

S. No	Name of Focal Person	Designation	Contact No
1	Mr. Shakoor Kakar	Community Development Specialist, PSIAC	+92-333-2211169

Control exits and entry on-site

- Secure the boundaries of the site and establish designating entry/exit points (if they do not already exist).
- Entry/exit to the site should be documented. Ensure screening of the person entering the project office, site, and camp areas and maintain a logbook for record-keeping of temperature readings (using an infrared thermometer) of all the workers entering the office area/building.
- All drivers, conductors, loaders, and other staff of the vehicle transporting materials shall be screened and no person(s) suspected (and any person accompanying the suspected person) to have COVID-19 shall be allowed to enter the site or premises
- Train security staff on the (enhanced) system that has been put in place for securing the site and controlling entry and exit, the behaviours required of them in enforcing such system, and any COVID - 19 specific considerations.

¹⁶ <https://ncoc.gov.pk/>

- Train staff who will be monitoring entry to the site, providing them with the resources they need to document the entry of workers, conduct temperature checks, and record details of any work that is denied entry.
- Confirm that workers are fit for work before they enter the site or start work with special attention to workers with underlying health issues or who may be otherwise at risk. Consideration should be given to the demobilization of staff with underlying health issues.
- Provide daily briefings¹⁷ to workers before commencing work, focusing on COVID-19-specific considerations including cough etiquette, hand hygiene, and distancing measures, using demonstrations and participatory methods.
- Limit the travel to only essential. Any person coming from affected areas:
 - a. Should not return if showing symptoms
 - b. All persons returning to the site should self-isolate for fourteen (14) days following their return.
- Those who develop a high temperature or cold-like symptoms such as a runny nose or cough should not be allowed to come to work and must stay isolated.

Good Hygiene Practices

- Minimize face-to-face meetings. If face-to-face meetings are necessary, use a face mask and latex gloves while maintaining at least a 2m (6.5 ft) distance from each other during the meeting.
- Minimize the number of laborers and work time at sites. Maintain minimum safe distances.
- Ensure that hand wash facility with soap and water, sanitizing hand rub dispensers, and tissue papers are placed in prominent places around the workplace including toilets and entrance/exit to work areas, and are used. Make sure these dispensers are regularly refilled.
- Ensure that face masks and/or paper tissues are available and used at your workplaces along with closed bins for hygienically disposing of them (such waste should be contained in a designated area till its final disposal through incineration).
- Daily toolbox talks should discuss measures for COVID-19. Display posters promoting handwashing with soap and water (For further details please refer to (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>) and combine this with other communication measures such as offering guidance from occupational health and safety officers/medical staff, briefings at meetings, and information through Whats-App groups to promote hand-washing with soap and water.
- All the waste such as face masks, gloves, and other items generated at the office and campsites should be stored in a labeled marked container (Hazardous Waste) and should be stored separately in isolation after disinfection. The waste once accumulated should be disposed of via EPA, a certified contractor for Incineration.
- Ensure that sufficient supplies of PPEs, tissues, and hand sanitizers are available for all workers and they use them. Have masks available to offer to anyone who develops respiratory symptoms.

• ¹⁷ During the daily briefings, remind workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell.

- Make sure that the workplaces, toilets, and canteens are clean and hygienic. Cleaners should be provided with PPE and disinfectant as well as training on how to use PPEs.
- At canteens in campsites, the break times should be staggered, workers should sit about 2m apart, hand cleaning facilities and sanitizers should be provided, minimizing the exchange of currency notes, cleaning of the surface between use and immediate disposal of waste into bins should be ensured.
- The materials like steel, wood, and cloth, iron, plastic keep COVID-19 for days, therefore, all such raw materials shall be stacked separately for a few days before use to minimize transmission or sanitize and disinfect to the extent possible before entry to the site.
- All staff must be sprayed and cleaned on returning to the camp and a wash facility has to be set up at the site gate. The guards should be instructed to enforce these measures with a request to workers to cooperate. Gloves, masks, shoes, and helmets must be left at the gate after spraying.

Workplace Practice Adjustment:

- Measures to change work processes and timings to reduce or minimize contact between workers, (recognizing that this is likely to impact the project schedule) include:
- Decreasing the size of the work teams.
- Limiting the number of workers on-site at any one time.
- Changing to a 24-hour work rotation.
- Adapting or redesigning work processes for specific work activities and tasks to enable social distancing, and training workers on these processes.
- Continuing with the usual safety training, adding COVID-19 specific considerations. Training should include the proper use of normal PPE. While as of the date of this note, the general advice is that construction workers do not require COVID-19 specific PPE, this should be kept under review (for further information see WHO interim guidance on the rational use of personal protective equipment (PPE) for COVID-19).
- Reviewing work methods to reduce the use of construction PPE, in case of supplies become scarce or the PPE is needed for medical workers or cleaners. This could include, e.g. trying to reduce the need for dust masks by checking that water sprinkling systems are in good working order and are maintained or reducing the speed limit for haul trucks.
- Arranging (where possible) for work breaks to be taken in outdoor areas within the site.
- Consider changing canteen layouts and phasing meal times to allow for social distancing and phasing access to and/or temporarily restricting access to leisure facilities that may exist on-site, including gyms.
- As and when required, review the overall project schedule, to assess the extent to which it needs to be adjusted (or work stopped completely) to reflect prudent work practices, potential exposure of both workers and the community, and availability of supplies, taking into account Government advice and instructions.

Project Medical Services

After assessing the existing Project Medical Services, where possible, considerations should be given to expanding these services (if possible) as follows:

- As part of the organizational framework, the contractor shall appoint paramedic staff, who must also conduct training, on current WHO advice on COVID-19 and recommendations on the specifics of COVID-19. Where COVID-19 infection is suspected, medical providers on-site should follow WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected.
- Training medical staff in testing, if testing is available.
- Assessing the current stock of equipment, supplies, and medicines on-site, and obtaining additional stock, where required and possible. This could include medical PPE, such as gowns, aprons, medical

masks, gloves, and eye protection. Refer to WHO guidance as to what is advised (for further information see WHO interim guidance on the rational use of personal protective equipment (PPE) for COVID-19).

- If PPE items are unavailable due to worldwide shortages, medical staff on the project should agree on alternatives and try to procure them. Alternatives that may commonly be found on construction sites include dust masks, construction gloves, and eye goggles. While these items are not recommended, they should be used as a last resort if no medical PPE is available.
- Review existing methods for dealing with medical waste, including systems for storage and disposal ¹⁸

Local Medical and Other Services

Given the limited scope of project medical services, the project may need to refer sick workers to local medical services. Preparation for this includes:

- Obtain information as to the resources and capacity of local medical services (e.g., number of beds, availability of trained staff, and essential supplies).
- Conduct preliminary discussions with specific medical facilities, to agree on what should be done in the event of ill workers needing to be referred to.
- Consider ways in which the project may be able to support local medical services in preparing for members of the community becoming ill, recognizing that the elderly or those with pre-existing medical conditions require additional support to access appropriate treatment if they become ill.
- Clarify how an ill worker will be transported to the medical facility, and check the availability of such transportation.
- Establish an agreed protocol for communications with local emergency/medical services.
- Agree with the local medical services/specific medical facilities on the scope of services to be provided, the procedure for intake of patients, and (where relevant) any costs or payments that may be involved.
- A procedure should also be prepared so that project management knows what to do in the unfortunate event that a worker ill with COVID-19 dies. While normal project procedures will continue to apply, COVID-19 may raise other issues because of the infectious nature of the disease. The project should liaise with the relevant local authorities to coordinate what should be done, including any reporting or other requirements under national law.

Contingency plan

- If an exhibits symptoms of COVID-19 like high fever, he/she should be isolated immediately in the isolation room as a first step. The contractor should designate and maintain isolation and quarantine rooms.
- The Contractor should facilitate his contact with Pak Corona Helpline (+92-300-1111166) for further guidance and testing. He/She will be kept isolated till tests have been performed and the results are received. Resident laborers will use a quarantine/isolation facility while waiting for the test results. Non-resident laborers should not come to work and can stay at home until the test results are received. If the results are positive, the Contractor should contact the designated hospitals to transfer the patient for quarantine and treatment. The contractor may also be needed to facilitate the transfer of hospitals request to do so. The contractor should support the cost of treatment.
- The contractor will also need to facilitate the “contact tracing” for the persons who were in contact with the patient during work at the site through their records, attendance registers, etc., and inform the authorities. This is information that authorities will ask the Contractor to provide as they will require the persons who were in contact to be isolated and tested.

¹⁸ For further information see WHO interim guidance on water, sanitation and waste management for COVID-19, and WHO guidance on safe management of wastes from health-care activities).

- Local healthcare authorities should all be made aware of the preparations that have been made at the site.
- If a paramedic staff handles the infected person for any initial first aid at the site; he should use PPEs; medical masks, gowns, apron, eye protection goggles, or face shields (respirator N95 or FFP2 standard) and boots.
- The cleaning of quarantined areas and food supplies to the quarantined/isolated persons should be ensured. PPEs must be used by all personnel responsible for these services in isolation and quarantine areas.
- Healthcare wastes produced during the care of COVID-19 patients should be collected safely in designated containers and bags, treated, and then safely disposed of.
- Preparation measures and contingency plans will be communicated widely to workers, subcontractors, suppliers, adjacent communities, and nearby projects/workforces.
- If testing is available on site, the worker should be tested on-site. If a test is not available at the site, the worker should be transported to the local health facilities to be tested (if testing is available).
- If the test is positive for COVID-19 or no testing is available, the worker should continue to be isolated. This will either be at the worksite or at home. If at home, the worker should be transported to their home in transportation provided by the project.
- Extensive cleaning procedures with high-alcohol content disinfectant should be undertaken in the area where the worker was present before any further work is undertaken in that area. Tools used by the worker should be cleaned using disinfectant and PPE disposed of.
- Co-workers (i.e., workers with whom the sick worker was in close contact) should be required to stop work, and be required to quarantine themselves for 14 days, even if they have no symptoms.
- Family and other close contacts of the worker should be required to quarantine themselves for 14 days, even if they have no symptoms.
- If a case of COVID-19 is confirmed in a worker on the site, visitors should be restricted from entering the site and working groups should be isolated from each other as much as possible.
- If workers live at home and have a family member who has a confirmed or suspected case of COVID-19, the worker should quarantine themselves and not be allowed on the project site for 14 days, even if they have no symptoms.
- Workers should continue to be paid throughout periods of illness, isolation, or quarantine, or if they are required to stop work, in accordance with national law.
- Medical care (whether on-site or in a local hospital or clinic) required by a worker should be paid for by the employer. Workers will be reassured that there will be no retaliation or discrimination if they self-isolate as a result of feeling ill, and also with respect to the compensation or insurance arrangements that are in place.

Community Notification and Contact

To address the community concerns about the presence of non-local workers, or the risks posed to the community by local worker's presence on the project site¹⁹, the following good practice should be considered:

- Communications should be clear, regular, based on fact, and designed to be easily understood by community members such as Urdu, Balochi, Pushto, or graphical / visuals banners if communities are not able to read.
- Communications should utilize available means. In most cases, face-to-face meetings with the community or community representatives will not be possible. Other forms of communication should

¹⁹ The project should set out risk-based procedures to be followed, which may reflect WHO guidance (for further information see WHO Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response).

be used; posters, pamphlets, radio, text messages, and electronic meetings. The means used should take into account the ability of different members of the community to access them, to make sure that communication reaches these groups.

- The community should be made aware of procedures put in place at the site to address issues related to COVID-19. This should include all measures being implemented to limit or prohibit contact between workers and the community. These need to be communicated clearly, as some measures will have financial implications for the community (e.g., if workers are paying for lodging or using local facilities). The community should be made aware of the procedure for entry/exit to the site, the training being given to workers, and the procedure that will be followed by the project if a worker becomes sick.
- If project representatives, contractors, or workers are interacting with the community, they should practice social distancing and follow other COVID-19 guidance issued by relevant authorities, both national and international (i.e., WHO, CDC).

6.2.3.2 Residual Impact

By applying the above mitigations, the impact significance shall be the very low duration of the sub-project.

6.2.4 Air Quality

A decline in the ambient air quality within the vicinity of works is expected during the construction phase activities. The machinery, equipment, diesel generators, operation of batching plant, and project vehicles will be used for the movement of people and construction activities such as excavation for conduit channel, excavation of foundation works, etc. Due to these activities release of exhaust emissions, containing carbon monoxide (CO), sulphur dioxide (SO₂), oxides of nitrogen (NO_x), and particulate matter (PM₁₀) is expected, which can deteriorate the ambient air quality in the sub-project site. Furthermore, vehicular movement on Nari River Road (katacha route) from the head of NRB towards Sibi City may also cause fugitive dust emissions. The impact has been characterized and given in the table below.

Table 46: Impact of Characterization-Air Quality

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Certain	Moderate	Medium (adverse)

6.2.4.1 Mitigations

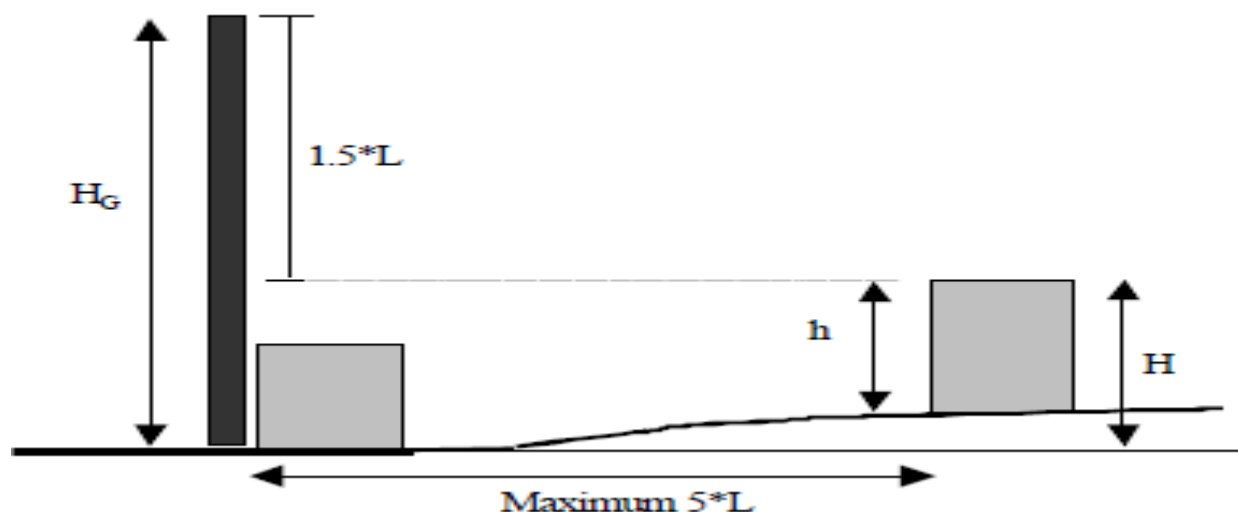
Ambient air quality analysis of the sub-project has been carried out to know the baseline data before the execution of the works. The existing prevailing conditions of ambient air quality are provided in section 4.1.3. The following mitigations will be used to minimize the impact.

- Contractor camps (main & sub-camp) will be established at least 500 m (1,625 ft) away from communities.
- The construction machinery, generators, all equipment, and vehicles will be kept in good working condition and properly tuned, to minimize exhaust emissions. The exhaust emissions will comply with the NEQS.
- Fugitive dust emissions will be minimized by continuous water sprinkling/water spraying on the soil.
- The sub-project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, the speed will be reduced to 15 km/h to avoid excessive dust emissions.

- While working within or near the communities for works such as the construction of new alignments and or structures, coordination with the communities will be maintained to minimize any detrimental impacts on the crops, settlements, or cultural values.
- Any area taken for haulage shall be taken with the permission of farmers and with a commitment to pay compensation accordingly.
- Diesel generation should be fitted with an acoustic enclosure and stack of appropriate height for the proper dispersion of emission

The minimum generator stack height and clearance from existing structures shall be as defined in the following figure.

Figure 11: Minimum Generator Stack Height and Clearance²⁰



$$H_G = H + 1.5L$$

Where:

H_G = Stack height measured from ground level

H = Height of existing nearby structures above ground level at the stack

L = lesser dimension of h or w

h = Height of existing nearby structures

w = Width of existing nearby structures

6.2.4.2 Residual Impact

Because of the proposed works, an increase in the levels of PM, SO₂, NO_x, and CO shall result in the degradation of ambient air quality. Through the implementation of the mitigations detailed above, the

²⁰ Source: World Bank Group IFC General Environmental, Health and Safety Guidelines

concentrations of these parameters shall not exceed the NEQS, reducing the impact magnitude to Low adverse impact in short term, and further reducing to neutral following the completion of works.

6.2.5 Dust

The potential for dust emissions shall be increased due to the various construction activities i.e. excavation and construction of conduit channel, sump well and overhead water storage tanks, and clearance of vegetation. Dust shall also be generated by vehicles running on katcha haul routes in between the treatment plant towards the head of NRB Weir, wherein a conduit channel will be constructed. In addition, erosion of open storage piles (aggregate, fill, etc.) shall also result in an increase in dust in the area of work, as shall the operation of the batching plant.

The first stage of the dust emission assessment involves the identification of construction activities that have the potential to cause dust emissions and the degree of that potential. The following table identifies work activities, the likelihood and consequence of potential dust emissions (low, medium, high), and the expected duration of such emissions.

Table 47: Potential for Dust Emissions by Works Activity

Stage	Description	Potential Dust Emitting Activities	Like hood	Duration	Consequence
Access to site	Transport of materials and personnel to and around the site	Heavy and light vehicles using unsurfaced access routes cause the suspension of dust	Certain	Short term	Moderate
Construction of structures and camps	Construction of structures. Construction of temporary and permanent facilities (staff and office accommodation, workshops, storage, security walls, etc.)	Concrete batching/mixture machines Transport of materials Storage of materials Preparation of materials (cutting etc.)	Certain	Short term	Moderate
Decommissioning	Demolition, site clearance	Earthmoving Excavation Transport of materials Re-suspension of dust on un-surfaced roads	Certain	Short term	Minor

The impact has been characterized in the following table.

Table 48: Impact of Characterization-Dust Generation

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Certain	Moderate	Medium Adverse

6.2.5.1 Mitigations

- Water bowsters shall be used to sprinkle water to the haulage routes to reduce dust emissions resulting from vehicles passing along these un-surfaced routes. This shall be the main mitigation during the project duration.
- Hard-core fill is used to repair the Kacha routes to make them accessible to heavy vehicles shall also reduce the impact as the larger fill material has a lower dust-raising potential. Vehicle speeds shall also be limited to 15km/hr. These actions shall reduce the dust-raising potential of these long-running activities, and if effectively implemented, this shall reduce the impact magnitude to a minor.
- The contractor shall be required to submit a traffic management plan which identifies the proposed access and haulage routes and shall be prohibited from using any routes other than those specified in the traffic management plan.
- The contractor shall be required to minimize the double handling of material during earthworks operations for the embankment strengthening.
- The contractor shall be prohibited from vegetation clearance beyond the RoW.
- Water sprinkling shall be carried out at material stockpiles where dust is generated.
- Materials delivered to sites, such as cement, loose material, sand, or aggregates shall be transported in a covered truck.

6.2.5.2 Residual Impact

By applying the above mitigations, the impact significance shall reduce to Low Adverse Impact for the duration of the works, reducing to very low following the completion of the work.

6.2.6 Occupational Health and Safety

The construction phase will include various activities such as; the construction of a conduit channel and sump well, cleaning of the water reservoir, overhead water storage tanks, installation of a batching plant, earthworks, movement of various heavy machines (lorries and dumpers), manual handling during loading-unloading operation, bad housekeeping, improper storage of hazardous materials, (i.e. petrol, admixtures, etc), as a result of these works, there will be a direct impact on the health and safety of all staffs working in sub-project sites.

The potential impacts that can occur during the construction activities are presented below:

Table 49: Activities and Potential Impact

Activity	Potential Impact (<i>in Worst Case</i>)
Earthworks	Ill health due to dust or injury/death following an accident caused due to poor visibility
Use of hazardous substances	Ill health/injury/death from improper handling
Manual handling	Injury from improper lifting

Activity	Potential Impact (<i>in Worst Case</i>)
Working in the vicinity of batching plant	Injury/ill health due to high noise or emissions
Inhabitation of the construction camp	Ill health due to poor quality or unhygienic camps
General site works	Injury from slips and trips
Working at height	Injury/death from fall during the construction of contractor's camps, and installation of batching plant.
Operation of heavy construction plant/machinery	Injury/death
Movement of vehicles and plant	Injury/death from traffic accidents

Health and safety impacts have been characterized as follows:

Table 50: Impact Characterization- Health and Safety

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Likely	Severe	High Adverse

6.2.6.1 Mitigations

The contractor shall also employ a safety officer, who shall have the day-to-day responsibility for health and safety at each worksite in accordance with the World Bank Group General Environmental Health and Safety Guidelines²¹. He must prepare and identify:

- Emergency prevention, preparedness, and response arrangements – including details of emergency evacuation of labor following a life-threatening accident to the nearest hospitals;
- Provision of security;
- The contractor shall prepare a Health and Safety Plan which is relevant to his chosen methodology.
- Identification of potential hazards to workers, particularly those that may be life-threatening;
- Provision of preventative and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- Training of workers;
- Documentation and reporting of occupational accidents, diseases, and incidents;
- The provision of the supply of personal protective equipment shall also be mandatory for all staff and visitors.

In addition, the following arrangement shall be made:

- Adequate lighting and electricity supply;
- Fire prevention and fire-fighting equipment;
- Sheltered kitchen area (separated from living quarters);
- Proper ventilation facility with availability of electric fans;
- Pedestrian routes are segregated from vehicular traffic routes;
- An adequate number of toilets and sanitary fittings (1 toilet, 1 hand wash basin, 1 bathroom with bench; per 10 persons to be provided) located no greater than 60m from dormitories;

²¹<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

- Floor to ceiling partitions within sanitary facility buildings for privacy;
- Lined washing areas;
- Safe and reliable water supplied from tube wells that meet the national standards;
- A minimum area of 4m² and one bed per person resident in a camp dormitory;
- Camp building with a minimum height of 2.1m;
- Appropriate protection against heat, cold, damp, noise, fire, and disease-carrying animals, in particular insects;
- Float finished plain cement washable floor for easy cleaning throughout camp buildings;
- Provision of mosquito nets;
- Locks to doors and windows on camps;
- Regular cleaning throughout camps;
- Laundry facilities;
- In-house community/common entertainment facilities for foreign staff. The dependence on local entertainment outlets by foreign staff is to be discouraged;
- Drinking water;
- First aid kits.

The contractor shall be required to comply with the World Bank Group (IFC and EBRD) guidance note on *Workers' accommodation: processes and standards*²², which shall be incorporated into the contract documents. This guidance note covers the following standards:

- Sanitary and toilet facilities
- Canteens and cooking
- General living facilities
- Dormitory facilities
- Nutrition and food safety
- Medical facilities
- Leisure, social, and telecommunication facilities

The guidelines on the details of the Workers Accommodation Guidance Note (World Bank Group: IFC/EBRD) are given below:

Table 51: Workers Accommodation Guidance Note (World Bank Group-IFC/EBRD)

S. No	World Bank Group IFC Guidelines	Best Practice
1	Structures, surfaces, and installations should be easy to clean and maintain, and not allow for the accumulation of hazardous compounds	Surfaces (including flooring and work surfaces) in camps, kitchens, dining areas, and workshops should be solid and easy to clean. Flooring for work camps must be float-finished concrete or better.
2	Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions	The contractor's staff accommodation must be structurally sound and provided with lighting and ventilation. Accommodation must be situated at least 25m from the nearest generator
3	Floors should be level, even, and non-skid	As for #1

²² Available at: <http://www.ebrd.com/downloads/about/history/workers.pdf>

S. No	World Bank Group IFC Guidelines	Best Practice
4	Workplace structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge, if appropriate	The contractor's staff accommodation must be located such that it is not at risk of flooding
5	The workspace provided for each worker, in total, should be adequate for the safe execution of all activities, including transport and interim storage of materials and products	The Contractor shall submit to the Engineer for approval a site layout plan, identifying work areas, accommodation, kitchen, dining area, sanitary facilities, location of generators, plant and vehicle parking, transport routes through the camp, pedestrian routes through the camp, evacuation routes, emergency exits, batching plants, storage areas, waste facilities, etc.
6	Passages to emergency exits should be unobstructed at all times. There should be a minimum of two exits from any work area	Evacuation routes are to be unobstructed at all times. At least two emergency exits are to be provided from each building and the camp itself.
7	Equipping facilities with fire detectors, alarm systems, and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible.	Fire extinguishers should be provided throughout camps and work sites. Fire extinguishers should be inspected monthly and maintained as necessary
8	Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work. Allowances should be made for segregated facilities or indicating whether the toilet facility is "In Use" or "Vacant"	<p>Separate latrines and washing facilities for males and females with total isolation by a wall or by location shall be provided. Female toilets should be marked in a language understood by those using them to avoid miscommunication</p> <p>Suitable and sufficient washing facilities, including showers, shall be provided or made available at readily accessible places within the immediate vicinity of every sanitary facility. Washing facilities shall include a supply of clean running water, soap, or other suitable means of cleaning and towels or other suitable means of drying. Rooms containing washing facilities shall be sufficiently ventilated and lit and kept in a clean and orderly condition</p>
9	Where workers may be exposed to substances poisonous by ingestion and skin contamination may occur, facilities for showering and changing into and out of the street and work clothes should be provided	As for #8
10	Adequate supplies of potable drinking water should be provided from a fountain with an upward jet or with a sanitary means of collecting the water for drinking. Water supplied to areas of food preparation for personal hygiene (washing or bathing) should meet drinking water quality standards	<p>An adequate and reliable supply of safe drinking water shall be made available at readily accessible and suitable places including at all camps.</p> <p>The Contractor shall take samples from each supply of drinking water and arrange for these to be samples to be tested at a licensed laboratory before their use by the Contractor's staff. The results of these tests for each supply must be submitted to the Engineer and must demonstrate that each water supply meets national and World Health Organisation standards for drinking water.</p>
11	Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for the provision of clean eating areas where workers are not exposed to the hazardous or noxious substances	The Contractor shall provide and maintain adequate hygienic kitchens that are sheltered and separated from the living quarters. Kitchens shall include raised and washable surfaces suitable for food preparation. The Contractor shall provide and maintain adequate hygienic dining areas for staff.

S. No	World Bank Group IFC Guidelines	Best Practice
12	Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met. Emergency lighting of adequate intensity should be installed and automatically activated upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.	Workplaces and camps should be provided with both natural and artificial light. Artificial lighting should be powered by a generator in the event of power cuts.
13	Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access	Pedestrian and vehicle routes are to be included in site layout plans to be submitted to the Engineer for approval
14	The employer should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work	A qualified paramedic shall be appointed on-site and adequately equipped and properly staffed portable first aid stations or dispensaries shall be provided by the Contractor at camps and other strategic locations, to administer first aid treatment at any time required and free of charge to all persons on the Site, including personnel of the Engineer and the Employer. The nature, number, and location of facilities furnished and the Contractor's staff for administering first-aid treatment shall, at a minimum, meet the requirements of the Health Service of the Government of Pakistan. Dispensaries should be adequately stocked with medicines. The paramedic staff shall be available at the site all the time.

Furthermore, the ECOPs guideline given in table 10, Appendix B shall be implemented by the contractor.

6.2.6.2 Residual Impact

After the implementation of the above mitigations, the impact significance shall reduce to medium (adverse) for the duration of the works, however, it will become neutral after the completion of work.

6.2.7 Noise and Vibration

Noise and vibration will be generated because of the construction works. The main impacts will be from increased traffic along haulage routes, operation of batching plant and operation diesel generator. The duration of the impact will be short terms in nature. The existing noise levels in the area are below the

permissible provided in NEQs. The noise levels of various equipment and machinery are given in the table below²³.

Table 52: Noise Levels of Equipment/Machinery

Equipment/Machinery	Noise Level (dB)
Generator	<85
Bull Dozer	96
Roller	90
Grader	<85
Truck	96
Concrete Mixer	<85
Concrete Pump	<85

The impact characterization of noise and vibrations is evaluated as follows:

Table 53: Impact Characterization- Noise and Vibration

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Certain	Moderate	Medium (adverse)

6.2.7.1 Mitigations

- The contractors working hours shall be limited to between 6 a.m. and 6 p.m, six days a week to reduce disturbance.
- The movement of vehicles and personnel will be restricted to within the work areas.
- The Community Liaison Officer shall notify affected people and communities before undertaking, especially noisy work activities and before any noise event outside of daylight hours.
- The contractor shall keep in place any acoustic guards, covers, and doors provided on the plant, generators, and vehicles and maintain all in accordance with the manufacturer's maintenance procedures to ensure good working order.
- The pressure horns will not be allowed while passing through or near communities in the sub-project area.
- The contractor shall train the operators of construction equipment on potential noise problems and the techniques to minimize noise levels.
- In the case of concrete pouring, if it is inevitable to work at night or at late hours, the contractor will seek special permission from PSIAC before carrying concrete.
- The ECOPs guideline given in table 7, Appendix B to be implemented by the contractor

6.2.7.2 Residual Impact

Following the implementation of these mitigations, the impact shall reduce to neutral in the short term and following the completion of the works.

²³ Construction Noise, Workers Compensation Board of British Columbia

6.2.8 Loss of Vegetation and Trees

The trees and scattered vegetation cover will be removed during the construction of the conduit channel. During the survey, it was found that 324 trees of native species are anticipated to be felled, and these all trees belong to the Railway department. A strip of approximately 05 meters (16.4 ft) will need to be cleared for the construction of the conduit channel. The cleared vegetation material may be reused to backfill the existing conduit channel which shall be abandoned following the commissioning of the new conduit channel. The details of the tree species which are anticipated to be felled are shown in the table below:

Table 54: Felling of Trees

Serial No	Name of tree species	Number of total trees to be cut
1	Babur (Acacia nilotica)	257
2	Khabar (Salvadora oleoides)	44
3	Kandi (Prosopis cineraria)	10
4	Shisham (Dalbergia sissoo)	10
5	Beer (Ziziphus jujube)	03
Total		324

Table 55: Impact Characterization-Loss of Vegetation and Trees

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short Term	Reversible	Likely	Moderate	Medium Adverse

6.2.8.1 Mitigations

The following mitigations measures shall be adhered to by the contractor before and after tree cutting:

- The five (05) trees of each tree cut shall be planted. A Total of $(324 \times 5 = 1,620)$ new trees shall be planted.
- The new tree plantation shall be preferred at locations from where the trees had been cut. In addition, the contractor along with PSIAC will jointly identify tree plantation areas.
- The community shall be consulted about the expected removal of trees to avoid anticipated frustration among the local community.
- Clearing of natural vegetation and cutting of trees will be minimized as far as possible during the earth's works.
- The construction crew will be provided with The LPG cylinder shall be provided for cooking and heating purpose. The use of fuel wood will not be allowed.
- No fires will be allowed in the open.
- The contractor shall mark each tree that needs to be removed with a cross on all four sides using highly visible paint. The marking shall be located approximately 4.5 feet from the base of the tree.
- The contractor shall prepare an inventory of all trees to be cut. The inventory shall include the following details for each tree:
 - Reference number
 - Location
 - Species
 - Girth

- Approximate height
- Photograph of tree
- The contractor will submit the inventory of expected trees to be cut to the PSIA and PMU. No tree-cutting will be permitted until written approval is received from the Engineer.
- An inventory of trees cut by the contractor during the execution of works will be maintained throughout the construction period. The contractor will minimize the number of trees to be cut, making careful and selective pruning where possible to reduce the need for removal.
- The Engineer will only approve tree cutting where a complete tree inventory has been submitted to the Engineer detailing all trees included in the request. A joint visit between the Engineer and the Contractor (or their representatives) will be carried out to verify the inventory before approval.
- Once the contractor receives approval from the Engineer and PMU he can proceed to cut the sanctioned trees and will store them in a designated and secure storage area.
- The Contractor will mark each cut section of a tree with a unique reference number that corresponds to a reference number given in the tree inventory.
- The Contractor will maintain the tree inventory to include the number of cut sections of each tree and storage details of each section removed from the site. The tree inventory will be kept up-to-date and available to the Engineer at all times.
- The contract for the works will include the plantation of five times the number of mature trees that are cut during construction. A mature tree is defined as a tree with a girth greater than 0.15 m (six inches). The contractor will be responsible for the aftercare of these trees for one year
- All trees to be replanted will be native species as they have the best chances for survival.
- All cut-down trees will be handed to the railway department.

Taking into account the improvement of vegetation coverage of the scheme, and as an environmental enhancement plan, a separate community-based tree plantation plan of the sub-project area has been designed by the project under the component of “Forest sub-projects” with budget allocation under the BIWRMDP. The details are given in the table hereunder;

Table 56: Proposed Tree Plantation under the Forest Component of the BIWRMDP²⁴

S. No.	Main locations of plantation	No of the plants targeted	Proposed Species
01	Conduit Channel, Water Treatment, and filtration Plant	5,000	Babur (Acacia ilotica), Shisham (Dalbergia sissoo), Beer (ziziphus jujube), Neem (Azadirachta indica)

6.2.8.2 Residual Impact

By planting five (05) trees of each tree cut and through the implementation of a community-based plan for tree plantation, as a separate plantation activity under BIWRMDP. The significance of the residual impacts on the floral resources of the area is expected to be positive in the long term.

²⁴ The preparation of tree plantation plan under the BIWRMDP shall be the responsibility of the PSIA, in consultation with PMU.

6.2.9 Surface and Ground Water Pollution

There shall be a risk of contamination of surface and groundwater resulting from bad waste management in camps and construction sites, where it is expected that large quantities of solid waste will be generated at construction sites. Wastes shall include demolition material (concrete, masonry, steel gates, and rubber seals) and debris from construction sites (excess aggregate, sand, etc.). In addition, delay in the delivery of solid wastes to landfills (dump sites) results in nuisance and unpleasant odors, which attract flies and other disease vectors. Open solid waste dumps can also provide suitable breeding places for vermin and flies and other disease vectors and can also contain pathogenic micro-organisms. While during the cleaning process of sedimentation tanks and slow sand filter, slugged water, sand scrapings, and muddy water will be generated.

Improper disposal of these wastes; domestic waste, food waste, and sewage waste can result in contaminated leachate or runoff reaching the ground or surface water resources. Proper management of solid waste is also important because improper solid waste handling and disposal pose risks to human health and cause environmental degradation. Whereas, the improper disposal of slugged water and sand scrapings at agricultural lands, in open water bodies i.e. NRB, and in the drainage system of the Sibi City will block the drainage lines resulting in an overflow of sewage waste and deterioration of the surface and groundwater resources.

The risk of leaks or spills is especially high in the campsites and or from the vehicles. Contaminated groundwater holds potential health hazards if the contaminant reaches groundwater aquifers which are exploited for drinking purposes. Risks of groundwater contamination may also result from wastewater disposal in any of the camps. The quality of surface and ground is already depleted in these areas and due to the unanticipated events, the impact of groundwater and surface water contamination will be further felt most severely by those nearby who depend on groundwater as their source of drinking water and domestic needs. The result of baseline sampling and PHE reports showed that color, odor, taste, turbidity, -and total coliform, fecal coliform, escherichia coli are also above the permissible limits of NDWQs in all samples.

Table 57: Impact Characterization-Surface and Ground Water Pollution

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Long Term	Irreversible	Certain	Moderate	Medium Adverse

6.2.9.1 Mitigations

- The contractor camp will not be located within 500 m (1,625 ft) of the community.
- The contractors will submit their contractor environmental and social management plan which must include (camp layout and waste disposal system and obtain approval).
- Vehicles will only be washed in designated areas within each campsite.
- All fuel tanks and other hazardous material storage containers will be properly marked to highlight their contents. Hazardous material storage areas shall include a concrete floor to prevent soil contamination in case of leaks or spills and be permanently covered. Hazardous material storage areas shall be secured, and access shall be controlled.

- Fuel storage areas and generators will have secondary containment in the form of concrete or brick masonry bunds
- Within camp area, all solid wastes will be stored in the waste bins provided within the camp area and the waste disposed of regularly. The waste will be transported to disposal points in well-maintained, designated, and covered vehicles.
- The biodegradable domestic waste shall be disposed of in landfills established in the sub-project area or disposed of at municipal waste facilities where available.
- Landfills shall be sited at the main camp and in each sub-camp in areas where groundwater is low and, where the base of the landfill is highly permeable, the base shall be lined with an impervious layer (such as clay) to prevent groundwater contamination. The contractor shall provide fences and secure landfills to prevent unauthorized access.
- Medical wastes will be temporarily stored on-site as hazardous material and ultimately incinerated at a medical facility
- A sewerage system will be constructed for the disposal of wastewater from all staff and labor camps. The quality of the sewage water shall be monitored quarterly against NDWQs.
- Refueling points shall be provided with a concrete pad and bund, or drip trays shall be used to prevent soil contamination in the event of leaks or spills.
- The contractor shall submit a plan for treatment using septic systems to PSIA during mobilization for approval. The plan must include designs or specifications demonstrating that the treatment rate of the system exceeds the loading rate, maintenance of the system, proposal for treatment, and disposal of sludge from septic tanks.
- An adequate and reliable supply of safe drinking water shall be made available at readily accessible for drinking;
- The Contractor will install his tube wells or hand pumps for the supply of water for consumption. These arrangements shall be made at least 500m (1,640 ft.) away from communities' areas, as during the water quality testing in the community areas microbiological contaminations were found high;
- The contractor shall be required to install water purifiers systems at drinking water sources (tube wells or hand pumps) to have clean water for consumption;
- The drinking water quality testing shall be carried out by the contractor before supply for consumption.
- And if water is found fit for drinking, and following is fitness, the water quality testing shall be carried out on a bi-weekly basis for the first two months, and then quarterly basis to ensure that water is still healthy for drinking and consumption.
- In case, the drinking water is not found healthy for drinking at any stage, the contractor shall be required to out-sourced drinking from a registered company with the GOP, which shall meet the requirements of NDWQs.
- The waste water generated during the cleaning process of sedimentation tanks and slow sand filter shall be collected in a settlement pond and from there safe disposal away from community areas and surface water resources i.e., NRB will be ensured. However, the low-lying areas/ditches shall also be preferred for the disposal of waste, as these sediments or muddy water will become hard after getting dry. And that piece of land can be reused for economic benefits or to live by the community.
- Identification of disposal areas shall be the responsibility of the District Administration and Public Health Engineering Department of Sibi City, as this scheme will be handed over to these departments and will be operationalized by them.
- The local Community shall be consulted by the district administration and PHE department for the identification of the disposal areas.

- Once the new water supply scheme is made operational, physical, biological, and chemical parameters testing of the filtered water is to be carried out on weekly basis by the PMU till the defect notification period to ensure that the water supply system is working efficiently.
- In case, if the water is not tested safe for drinking in any of the physical, biological, and chemical parameters, then the chlorination/disinfection, mineralization, and ozone treatment shall be carried out by district administration and the PHE department.
- These treatments shall be selected on basis of drinking water test results.

6.2.9.2 Residual Impact

The construction of the scheme will provide long-term benefits to the people living in Sibi City. However, the baseline sampling shows that groundwater quality is already contaminated in the sub-project area. However, the contractor shall ensure that these mitigation measures are adequately adhered to at the site, reducing the level of the impact to low adverse and will become neutral following completion of construction works.

6.2.10 Fauna

During the construction works there will be a possibility that the incidence of injury and killing of terrestrial and reptilian fauna could occur such as; being struck by construction machinery (run over or struck by an excavator bucket). It is also anticipated that noise created during the construction works may also cause a temporary impact on fauna behavior, and these may vacate the nesting areas due to noise pollution and disturbance created due to construction works, particularly, when the works are carried out at night time. In addition, illegal hunting and shooting of faunal species by working staff are possible. However, there are no major adverse impacts related to the construction phase, and the impact will be temporary.

The proposed works will require the establishment of construction and labor camps which will generate construction; domestic, sanitary, and hazardous wastes. This has also some impacts on fauna. The greatest potential impacts result from uncontrolled waste disposal and include entanglement of fauna within solid waste and pollution of water sources due to improper disposal. The changes in water hydrology and flow could lead to disruption of the natural ecosystem and thus, affect the biodiversity of the area. However, since diversion channels shall be constructed to maintain the flow of water, this effect is minimized.

Table 58: Impact Characterization-Fauna

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short Term	Reversible	Likely	Moderate	Medium Adverse

6.2.10.1 Mitigations

- The contractor environment officer shall survey the construction site to eliminate the potential risk of any incident to any terrestrial, reptilian, mammal, or fauna species before the construction works
- On identification of any such nest, the contractor shall immediately cease works in the area and inform the Engineer and PMU. The contractor shall also erect a fence within 50ft of the nest and prohibit any

works within this area until approved by the Engineer who shall arrange for an ecologist from PSIA to visit the site and assess the impact.

- The contractors working hours shall be limited to between 6 a.m. and 6 p.m. to avoid disturbance to fauna at Night-time.
- Low voltage lights shall be used at construction sites in the case near around nesting, breeding, and flight paths
- Waste and other hazardous substances shall be handled, stored, and treated as per the mitigation measures provided in sections 6.2.2 and 6.2.9.
- The contractor shall train the operators of construction equipment on potential noise problems and the techniques to minimize noise levels
- There shall be a ban on hunting, poaching, or trapping. The contractor's staff shall be required to sign a code of conduct prohibiting hunting, poaching, or trapping.
- Garbage will not be left in the open.
- The project staff will not be allowed to indulge in any hunting or trapping activities.
- In case any project activity is carried out in any protected area, a separate environmental study will be carried out in accordance with the Change Management.
- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.
- As part of the CESMP, the contractor shall prepare a conservation plan to avoid any impact on these animals during construction.
- The contractor shall comply with ECoP guidelines for fauna given in table 9, Appendix B.

In case of any change of the sensitive areas or habitat location, the contractor shall require preparing the alternative habitat management plan and implement it accordingly without any additional cost. The plan shall document the presence of affected species, and the land needs of the species that may be met on the development site and shall recommend appropriate habitat management plans and other measures to protect the subject wildlife.

6.2.10.2 **Residual Impact**

The potential impacts of the proposed project on the wildlife of the area are expected to be moderate. By implementing these mitigation measures, anticipated impacts are expected to reduce further. The Significance of the residual impacts on the faunal resources of the area is therefore expected to be 'minor'.

6.2.11 Protected or Sensitive Areas

A Chinkara (*Gazella bennettii*) facility exists North of the NRB weir. It spreads at 200 acres and was established and is being maintained by the joint support of the forest and wildlife department, GoB. It is located about 20 km away from the sub-project area, which is beyond the corridor of impact and engineering interventions. Therefore, there shall be no impact due to the execution of the scheme.

6.3 Social Impacts and Proposed Mitigation Measures

6.3.1 Possible Positive Economic Impacts

Following are the potential positive social impacts of the sub-project:

- Increased water storage for domestic use purposes after the proposed construction work.
- An increase in skilled/unskilled job opportunities for area residents skilled/unskilled job opportunities to a villager will be increased.
- This is an old roved irrigation system that was provided to Sibi City by the British Empire earlier in 1901 from the Nari Gorge of the Sibi area. Therefore, benefits will directly be given to all population and Wards and Union Councils of Sibi city, through the construction of a new Conduit Channel and distributary reservoirs thus supply of water to the whole city at the start to a tail end, however, tail-end users will be more beneficiary for this improved water supply system.

6.3.2 Induced Economic Development during Construction

The implementation of the sub-project will potentially lead to economic development through direct and indirect investments in the area. The hiring of local labor will be prioritized and workers will benefit due to the availability of an additional source of income. This income, in turn, will hopefully lead to an increase in economic activity and contribute to local area economic development. Direct employment usually creates indirect employment (which results from increased business expenditure on goods and services including procurement of materials, equipment, and services) and induced employment (employment generated in the local and regional economy by increased spending of direct, on-site employees and indirect, supply chain, employees).

Table 59: Impact Characterization- Induced Economic Development

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Certain	Severe	Highly Positive

6.3.2.1 Residual Impact

The impact significance is assessed to be highly positive in the short term, reducing to neutral following the conclusion of the scheme works.

6.3.3 Site Security

The project has experienced two incidents of the explosion of a landmine on an ongoing World Bank-funded project site in the Sibi district of NRB in January and April 2021. Keeping this in view, the project conducted a detailed security risk assessment with the need to strengthen the security measures for the project teams and equipment at all working sites of the BIWRMD project. The mitigation measures and security recommendations are provided in the security management plan and will be implemented to strengthen the security of staff, workers, and project facilities. The following mitigation measures will be implemented at all work sites.

Table 60: Impact Characterization-Site Security

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short Term	Irreversible	Rare	Severe	High adverse

6.3.3.1 Mitigations

All the work executed by or on behalf of the contractor (sub-contractor) in the performance of the work shall be in accordance with high standards of safety at all times and shall, inter alia, comply with local laws, and ensure strict adherence. The following mitigation measures shall be adopted by the contractor and project management to deal with site security issues and emergencies at the site.

Management Steps

The following are the management steps:

- The project shall hire a security manager (Individual Consultant) who will supervise the implementation of recommended security measures and will help the project develop further plans policies and procedures related to security for the project.
- The project shall hire the services of a professional and efficient security guarding company with an adequate number of armed private security personnel for the protection of offices, contractor camps, and work sites and will work under the supervision of the security manager.
- A system of key performance indicators will be agreed upon with the guarding service provider and strictly enforced to ensure the maintenance of service quality.
- Where possible it will be ensured that the locals or those conversant with the area and customs must be hired for the guarding duties and thorough background checks will be done by the security company before deploying any guards at the site.
- It shall be ensured that physical measures such as a fence, barriers, gates, warning signage, and surveillance system are in place to prevent access to or passage through work areas, camps, and offices.
- The project shall ensure that the security personnel should be stationed at the entry and exit points of the sites, offices, and camps around the clock.
- Perimeter walls and entry points to all facilities should be well-lit at night and where electricity is not available solar/generator-backed-up lights can be used.
- The contractor will issue cards to the staff which will be checked at the entry points. The record of all the visitors will be maintained and will be checked by the OHS staff.
- The contractor shall maintain communication through the employer with local police and other law enforcement agencies in the area about his construction activities especially if the construction area is near any sensitive place and the movement of staff.
- In case of any suspicious activity observed at the camp or worksite, the contractor staff shall immediately inform about the situation to the management and security personnel. The security personnel will immediately observe, report, and record the suspicious activity.

- In case of emergency, the security personnel and site/camp management will contact police control, police station, and patrolling parties of law enforcement agencies in the respective area to tackle the issue.
- The contractor shall not permit an unauthorized person to enter the working site or camp areas. Only authorized persons will be allowed to enter the worksite and the camps.
- The contractor shall prepare emergency evacuation procedures under their health and safety management plan. Training should be provided to all staff on different emergencies and drills should be conducted periodically.
- The emergency contact numbers of the police department, fire department, nearby hospitals, and rescue department shall be displayed at the campsites and work areas.
- The project has developed a grievance redressal mechanism for the project to resolve complaints of the public and project people. A public complaint centre (PCC) and a grievance redressal committee have been established for this project. The public and project staff can register their complaints related to social issues, security issues, and other aspects related to the project in the complaint centre. Their complaint will be received and resolved within a given time frame. The complaints which were not resolved by PCC will be forwarded to the grievance redressal committee (GRC) for resolution.

Emergency Preparedness and Response Procedures

i. Emergency Evacuation & Transfer

- The Contractor will nominate an incident response team which will be headed by HSE Manager. This team can be activated by verbal communication or radio. This will be the most rapid response in the camps and on-site.
- In case of an emergency, the emergency disaster siren will be blown to alert the staff and stop the work immediately. The security staff will ensure that all project personnel and workers leave the site by a safe route. The assembly area shall be marked in the main camp area and work sites.
- Information related to (key persons to be contacted & telephone numbers) medical support during an emergency shall be made available to all on the project site to save time in communication.
- A well-equipped ambulance with a dedicated driver and paramedic will be readily available at all times for any emergency handling and to transfer the victim to the nearby hospital
- A close liaison will be maintained by the health and safety officer with a nearby hospital for assistance during an emergency.

ii. Emergency Drills

- All site personnel/members (PMU/PSIAC/Contractor) will follow emergency drills that shall be periodically tested through exercises. The frequency of these drills shall be every quarter which includes fire Fighting, medical evacuation, and patient transfer. The schedule of these drills shall be planned on-site in accordance with site activities and be made part of the contractor's health and safety plan.
- The finding of the observations and debrief notes of the emergency drills shall be recorded. The health and safety officer shall analyze the findings and identify any remedial actions required.
- The emergency procedure shall be updated from time to time to reflect observations made.
- Training shall be conducted on regular basis for emergency response teams.

- During toolbox talk, the supervisor must emphasize how to raise an emergency and the emergency response protocol associated with the work shall also be discussed with it.

6.3.3.2 Residual Impact

By applying the above mitigations, the impact significance shall be medium adverse during the duration of the scheme.

6.3.4 Impediment to Community Movement

The Community disturbance is anticipated to be created because of traffic movement from the by-pass road towards Sibi City and then to the construction site. This, in turn, may lead to congestion on transport routes causing delays to local traffic in Sibi City. The contractors will also use the existing Nari river road (katacha roads) that is in between NRB Weir (Sump well site) to the treatment plant for the construction activities. As it is mainly used by the irrigation staff and security agencies for monitoring purposes, therefore, impact on the local community within this area is minimal, as it is not in use by the local communities. The main impact will arise due to the use of the existing roads that pass-through Sibi City.

The impact characterization of community disturbance is given below:

Table 61: Impact Characterization-Impediment to Community Movement

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Likely	Minor	Low adverse

6.3.4.1 Mitigations

- The transportation of material shall be made at night time in coordination with the Sibi City traffic police department, as during the night time public movement and traffic are less than morning.
- The project has a grievance redressed mechanism in place to address community complaints and resolve these in a timely and effective manner.
- Details of transport and medical treatment en route are to be included.
- A complaints register shall be placed at the Contractor's, PIU, and Engineer's offices to address complaints.
- Where appropriate, the local authorities responsible for health, religious, and security matters shall be duly informed on the set up of camp facilities to maintain effective surveillance of public health, social impacts, and security.
- The contractor's traffic management plan shall include plans for the emergency transfer of members of the public to suitable medical facilities in the event of a serious accident due to the construction works.
- The contractor for the works shall be required to implement a traffic management plan with the approval of the Engineer and the Client to reduce stress on the transport system.
- The contractor shall also submit a training plan to the Engineer for approval – this plan must include training of drivers.
- All drivers engaged by contractors must hold a valid license for the vehicle they are operating, and a speed limit of 15km/hr on on-site roads shall be enforced.

- The contractor shall provide warning signage where access routes pass adjacent to settlements or schools.
- The contractor shall provide flag persons where the construction plant and vehicles cross, or join, main roads in the sub-project area to ensure project traffic merges safely with public traffic. Signage and flagmen are to be provided by the contractor to direct public traffic whenever it is necessary to partially close any public road (i.e., close one of two carriageways).
- The blockage of local roads and routes will be minimized. If unavoidable, consultation with the concerned communities will be carried out and alternate routes (by-passes) shall be identified and advertised.

6.3.4.2 Residual Impact

Following the implementation of these mitigations, the impact shall reduce to neutral in the short term and following the completion of the works.

6.3.5 Disturbance to Community Mobility

An increase in traffic is expected in Sibi City, resulting in disturbance in routine flows of traffic on the existing transport routes causing delays to local mobility. While there shall be no disturbance to the community mobility during the use of the Nari river road (existing katacha road), as it is not in use by the local community, and the nearest settlement is approx. 2km away from the construction site. The only main impact will arise due to the use of existing roads in Sibi City which pass through or adjacent to settlements.

The impact characterization of community disturbance is given below:

Table 62: Impact of Characterization-Community Disturbance

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Likely	Minor	Low adverse

6.3.5.1 Mitigation Measures

- A community Liaison Officer will be appointed by the contractor to address community mobility issues.
- A community Liaison Officer will liaise with the local traffic police department on the use of existing main roads in Sibi City.
- The route-specific traffic management plan will be developed by the contractor.
- The contractor will locate its camps in which laborers will reside overnight, at least 500 m (16,25 ft.) away from communities to avoid social conflict in using natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities, such as traffic noise.
- The contractor for the works will be required to implement a traffic management plan with the approval of the Engineer and the Client to reduce stress on the transport system.
- The contractor will also submit a training plan to the Engineer for approval – this plan must include training of drivers.

- All drivers engaged by contractors must hold a valid license for the vehicle they are operating, and a speed limit of 15 km/hr on on-site roads will be enforced.
- The contractor will provide warning signage where access routes pass adjacent to settlements or schools.
- The contractor will provide flag persons where construction plants and vehicles cross, or join, main roads in the sub-project area to ensure project traffic merges safely with public traffic. Signage and flagmen are to be provided by the contractor to direct public traffic whenever it is necessary to partially close any public road (i.e. close one of two carriageways).
- The blockage of local roads and routes will be minimized. If unavoidable, consultation with the affected communities will be carried out and alternate routes (by-passes) will be identified and advertised.

6.3.5.2 Residual Impact

Following the implementation of these mitigations, the impact shall reduce to neutral in the short term and following the completion of the works.

6.3.6 Community Health and Safety

As a result of the civil works and contractor camp sitting there shall be impacts on the health and safety of the local community. The potential impacts to the local communities shall be traffic incidents/accidents due to collision with a vehicle, health diseases, (i.e., asthma, skin irritation, diarrhea, hepatitis B and C, and typhoid) due to a decline in air quality, exposure to hazards material (ad-mixtures chemical), bad waste management and improper disposal of sewerage waste from campsites.

Table 63: -Impact Characterization- Community Health and Safety

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Likely	Moderate	Medium Adverse

6.3.6.1 Mitigations

All the work executed by or on behalf of the contractor (sub-contractor) in the performance of the work shall be in accordance with this ESMP. The contractor shall observe high standards of health and safety at all times and shall, inter alia, comply with local laws, and ensure strict adherence to the following:

- The contractor shall protect its workers and member of the community from excavations by ensuring appropriate barricading.
- The contractor's Health and Safety Plan should include plans for the emergency transfer of members of the public to suitable medical facilities in the event of a serious accident resulting from the construction works. Details of transport and medical treatment en-route are to be included.
- The contractor shall not permit casual observers close to excavating operations or work areas.
- The contractor shall provide adequate fencing around the working areas and excavations.
- The contractor shall prepare emergency shutdown procedures and evacuations to cover all staff and affected members of the public in the event of any emergency incident (such as traffic accidents

and fire). The contractor shall ensure emergency access routes are well-known and have appropriate signage.

- Water sprinkling shall be carried out to suppress dust.
- Contractor shall prepare a pollution prevention and control plan to protect the member of the local community and shall include:
 - Method of treatment and disposal of sanitary wastes.
 - Method for disposal of hazardous waste
 - Actions to be taken in the event of land and water-based pollution events
 - Procedures for the collection and disposal of wastes, including domestic and construction waste

6.3.6.2 Residual Impact

Following the implementation of these mitigations, the impact shall reduce to low adverse in the short term, reducing to neutral following completion of works.

6.3.7 Labor Influx

Approximately 75 laborers will be required at different times for construction activities. The priority will be given to local area inhabitants for skilled and unskilled labor jobs. The majority of labor needs (Skilled and Unskilled) will be hired from the local area. It is anticipated that approximately 75% of the workforce will be from the sub-project area while some 25% of labor (skilled) would be hired from outside the sub-project area. This labor influx may have an impact on the social norms, culture, and economy of the area. While during the influx of labor for the construction works, guidelines given on Covid-19 in Section 6.2.3 shall be followed.

Temporary employment within the area would contribute to a reduction in the local poverty level. Increased employment for area inhabitants will also increase the skill base of those employed on the sub-project. However, labor influx from outside the local community may result in a 'squeeze' on local resources. Most importantly, there may be behavior and practices which are not considered appropriate or socially acceptable by the community resulting in conflict between the local community and the contractor's staff.

Table 64: Impact Characterization- Labor Influx

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Certain	Moderate	Medium Adverse

6.3.7.1 Mitigations

- Priority will be given to locals for skilled and unskilled jobs.
- The contractor will ensure that, it shall not make decisions relating to the employment or treatment of workers on the basis of personal characteristics unrelated to inherent job requirements.
- Adequate training for migrant labor will be provided on the cultural norms of the local community.
- The Contractor will employ a full-time qualified Human Resource Officer for the project who is conversant with the Ministry of Labor and Manpower laws and their objectives. Priority will be given to mitigating the risk of gender-based violence (GBV), sexual exploitation, and abuse (SEA).
- The Camp will be located at least 500 m (1,625 ft.) away from the population.

The Contractor shall ensure that:

- Shelters are built for safety and privacy (e.g. alternative lighting when no power, secure locks/windows, etc.)
- Appropriate transportation for vulnerable groups.
- Inequality, discrimination, and marginalization, including based on gender and or vulnerability, is avoided.
- Establish security patrols and provide details in the CESMP.
- Strive to reduce at-risk groups' exposure to GBV and SEA violence.
- Formulation of a progressive and dynamic Labor and Manpower Policy
- Human Resource Development, focus on education, training, and skill development
- Respect for human rights, gender balance, eradication of child and bonded labor
- Promotion of dignity of labor
- Promotion of social dialogue among the stakeholders
- Coordination with the Provincial Governments, International Labor Organizations, and other international agencies
- The contractor will be required to provide workers with documented information about the norms and local culture to be followed
- Workers will also be provided easily understandable information, regarding their rights under national labor and employment law, rights related to hours of work, wages, overtime, and compensation.
- Culturally appropriate consultation mechanisms are followed by the contractor.

The General CoC are:

- CoC will specify respect for the local community and its cultural norms
- Presentation of professional behavior and integrity when dealing with the local community;
- Discrimination is prohibited such as gender, age, ethnic or national origin, religion, disability, sexual orientation;
- Respect privacy, particularly among women
- CoCs will specify sanctions, including for any incidents of SEA.
- The CoC will include specific prohibitions against SEA with children defined as anyone younger than 18 and commensurate sanctions.
- The CoC will include establishing anti-sexual harassment policies that govern conduct in the workplace.
- The CoC will include provisions for mandatory reporting of SEA incidents - links to GRM.
- The CoC will ensure to demonstrate that they can manage SEA risks, including SEA prevention and response action plan/s and key staff with appropriate experience;
- The CoC will provide mandatory and repeated training to workers and staff on sexual exploitation and abuse, HIV/AIDS prevention, etc. including inappropriate behavior such as sexual harassment, gender-based violence, and sexual abuse.

The Specific CoC are:

- Take respect for the local community and its cultural norms, especially on construction sites where communities may come on the site to see the construction works. The staff will insure their positive professional behavior and integrity when dealing with the local community.

- Inappropriate behavior such as sexual harassment, gender-based violence, and sexual abuse is strongly prohibited. In any case, the victim must be compensated and serious action must be taken against the accused person.
- Discrimination in any form prohibited such as gender, age, ethnic or national origin, religion, disability, sexual orientation, etc. If this happens, termination of involved staff should be in place.
- Respect privacy, particularly during the visits of women and children to washing points. No project staff member will go to these washing places or other sensitive areas where communities don't like strangers to visit. These points must be taken as prohibited for all staff members.
- The contractor will provide mandatory and repeated training to workers and his staff on sexual exploitation and abuse, HIV/AIDS prevention, and the content and obligations.
- The project staff will ensure zero tolerance for any form of harassment, bullying, or other offensive physical or verbal treatments.

6.3.7.2 Residual Impact

Following the implementation of these mitigation measures, the impact shall reduce to low adverse in the short term, reducing to neutral following completion of the works.

6.3.8 Gender based Violence or Sexual Exploitation and Abuse

In general, presently the prevalence of SEA/SH doesn't exist in the scheme area but due to the influx of local and non-local labor and during the peak of construction activities, there may be a risk of gender-based violence or sexual exploitation and abuse among women and children and other vulnerable population groups (poor women, single women living alone, elderly, infirm or ill, orphans, etc). The project Grievance Redressed Mechanism (GRM) has the mandate to cover the aspects of SEA/SH in the area if occurred during the construction period. This can contribute to enduring physical and mental harm, while undercutting the ability of survivors, and often their families, to engage in meaningful, productive lives.

Table 65: Gender-based violence or sexual exploitation and abuse

Nature	Duration	Reversibility	Likelihood	Consequence	Impact Significance
Direct	Short term	Reversible	Likely	Moderate	Medium adverse

6.3.8.1 Mitigation

- Adequate training especially for migrant workers will be provided on the cultural norms of the local community.
- The project GRM has already mandated to uptake SEA/SH-related grievances of the project, and its other related issues.
- Priority will be given to mitigating the risk of gender-based violence, sexual exploitation, and abuse.
- Appropriate transportation for vulnerable groups.
- The Contractor shall ensure that a code of conduct is developed for all staff and labor describing acceptable and prohibited behaviors (guidelines are given below):
- Inequality, discrimination, and marginalization, including based on gender and or vulnerability, is avoided.

- Labor and or other staff engaged by the contractor are educated and made aware of the civil, social, and legal rights of women and vulnerable groups (poor women, single women living alone, elderly, infirm or ill, orphans), and about the action that can be taken in the event of GBV and SEA. Community members including poor women, single women living alone, elderly, infirm or ill, and orphans should be made aware of the risks of GBV and SEA and redress measures, including case management support, health services, psychosocial support, police support, and security, access to legal services, and shelter if needed.
- Strive to reduce at-risk groups' exposure to GBV and SEA violence.
- Respect for human rights, gender balance, eradication of child and bonded labor
- Promotion of social dialogue among the stakeholders
- The contractor will be required to provide workers with documented information about the norms and local culture to be followed
- Culturally appropriate consultation mechanisms are followed by the contractor.

To achieve the above-mentioned mitigation measures and guidelines, training will be organized and conducted on GBV and SEA at the field level.²⁵ These training will be organized for the contractor and PSIA staff, and it will be the responsibility of the Contractor. The contractor will hire the services of a qualified professional Resource Person of GBV & SEA from the open market and an agreement will be signed between the contractor and Resource Person, under the supervision of the training Specialist of PSIA. At the end of each training, the Resource Person will produce a training report and other relevant material, and submit it to the concerned section of PSIA with a cumulative report to PMU and PIU. This process will complete under the overall supervision and monitoring of the Social Safeguard Specialist of PMU and Training Specialist of PSIA sitting there for this purpose and M&E consultants.

The bidders will be required to submit Codes of Conduct of acceptable and prohibited behaviors with their bids. The CoCs will set clear boundaries for acceptable and unacceptable behaviors of all individuals and companies and will be signed by companies, managers, and individuals.

- CoC will specify respect for the local community and its cultural norms
- Presentation of professional behavior and integrity when dealing with the local community;
- Discrimination is prohibited such as gender, age, ethnic or national origin, religion, disability, sexual orientation;
- Respect privacy, particularly among women
- CoCs will specify sanctions, including for any incidents of SEA.
- The CoC will include specific prohibitions against SEA with children defined as anyone younger than 18 and commensurate sanctions.
- The contractor will be required to establish anti-sexual harassment policies that govern conduct in the workplace.
- The contractor's contract will include provisions for mandatory reporting of SEA incidents - links to GRM.

²⁵ Gender-based violence (GBV) (with reference to WB Note on GBV available at: <http://pubdocs.worldbank.org/en/399881538336159607/Good-Practice-Note-Addressing-Gender-Based-Violence.pdf>)

- The Contractor will demonstrate that they can manage SEA risks, including SEA prevention and response action plan/s and key staff with appropriate experience;
- The contractor will be required to provide mandatory and repeated training to workers on sexual exploitation and abuse, HIV/AIDS prevention, and the content and obligations derived from the code of conduct
- Inappropriate behavior such as sexual harassment, gender-based violence, and sexual abuse is strongly prohibited.
- Zero tolerance for any form of harassment, bullying, or other offensive physical or verbal treatments;

6.3.8.2 **Residual Impact**

Following the implementation of these mitigation measures, the impact shall reduce to low adverse in the short term, reducing to neutral following completion of the works.

6.3.9 Archaeological and Cultural Heritage Site

There is one archaeological and cultural heritage site known as Jirga Hall (Victoria Memorial Hall) in Sibi City. This Jirga Hall (Victoria Hall) is now converted into a museum which is known as Sibi Museum. It is beyond the corridor of impact and engineering activities. However, in the event of any discovery of an unidentified archaeological or cultural heritage site or resources, a chance finding procedure will be followed and implemented as given in Appendix F.

6.3.10 Physical Resettlement

There is no community beyond or in RoW of the conduit channel and its associated activities, therefore, there will be no physical resettlement for the works to be carried out under this contract.

6.3.11 Land Acquisition

The proposed conduit channel and crossing shall be within the RoW of government-owned land; therefore, no permanent land acquisition will take place from a private party/individual owner. However, before the start of the construction activities of the conduit channel crossing, a No Objection Certificate (NOC) will be obtained along with completion of all cordial formalities (purchase of land from the railway department, if required) by the project proponent.

7 Community and Stakeholder Consultation

7.1 General

The roles of men and women in the processes of social safeguards and social mobilization as in the approved Gender Action Plan (GAP) of the project were developed to equitably participate men and women in decision-making processes and can be benefited from the whole project planned interventions. Similarly, efforts are also made to mainstreaming women in all planned project activities as the GAP has also proposed the design and implementation of specialized projects and its interventions strategically to promote active engagement of men and women with the Project. These include the designing of On-Farm Water Management schemes, Irrigation schemes, Rangeland & Watershed Management of Forest schemes, and Water Supply Schemes for Public Health Engineering departments of the Government of Balochistan to improve men's and women's practical strategic gender needs. For women exclusively, Kitchen Gardening and Tunnel Farming demos will also be a part of the project interventions which will be implemented only with them to promote income enhancement through entrepreneurial training and skill development in relevant areas as well as access to and use of technology. The activities for men and women mainly focused on awareness-raising regarding women's importance, their fundamental rights, and sensitization amongst all relevant stakeholders.

Similarly, consultations with stakeholders and the community have become standard practice in the environmental and social assessment of development projects including drinking water supply schemes. The objective of public consultation is to ensure that the sub-project proponent should share relevant information about the project interventions and the potential environmental and social impacts with all stakeholders. Consultation is a two-way process by which the knowledge and views of affected persons and other interested parties are considered for purposes of decision-making. Information dissemination during public consultation by the project proponent or his representative is fundamental to meaningful consultation.

The consultation meetings were held with 210 male and 148 female community members in different consultation cycles. During the consultations, the locals in the sub-project area were very humble and welcoming in nature to outsiders which are reflected in successful consultation cycles. These consultation sessions were held with different stakeholder groups who may be affected positively or negatively by the proposed project. The consultation process was carried out in accordance with the World Bank's policy and guidelines. Consultations were conducted to:

- Obtain feedback from primary stakeholders and community members (including women).
- Obtain feedback from secondary stakeholders.
- Orient communities on the BIWRMD project and its sub-projects.
- Consultations of communities on proposed village water supply scheme and pros and cons.

The purpose of the meetings with beneficiary communities and line departments was:

- To inform the beneficiaries about the overall objectives of the project and the scope of work involved in the execution of the sub-project.

- To receive and document feedback and views of the stakeholders
- To determine the issues and needs of community members regarding the use of drinking and domestic water at the household level
- To consult community members about the construction of contractor camp and other associated activities (influx of labor, construction activities, waste disposal sites)
- Develop a schedule for future consultations
- Walk-through surveys for identification and verification of affected landowners
- Achieving an agreement with the affected person/department on VLD or NOC.

7.2 Methodology of Consultation

Consultations at the sub-projects level were done with both men and women. There have been two major rounds of consultations. To prepare the overall grounds for the project and orient the focussed communities on the BIWRMD project, two rounds of consultations were held with the communities of Sibi city. The first phase round of consultations was held from December to February 2021 with beneficiary communities, while the second round of consultations was held from March to May 2021, to share and finalize the designs of the proposed scheme. These consultations were held with both men and women of 35 Wards of Sibi City during the preparation of this ESMP.

At the start of the proposed activities, the response from male and female community members was encouraging as this scheme was not new for them as they getting the benefits for a long time but since few years the scheme got defunct and did not provide sufficient water to the communities. After these community consultations and orientations of the communities on the project designs and their benefits, they turn into vibratory activism towards the achievements of the desired outcomes of the scheme. During the first and second meeting consultations, community members of both men and women expressed their great willingness to participate in and cooperate for purposes of project implementation and execution of proposed works. Male members participated in the walk-through surveys as well as the sub-project sites.

7.2.1 Details and Location of Consultation Meeting

The list of attendees of each meeting is provided in Appendix E (E.1)

Table 66: Location and date of consultative meeting with Male Community

S. No.	Location	Date
1	Shah Abad Ward No. 35	03-Oct-21
2	Haji Yassen Buladi Ward No. 14	14/3/2021
3	Malak Qahim Khan Ward No. 32	15/03/2021
4	Lashari Muhala Ward No. 34	17/03/2021
5	Saddique Abad Ward No. 25	22/03/2021
6	Mehbood Murree Ward No. 16	22/03/2021
7	Somroo Muhala Ward No. 28	25/03/2021
8	Muhala Ghreeb Abad Ward No. 18	26/03/2021
9	Sadat Ullah Ward No. 27	26/03/2021
10	Gehramzai Ward No. 04	25/03/2021
11	Harha Abad Colony Ward No. 29	27/03/2021

12	Malak Ghulam Sarwar Ward No. 31	31/03/2021
13	TTC Colony Ward No. 03	04/04/2021
14	Abdul Ghafoor Rasheed Ward No. 10	04/06/2021
15	Mahar Muhala Ward No. 30	21-05-2021
16	Hashmi Masjid Ward No. 33	24/05/2021

Source: Socio-economic survey by PMU/PSIAC teams

7.3 Formation of Water Supply Committees (WSC)

Sixteen WSCs were formed at the ward level of the (Sibi WSS). The members of each WSC were elected through the participatory process and from among the local community by themselves. The list of WSCs members is provided in Appendix E (E.1).

Table 67: Location and date of WSC

S. No.	Location	Date
1	Shah Abad Ward No. 35	07-Dec-21
2	Haji Yassen Buladi Ward No.14	14-Mar-21
3	Malak Qahim Khan Ward No. 32	15-Mar-21
4	Lashari Muhala Ward No. 34	17-Mar-21
5	Saddique Abad Ward No. 25	22-Mar-21
6	Mehbood Murre Ward No. 16	22-Mar-21
7	Somroo Muhala Ward No. 28	25-Mar-21
8	Muhala Ghreeb Abad Ward No.18	26-Mar-21
9	Saddad Ullah Ward No. 27	26-Mar-21
10	Gehramzai Ward No. 04	25-Mar-21
11	Harha Abad Colony Ward No. 29	27-Mar-21
12	Malak Ghulam Sarwar Ward No. 31	31-Mar-21
13	TTC Colony Ward No. 03	04-Apr-21
14	Abdul Ghafoor Rasheed Ward No. 10	04-Jun-21
15	Mahar Muhala Ward No.30	21-May-21
16	Hashmi Masjid Ward No. 33	24-May-21

7.4 Summary of Discussions

To facilitate the beneficiary communities adequately, the information and comments were gathered through a structured format using 09 prescribed questions. The following is a result of the main comments and views expressed by the stakeholders, and the measures taken to satisfy them during the consultation;

Table 68: Summary of Key Discussions

S. No.	Topic of Discussion	Measures to be Implemented
1.	How will the supply of drinking water in pipelines to the households of the tail end be ensured?	The supply of water through pipelines to all targeted households of 35 wards is not possible in the present designed scheme as some 16 wards of the city is benefited from the water of Nari Gorge in others are not connected with the system. It would be great for the project, government, or elected representatives to ensure the installation of pipelines in the whole city connecting all 35 wards with the system so that the tail-end remaining wards can also get sufficient water from the scheme. However, the present scheme will also improve the living standards of communities

S. No.	Topic of Discussion	Measures to be Implemented
		<p>of Sibi City through the construction of conduit channels and rehabilitation of existing ponds of the Water Supply system. The proposed conduit channel structure will maximize the water quantity from 1.6 cusecs to 03 cusecs flow from the Nari River. This will reduce sedimentation, and can carry water with full discharge to the existing water ponds and communities.</p> <p>The relevant WSCs are true representatives of the communities/wards and will ensure a fair share of water to all households including tail-end communities in an equitable manner through the active participation of all members. The project and PHE staff once completed the project, will work on the enhancement of the capacity of these committees through training and job sessions through their regular follow-up visits.</p>
2.	Community disturbance during construction	Locations for the construction of DWS schemes are far beyond the villages and communities. Therefore, it will not disturb any community during construction work.
3.	Labor Influx	The concerned communities were informed that it will be preferred to hire local labor from the villages and communities. However, due to the shortage of skilled labor, the project will give preference to the non-local skilled laborers to provide their technical services for the proposed DWS schemes.
4.	How will the privacy of women and children be protected during construction?	<p>Fetching water from the nearest sources is the main responsibility of women and children of the concerned villages and communities, however, in this case, it is not practiced due to the large population of Sibi city. The communities are purchasing water from local sources (Private Tankers) for Rs. 800 to 1000 per water tank which is fulfilling the water needs of the household for a week.</p> <p>Therefore, communicated that the construction site is very far from the living areas of the communities and during construction activities, the contractor and project staff will provide all possible support to the communities to use proper alternate routes for labor so that community roads are not disturbed. This is also necessary to protect the mobility and privacy of women. Moreover, to mitigate and address the risk of sexual exploitation and abuse on both the male and female sides, if needed, during the project implementation process proper awareness will be given to contractor staff and communities during different meetings/training that are already planned.</p>
5.	Will roads, buildings, and structures (shops, houses, and community structures) be lost because of the Works?	The communities were informed that works only involved the construction of an 11 km Conduit channel from Nari Gorge to Sibi City which will connect with the existing water ponds. The channel will be constructed on state lands only therefore, there shall be no negative impact on any government and community structure.

S. No.	Topic of Discussion	Measures to be Implemented
6.	Will employment opportunities be offered to the community?	The E&S team of the project will emphasize to the Contractor to develop coordination with the concerned officials of the PHE department and members of WSCs to offer joint employment to those within the community, favoring the poor who work with any contractor on similar constructions works that will be temporarily hired during the project. The contractor will also employ a maximum number of locals in the construction work. All laborers will also be trained in different skills, during work so that, they become skilled workers for the project in question and future projects.
7.	What is the scope of work and how will the quality of work be ensured?	The WSCs will play their vital role with the support of the contractor and PSIAC engineer team to supervise technical aspects of the project as well as the quality of work etc.
8.	Is there a Grievance Redress Mechanism (GRM) in the sub-project?	WSCs and Communities of all 35 wards of Sibi city were given a detailed orientation about the project-approved GRM and its procedures. An Urdu description of the GRM was also provided and the nomination of focal persons from communities was noted.
9.	Is permanent land required for the Sibi City Water Supply Schemes for temporary diversion channels?	The community was informed that there shall be no permanent land requirement for the construction activities, as the works will be carried out on the barren lands which belong to the state. Therefore, no private lands exist on the construction sites.

7.5 Summary of Findings of Consultation with Farmers

In addition to the information given about the Sibi (WSS) and associated work activities, communities were also provided with brief information about the BIWRMD Project. The farmers expressed their willingness and cooperation vis-à-vis the project.

7.6 Consultation with Women Community

Consultation sessions with local women were also conducted in twelve different locations of 35 Wards of Sibi City. The Female Social Organizer of the project at the PSIAC level conducted these sessions. Most women consulted were mixed with literate and non-literate housewives. The women of the area were keenly interested in the consultations and provided significant information regarding the possible role and needs of women in the project. The input was provided regarding the planned activities of the Gender Action Plan, construction of conduit channel, rehabilitation of water ponds, and capacity program for the women folks planned under the PHE component, etc.

The list of women participants is provided in Appendix E (E.2).

Table 69: Consultative meeting with Women Community

S. No	Location	Date
1	Hamal Abad	02-05-2021
2	Ala Abad Road	02-05-2021

3	Ghareeb Abad	03-05-2021
4	Meer Azam Khan	03-05-2021
5	SP Colony Ghareeb Abad	04-05-2021
6	Railway Colony Hamal Baba	05-05-2021
7	Shah Muhd Street	05-05-2021
8	Sadar B Hanbi Muhala	06-05-2021
9	Railway Colony Kolu Station Sibi	06-05-2021
10	Railway Colony	07-05-2021
11	Ala Abad Road Street no 03	08-05-2021
12	Railway Station	09-05-2021

7.7 Women Water Supply Committees (WWSC)

To support the implementation of women-related activities, it was planned that at least one water supply committee for women in each ward shall be formulated. However, during the process, it was mutually decided that out of 35 only 12 Women Water Supply Committees covering all 35 wards would be formed. This process is realized by involving the potential local active women in the wards and then these potential women will facilitate the social teams of the project to identify, involve and train all their other members of the respective areas to participate in the decision-making process in all planned sub-project intervention properly which would be carried out by the BIWRMDP Balochistan. The men local Water Supply Committees will also provide their support to the project social staff in the implementation and monitoring of women-related activities as well. Once women are organized and trained, then the women members would then be engaged on a need basis to identify their domestic water needs and shall prioritize planned activities which may include all relevant topics discussed, including those that may not be directly relevant to the planned interventions.

Consequently, twelve planned Women's Water Supply Committees respectively were formed by covering all 35 Wards of the project area. For this purpose, meetings were convened at the Ward and cluster levels. The project's female social organizer at PSIAC conducted formation meetings.

In the first round of consultations, women were oriented briefly about the project development objectives of the BIWRMD Project and its benefits; and, the need for and purpose of WWSCs.

In the second round of meetings, WWSCs were formed covering all urban Wards of Sibi City. These groups include a President, General Secretary, Treasurer, other executives, and general body members. All the positions were nominated and selected by the respective community. These elected members will work closely with the BIWRMD project for the betterment and fulfillment of women's needs. The details of women's water supply committees are provided in Appendix E (E.2).

Table 70: Location and date of Meeting for the formation of WWSCs

S. No	Location	Date
1	Hamal Abad	02-05-2021
2	Ala Abad Road	02-05-2021
3	Ghareeb Abad	03-05-2021
4	Meer Azam Khan	03-05-2021
5	SP Colony Ghareeb Abad	04-05-2021

S. No	Location	Date
6	Railway Colony Hamal Baba	05-05-2021
7	Shah Muhd Street	05-05-2021
8	Sadar B Hanbi Muhala	06-05-2021
9	Railway Colony Kolu Station Sibi	06-05-2021
10	Railway Colony	07-05-2021
11	Ala Abad Road Street no 03	08-05-2021
12	Railway Station	09-05-2021

7.8 Findings of Women Consultations and Priority Needs

Based on the above-mentioned theme given in para-1 of section 7.7; the members of the WWSCs have shared their issues related to the provision of drinking water supply from the government-provided facilities which they are facing for a long time. They shared that due to the highly populated area/city of the Sibi town the basic provided water and sanitation facilities are in very poor conditions and are defunct or badly damaged or not provided in some areas. Due to poor solid and liquid waste management systems, the diseases are spreading every year in the spring seasons which created many problems for the local population like diarrhea, malaria, food poisoning, etc. Similarly, load-shedding of electric supply company is now a day are on the higher side whereas people are bound to purchase water at higher rates from the local water providing contractors to use it for drinking and domestic purposes. The qualities of these waters are also not tested which is also one of the causes of the spreading of diseases. In some cases, the women, men, and children are buying fuel woods and bushes from the local market for use for cooking purposes as the gas pressure has been observed very low during the winter season.

During consultations with the women of the area who were keenly interested in the consultations and formations process. Women expressed great interest in initiatives for livelihood generation and requested support for the following:

- Provision of sewerage system as old one is destroyed;
- High load shedding of electricity;
- Provision and rehabilitation of Drinking-Water Supply;
- Livelihood enhancement and skill training programme for the youth.

7.8.1 Consultations with District Administration

Separate consultation meetings were held with Deputy Commissioner Sibi, Additional Deputy Commissioner Sibi, Assistant Commissioner, Tehsildar Sibi, his staff, and other government representatives. In the meeting, PMU, PIU, the Irrigation Department along with PSIAC team informed the representatives of the district administration about the BIWRMD project and the proposed Sibi City Water Supply Scheme.

During the meeting, the scope of work, construction schedule, VLD process, and other associated project activities were discussed in detail. It was communicated accordingly that the Sibi City Water Supply sub-project will require lands permanently which may be belongs to the state (Forest and Pakistan Railways) as the proposed conduit channel will be constructed along with the main road towards Sibi to Nari Gorge weir. They were briefed that the project team along with authorities of the revenue department have

identified these forest and railway lands in one of their walk-through survey along the channel and verified from the available cadastral records of Sibi City and completed the assessment process. The team also discussed in detail the previous volatile law and order situation of the sub-project area. It was revealed that presently there are possible law and order risks that can occur during the implementation process. Therefore, to tackle the possible risks in the future, support is and will be required from the district administration and law enforcement agencies. All the officials of the district administration offered their complete support for the execution of the project.

Table 71: Meetings carried out with District Administrations

S. No.	Location	Date
1	Meeting with Deputy Commissioner Sibi	February 28, 2021
2	Meeting with SDO PHE Sibi	February 17, 2021
3	Meeting with Tehsildar Sibi	February 28, 2021
4	Meeting with XEN PHE Sibi	December 11, 2020

8 Institutional and Implementation Arrangements

Baluchistan Irrigation Department (BID), GoB, will be the Implementing Agency for this sub-project. The BID will access technical expertise from the departments of Agriculture, Forestry, Livestock, and Public Health Engineering to guide project implementation. A central Project Management Unit (PMU) in BID (located at Quetta) will incorporate staff from the BID Planning and Monitoring wing and the ID Water Resource Management directorate, supplemented with 10 additional qualified staff. The Project Implementation Units (PIU) will lead the field implementation and manage the community, engagement process for the project, with PMU oversight.

The PMU is led by a Project Director (PD). It will include a financial management specialist, two accountants, a procurement specialist, a communication specialist, an environmental safeguards specialist, a social safeguards specialist, a gender development specialist, a monitoring and evaluation specialist, a matching grants specialist, a training management specialist, a water resource specialist, a livestock specialist, and an agriculture specialist.

The PMU will be responsible for project implementation, including technical aspects, financial management, and procurement. Led by executing engineers, the PIUs will be responsible for the supervision of project works and activities in the river basins and community liaison and participation through COs/FOs. The PMU and PIUs will be supported by Project Supervision and Implementation Assistance (PSIAC) and Monitoring and Evaluation (M&E) consultants.

A Project Steering Committee will provide strategic guidance and facilitate inter-agency coordination. It will be chaired by the Additional Chief Secretary Balochistan and will include the Secretaries of Irrigation, Agriculture, Forestry, Public Health Engineering, Livestock and Finance departments, and Local Government. It will meet quarterly or as required to review physical and financial progress, to recommend ways to accelerate implementation, and to resolve any complaints that have been brought by the Chairman of the Grievance Redress Committee.²⁶

8.1 The Contractor

The Contractor will be overall responsible for the implementation of the ESMP. The Contractor will be responsible for environmental protection liabilities under the Balochistan Environmental Protection Act (2012), World Bank's Environmental and Social safeguard policies, and relevant ESMP provisions. The Contractor will also be responsible for better communication and training of his crews for the implementation of the ESMP.

²⁶ Project Appraisal Document-PAD

Upon mobilization, the contractor will submit to PSIAC, for approval, the Contractor's Environmental and Social Management Plans which will detail exactly how the contractor will meet the requirements of this ESMP and the contractor's Health and Safety Plan. The Contractor's Environmental and Social Management Plans will reflect the contractor's chosen construction methodologies. The Contractor will submit these plans within 30 days after the award of the contract and will not commence any Works until the CESMP and Health and Safety Plan are approved by the Engineer.

The Contractor's specific responsibilities will include the following:

- Provide the Engineer and Employer with access to records of the environmental management program for an audit.
- Prepare and implement the CESMP, including mitigation given in this ESMP.
- Monitoring their compliance with environmental and social requirements.
- Produce a monthly report to the Employer, copied to the Engineer, which reviews the Contractor's compliance with the environmental and social requirements of this specification and the CESMP and identifies any problems.

8.2 Contractor's Environmental and Social Management Plan (CESMP) and Contractor Health and Safety Plan

Upon mobilization, and within 30 days of commencement, the contractor will prepare a series of plans as part of the Contractor's Environmental and Social Management Plan (CESMP) and Health and Safety Plan which will be relevant to his chosen methodology and meet the requirements of this ESMP. Decommission and Restoration report will be submitted by the contractor to PMU when 90% civil work will be completed.

The plans shall include various management plans:

- Pollution Prevention Plan (Air/Noise/Waste/Sanitary waste management plans).
- Traffic Management Plan
- EHS Training Plan
- Health and Safety Plan including SOPs for COVID 19 Infection Prevention
- Emergency Plan including SOPs for COVID 19 Infection Control
- Contractor Layout Plan
- Decommissioning and Restoration Plan

8.2.1 Contractor's Organisational Framework

The Contractor will provide details of his organizational framework, the designation of a senior manager to take overall responsibility, and the designation of the following positions. The Contractor will provide a Curriculum Vitae for staff appointed to the positions below. These staff, must have 3 to 5 years of work experience in EHS compliance and reporting in the foreign-funded project and will meet the requirement of the contract specification and this ESMP.

- Environmental Officer
- Safety Supervisor

- Paramedic staff
- Health and Safety Officer
- Human Resource Officer
- Community Liaison Officer

8.2.2 Layout Plans of Contractor Camps

The Contractor will submit a layout plan for the main construction and subcamps in the CESMP. Before the construction of any camp, the Contractor will submit, to the Engineer for approval, a layout plan for the camp. All layout plans will include the following details:

- Location of landfills.
- Generators.
- Batching plants (if applicable).
- Storage areas (including hazardous material storage areas).
- Fuel tanks.
- First aid facilities.
- Waste facilities.
- Medical facilities.
- Refueling points.
- Plant washes down points.
- Water supply.
- Plant and vehicle parking.
- Measures are taken to segregate pedestrian and vehicle routes.
- Evacuation routes and emergency exits.
- Drainage.
- Camp location.
- Camp boundary.
- Work areas.
- Accommodation areas.
- Kitchens and dining areas.
- Sanitary facilities (including toilets and washrooms/showers).
- Location of sanitary treatment facilities and discharges.

9 The Environmental and Social Management and Mitigation Plan

9.1 General

Mitigation measures for the reduction of environmental degradation and social impacts, especially relating to air quality, soil contamination, pollution of water resources, loss of habitat, and disruption to wildlife will need to be implemented and monitored. Monitoring tasks will vary over the construction and operation stages of the sub-projects. Physical, biological, and socio-cultural parameters will be measured/monitored to determine compliance with national and international standards and comply with the ESMP itself. The contractor is responsible for the implementation of this ESMP.

Before the execution of the work of sub-projects, the contractor will prepare the Contractor Environmental and Social Management Plan (CESMP) and Contractor Health and Safety Plan would be prepared and duly approved by PSIAC in coordination with PMU. Each contractor will provide its proposed social, health, safety, and environmental implementation procedures, to ensure that civil works are operating satisfactorily and that problems are being dealt with swiftly. These will be submitted to the PSIAC for review and onward submission to the PMU.

This will include the following:

- The format of a monthly report which reviews the Contractor's compliance with the environmental and social requirements of this ESMP and their plan.
- A formalized mechanism to audit the effectiveness of the own plan, (i.e., Contractor Environmental Social Management Plan)
- Details of the records to be kept demonstrating compliance with safeguards.
- Monitoring checklists for day-to-day monitoring with safeguards.
- A plan for day-to-day monitoring of the site and identification of staff responsible for this
- Proposed actions to be taken to correct non-compliances noted by the PSIAC.
- Internal reporting channels for non-compliances

To ensure the successful implementation of an ESMP, monitoring and supervision are considered effective tools. The level of monitoring and supervision must be appropriate. These measures are mean to reduce the risks and impacts and ensure compliance with the sub-project requirements and the procedures for documentation, reporting, and feedback on the outcomes of corrective and preventive action.

Physical, biological, and socio-cultural parameters will be monitored to determine the compliance level with National, and World Bank standards and compliance with this ESMP. Monitoring will be divided into Compliance monitoring and Effect monitoring.

Compliance monitoring represents the majority of the monitoring during the sub-project operational and handing over (defect notification). PSIAC along with PMU will be responsible for day-to-day monitoring of the contractor's compliance with this ESMP and will monitor the implementation of the mitigation measures.

PSIAC will complete monitoring within the sub-project area using contract-specific monitoring checklists and will engage a full-time environmental representative to be present on-site for daily monitoring who will report directly to the Resident Engineer from PSIAC, and who will coordinate with the project management unit.

Effects Monitoring will be carried out by M&EC of various environmental and social parameters quarterly to evaluate the performance of this ESMP. The following parameters are to be monitored:

- Monitoring of Noise levels at fixed locations during the construction phase
- Availability of water at the downstream end of the channel system;
- Monitoring of ambient air quality during the construction phase;
- Health and safety of Contractors personnel.
- Monitoring for waste management and sanitary waste disposal.
- Monitoring labor management in the project area such as the process of hiring skilled and unskilled labor from the local community or other areas, no labor rights are affected, camps are located 500 meters away from community trespass area and have an adequate boundary, contractor's training plan is implemented accordingly, no GBV or sexual exploitations are taken place, rights of women and children or any vulnerable groups are not affected.
- Monitoring of overall GRM mechanism developed in the project such as their functional committees, a database of grievances received from the communities in soft and recorded in hard in database register in writing or verbally and follow-ups status.
- Monitoring of overall VLD process as per the requirements of given RPF and its record-keeping at the community, tehsil, and PIU level.

9.2 Monitoring Mechanism

Before the execution of work, in the contractor's environmental and social management plan, each Contractor will include details of its proposed social, health, safety, and environmental implementation procedures, to ensure the construction sites are operating satisfactorily and that problems are being dealt with swiftly.

This will include the following:

- The format of a monthly report which reviews the Contractor's compliance with the environmental and social requirements of this ESMP and their own plan.
- A formalized mechanism to audit the effectiveness of the own plan (i.e. Contractor Environmental Social Management Plan)
- Details of the records to be kept demonstrating compliance with safeguards.
- Monitoring checklists for day-to-day monitoring with safeguards.
- A plan for day-to-day monitoring of the site and identification of staff responsible for this
- Proposed actions to be taken to correct non-compliances noted by the PSIAC.
- Internal reporting channels for non-compliances

9.3 Aims of Monitoring

The main objectives of the monitoring plan are:

- Evaluate the performance of the ESMP and bring about improvements.
- To provide a means where impacts that were uncertain at the time of preparation of ESMP or unforeseen could be identified and steps are taken to adopt appropriate corrective measures.
- Record the inputs provided by various participants in the environmental and social management process, (i.e., clients, consultants, contractors)
- To check whether mitigation measures are adequate, effective, and adopted in the field.
- To comply with legal and community obligations, including safety on construction sites.

9.4 Non-compliance and Corrective Measures

The Contractor will be notified of any violations with this ESMP, as well as any corrective actions required. The payment of mobilization bill item will not be paid to the contractor until the following conditions have been met.

- Preparation and submission of Health and Safety Plan to the PSIAC in coordination with PMU for review and approval.
- Provision of contractor's staff camps.
- Preparation and submission of the contractor's Environmental and Social Management Plan to the PSIAC in coordination with PMU for review and approval.
- The contractor will submit the curriculum vitae of its ESMP staff to the PSIAC in coordination with PMU for review and approval. The availability of the Contractor's ESMP staff will be made full-time on-site.

Where the contractor fails to comply with his management plans, (i.e., CESMP or Health and Safety Plan) and, therefore fails to comply with this ESMP, payments will be deducted from the relevant bill item each month. The percentage deduction from these bill items will be based on the percentage compliance as measured through monthly monitoring checklists.

The following stages will be performed, relating to the increasing severity of ESMP non-compliances.

Stage 1 PSIAC discusses the problem with PMU and Contractor to work out mitigations together and record the facts and the decision implemented.

Stage 2: A more serious infringement is observed and PSIAC notifies the Contractor of the issues in writing, with a deadline by which the problem must be rectified. All costs will be borne by the Contractor.

Stage 3: PMU/PSIAC will order the Contractor to suspend part, or all, of the works. The suspension will be enforced until the offending party, procedure, or equipment is corrected and/or remedial measures put in place if required. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

Stage 4: Breach of contract - One of the possible consequences of this is the removal of a Contractor and/or equipment and/or the termination of the contract. Such measures will not replace any legal proceedings that PMU may institute against the Contractor.

9.5 Communication, Reporting, and Documentation

9.5.1 Meetings

A preliminary meeting will be held with the aim of setting out the format for the regular meetings. This meeting will be held before the commencement of the works, following the contract award. The meeting will be attended by PMU/PIU, M&EC, PSIAC, and the contractor.

In addition to the meetings above, PSIAC (Environmental Engineer) will monitor or check the compliance status of contractor commitment on social, environmental, health, and safety-related issues. The day-to-day progress will be provided by the PSIAC to PMU.

9.5.2 Communications

Most communications between PSIAC and the contractor will be verbal on-site. Where such verbal communication proves to be ineffective for an issue, the environmental team of PSIA will issue a formal instruction to the contractor under the civil works contract. Such instructions will also be copied to PMU, as the *Employer*.

9.5.3 Reporting Frequency

The Contractor and PSIAC will produce monthly reports detailing the compliance level and non-compliance with this ESMP. The distribution list of reports is given in the below table.

Table 72: Distribution of Periodic Reports

S. No	Report	Prepared by	Frequency	Reviewed by	Distribution
1.	Monthly PSIAC Compliance Report (<i>see report template in Appendix C</i>)	PSIAC	Monthly	ES PMU/PIU	PMU, Contractor
2.	Monthly Contractor's ES Mitigation and Management Compliance Report	Contractor's Environmental Coordinator/Office r	Monthly	ES PSIAC	PMU & PSIAC
3.	Monthly M&E ESMP Monitoring Report	M&E Consultant	Monthly	ES PMU	PMU and World Bank by PMU.
4.	Quarterly ESMP Progress Report	PSIAC	Quarterly	ES PMU	PMU and World Bank by PMU

9.5.4 Pictorial Record

A photographic record of the sub-project locations shall be kept and taken at key locations in a walkthrough survey by the contractor, PSAC and PMU. The photographic record shall be incorporated into the monthly reports. The pictorial record shall include the time, the title of the photograph, and the date.

9.5.5 Monthly Environmental Health and Safety Checklists

The completed monitoring checklists shall be attached to the monthly reports. The format of the monthly monitoring checklist is provided in Appendix D.

9.5.6 Complaints Register

The contractor will maintain social complaints register at all camps and worksites to document all complaints received from the local communities. The register will also record the measures taken to mitigate the reported concerns. The final report will be communicated to the PMU. All complaints/issues of the community will be reported in the monthly progress report for the following month along with the status of the last month's complaints.

9.5.7 Training Plan

The Contractor shall include a training plan within the CESMP which details the program for the delivery of training, demonstrating the training shall be carried out initially at the induction of staff and repeated intermittently throughout the project, to cover the subjects included in the following table.

Table 73: Training Subjects for inclusion in Contractor Training Plan

S. No	List of Topics/Training	Contents	Staff
1.	Covid-19 Pandemic (Corona Virus)	<ul style="list-style-type: none">• Good Hygiene Practices• Medical Aid Facilities• Covid-19 Symptom• Precautionary measures in dealing with Covid-19 patient• Social Distancing• Needs and Benefits of Isolation or Quarantine	All Construction Staff
2.	Handling, use, and disposal of hazardous material	<ul style="list-style-type: none">• Type of Hazardous Material and waste• Routes of Entry• Safety Labelling• Use of Safety Data Sheet• Goal and Objectives• Actions to Do and Preventive Measures• How to Avoid Injuries	All construction staffs
3.	Waste Management	<ul style="list-style-type: none">• Introduction to types and waste• Solid Waste and its types• Effects of Solid waste• Waste Management concept• Collection, storage, and disposal techniques	All construction staff working on regulating structures

S. No	List of Topics/Training	Contents	Staff
		What to do and what not to do	
4.	Efficient & safe driving practices, including road & vehicle restrictions	<ul style="list-style-type: none"> • Introduction • Causes of Road Accidents • Driving hazards • Road Journey • Vehicle inspection • Health Condition • Signposting • Competency 	All staff
5.	Actions to be taken in the event of major or minor pollution event on land/Pollution Prevention	<ul style="list-style-type: none"> • Type of pollution and its causes • How to Avoid pollution • What to do in case of an event • Reduction Techniques • Use of tools in case of pollution • House Keeping • Impact on Human Health and Environment • Benefits 	All Staff
6.	Health & Safety: Safe way to work & hazard awareness	<ul style="list-style-type: none"> • Objectives • Types of Hazards • Work at height procedures • Moving of machinery • Use of PPEs • Housekeeping • Hazards control 	All construction staff
7.	Health & Safety: Safe use of plant & equipment	<ul style="list-style-type: none"> • Use of Plant procedures • Competency and training • Machine guarding • Dismantling of equipment • Daily maintenance • Safe operation • Intended use of equipment 	Operators of plant & equipment
8.	Health & Safety: Working at a height	<ul style="list-style-type: none"> • Access and Egress, Loading Places • Ladders • Landing Places • Openings, Corners, Breaks, Edges, and Joisting • Roof Work (Flat roofs/Sloping roofs/Steep roofs etc.) • Fragile Roofing Materials • Work over Water • Safety Nets, Belts, and Harnesses • Equipment for working at height: Scaffold, MEWPS, Towers 	All construction staff
9.	Health & Safety: Working near/on water	<ul style="list-style-type: none"> • Contamination and biological/chemical hazards • Weather conditions • Hypothermia and hyperthermia • Unstable surface • Electrical hazards • Lone working • Accidental immersion • Using rescue and safety equipment • Key control measures (planning, training) 	All construction staff

S. No	List of Topics/Training	Contents	Staff
		<ul style="list-style-type: none"> Hazards of Falling into Water Precautions 	
10.	Health & Safety: Use of PPE	<ul style="list-style-type: none"> Common Types of PPEs Use of PPEs Benefits Workplace requirement of PPEs Care and Maintenance of PPEs When PPE is necessary Limitations of the PPE 	All construction staff
11.	Emergency procedures and evacuation	<ul style="list-style-type: none"> Types of emergencies What is an Emergency Plan? What is an individual role in case of an emergency? Supervising Rescue Operations Emergency reporting procedures Means of egress 	All staff
12.	Fire fighting	<ul style="list-style-type: none"> Objectives How fire starts Use of fire extinguishers Type of Fire extinguishers Fire safety inspection Competency required Action in case of fire Do's and Don'ts 	All staff
13.	Site inductions, including requirements under the CESMP & details of environmentally sensitive areas of the site	<ul style="list-style-type: none"> Purpose of induction training Why health and safety are important What is CESMP What is the requirement of CESMP Duty of care and responsibility Your responsibility and our responsibility Protection of Environment What is an ecosystem What is ecology Identification of key species Protection of key species Dos and don'ts Care during the clearance of vegetation 	All staff
14.	Culturally sensitive awareness raising on HIV/AIDS and the spread of sexually transmitted diseases. Awareness-raising on risks, prevention, and available treatment of vector-borne Diseases, Cultural sensitivities of the local population	<ul style="list-style-type: none"> Valuing cultural difference Avoiding habits in other areas during migration What are sexually transmitted diseases Type of infection Prevention Strategies for controlling vector-borne diseases Type of vector-borne diseases Treatment procedures 	All staff
15.	Awareness of cultural heritage	<ul style="list-style-type: none"> Purpose of training Awareness about cultural heritage and its importance What to do if any cultural heritage is found in the area Prevention of cultural heritage and its techniques 	All staff

S. No	List of Topics/Training	Contents	Staff
16.	Gender-based violence and Sexual harassment/abuse	<ul style="list-style-type: none"> Objectives GBV and SH Cultural sensitivity and tribal system of the project area The negative impact of GBV/SH on the community and project Code of conduct to avoid GBV/SH Means of Conflicts due to GBV/SH Stakeholders responsibilities 	All staff

9.6 Contractor's Health and Safety Plan

Upon mobilization, and within 30 days of commencement, the contractor shall prepare a Health and Safety Plan which shall be relevant to his chosen methodology. This plan shall detail the following:

- Health and safety management structure, responsibilities, supervision, and reporting scheme;
- Health and safety goals for the project;
- Health and safety procedures;
- Identification of potential hazards (health risks, safety risks);
- Proposed measures to reduce the risk of identifying hazards;
- Arrangements to implement such measures;
- A system for reporting and investigating accidents, incidents, and near misses;
- A plan for emergency transfer of staff or public from site to medical facilities;
- Site rules;
- Fire and emergency preparedness and response plan (especially dealing with Covid-19);
- Site security.

9.6.1 Emergency Plan

The Contractor shall include an emergency plan within the CESMP which includes the following details:

- Measures for fire prevention and fire fighting
- Indicators on site (for example, heavy rainfall) that shall prompt the shutdown of specified areas of work
- Procedure for the shutdown of the site, including the transfer of plant, materials, and personnel to safe areas (for example in the event of a flood)
- Emergency evacuation procedures for staff and members of the public are likely to be impacted by an emergency event on-site such as dealing with Covid-19, fire, or blast. The details of the Covid-19 emergency preparedness and response shall be included by the contractor in his plan, following guidelines given in Section 6.2.3.1.

9.6.2 Pollution Prevention Plan (Air/Noise/Water)

The Contractor will include a pollution prevention and control plan within the CESMP which includes the following details:

- Method of treatment and disposal of sanitary wastes.

- Method for disposal of hazardous waste
- Actions to be taken to prevent the spill of contaminants on the site
- Actions to be taken in the event of land and water-based minor and major pollution events, including materials/equipment to be permanently based on site, regularly maintained, and to be used during a pollution event
- Proposed methods for treatment of concrete batching plant washout water (if applicable), to include as necessary, flow and load equalization, pH adjustment, and sedimentation using settling basins or clarifiers.
- Procedures for the collection and disposal of wastes, including domestic and construction waste

9.6.3 Traffic Management Plan

The Contractor must provide the following information regarding the traffic management plan within his document:

- Loading/unloading points for deliveries, plant, and vehicles at the construction camp
- Access routes around the site for the transfer of materials and personnel.
- Proposed access/haul routes
- Access routes for deliveries to and from the main camp
- Queuing points for delivery vehicles
- Locations and details of warning signs to be erected on public roads
- Locations where banks-men will be provided (if required).

9.7 Contractor's Code of Conduct

The contractor should develop conduct of conduct and ensure that each member of staff signs or provides a written explanation of why they have elected not to sign it. The contents of the Code of Conduct are as follows:

Social aspects

- Discreet sexual behavior that takes into consideration HIV/AIDS messages;
- Respect for the local community and its cultural norms;
- Presentation of professional behavior and integrity when dealing with the local community;
- Discrimination is prohibited such as gender, age, ethnic or national origin, religion, disability, sexual orientation;
- Respect privacy, particularly among women
- Inappropriate behavior such as sexual harassment, gender-based violence, and sexual abuse is strongly prohibited.

Health and Safety

- Show commitments to health and safety;
- Zero tolerance for any form of harassment, bullying, or other offensive physical or verbal treatments;
- Use of PPEs provided;
- Attend regular training Health and safety training sessions

Environment

- No hunting and poaching of wildlife;
- Staff should not be involved in any environmental damage i.e. illegal tree cutting;
- Rules and regulations on pollution prevention and control.

9.8 Criteria for the Approval of Contractor Documents

Once the CESMP and CHSP are submitted to the PSIAC, these documents will be reviewed by PSIAC along with PMU in the context and requirements of this ESMP. If any changes are required, the contractor will be given written comments to make the required changes and re-submit the revised version for review and approval. Approval will be accorded by the Engineer with the consent of the PMU if both have met the requirements of this ESMP.

9.9 The Environmental and Social Monitoring and Mitigation Plan

The following table includes details of the mitigation and monitoring activities with relative agencies responsible for those actions during the implementation of this ESMP and civil works execution by the contractor.

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
	1. Covid-19 (Corona Virus)									
1.1	COVID 19 (Corona Virus)	Spread of Corona Virus during the implementation phase of the sub-project	The guidelines and mitigations given in section 6.2.3.1 and SOPs in Appendix G shall be implemented and followed by the contractor	PMU, PIU, PSIAC	Through the sub-project location (i.e Work areas, campsites	Daily	Monitoring of sick person or suspected patient. Social distancing is observed Face masks and gloves are worn all the time. Hand washing for 20 seconds is carried out several times a day. Hand sanitizers are available at the campsite and work locations and are being used. Hygiene practices are being maintained.	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
1.2	Handling and disposal of Covid-19 waste	Chances of getting an infection while handling Covid-19 waste	<p>waste such as latex gloves, face masks, and tissue papers shall be disposed of in top-covered waste bins</p> <p>Waste bins shall be marked with Covid-19 waste.</p> <p>All this waste shall be collected with appropriate safety measures and be transported to the burning pit away from the campsite and community.</p> <p>Provide training to staff on the safe use of PPE while handling Covid waste</p>	PMU, PIU, PSIAC	Through the sub-project location (i.e Work areas, campsites	Daily	<p>Waste collected in the separate top-covered waste bin</p> <p>The burning pit is located away from the local community and camp area.</p> <p>Appropriate safety measures are taken while collecting covid waste</p> <p>Training provided on safe use and removing PPE after work.</p>	✓	✓	✓
1.3	Emergency preparedness response plan	Transfer of suspected patients/workers to the hospitals	<p>The contractor's Health and Safety Plan should include plans for the emergency transfer of members of the workers to suitable medical facilities in the event of Covid medical emergency</p> <p>Display emergency contact numbers clearly and prominently in strategic places in camps.</p> <p>Provide a transport facility for the laborers during an emergency to be transported to the nearest hospitals.</p>	PMU, PIU, PSIAC	Through the sub-project location (i.e Work areas, campsites	In case of emergency	<p>Training on Covid-19 emergency procedures is provided.</p> <p>Emergency contact number displayed.</p> <p>Transport facility readily available</p>	✓	✓	✓
2. Traffic Management										
2.1		Air pollution	Regularly service vehicles							✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
	All traffic movements		<p>Limit particulate matter emissions from vehicles to less than 100 mg/Nm³</p> <p>Limit sulfur dioxide content from vehicles emissions to less than 3%</p> <p>Limit nitrogen oxide emissions from vehicles to less than 1,460 mg/Nm³</p> <p>Provide training in fuel-efficient driving practices for drivers.</p>	Contractor	Entire Sub-Project area	Quarterly	<p>Air quality at any inhabited area to meet NEQS and EHS guidelines for ambient air</p> <p>Training identified in the contractor's training plan</p> <p>Training delivered as per training plan</p>	✓		
		Dust Pollution	<p>Water bowsers shall be used to sprinkle water on the haulage routes</p> <p>Hard-core fill is used to repair the Kacha routes. Fill material has a lower dust-raising potential.</p> <p>Water sprinkling shall be carried out at material stockpiles where dust is generated</p> <p>Materials delivered to sites, such as cement, loose material, sand, or aggregates shall be transported in a covered truck.</p>	Contractor	Entire Sub-Project area	Daily Basis	<p>Water Sprinkling carried out.</p> <p>Katacha routes repaired with hard core fill</p> <p>Water sprinkling carried at construction material stock piles</p> <p>Construction material covered during transportation</p>	✓		
		Soil and groundwater pollution	Inspect vehicles regularly for leaks	PSIAC	Entire Sub-Project area	Monthly	No leaking oil or fuel observed from the plant or vehicles	✓	✓	

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
2.2	Movement of plant and equipment on public roads	Increase in traffic in Sibi City and the sub-project areas	Prepare a traffic management plan detailing proposed routes to access the site Prohibit pressure horn and prevent excessive noise levels from the contractor's vehicles	Contractor	Entire Sub-Project area	At the commencement of works & then on Quarterly	Traffic management plan submitted and approved by Engineer (including details of proposed access routes to project area) Noise emissions from plant and vehicles within NEQS and EHS guidelines	✓		✓
		Safety of workers and public	Obey speed limits on public highways Provide barricades, flagmen, and signs where haulage routes on private land intersect public highways Clean mud from vehicles before entering Sibi city or regularly sweep the road	Contractor	Sibi City Road and Nari River Road	Monthly	Contractor's vehicles not exceeding highway speed limits Barricades, flagmen, and signs provided No mud observed on the roads	✓	✓	✓
		Damage to public infrastructure	Obey height & weight restrictions Repair ruts and scars resulting from contractors' operations (at contractors' cost)	Contractor	Sibi City Road and Nari River road	Monthly	Vehicles are not overloaded Ruts and scars not observed	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
2.3	Deliveries	Blockage of traffic on access routes and public roads	Prohibit delivery vehicles from queuing on Sibi city road and Nari River Road Load & unload vehicles off roads Maintain one-way traffic with speed restrictions Provide flagmen, warning signs, and barricades to protect staff	Contractor	Camp, structure sites, and access roads of public	During deliveries	No delivery vehicles parked on roads One-way traffic maintained Flagmen, warning signs, and barricades are available	✓		
		Air pollution	Prohibit the running of engines while vehicles are waiting	Contractor	Camp and Nari River and Sibi City roads	During deliveries	Delivery vehicle engines turned off while waiting for loading/unloading	✓		
2.4	Haulage of construction materials	Dust	Cover the bed of haulage vehicles when transporting loose and/or fine materials	Contractor	Haulage routes	During deliveries	No dust observed from the bed of haulage vehicles near settlements or active agricultural land	✓		
2.5	Transport in the sub-project area	Damage to access roads	Promptly repair any damage caused by the Works	Contractor	Haulage & access tracks	Monthly	No damage to access roads			
		Safety of all staff & public	Limit speed of plant and vehicles on-site to 15km/hr				Speed of plant & vehicles not exceeding 15 km/hr	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
		Damage to crops, pasture, and injury to livestock	Access & haulage routes included in the Traffic Management Plan and enforcement of the plan Minimize damage to crops, pasture, woodland, and livestock	Contractor	Access routes to channels	During Works	Traffic management plan submitted and approved by Engineer (including details of proposed access & haul routes throughout the project area and to borrow areas) No damage or harm, to crops, pastures, and livestock	✓		
		Dust	Regular water sprinkling of katcha tracks focused near settlements and active agricultural land	Contractor	Haulage & access tracks	Monthly	Low dust levels from haulage & access routes close to communities and active agricultural land	✓	✓	
3. Batching Plant & Excavation										
3.1	Operation of batching plant	Noise	The batching plant shall be installed 500 meters (1625 ft) away from community areas Maintain & operate the plant as per the manufacturer's guidelines.	Contractor	Main Camp & Sub-Camp	During the installation of the batching plant	No community disturbance is caused. Acoustic guards, doors, and hatches supplied on the rig are closed Noise levels are within the NEQs limit	✓	✓	
		Disturbance to the community	Plan all work to be completed between the hours of 6 am and 6 pm	Contractor	Main Camp & Sub-Camp	Monthly	No work undertaken from 6 pm to 6 am	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
		Air pollution	<p>Install new or highly maintained batching plants</p> <p>Install fabric filters, cyclone control, or wet scrubbers if necessary to ensure particulate matter emissions from batching plant do not exceed 500 mg/Nm³</p> <p>Regularly service plant</p> <p>Reduce the distance between silos and containers when filling with cement</p>	Contractor	Main Camp	Quarterly	<p>Air quality at any inhabited area within the sub-project area to meet NEQS for ambient air.</p> <p>No cement dust emitted while filling containers</p>	✓	✓	✓
3.2	Washing down plant & equipment	Ground, groundwater, and surface water pollution	<p>Wash down only in designated and bunded wash down areas.</p> <p>Separate oil and cement from effluent and dispose of hazardous effluent at a licensed site.</p> <p>In addition, concrete washout must be diluted by the addition of more water and then can be used for water sprinkling.</p> <p>Further treatment of wash down, if necessary to meet NEQS, using flow and load equalization with pH adjustment and/or sedimentation of suspended solids using settling basins or clarifiers</p>	Contractor	Main Camp & subcamps	Monthly	<p>Bunded wash-down areas provided</p> <p>Plant & equipment not washed down outside wash down areas</p> <p>Disposal of hazardous effluent at a licensed site</p> <p>Effluent water quality meets NEQS for municipal and liquid industrial effluent</p> <p>Groundwater meets NEQS for drinking water, except for parameters where baseline water quality did not meet NEQS.</p>	✓		✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
3.3	Civil works and earth excavation for conduit channel and other structures at the treatment and filtration plant	Disturbance/harm to seasonal fauna	<p>The contractor environment officer shall survey the construction site to eliminate the potential risk of any incident to any terrestrial, reptilian, mammal, or fauna species before the construction works</p> <p>The contractor shall comply with ECoP guidelines for fauna</p> <p>As part of the CESMP (Contractor Environmental and Social Management Plan), the contractor shall prepare a plan /SOP to avoid any impact on flora/fauna during construction</p>	Contractor	All work areas	During earth excavation	Development of SOPs/Plan for protecting biodiversity in CESMP	✓	✓	✓
4. Storage of Construction Materials										
4.1	Locating the storage area	Ground, groundwater, and surface water pollution	<p>Locate storage areas away from watercourses, drains, and transport routes</p> <p>Protect storage areas from flooding</p> <p>Storage areas marked on the camp layout plan</p>	Contractor	Campsites	<p>Monthly</p> <p>Monthly</p> <p>Before camp establishment</p>	<p>Construction materials not entering watercourse drain or being spread along transport routes</p> <p>Storage areas above flood levels</p> <p>Camp layout plan approved by PSIAC</p>	✓	✓	✓
4.2	Use of storage areas	Ground, groundwater, and surface water pollution	<p>Ensure only designated storage areas are used</p> <p>Mark storage areas and label containers</p>	Contractor	Campsites & Storage areas	Monthly	<p>No materials stored outside storage areas</p> <p>Storage areas and containers clearly labeled</p>	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
4.3	Storage of cement	Pollution The health of staff & public	Store within sheds, under polythene sheets, or in unopened bags	Contractor	Campsites	Monthly	Cement dust not observed	✓	✓	✓
4.4	Storage of sand	Dust	Cover with polythene sheets or store within sheds during times of high wind Employ water sprinkling if airborne particulate matter increases around the sand stockpile	Contractor	Campsites	Monthly	Sand from stockpile not spread by wind	✓	✓	✓
5. Hazardous Materials										
5.1	Storage of hazardous material (i.e., petroleum products, batteries, admixture chemicals, including waste)	The health of staff & public	Lock & secure hazardous material storage area to prevent unauthorized access Display warning signs depicting hazards and PPE required at the entrances to hazardous material storage areas	Contractor	Storage areas	Monthly	Hazardous storage areas are locked and secured when not in use Warning signs displayed at the entrance to hazardous material storage areas	✓	✓	
		Fire	Provide fire extinguishers at hazardous material storage areas	Contractor	Storage areas	Monthly	Fire extinguishers provided	✓	✓	

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
		Ground, groundwater & surface water pollution	<p>Provide hard compacted, impervious, and bunded flooring to hazardous material storage areas</p> <p>Label each container indicating what is stored within store containers with clearance around each to facilitate inspection of containers</p> <p>Regularly check taps, hoses, lids & containers and dispose of damaged containers</p> <p>Provide spill kits and ensure staff are trained in their use</p> <p>Hazardous material storage areas to be covered</p>	Contractor	Storage areas	Monthly	<p>The floor of hazardous materials storage is impervious</p> <p>The bund is provided around the hazardous material store</p> <p>Each container is labeled indicating what is stored</p> <p>No leaks observed</p> <p>Spill kits provided at storage areas and around work sites</p> <p>Hazardous material storage areas are covered</p>	✓	✓	
5.2	Bulk storage of fuel	Ground, groundwater & surface water pollution	Contain fuel within a double-skinned bowser or surround container by a bund to the capacity of the container on hard compacted flooring	Contractor	Fuel storage area	Monthly	Fuel stored in double skinned bowser or surrounded by a bund on an impervious floor	✓	✓	
5.3	Handling of hazardous materials	Health & safety of staff	<p>Train staff in safe handling techniques</p> <p>Enforce the use of all necessary PPE</p>	Contractor	All sites	Monthly	Necessary PPE is used when handling hazardous material	✓		
		Ground, groundwater & surface water pollution	<p>Train staff in pollution control measures</p> <p>Lock valves and trigger guns when not in use</p>	Contractor	All sites	Monthly	No spills of hazardous materials observed	✓	✓	

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
5.4	Plant and vehicle wash down	Ground, groundwater & surface water pollution	Contractor to identify designated wash down areas in the camp layout plan	Contractor	Contractors Camp	Before the construction of each camp	Wash down areas identified in the camp layout plan	✓	✓	✓
			Wash-down points will have a concrete pad underneath		Wash down points	During camp establishment	Concrete pad provided at wash-down points			
			Mobile plants washed down only at designated wash down areas	Contractor	All Campsites	Quarterly	Mobile plants using wash down areas	✓	✓	
			Treatment of wash down effluent before disposal				Treatment and disposal methodology for wash down effluent included in Contractor's Pollution Control Plan			
5.5	Refueling	Groundwater & surface water pollution		Contractor	Wash down points	Monthly	Effluent disposal quality meets the NEQs limits	✓	✓	
			Separate oil from effluent and dispose of hazardous effluent at a licensed site				Disposal of hazardous effluent at a licensed site			
5.5	Refueling	Groundwater & surface water pollution	Refuel in designated and banded areas only over impervious flooring or provide drip trays	Contractor	All sites	Monthly	Plant refueling only in designated and banded areas or provide drip trays	✓		✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
5.6	Disposal of hazardous waste	Groundwater & surface water pollution	Identify and transport hazardous waste to an approved disposal site (include details in Pollution Control Plan Medical waste is stored and disposed of as hazardous waste.	Contractor	All landfill sites	Before the commencement of works and then on Monthly basis	Approval of Pollution Control Plan by the Engineer Disposal of hazardous waste at approved sites Medical waste not disposed of in landfills	✓	✓	✓
6. Waste Management										
6.1	Locating landfill	Ground & groundwater pollution Community disturbance & public safety	Site landfill in an area where groundwater is low, and if not possible, line landfill with an impervious layer (such as clay) Locate landfill 300m (1,625ft) away from existing settlements (to be identified in Camp layout)	Contractor	Landfill site	Before establishment and then on a monthly basis	Water not observed in the landfill Approval of camp layout by Engineer	✓	✓	✓
6.2	Collection of domestic waste	Soil, groundwater, and surface water pollution Odour & community disturbance	Provide garbage bins at a radius of 50ft at the main camp and 100ft in temporary and subcamps for collection of domestic waste Regular collection & disposal of domestic waste	Contractor	Main and Sub-camps	Monthly	No littering at campsites	✓	✓	✓
6.3	Disposal of biodegradable domestic waste	Soil, groundwater, and surface water pollution	Dispose of biodegradable waste at designated landfill or compost area	Contractor	Main and Sub-camps	Monthly	Landfilling or composting of biodegradable waste	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
6.4	Disposal of non-biodegradable & non-recyclable waste	Soil, groundwater, and surface water pollution	Dispose of non-biodegradable, non-recyclable waste at the designated landfill, licensed disposal site	Contractor	Main and Sub-camps	Monthly	Landfilling, transfer to a licensed disposal site, or incineration of non - biodegradable, non-recyclable waste	✓	✓	✓
6.5	Disposal of recyclable waste	Loss of resources	Sell recyclable waste to local vendors (where available)	Contractor	Landfill	Monthly	Recyclable waste sold to local vendors (where available)	✓	✓	✓
6.6	Generation of sanitary waste	Soil, groundwater, and surface water pollution	Provide latrines at camps & prohibit staff from fouling the camp	Contractor	All camps	Monthly	Regularly cleaned latrines provided at all camps	✓	✓	✓
6.7	Incineration of waste	Air pollution	Do not burn materials that may result in the release of toxic or hazardous substances	Contractor	Incineration site	Quarterly	Air quality at any inhabited area within the sub-project area to meet NEQS for ambient air			✓
		Spread of fire	Provide fire extinguishers at the incineration site Do not burn on-site when surrounding vegetation is dry and combustible	Contractor	Incineration site	Monthly	Fire extinguishers placed at the incineration site	✓	✓	✓
6.8	Generation & collection of construction waste	Loss of resources Visual impact & soil pollution	Reuse construction waste where suitable Remove all construction waste from the project area	Contractor	Sub-Project area	End of works	All construction waste removed	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
6.9	Disposal of medical waste	Health & safety of staff & public	Incineration at a nearby hospital (or equivalent facility)	Contractor	Landfill	Monthly	Medical waste not disposed of in landfill	✓	✓	✓
6.10	Generation of Waste during cleaning operation of sedimentation tanks and slow sand filter	Loss of Agriculture land Degradation of surface and groundwater resources Choking of sewerage system due to discharge of muddy or sediment water in sewerage drainage, ultimately resulting in an overflow of drainage systems	Waste shall be disposed off away from community areas and surface water resources The waste water after cleaning can be collected in a settlement pond and from there safe disposal can be ensured. Low-lying areas/ditches shall be preferred for the disposal of this waste Disposal areas shall be priority identified by the district administration and public health engineering department before the start of cleaning operations A local community shall be consulted by the District Administration and PHE department during the identification of disposal areas.	District Administration and Public Health Engineering Department of the Sibi City	Waste Disposal sites and treatment plant location	During Cleaning Operations	Waste disposed of away from community areas and surface water resources Low lying areas/ditches are preferred Disposal areas are identified by the respective department Local communities are consulted by the respective department		✓	
7. Construction of Health & Safety										
7.1	General construction activities	Health & safety to staff/Incident Handling	Qualified Health & Safety officer and site safety supervisor must be present all the time at the site. And shall be responsible for the health & safety of staff All necessary PPE is provided to staff and its use is enforced,		Entire Sub-Project area	Before works commence and then on monthly Basis	The CV of the appointed Health & Safety officer and site safety officer approved by the Engineer All necessary PPE is worn by all staff	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
			<p>particularly the use of safety belts while working at the site.</p> <p>Provide training to staff in the safe use of equipment & plant, use of PPE, and handling of hazardous materials. Training shall include hazards of their work, hazard awareness, safe work practices, and emergency procedures in case of fire</p> <p>No staff shall be allowed on the site who has not undergone induction training</p> <p>Identify potential hazards and provide preventative measures to reduce the risk of accidents</p> <p>In case of an incident, the person shall be given a first-aid facility and ambulance service to the nearest hospital.</p> <p>Document & report accidents, diseases & incidents</p> <p>A qualified paramedic shall be engaged on-site and adequately equipped and properly staffed portable first boxes or dispensaries provided by the Contractor</p>	Contractor		Monthly	<p>Approval of Health & Safety Plan by Engineer & inclusion of training plan</p> <p>Induction provided to all staff</p> <p>No accidents occurred</p> <p>Cause of accident or disease identified and measures implemented to prevent reoccurrence</p> <p>Paramedic staff is employed and first aid stations provided</p>	✓		

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
7.2	Appointment of labor	The exploitation of local communities	Children less than 18 years old will not be hired. , CNIC is issued to persons over 18 years. Those laborers are hired who have CNIC card, which is also a requirement of employment and be included in the CESMP Do not hire pregnant women or women who have delivered a child within 8 preceding weeks	Contractor	Entire sub-project area	Monthly	No staff is employed are under the age of 18 or pregnant	✓		
8. Staff, Labour & Construction Camps										
8.1	Locating Camps	Community Disturbance	The contractor shall enter into a signed and witnessed agreement with the owner of the land at which he wishes to establish camps Locate camps at least 500 meters (1625ft) from communities Appoint a Community Liaison Officer within the Contractor's staff	Contractor	Camp Locations	Before camp establishment	Signed and witnessed agreements in place for each campsite situated on private land Camp location at least 500m (1625ft) from the nearest community A community Liaison Officer appointed	✓		
		Loss of flora & fauna Surface water pollution	Locate camps away from the embankments of watercourses Submit layout plans for each camp for the approval of the Engineer before the construction of the camp	Contractor	Camp Locations	Before camp establishment	Construction of campsites is not begin before approval of the layout plan	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
		Acquiring Private Land for Contractor Camp Construction	In case the land is taken from a private individual or public entity the contractor has to sign a temporary lease agreement and will follow the Project's RPF for meeting such land needs.	Contractor	Camp Locations	Before camp establishment	Community Liaison Officer	✓	✓	
8.2	Vegetation clearance	Disturbance to Flora and fauna	The Contractor shall take full care to preserve and protect from damage to native shrubbery & vegetation	Contractor	Camp Locations	At the time of the camp establishment	Minimal unnecessary damage to vegetation	✓	✓	✓
		Loss of ground vegetation	Contractor to train staff engaged in vegetation clearance.	Contractor	-	Before commencement	Training in species identification included in the contractor's training plan	✓		
		Landscape change	Before vegetation clearance, a record of the pre-project landscape situation shall be taken The Contractor shall reinstate the camp area to the original form upon completion of works.	Contractor	Camp Locations	Before camp establishment and then once after removal of each campsite	Photographs of the camp areas taken Removal of all camp facilities (including fences)	✓	✓	
		Tree Cutting of 324 number of trees	Minimize tree cutting as possible Five trees for one tree cut planted	Contractor	Entire sub-project area	Following tree cutting, during plantation and after care for one year	Five trees for one tree are planted	✓	✓	✓
8.5	Tree Cutting by Contractor Staff	Loss of habitat	Supply fuel (gas cylinders) in work camps and supplement with training to prevent labor from felling trees	Contractor	camp locations	Monthly	Cooking fuel supplied and training delivered in their use at labor camps	✓	✓	✓

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Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
8.5	Provision of the drainage line	Flooding of the campsite Unsanitary living conditions & spreading of disease	Drainage provided & maintained in campsites	Contractor	All camp Locations	Monthly	No stagnant water accumulating in or around camps	✓	✓	
8.6	Provision of camp facilities	Health, safety & well-being of the workforce	Provision of electricity supply, lighting, and electric fans. Provision of fire prevention & fighting equipment Provision of sheltered kitchen area separated from living quarters Provision of dormitories providing at least 4m ² per resident	Contractor	Main and Sub-Camp	Monthly	Reliable electricity supply, lighting, and fans provided Fire extinguishers provided Provision of sheltered kitchen separate to	✓	✓	

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
			Provision of canteens with a minimum floor space of 1.25m ² per worker using the canteen at any time Provision of roads & paths Provision of safe & reliable water supply The Contractor shall maintain and cleanse sufficient latrines for use by his employees and ensure employees do not foul the camp/site Treatment/disposal facilities for sewage				living quarters & adequately ventilated Dormitories provided with at least 4m ² floor space per resident The canteen provides at least 1.25m ² floor space per worker using the canteen at any one time Segregation of traffic and pedestrians in camp Provision of drinking water as per NDWQs Clean latrines Method for treatment of sewage to be included in the contractor's Pollution Control Plan Sewage treated before disposal Sewage is disposed of through septic and burial			
			The Contractor shall nominate a qualified Health & Safety Officer and shall prepare and implement the Health and Safety Plan			At commencement	The nomination of a Health & Safety Officer	✓	✓	

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
8.5	Hunting by Contractors' staff	Disturbance to, and loss of, wildlife	Hunting, poaching, or trapping of wildlife/game is strictly prohibited and shall be included in a Code of Conduct to be signed by all Contractors Staff	Contractor	-	During the commencement of work	Code of Conduct prepared and signed by all staff		✓	
8.6	Provision of drinking water	Depletion of local water resources	The contractor shall make his arrangements for water supply for use by his staff and in construction and install tube wells and hand pumps where required	Contractor	Camp Locations	Monthly	Water is not abstracted from local water sources such as well or hand pumps		✓	✓
8.7	Provision of generators	Air pollution	<p>Install fabric filters, cyclone control, or wet scrubbers if necessary, to ensure particulate matter emissions from batching plant do not exceed 300 mg/Nm³ (measured at source)</p> <p>Use low sulphur fuels and sorbent injection as necessary to reduce sulphur dioxide in ambient air to below 120µg/m³ (average measured over 24 hours)</p> <p>Use of catalytic or non-catalytic reduction techniques as necessary to reduce oxides of nitrogen to below 80µg/m³ (average in ambient air measured over 24 hours)</p> <p>Install generator stack at the location and of height as per World Bank Group, IFC EHS guidelines.</p>	Contractor	Main and Sub-Camps	Quarterly	<p>Air quality at any inhabited area within the sub-project area to meet NEQS for ambient air</p> <p>Air quality at any inhabited area within the sub-project area to meet NEQS for ambient air</p> <p>Air quality at any inhabited area within the sub-project area to meet NEQS for ambient air</p> <p>The generator stack installed as per World Bank Group IFC requirements.</p>		✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
8.8	Sewage Waste	Water pollution	Treatment/disposal facilities for sewage	Contractor	Camp Locations	At the commencement of Work and then on Monthly basis	Method for treatment of sewage to be included in the contractor's Pollution Control Plan Sewage treated before disposal Sewage is disposed of through burial	✓	✓	✓
Dismantling Associated Facilities										
9.1	Demolition/ Dismantling of associated activities	Impact on human health due to improper disposal of biodegradable waste such as the spread of health diseases and waste eaten by faunal species	Biodegradable waste shall be composted/buried in the ground at the approved landfill site.	Contractor	Entire Project area	Monthly (after completion of engineering works)	Landfilling or composting of biodegradable waste and is not disposal off on the ground	✓	✓	✓
		Surface and groundwater pollution	Liquid waste should be buried in a designated sanitary landfill which is to be built by the Contractor and after treatment, as per the design approved by the Engineer	Contractor	Contractor Campsite and associated facilities	Monthly (after completion of engineering works)	Sanitary or liquid is not disposed of in an open environment and without treatment.	✓	✓	✓

Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
		Depletion of Air Quality	Recyclable waste is to be handed over to recycling contractors. Combustible waste is to be burned in a burn pit or incinerator. Medical waste is to be incinerated at a nearby hospital incinerator, if any, or an equivalent facility.	Contractor	Contractor Campsite and associated facilities	Monthly (after completion of engineering works)	Air quality at any inhabited area within the sub-project area to meet NEQS for ambient air. Medical waste is not disposed of in a landfill.	✓	✓	✓
		Demolition Waste and excessive construction material	Almost all construction and demolition waste is capable of being recycled, provided the waste is segregated and separated. The recycled materials can then go on to be used for aggregate formation, landscaping, and road construction. Excessive construction material to be sold back or given to the supplier or other users.	Contractor	Sub-project area	Monthly (after completion of engineering works)	Demolition waste is not kept unattended and is removed from the site. Excessive construction materials are taken back by the supplier.	✓	✓	✓
Site Security										

10.1	Security threat	<p>Un-peaceful work environment</p> <p>The threat of unwanted incidents/accidents that may lead to stoppage of work and injuries/deaths</p>	<ul style="list-style-type: none"> • The project shall hire a security manager (Individual Consultant) who will supervise the implementation of recommended security measures and will help the project to develop further plans policies and procedures related to security for the project. • The project shall hire the services of a professional and efficient security guarding company with an adequate number of armed private security personnel for the protection of offices, contractor camps, and work sites and will work under the supervision of the security manager. • A system of key performance indicators will be agreed upon with the guarding service provider and strictly enforced to ensure the maintenance of service quality. • Where possible it will be ensured that the locals or those conversant with the area and customs must be hired for the guarding duties and thorough background checks will be done by the security company before deploying any guards at the site. • It shall be ensured that physical measures such as a fence, barriers, gates, warning signage, 	Contractor and Project PMU	Work areas and Campsite	Monthly basis	<p>Communication carried out with LEAs.</p> <p>Emergency Preparedness and Response Procedures are prepared and included in CHSP.</p> <p>Risk assessment conduct and included CHSP</p> <p>Walk through surveys conducted on daily basis before the commencement of work activity</p> <p>A security guards are hired and available all the time at the site</p> <p>Emergency drills are conducted as per the schedule given in CSHP</p> <p>Assembly area marked and visible</p> <p>Training provided</p>	✓	✓	
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			<p>and surveillance system are in place to prevent access to or passage through work areas, camps, and offices.</p> <ul style="list-style-type: none"> • The project shall ensure that the security personnel should be stationed at the entry and exit points of the sites, offices, and camps around the clock. • Perimeter walls and entry points to all facilities should be well-lit at night and where electricity is not available solar/generator-backed-up lights can be used. • The contractor will issue cards to the staff which will be checked at the entry points. The record of all the visitors will be maintained and will be checked by the OHS staff. • The contractor shall maintain communication through the employer with local police and other law enforcement agencies in the area about his construction activities especially if the construction area is near any sensitive place and movement of staff. • In case of any suspicious activity observed at the camp or worksite, the contractor staff shall immediately inform about the situation to the management and 								
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		<p>private security personnel. The private security personnel will immediately observe, report, and record the suspicious activity.</p> <ul style="list-style-type: none"> • In case of emergency, the private security personnel and site/camp management will contact police control, police station, and patrolling parties of law enforcement agencies in the respective area to tackle the issue. • The contractor shall not permit an unauthorized person to enter the working site or camp areas. Only authorized persons will be allowed to enter the work site and the camps. • The contractor shall prepare emergency evacuation procedures under their health and safety management plan. Training should be provided to all staff on different emergency situations and drills should be conducted periodically. • The emergency contact numbers of the police department, fire department, nearby hospitals, and rescue department shall be displayed at the camp sites and work areas. • The project has developed a grievance redressal mechanism for the project to resolve complaints of 								
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Table 74:Environmental Mitigation and Monitoring Plan

Items	Activities	Environmental Impact	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
			the public and project people. A public complaint centre (PCC) and a grievance redressal committee have been established for this project. The public and project staff can register their complaints related to social issues, security issues, and other aspects related to the project in the complaint centre. Their complaint will be received and resolved within a given time frame. The complaints which were not resolved by PCC will be forwarded to the grievance redressal committee (GRC) for resolution.							

Table 75: Social Mitigation and Monitoring Plan

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M& E C
Impediments to Community Movement										

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
1	Impediments to Community Movement	Blockage of community routes Community disturbance due to an increase in traffic around settlements areas	<p>The contractor's traffic management plan should include plans for the emergency transfer of members of the public to suitable medical facilities in the event of a serious accident resulting from the construction works.</p> <p>A complaints register shall be placed at the Contractor's, PIU, and Engineer's offices to address complaints.</p> <p>The blockage of local roads and routes shall be minimized. If unavoidable, consultation with the affected communities will be carried out and alternate routes (by-passes) shall be identified and advertised.</p> <p>Details of transport and medical treatment en-route are to be included in the contractor traffic management plan.</p>	Contractor	Entire Sub-Project area	Routine Basis	<p>The contractor traffic management plan shall be prepared and include alternative routes for their traffic movement.</p> <p>The key mitigation provides in this ESMP.</p>	✓	✓	✓

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
2	Labor Influx	<p>The hiring of skilled and unskilled labor</p> <p>Increased population in the area by the workforce from outside the local community.</p> <p>GBV or sexual exploitations and abuse among women and children's</p>	<p>Priority shall be given to locals for skilled and unskilled jobs.</p> <p>Respect for human rights and no violation of the rights of labor</p> <p>All camp sitting shall be 500 m away from the local community to avoid disturbance to local cultural norms.</p> <p>Adequate training to migrant labor shall be provided on the cultural norms of the local community.</p> <p>Educate and raise awareness among labor's (contractor's staff) on the civil, social, and legal rights of women, adolescents, and children about the risks of SEA, including case management support, health services, psychosocial support, police support, and security, access to legal services, and shelter, if needed.</p>	Contractor	<p>All Work areas (channel and construction sites)</p> <p>Settlements near the work areas</p> <p>Entire sub-project area</p>	<p>During the project execution phase</p> <p>Monthly basis</p> <p>During siting of camp</p> <p>Quarterly Basis</p> <p>Routine Basis</p>	<p>Skilled and unskilled labor are hired from the local community</p> <p>No labor rights are affected</p> <p>Camps are the location from community trespass area and have adequate boundary</p> <p>The contractor training plan is implemented accordingly.</p> <p>No GBV or sexual exploitations take place.</p> <p>The rights of women and children or any vulnerable groups are not affected.</p>	✓	✓	

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
4	Community Health and Safety	<p>Traffic movement around the sub-project areas</p> <p>The decline in air and water can cause health diseases asthma, skin irritation diarrhea, hepatitis B and C, and typhoid</p> <p>Safety hazards to the local community or trespassers due to bad housekeeping, movement of machinery,</p> <p>Inadequate disposal of sewerage waste</p>	<p>The contractor's Health and Safety Plan should include plans for the emergency transfer of members of the public to suitable medical facilities in the event of a serious accident</p> <p>The contractor shall not permit casual observers close to work sites</p> <p>Adequate safety measure is implemented around the worksite (i.e. barricades, safety sings)</p> <p>The contractor shall prepare a pollution prevention and control plan, which shall include a method for the disposal of sanitary waste</p>	Contractor	<p>All Worksites</p> <p>Sanitary and solid waste disposal locations</p>	<p>Monthly Basis</p> <p>During work activities</p> <p>During work activities</p> <p>During camp establishment</p>	<p>Contractor health and safety is implemented accordingly</p> <p>Health and safety officer is available full-time at the sites</p> <p>No, any waste is directly disposed of near the water bodies, channels, or on open land</p>	✓	✓	

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
	Construction Activities	Drowning risk especially for children during floods	Contractor to appoint Community Liaison Officer, and install display boards. Provide side railing in design.	Contractor	Construction Site	In design and during the commencement of works	Community awareness to be conducted	✓		

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
5	Community Disturbance	Use of community routes for the transportation of machinery and manpower	A Community Liaison Officer will be appointed full-time at the site to address community issues if any.	Contractor		Monthly basis	The contractor community liaison officer is available full time at the site.	✓	✓	✓
		Use of generators, horns, and other equipment which may cause noise pollution	The contractor shall locate its camps in which laborers shall reside overnight, at least 500m (16,25 ft)			During camp establishment	No camp is located near any settlement			
		Congestion on community routes	A complaints register shall be placed at the Contractor's, PIU, and Engineer's offices to address complaints. The register shall record measures taken in response to the complaint			Monthly Basis	The record of social complaint register is maintained and is kept at the contractor campsite			
		Use of community water resources resulting in the depletion of community water resources.	The contractors working hours shall be limited to between 6 am and 6 pm, six days a week to reduce disturbance.				Work timing is limited during the day time and the community is consulted before carrying out work activities at night time			
		Construction of contractor camps	The pressure horns will not be allowed while passing through or near communities in the sub-project area			Routine basis	No pressure horn is used by contractor staff at all times.			
		Construction carried out during night time								

Item	Social Impacts	Related Activity	Mitigation Measures	Implementing Entity	Monitoring			Monitoring body		
					Monitoring Location	Monitoring Frequency/ Duration	Monitoring Parameter (for compliant action)	PSIAC	PMU	M&E C
6	Impacts on Women, Children, the elderly, the disabled, and other Vulnerable Groups	Impacts on women and other vulnerable groups are not considered during planning, implementation, and monitoring activities	<p>In awareness-raising, women and vulnerable groups should be given priority.</p> <p>Ensure participation of women and vulnerable groups in project activities through consultations, to ensure planned investments take the well-being of such groups into consideration.</p> <p>Ensure the participation of women and vulnerable groups in social mobilization activities. Use female social organizers and social mobilizers to reach out to women and discuss impacts that have specific relevance for women.</p>	PMU, PIU, PSIAC	All Channel sites	Monthly	<p>Consultation records</p> <p>Awareness-raising records</p> <p>Social mobilization records</p>	✓	✓	✓
7	Participation of women and other groups	The voice and needs of women and other vulnerable groups do not inform project development activities	<p>Identify all direct and indirect stakeholders</p> <p>Hold meetings with all community groups. Use female social organizers and social mobilizers to encourage the participation of women in all stages of the project.</p> <p>Identify the communication mechanisms most commonly used by women and ensure these are used to impact and receive information throughout the project.</p>	PMU, PIU, PSIAC	All Channel sites	Monthly	<p>Consultation records</p> <p>Awareness-raising records</p> <p>Social mobilization records</p>	✓	✓	✓

10 Grievance Redress Mechanism (GRM)

10.1 General

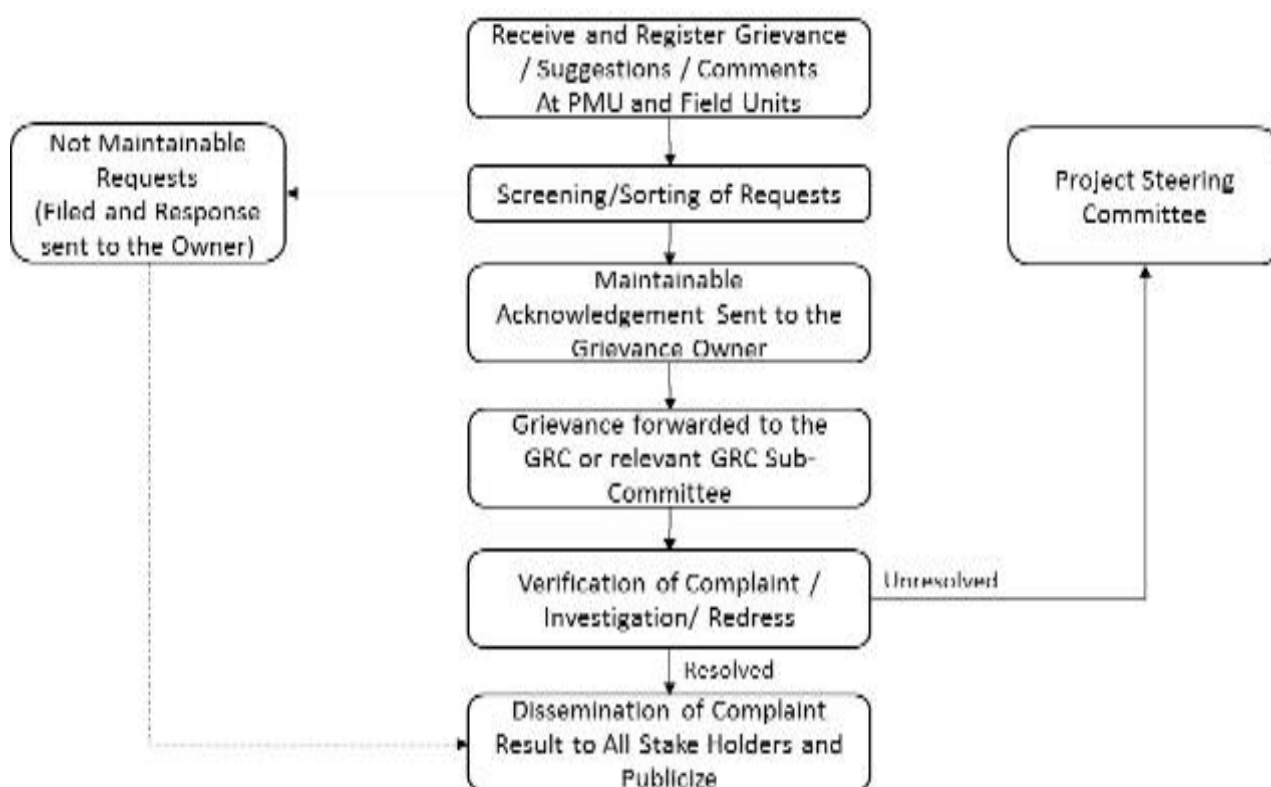
The BIWRMDP is committed to grievance redress. Effectively addressing grievances from people impacted by the projects is a core component of managing operational risk. Grievance Redress Mechanism (GRMs) will be an effective tool for early identification, assessment, and resolution of complaints such as labor issues, GBV/SH within the project staffs and communities, and other environmental and social-related issues along with anonymous grievances/complaints. The approach to Grievance Redress will be through three interlinked steps: (i) a risk-based assessment of potential grievances, disputes, or conflicts that may arise during project implementation; (ii) identification of the PMU's existing capacity for grievance redress; and (iii) an action plan that identifies mechanisms at the project level and where applicable.

The action plan will necessarily be BIWRMDP specific but would focus on tangible arrangements and steps. A key emphasis will be to support improved departmental capacity for addressing disputes that might arise from Project impacts. A firm channel and mechanism will be adopted which will include:

- 1 Access Point / Complaint Uptake - The uptake channels should be established and publicized by the PMU and where relevant, the contractors.
- 2 Grievance Recording – It will be made sure that all incidents and complaints/grievances are properly recorded and on time.
- 3 Assessment and Acknowledgment - Eligibility would be made to ensure that the issue being raised is relevant to the Project. A written response to the complainant, acknowledging receipt, and detailing the next steps will duly be done. Response to the aggrieved about the mechanism and time span or referring to the next or appropriate channel for redress will be made.
- 4 Resolution and Follow-up – All grievances would be resolved within a stipulated time span at the respective level. A follow-up of cases will be done to determine satisfaction with the process, resolution of the complaint, etc.
- 5 Record and Reporting - The PMU will provide tracking numbers to the grievances received to determine and monitor whether complaints have been redressed or not.

The Bank team would be provided the grievance data through scheduled progress reports on the status of grievance redress to support the PMU in the early identification of developing any risks by the Task Team. The issues of grievances related to project development works etc. under BIWRMDP will be reported and addressed through the PMU and locally established set-ups. The community institutions such as Water Supply Committees through their nominated Focal Persons (established under the project) will also play a role in the existing project GRM. All grievances will be recorded and within a stipulated time period, redressed.

Figure 12: Key Steps in Grievance Redress Mechanism



10.2 Objectives of the Grievance Redress Mechanism

A grievance redress mechanism (GRM), consistent with the requirements of the World Bank Operational Policies and Guidelines will be established to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances, the GRM has been designed to help achieve the following objectives:

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

The GRM will be accessible to diverse members of the community, including more vulnerable groups such as women and youth. Opportunities for confidentiality and privacy for complainants are to be honored where this is seen as important.

10.3 Principles, Procedures, and Timelines

Bearing in mind the range of possible grievances, the following three basic standards will underpin the proposed systems for handling these:

- All grievances submitted in writing to staff assigned under the proposed Public Complaints

Centre (PCC) for the project will be formally recorded, and a written acknowledgment issued to the aggrieved;

- Grievances will be dealt with on a referral basis; those that the Contractor or the Project Implementation Consultant (PISA) are unable to resolve will be referred to the Grievance Redress Committee, with a final provision for appeal to Project Director, if an issue cannot be resolved with the PMU of the project.
- Every effort will be made to address or resolve grievances within the below explained fixed time-lines, which will be an indicator against the performance of the handling system:
 - Acknowledgment of a written submission will be issued to the complainant within three working days. If not resolved earlier by the Contractor or Supervisory staff on-site;
 - Grievances will be tabled for discussion/resolution to the Project Director within one week of receipt of the written submission. The Project Director will forward it to the Grievance Redress Committee,
 - If not satisfactorily resolved by the Grievance Redress Committee; the grievance will be referred to consideration by the Secretary, Irrigation Department Government of Balochistan within 1 week.
- The cases that prove impossible to resolve through Grievance Redress Committee may be referred to as the Project Steering Committee (PSC) established under the Planning and Development Department (P&D), Government of Balochistan, comprising senior representatives from P&D, Irrigation Department. This Board will meet as needed to adjudicate on cases and either send their recommendations for endorsement to the Secretary, P&D, or refer these for legal action. Where feasible, a response will be forthcoming to such appeals within one month of submission.
- If the complainant is not satisfied, the complaint will have the option to seek redress through a court of law.

10.4 Grievance Recording and Redress Monitoring

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

10.5 Dissemination

Once finalized, procedures to be followed through the grievance handling system will be translated into local languages (Pashto and Urdu). These will be made available (in both leaflet and poster format) to all stakeholders, through the PD office and DC Sibi District.

The PD will ensure that copies of the standard grievance registration form are available with Consultants and the Contractor and are kept in sufficient numbers in local government / and area administration offices including Deputy Commissioners during the entire period of implementation. PD will also ensure that the database of all grievances submitted is updated regularly, and that information on the status of individual cases is made available as required.

10.6 Proposed Mechanism for Grievance Redress under BIWRMDP

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

- a. Grievance Focal Points (GFPs), which will be educated people from each community. The GFPs should be community members who are easily approached by the community. The GFPs will be provided training by the Social Section of the PSIAC and PMU.
- b. A Public Complaints Centre (PCC) will be established in the project office and will be responsible to receive, log, and investigate complaints;
- c. A Grievance Redress Committee (GRC) will be established in the PMU office, responsible to address grievances forwarded by the PCC

10.7 Grievance Focal Points (GFPs)

The GFPs will be educated/literate people from each community that will assist and facilitate the community members in reporting grievances resulting from project activities. The GFPs will be provided training by the PMU/ PSIAC in facilitating grievance redress. The project team will facilitate the process and the GFPs (female and male) will be selected for the scheme area.

10.7.1 The Nomination of the Focal Person for GRM at the Community Level

The BIWRMD project has constituted a GRM committee at PSIAC and PIU levels for Sibi City Water Supply Scheme. To further streamline the procedures, during community consultations at the wards, the WSCs through mutual agreement of their members, have nominated the following Focal Persons for grievance redress at the WSCs level.

Table 76: Member of GRM Focal Member

S. No	Name of village	Name of WWSCs	Name of Focal Persons
1	Shaa Abad	Ward no-35	Qaisar Khan
2	Haji Yassen Buladi	Ward no-14	Akhbar Khan
3	Malak Qahim Khan	Ward no-32	Muneer Ahmed
4	Lashari Muhala	Ward no-34	Wahid Bakhsh
5	Saddique Abad	Ward no-25	Amna Ullah
6	Mehbood Murre	Ward no-16	Kamal Khan
7	Somroo Muhala	Ward no-28	Rasool Bakhsh
8	Muhala Ghreeb Abad	Ward no-18	Habib Ullah
9	Saddad Ullah	Ward no-27	Mir Muhammad
10	Gehramzai	Ward no-04	Talha Khan
11	Harha Abad Colony	Ward no-29	Shah Nawaz
12	Malak Ghulam Sarwar	Ward no-31	Barkat Ali
13	TTC Colony	Ward no-03	Junaid Khan
14	Abdul Ghafoor Rasheed	Ward no-10	Muhammad Alam
15	Mahar Muhala	Ward no-30	Muhd Amin
16	Hashmi Masjid	Ward no-33	Muhammad Hassan

10.8 Public Complaints Centre

In its capacity as the project proponent, the PMU in consultation with the Irrigation Department, Balochistan will establish a Public Complaints Centre (PCC) in the PMU office. The PMU and the local government bodies will issue public notices to inform the public within the project area of the Grievance Redress Mechanism. The PCC's phone number, fax, address, the email address will be disseminated to the people through displays at the respective office of the Deputy Commissioner Sibi district.

The PCC will be staffed by a full-time officer from the PMU and will be independent of the PSIAC and contractor/operator. The officer should have experience and/or training in dealing with complaints and mediation of disputes. The PCC officer will have resources and facilities to maintain a complaint database and communicate with contractors, Site Engineers, PSIAC, and DC Sibi with complainants.

The PCC will be responsible to receive, log, and investigate grievances at the PCC level. However, the PCC is unable to resolve the grievances. The grievances will be referred to as GRC.

10.8.1 Role and Responsibilities of PCC

The responsibilities of the PCC are:

- a. The PCC will log the complaint and date of receipt onto the complaint database and inform the PSIAC and the Contractor;
- b. The PCC will instruct contractors and PSIAC to refer any complaints that they have received directly to the PCC. Similarly, the PCC will coordinate with local government to "capture" complaints made directly to them;
- c. The PCC, with the PSIAC and the Contractor, will investigate the complaint to determine its validity and assess whether the source of the problem is due to project activities, and identify appropriate corrective measures. If corrective measures are necessary, PCC, through the PSIAC, will instruct the Contractor to take necessary action;
- d. The PCC will inform the Complainant of the investigation results and the action taken;
- e. If the complaint is transferred from local government agencies, the PCC will submit an interim report to local government agencies on the status of the complaint investigation and follow-up action within the time frame assigned by the above agencies;
- f. The PCC will review the Contractor's response to the identified mitigation measures and the updated situation;
- g. The PCC will undertake additional monitoring, as necessary, to verify as well as review that any valid reason for a complaint does not recur.

During the complaint investigation, the PCC should work together with the Contractor and the PSIAC. If mitigation measures are identified in the investigation, the Contractor will promptly carry out the mitigation. PSIAC will ensure that the measures are carried out by the Contractor.

10.9 Grievance Redress Committee (GRC)

The GRC will function as an independent body that will regulate PCC and the grievance redress process. At the sub-project level, a GRC will be headed by the Project Director and will be comprised of a Sociologist, a Senior Engineer from PMU, and a representative from the community.

10.9.1 GRM Steps and Timeframe

Procedures and timeframes for the grievance redress process are as follows:

Stage 1: When a grievance arises, the affected person may contact the contractor/operator or GFP, directly to resolve the issue of concern. If the issue is successfully resolved, no further follow-up is required;

Stage 2: If no ad hoc solution can be found, the affected person/s will submit an oral or written complaint to the PCC by themselves or through GRM entry points (the CFP, PSIAC, and Contractor/Operator). For an oral complaint, the PCC must make a written record. For each complaint, the PCC must investigate the complaint, assess its eligibility, and identify an appropriate solution. It will provide a clear response within five (5) working days to the complainant PSIAC and Contractor. The PCC will, as necessary, through PSIAC instruct the Contractor to take corrective actions. The PCC will review the Contractor's response and undertake additional monitoring. During the complaint investigation, the PCC will work in close consultation with the Contractors, the Supervising Engineer (during construction), and the PMU representatives (during operation). The contractors during construction and the PSIAC during operation should implement the redress solution and convey the outcome to the PCC within seven (7) working days;

Stage 3: If no solution can be identified by the PCC or if the complainant is not satisfied with the suggested solution under Stage 2, the PCC will organize, within two (2) weeks, a multi-stakeholder meeting through GRC under the auspices of the PD-PMU, where all relevant stakeholders (i.e., the complainant, PSIAC, contractor/operator, relevant local government offices) will be invited. The meeting should result in a solution acceptable to all, and identify responsibilities and an action plan. The contractors during construction and the PSIAC during operation should implement the agreed-upon redress solution and convey the outcome to the PCC within seven (7) working days;

Stage 4: If the affected people are still not satisfied with the reply in Stage 4, he or she can go through local judicial proceedings.

10.10 The budget for GRM Implementation

The cost for the implementation of GRM activities of the Sibi Water Supply Scheme is estimated at PKR 1,000,000 and is provided in Section 11. The cost given will be borne by the project proponent (Client).

11 ESMP Budget

All the environmental and social management activities will be undertaken by the Contractor under the direct supervision of PSIAC. The cost of ESMP activities will be included in the Contractor Budget in accordance with the procedures defined in the Condition of Contract (CoC) of the bidding document. The cost details for the implementation of ESMP are provided below.

Table 77: ESMP Implementation Cost Estimates

S. No.	Description	Estimated Cost (PKR)	In US \$ (exchange rate 165 PKR)
1.	Preparation and Implementation of Contractor Environmental and Social Management Plan (<i>Pollution Prevention Plan (Air/Noise/Waste/Sanitary waste management plans), Traffic Management Plan, EHS training Plan</i>)	250,000 Rupees/Month X 15 months= 3,750,000 Rupees	22,727 \$
2.	Preparation and Implementation of Contractor Health and Safety Plan (<i>Detailed HSP, emergency plan</i>)	250,000 Rupees/Month X 15 months= 3,750,000 Rupees	22,727 \$
3.	Appointment of ESMP Staffing: <ul style="list-style-type: none"> • Paramedic staff • Health and Safety Officer • Environmental Officer • Human Resource Officer • Community Liaison Officer • Safety Supervisor • 	540,000 Rupees/Month X 15 months= 8,100,000 Rupees	49,090 \$
4.	Ambient Air/Water/Noise Monitoring (water testing yearly, air quality yearly, vehicle and machinery testing 1st at time of mobilization then quarterly. <i>Cost to be borne by PMU</i>)	800,000 Rupees (Lump sum for Project Duration)	4,848 \$
5.	Develop GRM Mechanism and training of GRM committees, contractor, and PSIAC staff (All expenses to be incurred in GRM implementation)	1,000,000 Rupees (<i>Cost to be borne by PMU</i>)	6060 \$
6.	Training on Covid-19, environmental health and safety, GBV and SEA, for Contractor and PSIAC staff including awareness sessions for the communities and develop printing materials to be disseminated ²⁷ .	PKR 200,000 lump-sum /event (250 number of persons, 13 trainings & 6 sessions). Total=2,600,000 (<i>Cost to be borne by PMU</i>)	15,757 \$

²⁷ Arranged and borne by PMU.

S. No.	Description	Estimated Cost (PKR)	In US \$ (exchange rate 165 PKR)
7.	Dealing with Covid-19 Emergency ²⁸	750,000 (Cost to be borne by PMU)	4545 \$
8.	Contingency ²⁹	1,000,000 (Cost to be borne by PMU)	6060 \$
9.	Plantation of 1,620 trees including after care till defect liability period	632,000	3,830 \$
10.	Total ESMP Budget	22,382,000 PKR	135,648 \$

²⁸ Dealing with medical emergency and testing kits, provision of safety kits

²⁹ For unforeseen social and environmental impact or cost adjustment required for additional budget.(i.e Covid-19)

12 Conclusions

The proposed scheme will have major positive environmental and social impacts. Once the scheme is operationalized, it will supply safe and clean drinking water to the whole city from the start to the tail end, however, tail-end users will be more beneficiary from this improved water supply system. Taking into account the improvement of vegetation coverage of the scheme, and as an environmental enhancement plan, a separate community-based tree plantation plan has been made of this scheme under the component of "Forest sub-projects" and enhanced environmental measures. In addition, the project will also create skilled/unskilled job opportunities for area residents skilled/unskilled job opportunities for a villager will be increased.

The anticipated adverse environmental and social impacts are avoided or minimized by taking necessary mitigation measures and properly implementing environmental and social monitoring plans. The overall scheme implementation will have positive impacts.

13 References

The following documents were referred to during the preparation of ESMP.

1. Bidding documents (Sibi Water Scheme).
2. Engineering Drawings (Sibi Water Supply Scheme)
3. Social Impact Assessment and Management Plan, BIWRMDP Jan 2016.
4. Environmental Assessment (EA), BIWRMDP, Jan 2016.
5. Project Appraisal Document (PAD), Jun 2016.
6. Appraisal Stage Integrated Safeguard Data Sheet (ISDS), BIWRMDP, Feb 2016.
7. The Balochistan Wildlife Protection Preservation Conservation Management Act 2014.
8. The International Union for Conservation of Nature (Red List).

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Appendix A. Study Team

Following team members were involved during the term of field visit and preparation of this ESMP.

Table A.1: Name of Team Members

S. No	Name of members	Responsibilities
1	Mr. Kaleemullah Khan Environmental Specialist PSIAC)	Conduct baseline surveys Walkthrough survey to the scheme area for environmental aspects Preparation of ESMP
2	Muhammad Arif Khan (Social Specialist-PMU)	Review social data of the scheme Review the social component of ESMP and provide support in originating the social component of the ESMP. Reviewing Socio-economic baseline, consultation, the formation of water supply committees (male and female), walkthrough surveys along with channels, involvements in a meeting of all line departments
3	Ruksana (Environmental Specialist PMU)	Review Environmental data of the scheme Review the environmental component of ESMP
4	Mr. Abdul Jabbar Kakar (Deputy Director of Environmental Protection Agency, Balochistan)	Baseline Samplings (Air/Water/Noise/Meteorological Parameters)
5	Mr. Naqeeb Ullah Kakar Community Mobilizer PSIAC	Participated in project orientation meetings, review meetings, data collection, and feeding the data in soft, initial orientation meetings with communities on project objectives and interventions, etc, keep records of each meeting and baseline surveys, etc. Supported the project teams in organizations of water supply committees' formations meetings, report writing, and keep a record in hard/soft.
6	Mr. Siraj Ahmed Community Mobilizer PSIAC	
7	Mr. Ehtesham ul Haq Social Organizer PSIAC	
8	Ms. Rizwana (Female Community Mobilizer)	Women side Community Consultations Record keeping

Field Visit Photographs

Photo 1: Public Consultation at Sibi City



Photo 3: Katch road and Abandoned railway track towards Sibi City

Photo 2: View of Vegetation cover at NRB Weir



Photo 4: View of Public consultation at Sibi City

Photo 5: U/S side of NRB Weir



Photo 6: View of landscape in Sub-Project area



Appendix B. Environmental Code of Practices (ECOPs)

The basic objective of the ESMP exercise is to minimize the adverse impacts of project interventions on the environment of the sub-project areas. The following Environmental Code of Practices (ECOPs) provides the method by which the Contractor should comply with the mitigations contained in this ESMP. The objectives of these ECOPs are to provide the best guideline practices on environmental, health, and safety during the operation phase of the sub-project.

The following ECOPs be followed best practices:

- Water resource management
- Drainage
- Waste Management
- Management of fuel and hazardous material
- Management of soil quality
- Management of air quality
- Management of Noise and vibration
- Protection of flora
- Protection of Fauna
- Health and Safety
- Traffic Management
- Management of Contractor Camp
- Water Resource Management

Table 1: ECoP for Water Resource Management

Activity	Environmental Impact	Environmental Management Guideline
Drinking water	Groundwater at shallow depths might be contaminated and hence not suitable for drinking purposes.	Tube wells will be installed with due regard to the surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross-contamination. Control the quality of the groundwater to be used for drinking water on the basis of NEQS standards for drinking water. Safe and sustainable discharges are to be ascertained prior to the selection of pumps. All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned
Construction activities in water bodies	Construction works in the water bodies will increase sediment and contaminant loading, and affect the habitat of fish and other aquatic biology.	Monitor the water quality in the runoff from the site, and improve work practices as necessary Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, stormwater systems or underground water tables. Use environment-friendly and nontoxic slurry during the construction of piles to discharge into the river. Reduce infiltration of contaminated drainage through stormwater management design Do not discharge cement and water curing used for cement concrete directly into watercourses and drainage inlets.
Discharge from construction sites	During construction both surface and groundwater quality may be deteriorated due to construction activities in	Install temporary sediment basins, where appropriate, to capture sediment-laden runoff from the site. Divert runoff from undisturbed areas around the construction site Stockpile materials away from drainage lines

Activity	Environmental Impact	Environmental Management Guideline
	the river, sewerages from construction sites and work camps. The construction works will modify ground cover and topography changing the surface water drainage patterns, including infiltration and storage of stormwater. The change in the hydrological regime leads to increased rates of runoff and in sediment and contaminant loading, increased flooding, groundwater contamination, and affect the habitat of fish and other aquatic biology.	Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, Bitumen spray waste and wastewaters from brick, concrete, and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot. Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off-site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion Ensure that roads used by construction vehicles are swept regularly to remove sediment. Water the material stockpiles (where appropriate), access roads and bare soils on an as-required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. High winds)
Handling, use, storage & disposal of hazardous material and waste	Water pollution from the storage, handling, and disposal of hazardous materials and general construction waste, and accidental spillage	Follow the management guidelines proposed in ECoPs for Waste Management and Management of Fuels & Hazardous Substances. Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter a watercourse or underground water tables

Table 2: ECoP for Drainage

Activity	Environmental Impact	Environmental Management Guideline
Excavation and earthworks, and construction yards	Lack of proper drainage for rainwater, surface water, liquid waste or wastewater owing to the construction activities harms the environment in terms of water and soil contamination and mosquito growth.	Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line Rehabilitate road drainage structures immediately if damaged by contractors' road transports. Build new drainage lines as appropriate and required for wastewater from the construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to the relevant standards before being discharged into recipient water bodies. Ensure the internal roads/hard surfaces in the construction yards/construction camps have adequate stormwater drainage to accommodate high runoff during a downpour and that there will be no stagnant water remaining in the area at the end of the downpour. Construct wide drains instead of deep drains to avoid sand deposition in the drains that will require frequent cleaning. Protect natural slopes of drainage channels to ensure adequate stormwater drains. Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem. Reduce infiltration of contaminated drainage through stormwater management design

Table 3: ECoP for Waste Management

Activity	Environmental Impact	Environmental Management Guideline
Generation of hazardous wastes	Safety, health and environmental hazards due to improper waste Management practices	<p>Collect chemical wastes in 200-liter drums (or similar sealed containers), appropriately labeled for safe transport to an approved chemical waste depot.</p> <p>Store, transport and handle all chemicals, avoiding potential environmental pollution.</p> <p>Collect hydrocarbon wastes, including lubricating oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations.</p> <p>Construct concrete or other impermeable flooring to prevent seepage in case of spills.</p> <p>Store all hazardous wastes appropriately in Bunded areas away from watercourses.</p> <p>Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction.</p>
General waste	Soil, surface water & groundwater pollution from the improper disposal of wastes.	<p>Request suppliers to minimize packaging where practicable.</p> <p>Place a high emphasis on good housekeeping practice.</p> <p>Collect and transport non-hazardous wastes to all the approved disposal sites.</p> <p>Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process.</p> <p>Develop a waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste, etc.) prior to commencing of construction and submit to PSIAC for approval.</p> <p>Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of the disposal site, so as to cause less environmental impact.</p> <p>Maintain all construction sites in a clean, tidy and safe condition and provide and maintain appropriate facilities for the temporary storage of all wastes before transportation and final disposal</p> <p>Provide refuse containers at each worksite.</p> <p>Minimize the production of waste materials through the '3 Rs' (Reduce, Recycle and Reuse) approach.</p> <p>Segregate and reuse or recycle all the wastes, wherever practical.</p>

Table 4: ECoP for Management of Fuels & Hazardous Substances

Activity	Environmental Impact	Environmental Management Guideline
Fuels and hazardous goods	Materials used in construction have the potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	<p>Put containers and drums in temporary storage in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area should preferably slope or drain to a safe collection area in the event of a spill.</p> <p>Train the relevant construction personnel in the handling of fuels and spill/pollution control procedures.</p> <p>Store dangerous goods in bunded areas on a top of a sealed plastic sheet or other impervious material away from watercourses.</p> <p>Refueling should occur only within bunded areas.</p> <p>Make available MSDS for chemicals and dangerous goods on-site.</p> <p>Transport waste of dangerous goods, which cannot be recycled, to a designated & approved disposal site.</p> <p>Prepare pollution control procedures and submit the plan to the Engineer.</p> <p>Put containers and drums in permanent storage areas on an impermeable floor that slopes in a safe collection area in the event of a spill or leak.</p>

Activity	Environmental Impact	Environmental Management Guideline
		<p>Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution.</p> <p>Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly material.</p> <p>Provide absorbent and containment material (e.g. Absorbent mats) where hazardous material is used and stored and train personnel in their correct use.</p> <p>Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use.</p> <p>Make sure all containers, drums, and tanks that are used for storage are in good condition and label with an expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur.</p> <p>Store hazardous materials above flood plain level.</p>

Table 5: ECoP for Management of Soil Quality

Activity	Environmental Impact	Environmental Management Guideline
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	Protect the toe of all stockpiles, where erosion is likely to occur, protect with silt fences, straw bales or bunds
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	<p>Strictly manage the waste management plans proposed and the storage of materials.</p> <p>Construct appropriate spill contaminant facilities for all fuel storage areas.</p> <p>Establish and maintain hazardous materials, a register detailing the location and quantities of hazardous substances, including storage, use, and disposal</p> <p>Train personnel and implement safe work practices for minimizing the risk of spillage</p> <p>Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site</p> <p>Remediate the contaminated land using the most appropriate available method</p>

Table 6: ECoP for Air Quality

Activity	Environmental Impact	Environmental Management Guideline
Construction machinery	Air quality can be adversely affected by emissions from machinery and the combustion of fuels.	<p>Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites</p> <p>Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition.</p> <p>Focus special attention on containing the emissions from generators</p> <p>Service all equipment regularly to minimize emissions</p>
Construction activities	Dust generation from construction sites, material stockpiles, and access roads is a nuisance in the environment and can be a health hazard.	<p>Minimize the extent and period of exposure of the bare surfaces</p> <p>Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary, to avoid periods of high wind and if visible dust is blowing off-site</p> <p>Water the material stockpiles & access roads on an as-required basis to minimize the production of dust. Increase the watering frequency during periods of high risk (e.g. High winds)</p> <p>Restore disturbed areas as soon as practicable by vegetation/grass-turfing</p>

Table 7: ECoP for Noise & Vibration

Activity	Environmental Impact	Environmental Management Guideline
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	<p>Notify affected people if/when noisy activities will be undertaken</p> <p>Plan activities on-site and deliveries to and from site to minimize the impact</p> <p>Monitor and analyze noise and vibration results and adjust construction practices as required.</p> <p>Notify adjacent residents prior to any typical noise event outside of daylight hours</p> <p>Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions</p> <p>Employ the best available work practices on-site to minimize occupational noise levels</p> <p>Avoid undertaking the noisiest activities at night near the residential areas</p>
Construction vehicular traffic	Increased noise levels in the project area	<p>Maintain all vehicles in accordance with manufactures maintenance procedures to ensure good working order</p> <p>Make sure all drivers will comply with the traffic codes concerning the maximum speed limit, driving hours, etc.</p>
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	<p>Appropriately site all noise-generating activities to avoid noise pollution to local residents</p> <p>Install acoustic enclosures around generators to reduce noise levels.</p> <p>Fit high-efficiency mufflers to appropriate construction equipment.</p> <p>Use the quietest available plant and equipment</p> <p>Modify equipment to reduce noise (for example, noise control kits, the lining of truck trays)</p> <p>Maintain all vehicles in accordance with manufactures maintenance procedures to ensure good working order</p>

Table 8: ECoP for Flora

Activity	Environmental Impact	Environmental Management Guideline
Vegetation clearance	Local flora is important to provide shelters for the fauna, offer fruits and/or timber/firewood and protect soil erosion. Such as damage to flora has a wide range of adverse environmental impacts.	<p>Clear only the vegetation that needs to be cleared in accordance with the designs. These measures are applicable to both the construction areas as well as for any associated activities such as sites for stockpiles, disposal of fill and construction of diversion roads, etc.</p> <p>Do not burn cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages re-growth and protection from weeds.</p> <p>Reduce disturbance to surrounding vegetation</p> <p>Use appropriate type and minimum size of the machine to avoid disturbance to adjacent vegetation.</p> <p>Get approval from the supervision consultant for the clearance of vegetation.</p> <p>Make selective and careful pruning of trees where possible to reduce the need for tree removal.</p> <p>Control noxious weeds by disposing of at a designated dump site or burn on site.</p> <p>Provide adequate knowledge to the workers regarding nature protection and the need to avoid felling trees during construction</p> <p>Supply appropriate fuel in the work camps to prevent fuelwood collection.</p> <p>Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from.</p> <p>Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil.</p>

Activity	Environmental Impact	Environmental Management Guideline
		Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetating the area at the earliest practical possible. Ensure excavation works occur progressively and re-vegetation is implemented at the earliest practicable stage

Table 09: ECoP for Fauna

Activity	Environmental Impact	Environmental Management Guideline
Construction activities	The location of construction activities can result in the loss of wildlife habitat and habitat quality Impact on migratory birds, habitat and active nests	Limit the construction works within the Col. The Contractor is not permitted to destruct active nests or eggs of migratory birds Minimize the release of oil, oil wastes or any other substances harmful to migratory birds to any waters or areas frequented by migratory birds.
Construction camps	Illegal poaching	Provide adequate knowledge to the workers regarding the protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.
Vegetation clearance	Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas	Restrict the tree removal to the minimum required. Retain tree hollows on-site, where appropriate Leave dead trees where possible as habitat for fauna Fell the hollow-bearing trees in a manner that reduces the potential for fauna mortality. After felling, hollow trees will remain unmoved overnight to allow animals to move of their own accord.
Breeding Season & Nesting	During earth works and vegetation clearance	The contractor environment officer shall survey the construction sites to eliminate the potential risk of any incident to any terrestrial, reptilian, mammals, fauna species prior to the construction works. On identification of any such nest (on ground or trees), the contractor shall immediately cease works in the area and inform the Engineer and PMU. The contractor shall erect a fence within 50ft of the nest and prohibit any works within this area until approved by the Engineer who shall arrange for an ecologist from PSAC to visit the site and assess the impact. The contractor shall not fell a tree which houses an active nest or eggs. The breeding season of the following faunal species that are Vulnerable, Near Threatened and Protected are identified below: <u>Avi-Fauna</u> <ul style="list-style-type: none"> • Greter Spotted Eagle (<i>Aquila clanga</i>)-April and May • Houbara Bustard (<i>Chlamydotis undulata</i>)-March & October • Black-tailed Godwit (<i>Limosa limosa</i>)-March to August <u>Reptiles</u> <ul style="list-style-type: none"> • Bengal Monitor (<i>Varanus bengalensis</i>)-June to September • Tortoise Afghan (<i>Testudo horsfieldii</i>)-May or June <u>Mammals</u> <ul style="list-style-type: none"> • Common Hill fox (<i>Vulpes vulpes</i>)- December or February • Chinkara (<i>Gazella bennetti</i>)-August to October & March to April

Activity	Environmental Impact	Environmental Management Guideline
		<ul style="list-style-type: none"> Desert Cat (<i>Felis Libyca</i>)-May to September

Table 10: ECoP for Health & Safety

Activity	Environmental Impact	Environmental Management Guideline
Training	Lack of awareness and basic knowledge in health care among the construction workforce, making them susceptible to potential diseases.	<p>Train all construction workers in basic sanitation and health care issues (e.g. How to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS).</p> <p>Train all construction workers in general health and safety matters, and on the specific hazards of their work Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.</p> <p>Commence malaria, HIV/AIDS and STI education campaign and compliment it with a strong condom marketing and increased access to condoms in the area</p> <p>Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on a regular basis.</p>
Accidents	Health and safety of the workforce, exasperated if adequate health care is not available	<p>Ensure health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the project area</p> <p>Document and report occupational accidents, diseases, and incidents.</p> <p>Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice.</p> <p>Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.</p> <p>Provide awareness to the construction drivers to strictly follow the driving rules</p> <p>Provide adequate lighting in the construction area</p>
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply, and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	<p>The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in Table 14 (Construction Camp Management):</p> <p>Adequate ventilation facilities</p> <p>Safe and reliable water supply. Water supply from deep tube wells that meets the national standards</p> <p>Hygienic sanitary facilities and sewerage system</p> <p>Treatment facilities for sewerage of toilet and domestic wastes</p> <p>Stormwater drainage facilities.</p> <p>Recreational and social facilities</p> <p>Safe storage facilities for petroleum and other chemicals in accordance with Table 2</p> <p>Solid waste collection and disposal system in accordance with Table 1.</p> <p>Arrangement for training</p> <p>Security fence at least two meters in height.</p> <p>-Sickbay and first aid facilities</p>
Water and sanitation facilities at the construction sites	Lack of water, sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	<p>The contractor shall provide latrines on the construction sites. The location of facilities should be at least six meters away from any storm drain system and surface waters. These latrines should be cleaned once a day.</p> <p>The contractor should provide drinking water facilities to the construction workers at all the construction sites.</p>

Activity	Environmental Impact	Environmental Management Guideline
General construction works	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, wastewater, vector transmitted diseases, etc), (ii) risk factors resulting from human behavior (e.g. STD, HIV, etc) and (iii) Road accidents from construction traffic.	Implement suitable safety standards for all workers and site visitors, which should not be less than those laid down on the international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national acts and rules of the Government of Pakistan Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas, Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty, and replacing damaged, PPE. Safety procedures include the provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job Appoint an environment, health, and safety manager to look after the health and safety of the workers Inform the local authorities responsible for health, religious and security before the commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters The Contractor shall follow the ECoPs presented in the following tables to reduce health risks to the construction workers and nearby community

Table 11: ECoP for Traffic Management

Activity	Environmental Impact	Environmental Management Guideline
Construction vehicular traffic	Increased traffic use of roads by construction vehicles will affect the movement of normal road traffics and the safety of the road-users. Accidents and spillage of fuels and chemicals	Restrict truck deliveries, where practicable, today time working hours. Restrict the transport of oversize loads. Operate road traffics/transport vehicles, if possible, at non-peak periods to minimize traffic disruptions. Enforce on-site speed limit Prepare and submit a traffic management plan to PSIAC for their approval. Include measures in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary diversions, necessary barricades, warning signs/lights, road signs, etc. Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistani Traffic Regulations. Install and maintain a display board at each important road intersection on the roads to be used during construction, which shall clearly show the following information in Urdu:

Table 12: ECoP for Camp Management

Activity	Environmental Impact	Environmental Management Guideline
Safety	Inadequate safety facilities at the construction camps may create security	Provide appropriate security personnel (police /home guard or private security guards) and enclosures to prevent unauthorized entry into the camp area.

Activity	Environmental Impact	Environmental Management Guideline
	problems and fire hazards	<p>Maintain register to keep track of personnel present in the camp at any given time.</p> <p>Encourage the use of flameproof material for the construction of the labor housing/site office. Ensure that these houses/rooms are of sound construction and capable of withstanding storms/cyclones.</p> <p>Provide the appropriate type of firefighting equipment's suitable for the construction camps</p> <p>Display emergency contact numbers clearly and prominently in strategic places in camps.</p> <p>Communicate the roles and responsibilities of labourers in case of an emergency in the monthly meetings with contractors.</p>
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply, and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	<p>Adequate housing for all workers</p> <p>Safe and reliable water supply. Water supply from tube wells that meets the national standards</p> <p>Hygienic sanitary facilities and sewerage systems. Provide separate latrines and bathing places for males and females with total isolation by a wall or by location. Female toilets should be clearly marked in a language understood by the persons using them to avoid miscommunication.</p> <p>Treatment facilities for sewerage of toilet and domestic wastes</p> <p>Stormwater drainage facilities – shallow v drains should be provided on both sides of any camp roads to drain off stormwater.</p> <p>Pave the internal roads of at least haring-bond bricks to suppress dust and to work against a possible muddy surface during monsoon.</p> <p>Provide in-house community/common entertainment facilities. The dependence of local entertainment outlets by construction staff is to be discouraged/prohibited to the extent possible.</p>
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment, such as soil or water pollution.	<p>Ensure proper collection and disposal of solid wastes within the construction camps</p> <p>Encourage waste separation by source; organic wastes in one container and inorganic wastes in another container at the household level.</p> <p>Store inorganic wastes in a safe place within the household and clear organic wastes on a daily basis to waste collectors. Establish waste collection, transportation and disposal systems supported by adequate manpower and equipment/vehicles.</p> <p>Dispose of organic wastes in a designated safe place on a daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, etc. are not attracted. Where waste is disposed of in a pit take care to protect groundwater from contamination by leachate formed due to decomposition. Cover the bed of the pit with an impervious layer of materials (clay, thin concrete) to protect groundwater from contamination.</p> <p>Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place with fencing to prevent access to children.</p> <p>Do not establish site-specific landfill sites. All solid waste will be collected and removed from the work camps and disposed of in the approval of waste disposal sites.</p>
Siting and Location of construction camps	Campsites for construction workers are important locations that have significant impacts such as health and safety hazards on local resources and	<p>Locate the construction camps in areas that are acceptable considering a balance of environmental, cultural and social aspects.</p> <p>Consider the location of construction camps away from communities in order to avoid social conflict in using natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities.</p>

Activity	Environmental Impact	Environmental Management Guideline
	infrastructure of nearby communities.	Submit to PSAC for approval a detailed layout plan for the development of construction camps showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. The local authorities responsible for health, religious and security matters shall be duly informed on the set up of camp facilities so as to maintain effective surveillance of public health, social impacts, and security.
Fuel supplies for cooking purposes	Illegal sourcing of fuelwood by construction workers will impact the natural flora and fauna	Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuelwood or other biomass. Make available alternative fuels like natural gas or kerosene to the workforce to prevent them from using biomass for cooking. Conduct awareness campaigns to educate workers in preserving the biodiversity of the project area, and relevant government regulations and punishments associated with improper wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted, including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.	Provide adequate health care facilities within construction sites. Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint a paramedic staff on site. Provide transport facility for the laborers during an emergency to be transported to the nearest hospitals. Provide initial health screening of the laborers coming from outside areas Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on a regular basis Provide adequate drainage facilities throughout the camps to ensure that disease vector habitats (stagnant water bodies, puddles) do not form. Place display boards at strategic locations within the camps containing messages on best hygienic practices
Site Restoration	Restoration of the construction camps to an original condition requiring demolition of construction camps and disposal of the material	Dismantle and remove from the site all facilities established within the construction camp, including the perimeter fence and lockable gates at the completion of the construction work. If possible, dismantle camps in phases as the work decreases (do not wait for the completion of the entire work) Give prior notice to the laborer before demolishing their camps/units Maintain the noise levels within the national standards during demolition activities Reuse the camp material to the maximum extent. Dispose of remaining debris at the designated waste disposal site. To restore the site to its original condition or to an agreed condition with the landowner defined prior to the commencement of the works (in writing).

Appendix C. Format of a Monthly Monitoring Report

Scope of Works

Provide a summary regarding the engineering activities

Summary of Non-Compliances

This section summarises the findings of the Environmental Management Plan (ESMP) compliance monitoring completed by the PSIAC under this project.

Summary of Action Required

Table XXX: Summary of Non-Compliances

S. No	Non-Compliances	Actions Required	ending Since	Status of Previous Month Non-compliances
1	Include Particular Non-Compliance Observed	Include Action Require, as per ESMP	Include Number of Months	Include so far progress made from the previous month
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Historical Review of Non-Compliances

So far the progress made and issues resolved by the contractor include a graph of the past three months. (Percentage Non-Compliance evaluated from monthly monitoring checklist)

Non-Compliances

Include specific social, Environmental Health and Safety Non-Compliances observed during the monitoring month

Provide Specific Non-Compliance (With Status)

- Provide details
- Provide Photographs
-

Action Required

- Provide a list of action required

5 Staffing and Documentation

This chapter provides the details about the key staff required and documentation required by the contractor

List of Key Staff, as per ESMP.

S. No	List of Staff	Remarks
1	Safety Supervisor	
2	Paramedic staff	
3	Health and Safety Officer	
4	Environmental Officer	
5	Human Resource Officer	
6	Community Liaison Officer	

List of Documents Required in ESMP

S. No	List of Documents	Remarks	Dated Approved
1	Traffic Management Plan		
2	Waste Management and Disposal Plan		
3	Pollution Prevention and Control Plan		
4	Training Plan		
5	Monitoring Plan		
6	Layout Plan of Main Camp		
7	Layout Plan of Sub-Camp		
8	Organization Frame Work		
9	Hazardous Waste Plan		
10	Health and Safety Plan		

Include Filled Monthly Monitoring Checklist for the month.

Appendix D. Monthly Monitoring Checklist

Site/Location: _____ Month: _____ Dated: _____				
S. No	Description	Yes	No	Comments
Health and Safety				
1.	Has a health & safety induction been provided to all staff starting this month?			
2.	Are any staff under the age of 18?			
3.	Are first aid stations/kits available at all Camp and construction sites?			
4.	Have there been any incidents/accidents this month? i. Was the accident recorded? ii. Have measures been taken/practice improved/Corrective action reports are prepared to prevent the accident reoccurring?			
5.	Is staff wearing all necessary PPE?			
6.	An adequate number of fire extinguishers available at all campsites?			
7.	Appropriate barricade, fencing erected at working areas/construction site?			
8.	Accident/incident, near misses record register available site and properly reported with corrective actions?			
9.	Guard rails or equivalent protection erected (at height or excavations) to stop falls?			
10.	Is the construction site is free from trip hazards?			
11.	Is the construction site is free from trip hazards?			
12.	Scaffolds/work platforms properly erected?			
13.	Use of harness belt?			
14.	Signage's displayed?			
15.	Emergency drills conducted?			

16.	Emergency telephone numbers displayed?			
17.	Is all staff aware of the emergency procedures?			
18.	Broken plugs, sockets, switches observed?			
19.	Frayed or defective lead observed?			
20.	Is work being carried out near exposed live electrical equipment?			
21.	Storage material Labelled correctly?			
32.	Is material data sheets available?			
33.	The danger of a falling object?			
34.	Are Drum's stacks stable?			
35.	Are training records available?			
36.	Warning notices in place to stop people using an incomplete scaffold or telephone			
37.	Individual employees from working in excavations are unsupervised?			
38.	Are workers protected from the moving parts of the machine by installing and maintaining proper guards?			
39.	At least one first aid kit is provided and kept stocked at all times at the structural site?			
40.	Has all new staff signed the Code of Conduct?			
Site Security Arrangements				
1.	Emergency Preparedness and Response Procedures prepared and included in CHSP.			
2.	Risk assessment conduct and included CHSP			
3.	Walk through survey conducted on daily basis before commencement of activity			
4.	Security guard hired and available all the time at site			
5.	Emergency drills are conducted as per schedule given in CSHP			
6.	Assembly area marked and visible			
7.	Physical measures are in place to prevent access to or passage through restricted areas, such as a fence, gates, signage, guards, fences, surveillance systems			
8.	Contact numbers at the worksite of the fire department, hospitals, and law enforcement agencies at the camp site and work areas			
9.	Training to workers on the identification of potential hazards particularly those that may be life-threatening and suspicious activity are provided			
Pollution Prevention and Control				

1.	Is cement dust spreading from the batching plant or storage areas during refilling?			
2.	Are plant and equipment being wash down outside the designated wash down areas?			
3.	Are fire extinguishers available?			
4.	Are plant & vehicle refilling only in designated and bunded areas or are drip tray used?			
Contractor Camp Sites				
1.	Are gas cylinders at labor camps provided for cooking purposes?			
2.	Is stagnant water accumulating in the camp sites?			
3.	Is reliable electricity and lighting supplied in the labor camps?			
4.	Are washing facilities including showers are provided and regularly cleaned?			
5.	Is a sheltered kitchen area provided which is separated from living quarters?			
6.	Are vehicles parked in designated parking areas at campsite?			
7.	Water sample test being conducted of each water source from an approved laboratory?			
8.	The water samples tested are safe for drinking water purpose?			
9.	All water storage tanks are covered to avoid the risk of contamination?			
10.	Are there any chemicals (waste oil, petrol, solvent) near to the drinking water point?			
11.	Are the latrines more than 50 feet away from the water drinking point?			
12.	Are fire extinguishers available at all camp site?			
13.	Are fire extinguishers periodically inspected and replaced prior to expiry			
14.	Are fire extinguisher easily accessible and their path clear			
15.	Is contractor staff using local wells or hand pumps?			
16.	Are septic provided for the disposal of sewage waste?			
17.	Is fencing provided and maintained around the camp site?			
18.	Are security guards present at project sites?			
19.	Is groundwater entering the landfill site?			
20.	Is recycling waste or medical waste disposed of in the camp site?			

21.	Is first aid box/kit facility available at camp sites?			
22.	Have littered waste been observed at camp site?			
23.	Are emergency access routes in all campsite are signed and maintained?			
24.	Floors to room are constructed of float finished concrete or other similar solid or washable material?			
25	All Labor dormitories and kitchen areas are regularly cleaned and maintained in hygiene condition?			
26	Are kitchen areas are built up/raised of smooth, easily cleanable, non-toxic and non-corrosive surface for food preparation?			
27	Are agreement with operator of municipal facilities where are used for ultimate disposal of sanitary waste			
Storage Areas				
1	Are storage areas built above flood levels and on leveled ground?			
2	Are any materials stored outside designated storage areas?			
3	Are all storage areas clearly labelled and each of the container are clearly marked?			
4	Are stockpiles of construction materials being eroded by wind?			
5	Are construction materials entering watercourses, drains or being spread along transport routes?			
6	Are storage areas built near to watercourses, drains and transport routes?			
7	Are stock pile are regularly sprinkled which have the potential to particulate matter in the locality?			
8	Is the hazardous material storage area secured, and locked when not in use?			
9	Are warning signs displayed at entrances to hazardous material stores and is necessary PPE depicted?			
10	Is the floor of the hazardous material storage area impervious and is a bund provided around it?			
11	Is the necessary PPE used when handling hazardous materials?			
12	Are any leaks or spills observed in storage areas?			
13	Are spill kits provided at storage areas?			
14	Are fire extinguishers provided at hazardous material storage areas?			

15	Is fuel stored in a double skinned bowser or surrounded by a bund on an impervious floor?			
16	Is storage area constructed on impervious floor and dike provided to avoid contamination of soil and ground?			
Traffic Management Plan				
•	Fuel or oil leaks observed from any vehicle?			
•	Are Contractor's vehicles exceeding speed limits on public highways?			
•	Are barricades, flagmen & signs provided where haulage routes cross highways?			
•	Is mud observed on route ways ?			
•	Are ruts & scars resulting from the Contractor's operations observed?			
•	Are delivery vehicles queuing on public highways?			
•	Are vehicles overloaded?			
•	Is water sprinkling is being carried out at project area?			
•	Are public highways blocked?			
•	Are any vehicles exceeding 40km/hr. on site?			
Waste Management and Disposal Plan				
•	Is waste stored in areas defined in the waste management plan?			
•	Is hazardous material safely and securely stored in a designated storage areas?			
•	Was any waste observed littering the site?			
•	Are containers segregated according to waste type?			
•	Is solid waste being disposed of in the approved site by the engineer?			
•	Are sanitary waste are safely disposed of through burial?			
•	Has any hazardous waste been disposed of through burial?			
•	Where any waste material is disposed of through burning, have all charred remains been removed			
•	Is liquid waste entering water courses?			
•	Is adequate number of waste bins provided at all camp and consruction site??			
•	Is the waste disposal burial area fenced?			

•	Is sufficient number of waste bins provided at camp and working sites?			
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Appendix E. List of Participants: Public Consultation, Formation of Water Supply Committees

Appendix E.1: Lists of Male Participants during Formations of Public Consultation & Water Supply Committees

Table E.1: List of Participants Shah Abad Ward-35

Date	Name of Participants
07/12/2020	Abdul Rauf S/O Mir Azad
	Ghulam Nabi S/O Khalil Ullah
	Surat Khan S/O Syed Ghulam Shah
	Juma Khan S/O Allah Bakhsh
	Hidayat Ullah S/O Allah Bakhsh
	Nasir Khan S/O Babrak Khan
	Abdul Qadeer S/O Abdul Kareem Adil
	Rehmat Ullah S/O Bacha Khan
	Musa Khan S/O Muhammad Umar
	Saeed Rehman S/O Khan Muhammad
	Khalil Ullah S/O Ghulam Rasool
	Dildar Ali S/O Kanda Khan
	Ishaq Khan S/O Ghulam Hussain
	Muhammad Hussain S/O Muhammad Ali
	Feroz Khan S/O Haji Abdul Ghani

Table E..2: List of Participants Sadadullah Ward-27

Date	Name of Participants
26/03/2021	Muhammad Aslam S/O Arbar Khan
	Isfaq Ali Shah S/O Asraf Ali Shah
	Muhammad Bakhsh S/O Shobahi
	Rasheed Khan S/O Shair Khan
	Ahmed Ali S/O Ghulam Mustafa
	Wazir Khan S/O Shah Mir Khan
	Muhammad Ashraf S/O Arbar Khan
	Sabir Ali S/O Meta Khan
	Hider Ali S/O Ghulam Sarwer
	Lal Bakhsh S/O Peral Khan
	Muhammad Tariq S/O Muhammad Anwer
	Ahmed Ali S/O Lal Bakhsh
	Muhammad Anwer S/O Ghulam Sarwer
	Juma Khan S/O Atta Muhammad
	Ghulam Fareed Hanbi S/O Abdul Kareem Hanbi

	Muhammad Yousaf S/O Mano Khan
	Abdul Hadi S/O
	Ali Ahmed S/O

Table E.3: List of Participants Haji Yaseen Buledi Ward-14

Date	Name of Participants
14/03/2021	Din Muhammad S/O Hidayat Ullah
	Allah Bakhsh S/O Hazar Khan
	Sajad Hussain S/O Hazoor Bakhsh
	Haji Abdul Ghaffar S/O Haji Raheem Khan
	Allah Bakhsh S/O Ali Muhammad
	Waris Ali S/O Muhammad Rafeeq
	Adan Khan S/O Muhammad Ishaq
	Haji Raheem Khan S/O Abdul Wahid
	Naseem Ahmed S/O Muhammad Tayab
	Asad Ullah S/O Ali Dad
	Abdul Samad S/O Meer Alam
	Mujeeb u Rehman S/O Rehmat
	Muhammad Mussa S/O Muhammad Bux

Table E.4: List of Participants Malik Qaim Khan Ward-32

Date	Name of Participants
15/03/2021	Muhammad Akram S/O Kareem Bakhsh
	Balegh Shair S/O Syed Muhammad
	Zaheer Ahmed S/O Taj Muhammad
	Ghulam Muhammad S/O Hamal Khan
	Manzoor Ahmed S/O Amir Bakhsh
	Qurban Ali S/O Mahe Khan
	Muhammad Murad S/O Abdul Rasheed
	Ijaz Ahmed S/O Lal Muhammad
	Akhas S/O Khasan Kumar
	Sala-u-din S/O Dost Muhammad
	Muhammad Umar S/O Ali Gul
	Najeeb Ullah S/O Shah Nawaz Khan
	Muhammad Asif S/O Mehmood Khan
	Nadeem Ahmed S/O Muhammad Yaqoob
	Mir Muhammad Ashgar S/O Mir Saleh Maree
	Ghulam Dastageer S/O Muhammad Jahangeer

Table E.5: List of Participants Lashari Mohalla Ward-34

Date	Name of Participants
17/03/2021	Jahram Darst S/O Lucky Chund
	Manak Lal S/O Shmamal
	Sehwa Ram S/O Jeha Ram
	Ajeet Kumar S/O Makhi Ram Lal
	Dehwan Chund S/O Bahbo jee Kumar

	Ghusham Dass S/O Tohta Ram
	Ahsoram Paremi S/O Wado Meel
	Ashok Kumar S/O Jashan Das
	Jehram Dars S/O Khasan

Table E.6: List of Participants Sadiqabad Ward-25

Date	Name of Participants
22/03/2021	Shakar Khan S/O Meta Khan
	Javeed Iqbal S/O Noor Muhammad
	Mehboob Ali S/O Muhammad Khan
	Shabir Ahmed S/O Abdul Rehman
	Haji Muhammad Hayat S/O Haji Abdul Majeed
	Arif Rehman S/O Abdul Rehman
	Akhlaq Ahmed S/O Fazal Haq
	Usama Shair S/O Shabir Ahmed
	Rajab S/O Budheel
	Nazeer Ahmed S/O Elahi Bakhsh
	Agha Basir Ahmed S/O Shabir Ahmed
	Sadam Hussain S/O Zahmeer Ali
	Muhammad Zubair S/O Bachal Khan

Table E.7: List of Participants Mehmood Marri Ward-16

Date	Name of Participants
22/03/2021	Atta Muhammad S/O Shafi Muhammad
	Khair Muhammad S/O Rehmat Ullah
	Ali Shair S/O Faqeer Juma Khan
	Muhammad Ismail S/O Haji Dad Muhammad
	Habib Ullah S/O Ghulam Mustafa
	Junaid Majeed S/O Abdul Majeed
	Fazal Ehali S/O Wazir Khan
	Kheramat Shah S/O Syed Sikandar Shah
	Muhammad Hayat S/O Khair Muhammad
	Manzoor Ahmed S/O Abdul Ghani

Table E.8: List of Participants Soomro Mohalla Ward-28

Date	Name of Participants
25/03/2021	Abdul Hakeem S/O Ghulam Bahoo
	Muhammad Suleman S/O Atta Muhammad
	Azghar Ali S/O Juma Khan
	Hafeez Ullah S/O Muhammad Hassan
	Muhammad Naeem S/O Muhammad Hassan
	Fazal Ahmed S/O Taj Muhammad
	Abdul Bari S/O Qaim Khan
	Abdul Ghaffor S/O Mero Khan

Table E.9: List of Participants Mohalla Ghareebabad Ward-18

Date	Name of Participants
26/03/2021	Kanya Lal S/O Kushan Chund
	Misre Chund S/O Ghoramkho Dosan
	Mohan Dhas S/O Kanya Lal
	Jawad Asad S/O Mukhtiyar Ahmed
	Muhammad Umar Manzoor S/O Manzoor Ahmed
	Allah Bakhsh S/O Gul Muhammad
	Manzoor Ahmed S/O Muhammad Din
	Sahre Chund S/O Kowal Ram
	Santoos Kumar S/O Nanak Chund
	Labnat Kumar S/O Eidan Dhas
	Muhammad Asim S/O Muhammad Buta
	Choni Lal S/O Ghotoo Mal
	Cheta Ram S/O Ghotoo Mal
	Sehas Kumar S/O Chandar Lal
	Haji Penal Khan S/O Haji Malik Dad
	Mool Chund S/O Khodo Mal

Table E.10: List of Participants Gehramzai Ward-04

Date	Name of Participants
25/03/2021	Ghulam Ali S/O Mir Ahmed
	Shafi Muhammad S/O Muhammad Amin
	Jan Muhammad S/O Meta Khan
	Nazeer Ahmed S/O Taj Muhammad
	Sumar Khan S/O Nabi Bakhsh
	Khair Ullah S/O Muhammad Arif
	Syed Haji Shah S/O Syed Muhammad Nawaz
	Mustafa S/O Abdul Khaliq
	Muhammad Ismail S/O Muhammad Ibrahim
	Muhammad Sarwer S/O Juma Khan
	Rehmat Ullah S/O Makshan Khan
	Sarwar Khan S/O Muhammad Yaqoob
	Sarfaraz Khan S/O Yaqoob
	Abdul Wahid S/O Abdullah

Table E.11: List of Participants Harhaabad Colony Ward-29

Date	Name of Participants
27/03/2021	Ghulam Rasool S/O Bahadur Khan
	Shakar Khan S/O Juma Khan
	Nisar Ahmed S/O Arbab Khan
	Ghulam Hussain S/O Bahadur Khan
	Elahi Bakhsh S/O Nabi Bakhsh
	Barakat Ali S/O Ghulam Rasool
	Noor Muhammad S/O Ghulam Hussain
	Shadi Khan S/O Khan Muhammad
	Muhammad Salman S/O Muhammad Shaban
	Taj Muhammad S/O Dad Muhammad

	Muhammad Usman S/O Muhammad Shaban
	Qurban Ali S/O Muhammad Ramazan
	Ejaz Ali S/O Muhammad Ramazan

Table E..12: List of Participants Malik Ghulam Sarwer Ward-31

Date	Name of Participants
31/03/2021	Abdul Ghafoor S/O Sarwar Khan
	Rasheed Ahmed S/O Fida Hussain
	Ubaid Ullah S/O Muhammad Usman
	Mujeeb-Ur-Rehman S/O Abdu-ur-Rehman
	Muhammad Usman S/O Ubadi Ullah
	Muhamamd Nawaz S/O Muhammad Murad
	Abdul Hakeem S/O Ghulam Bahoo
	Akhtar Hussain S/O Allah Dad
	Muhammad Yousaf S/O Pir Bakhsh
	Hayat Khan S/O Atta Muhammad
	Arbab Ali S/O Gul Muhammad
	Zeeshan Javed S/O Javed Akhtar
	Nawab Khan S/O Inayat Ullah
	Habib Ullah S/O Muhammad Usman

Table E.13: List of Participants TTC Colony Ward-03

Date	Name of Participants
04/04/2021	Shameer Khan S/O Abdul Karim
	Abdur-Ur-Rehman S/O Allah Deena
	Juma Khan S/O Aman
	Shaban S/O Muharam Khan
	Muhammad Shah Nawaz S/O Muharam Khan
	Salman Khan S/O Gul Muhammad
	Mushtaq Ahmed S/O Imam Bakhsh
	Mashooq Ali S/O Muhammad Malook
	Muhammad Salah S/O Mula Shakar
	Ghulam Mustafa S/O Khamsa Khan
	Muhammad Alam S/O Jaam Khan
	Ghulam Fareed S/O Daani Bakhsh
	Abdul Hameed S/O Lawang Khan
	Muhib Ali S/O Gul Hassan
	Zafar Ullah S/O Shameer
	Abdullah S/O Hameed Khan
	Muhammad Azim S/O Bakhtiyar Khan
	Lakir khan S/O Allah Deeta
	Abdul Hameed S/O Abdul Majeed

Table E..14: List of Participants Maher Mohalla

Date	Name of Participants
21/05/2021	Akbar Khan S/O Abdul Raseed
	Ghulam Shabeer Ahmed S/O Ghulam Yaseen
	Naveed Khan S/O Sanawal Khan
	Zahid Ali S/O Gul Hassan

	Lal Muhammad S/O Muhammad Umar
	Dur Muhammad S/O Rehmat Ullah
	Nasrullah S/O Allah Raka
	Arbab Hussain S/O Ali Nawaz
	Mir Hassan S/O Ahmed Khan

Table E.15: List of Participants Mohalla Abdul Ghafoor

Date	Name of Participants
06/04/2021	Majeed Ali S/O Muahmmad Ali
	Muneer Ahmed S/O Haji Saleh Muhammad
	Muhammad Rashed S/O Mula Bakhsh
	Syed Manzoor Shah S/O Syed Sohare Shah
	Muhammed Javeed S/O Muhammad Murad
	Ghulam Jan S/O Chata Khan
	Abdul Nabi S/O Shair Muhammad
	Gul Rehman S/O Mir Totah Khan
	Muhammad Rashed S/O Mula Bakhsh
	Muhammad Ramazan S/O Muhammad Ayoub
	Muhammad Khalil S/O Ghulam Fareed
	Abdul Sattar S/O Ghulam Khan

Table E.16: List of Participants Hashmi Masjid

Date	Name of Participants
24/05/2021	Zaheer Ahmed S/O Meta Khan
	Qaisar Khan S/O Noor Muhammad
	Fayaz Ali S/O Elahi Bakhsh
	Muhammad Anwer S/O Muhammad Akram
	Nazeer Ahmed S/O Meta Khan
	Muhammad Mohsin S/O Muhammad Hassan
	Hafeez Ullah S/O Ali Hassan
	Muhammad Ali S/O Amir Bakhsh

Appendix E.2: Lists of Female Participants during Formations of Women Water Supply Committees and Community Consultations

Table E.2.1: List of Women Participants in Hamal Abad

Date	Name of Women Participants
02/05/2021	Laila D/O Darya Khan
	Shah Gul D/O Muhammad Sadeeq
	Rashida Bibi D/O Murad Ali
	Najeema Bibi D/O Faiz Muhammad
	Shabana Bibi D/O Ismail
	Raham Bibi D/O Ahseed
	Zubaida Bibi D/O Murad Khan
	Shabana Umar D/O Muhammad Umar
	Bibi Sarah W/O Amanullah
	Rashida W/O Khan Mohammad
	Zubaida W/O Abdul Baaki
	Khair Bibi W/O Ghulam Qadir

	Zainab W/O Abubakar
	Nasiba W/O Khan Mohammad

Table E.2.2: List of Women Participants in Allahabad

Date	Name of Women Participants
02/05/2021	Khorseda Bano D/O Ghulam Hidar
	Hameeda D/O Abdul Ghaffor
	Aisa D/O Ghulam Nabi
	Mahe Khatoora D/O Ghulam Hidar
	Bibi Rasheeda D/O Abdul Wahab
	Zarena Bibi D/O Shah Nawaz
	Rukhsana D/O Aman Ullah
	Nazia Bibi D/O Allah Dena
	Mahe Zubaida D/O Allah Bakhsh
	Fareeda D/O Abdul Haleem
	Anila D/O Aman Ullah
	Khalida D/O Muhammad Ali
	Naseema D/O Abdul Ghaffor
	Rahim Bibi W/O Arz Mohammad

Table E.2.3 : List of Women Participants in Ghareebabad

Date	Name of Women Participants
23/05/2021	Mahjabeen D/O Shair Muhammad
	Hameeda Bibi D/O Ilyas Khan
	Murad Bibi D/O Shair Muhammad
	Hoor Bibi D/O Fateh Muhammad
	Latifa Bibi D/O Anwar
	Dastar Bibi D/O Musa Khan
	Jammala D/O Raheem Bakhsh
	Taj Bibi W/O Muhammad
	Sharbano W/O Imam Bukhsh
	Kazbano W/O Muhammad Sidiq
	Shah Bibi W/O Abdul Hameed

Table E.2.3: List of Women Participants in Mir Azam Khan

Date	Name of Women Participants
03/05/2021	Raseeda D/O Qaisar Khan
	Zainab D/O Mano Khan
	Almhas D/O Aziz Khan
	Nemra D/O Muhammad Arif
	Fatima D/O Muhammad Nadir
	Zarbhakt D/O Afzal
	Noor Bibi D/O Allah Dad
	Hakima D/O Shah Nawaz
	Ghulam Fatima D/O Muhammad Hiyat
	Uzma D/O Ali Shair
	Umera D/O Mano Khan
	Nehal Bibi D/O Fazil Shah
	Bibi Hoqeya D/O Mehboob Ali
	Jan Bibi D/O Muhammad Hiyat
	Khan Bibi Taj Muhammad

Table E.2.4.: List of Women Participants in SP Colony Ghareebabad

Date	Name of Women Participants
04/05/2021	Asiya D/O Sadiq Ali
	Fazila D/O Ghulam Sarwer
	Mehnaz Bibi D/O Muhammad Umar
	Meryam D/O Qadir Bakhsh
	Mehtab D/O Niaz Muhammad
	Imam Din D/O Amanullah
	Secheel Bibi D/O Bakhsh Khan
	Mameya Bibi D/O Allah Dena
	Gul Naz D/O Maryat
	Khanzade D/O Amir Bakash
	Bibi Feroza
	Zahra Bibi
	Zarkoona Bibi
	Mandai Bibi

Table E.2.5: List of Women Participants in Shah Mohammad Street

Date	Name of Women Participants
05/05/2021	Naeema D/O Muhammad Rafiq
	Rabia D/O Piyara Khan
	Murad Bibi D/O Gul Muhammad
	Nageet Anwer D/O Abdul Ghafor
	Kalsoom D/O Ahmed Khan
	Naeema D/O Muhammad Rafiq
	Rabia D/O Piyara Khan
	Murad Bibi D/O Gul Muhammad

Table E.2.5: List of Women Participants in Saddar Hanbi Mohalla

Date	Name of Women Participants
06/05/2021	Mena Bibi D/O Hiyat Khan
	Feroza D/O Ghulam Nabi
	Salima D/O Ibrahim
	Noor Bibi D/O Pir Bakhsh
	Zargana D/O Khuda Bakhsh
	Khan Bibi D/O Muhammad Qasam
	Farzana D/O Gul Muhammad
	Shama Bibi D/O Muhammad Qasam
	Mahe Sehaat D/O Khaliq Dad
	Gul Nisha D/O Atta Muhammad
	Halema Bibi D/O Khan Muhammad
	Niaz Bibi D/O Ghose Bakhsh
	Amirzade D/O Khan Muhammad

Table E.2.5: List of Women Participants in Railway Station

Date	Name of Women Participants
09/05/2021	Khosbo Nawaz D/O Muhammad Nawaz
	Safia Bibi D/O Ghulam Hussain
	Zainab Bibi D/O Ghulam Muhammad
	Rabia Bibi D/O Ahmed Yar
	Saqina Bibi D/O Nizam-u-din
	Robina D/O Haji Noor Muhammad
	Arbala Bibi D/O Manzoor Ahmed

	Sonare D/O Ali Hidar
	Kanal D/O Abful Hai

Table E.2.6: List of Women Participants in Railway Colony

Date	Name of Women Participants
07/05/2021	Nageet Bibi D/O Muhammad Yousaf
	Bibi Zainab D/O Ghose Bakhsh
	Mahi Hawa D/O Fazal Muhammad
	Gul Nisa D/O Ghulam Nabi
	Khan Zade D/O Khair Muhammad
	Bibi Fazila D/O Bhaktiar Khan
	Faiz Bibi D/O Ghose Bakhsh
	Izat Bibi D/O Allah Bakhsh
	Aesha Bibi D/O Muhammad Amin

Appendix F. Checklist of Procedures for Cultural Heritage finds

(Archaeological and Others)

1. Identify the protected sites in the project areas and ensure that there is no protected monument within 200 feet from a proposed project site. If the proposed site is not located in a notified area, and there are no apparent archaeological values associated with the site, take no further action.

2. If, during the implementation of works, unlisted cultural heritage is encountered in any form, the Irrigation and Power Department shall contact:

Directorate of Archaeology and Museums
Culture, Tourism and Archives Department, Quetta
Tel: 081-283 3595

3. If the site falls within the boundaries of a protected archaeological site or monument, then depending on its classification the relevant conservation authority (if federally protected, Department of Archaeology and Museums) will determine the level of development allowable, and the applicable conditions.

4. The Department for Irrigation and Power shall obtain written record of the assessment of the potential impacts on the site, by the Balochistan or federal Department of Archaeology and Museums – whatever the case might be.

5. The Irrigation and Power Department will liaise with the Provincial and/or Federal conservation authority to ensure that any chance finds are managed and protected.

Chance Find Procedure

Chance finds procedures which will be used during this scheme are as follows:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Antiquities Department take over;
- Notify the ESS team/supervisory Engineer who in turn will notify the Antiquities Department immediately (within 24 hours or less);
- Responsible local authorities and Antiquities Department would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Antiquities Department (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;

- Decisions on how to handle the finding shall be taken by the responsible authorities and Antiquities Department. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Antiquities Department; and
- Construction work could resume only after permission is given from the responsible local authorities and the Antiquities Department concerning safeguard of the heritage.

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

Appendix G. SOPs during Implementation of Civil Works

The following SOPs shall be followed during the implementation works.

1. Working on Site

The following SOPS shall be implemented:

- Before resuming the work, the contractor should ensure the disinfection of camp premises and this should be done on regular basis subsequently.
- Contractor representative (Project Manager) in consultation with PSIAC and PMU staff and PSIAC team shall arrange sufficient stock of PPE like coverall, face mask -N95/ surgical mask, hand sanitizer, soaps, temperature guns before the arrival of the workforce on site.
- The contractor should develop hand-washing areas for all the workers, with the facility of clean water and soap.
- Wastewater tank should be developed for the disposal of contaminated water.
- Minimize face to face meetings, on-site maximize telephonic, video, and conference calls as a replacement of physical meetings (where available).
- Maintain physical distance at least 6 feet distance with each other during the meeting.
- Use a face mask and latex gloves while maintaining physical distance
- Use a digital thermometer to screen all the personnel entering site office, site and camp areas and maintain a logbook for record-keeping of temperature readings of all the workers entering office area/building. DO NOT use a traditional mercury thermometer.
- Promote communication with staff to inform if anyone in their contact (such as within their residential area, community, market area, place of visit for work/ meeting/ religious gathering) has developed any symptoms of COVID-19 and restrict their entry to workplace or meeting with staff.
- If an individual's temperature is on the higher side and exhibits symptoms of high fever, he should be investigated by a paramedic staff for further symptoms of COVID-19.
- If an individual after examination exhibits all the symptoms of COVID-19 immediate attention should be given and contact Pak Corona Helpline (03001111166) for further guidance on an immediate basis.
- Have details of contact numbers of concerned District Health Officer (DHO), Taluka Hospital and local administration i.e., Deputy Commissioner and Assistant Commissioner. These numbers shall be displayed on notice board.
- Install sanitizer dispensers at the workplace in each room. Make sure these dispensers are regularly refilled.
- Ensure that face masks and / or paper tissues are available at workplaces, for those who develop a runny nose or cough at work, along with closed bins for hygienically disposing of them.
- Signages in local language promoting regular hand washing should be displayed at prominent locations, occupational health and safety officer and Social Officer shall make sure this.
- All persons including officers, labourers, etc. should frequently wash hands for more than 20 seconds regularly with soap or hand sanitizer.
- All bench tops, door handles, working tables, chairs, etc. should be sanitized by using alcohol-based cleaning liquids or hypochlorite-based chemicals (twice a day).

- COVID-19 waste should not dispose in an open area, and it must be contained properly and disposed of properly, through incineration only.
- All staff members should be trained for the COVID-19 waste management.
- All the waste such as face masks, gloves, and other items generated at office and campsites should be stored in a labelled marked container (Hazardous Waste) and should be stored separately in isolation after disinfection.
- In case of any worker/staff member develops the symptoms of COVID-19 he should be referred to the nearest Government facility for the testing.
- In case if any of the worker develops symptoms of COVID-19 he should be thoroughly explained about WHO's guidelines of "Home Care for Patients with COVID-19 presenting with mild symptoms and management of their contact"
- The contractor shall not allow the overage, person with diabetes, lung infection, cancer, or any other team member having chronic health issues HSE Team should check the COVID parameters of each worker before the start of work and record may be shared on the group by 9:00 am every day.
- If any worker found suspected should not be allowed on-site for work and after examination exhibits all the symptoms of COVID-19 immediate attention should be given and contact Pak Corona Helpline (03001111166) for further guidance on immediate basis.
- Daily toolbox talk should include COVID-19 preventive measures on a regular basis and preventive measures should be made mandatory for the contractors and subcontractors.
- All the team members conducting inspections should minimize their time on-site to the barest minimum necessary to ensure compliance with the Specification. DO NOT LINGER on-site and return as soon as possible to the colony.
- All staff must be sprayed and cleaned on returning to the camp and a wash facility has been set up at the site gate.
- The guards may be instructed to enforce these measures. Gloves, masks, shoes and helmet must be left at the gate after spraying.
- All the workers working on site, should be provided with protective clothing; coverall, face masks, gloves and hand sanitizers for their regular use.

2. Communication with Community

- Other forms of communication should be used; posters, pamphlets, the means used should take into account the ability of different members of the community to access them, to make sure that communication reaches these groups.
- Face to face meetings should be avoided or safe distance should be maintained.
- The community should be made aware of the procedure for entry/exit to the site, the training being given to workers, and the procedure that will be followed by the project if a worker becomes sick.
- Community as well workers should be encouraged to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

3. Material Transportation

- The temperature of the drivers, attendants, loaders, and other staff of the vehicle transporting such materials shall be monitored at entry points along with other indicators of COVID-19 that are flu, cough, and muscular pain, etc. No person(s) associated with such vehicles having any or all symptoms of COVID19 shall be allowed to enter the site or premises.

- The material like steel, wood, and cloth, iron, plastic the COVID-19 for days, therefore, all such raw material shall be properly sanitized and disinfected before entry to site or premises is granted.
- Seating arrangement of such vehicles amongst the individuals occupying it shall be such that 3 feet distance is maintained. Individuals occupying such vehicles shall wash hands with soap before entry into site or premises and, subsequently, their hands shall be sanitized.
- Raw materials, machinery, and any other material required to be processed shall be only allowed to enter the site or premises after the vehicle is completely sanitized and disinfected at the entry point.

4. Infected Persons/Team Member Isolation)

- If an individual after examination exhibits all the symptoms of COVID-19 immediate attention should be given and contact Pak Corona Helpline (03001111166) for further guidance on immediate basis.
- Allocate quarantine quarters at camp site and keep the infected person isolated from the remaining staff until the paramedic staff decides return to the wider community.
- No healthy person will be allowed to enter or access the quarantine quarter at all times not even after wearing proper PPEs.
- paramedic staff handling the infected person for initial first aid; should use following PPEs; medical masks, gown, apron, eye protection goggles or face shield (respirator N95 or FFP2 standard) and boots.

Healthcare wastes produced during the care of COVID-19 patients should be collected safely in designated containers and bags, treated and then safely disposed.

Appendix H. Certificate of Environmental (Water, Soil, Noise, Air)



Date: 6th January, 2021

Baluchistan Integrated Water Resources Management and Development Project

This is to certify that the EHS services JV ever Green Environment Laboratory (EGEL) Karachi has been conducted environmental baseline testing studies for different schemes regarding Environmental and Social Management Plan & checklists. The samples were collected in October 2020. The scope of monitoring activities by EHS JV evergreen follows.:

Baseline Sampling (Ambient Air/Noise/Water and Soil)					
S.No.	Project Site	Ambient Air Sample	Noise	Drinking Water/ Ground Water Sample	Soil Sample Chemical Test
1	Sibi Water Supply Scheme	02	02	05	02

The baseline environmental monitoring sampling as per above mentioned scope has been conducted by EHS JV Ever green as per requirement of the project. A comprehensive report of test conducted along with analysis and conclusion has been submitted to BIWRMDP, Quetta office.

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[Party of the First Part]

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Appendix I. Water Quality Results

I.1 Water Quality Testing Carried out by PMU

Table 1: Results of Surface Water Samples (NRB)

S.#	Parameter Description	NDWQs Limits	Units	Results (location 1)	Results (location 2)
Microbiological Analysis Results					
1	Total Coliform	0 cfu/100ml	cfu	275	212
2	Fecal Coliform	0 cfu/100ml	cfu	201	198
3	Escherichia Coli (E-Coli)	0 cfu/100ml	cfu	98	76
Physical & Chemical Results					
4	Color	≤15.0	TCU	1.62	1.51
5	Taste	Non objectionable	...	Acceptable	
6	Odor	Non objectionable	...	Acceptable	
7	TotalHardnessasCaCO ₃	<500.0	mg/L	315	304
8	Total Dissolved Solids(TDS)	<1000.0	mg/L	726	710
9	pH Value	6.5- 8.5	SU	8.12	8.32
10	Arsenic(As)	≤0.05	mg/L	BDL	
11	Chloride (Cl)	<250	mg/L	198	201
12	Copper (Cu)	2.0	mg/L	0.87	0.98
13	Fluoride (F)	≤1.5	mg/L	0.99	0.54
14	Mercury(Hg)	≤0.001	mg/L	BDL	
15	Nitrate(NO ₃)	≤50.0	mg/L	1.52	1.41
16	Nitrite(NO ₂)	<3.0	mg/L	0.007	0.009
17	Selenium(Se)	0.01	mg/L	BDL	
18	Sulphate (SO ₄)	250.0	mg/L	101.8	115.1
19	Zinc(Zn)	5.0	mg/L	0.21	0.36
20	Calcium(Ca)	100.0	mg/L	36.5	28.7
21	Magnesium(Mg)	50.0	mg/L	5.2	4.1
22	Potassium(K)	10.0	mg/L	3.5	3.0
23	Iron(Fe) total	0.3	mg/L	BDL	
24	Ammonia(NH ₃)	0.05- 0.5	mg/L	BDL	
25	Alkalinity total	NoGL	mg/L	201	119
26	Bicarbonate(HCO ₃)	NoGL	mg/L	135	121
27	Electrical Conductivity(EC)	NoGL	µs/cm	1241	1201
28	Total Suspended Solids(TSS)	NoGL	mg/L	28	16

Table 2: Ground Water Quality Results

S.#	Parameter Description	NDWQs Limits	Units	Location 1	Location 2	Location 3
Micro biological Analysis Results						
1	Total Coliform	0 cfu/100ml	cfu	109	120	118
2	Fecal Coliform	0 cfu/100ml	cfu	98	101	97
3	Escherichia Coli(E-Coli)	0 cfu/100ml	cfu	57	61	65
Physical & Chemical Results						
4	Color	≤15.0	TCU	0.45	0.42	0.36
5	Taste	No objectionable	...	Acceptable		
6	Odor	No objectionable	...	Acceptable		
7	Total Hardness as CaCO ₃	<500.0	mg/L	250	252	245
8	Total Dissolved Solids(TDS)	<1000.0	mg/L	570	574	581
9	pH Value	6.5- 8.5	SU	7.2	7.1	6.9
10	Arsenic(As)	≤0.05	mg/L	BDL		
11	Chloride (Cl)	<250	mg/L	110	108	112
12	Copper (Cu)	2.0	mg/L	0.38	0.36	0.33
13	Fluoride (F)	≤1.5	mg/L	0.25	0.21	0.18
14	Mercury(Hg)	≤0.001	mg/L	BDL		
15	Nitrate(NO ₃)	≤50.0	mg/L	1.7	1.74	1.74
16	Nitrite(NO ₂)	<3.0	mg/L	0.007	0.006	0.004
17	Selenium(Se)	0.01	mg/L	BDL		
18	Sulphate (SO ₄)	250.0	mg/L	1.2	1.21	1.34
19	Zinc(Zn)	5.0	mg/L	1.3	1.32	1.38
20	Calcium(Ca)	100.0	mg/L	35.6	35.4	36.2
21	Magnesium(Mg)	50.0	mg/L	4.1	4.4	5.1
22	Potassium(K)	10.0	mg/L	1.22	1.21	2.1
23	Iron(Fe) total	0.3	mg/L	BDL		
24	Ammonia(NH ₃)	0.05- 0.5	mg/L	BDL		
25	Alkalinity total	NoGL	mg/L	212	210	223
26	Bicarbonate (HCO ₃)	NoGL	mg/L	114	118	105
27	Electrical Conductivity(EC)	NoGL	μs/cm	1019	1021	1051
28	Total Suspended Solids(TSS)	NoGL	mg/L	7	5	2

I.2 Water Quality Testing Carried out by PHE Department Sibi Town

Table 3: Surface and Ground Water Results

Location (Sibi Town)		Physical Parameters							Chemical Parameter											MICRO BIOLOGICAL PARAMETERS
		NDWQs Limits																		
		Color	Taste	Odor	Turbidity	pH	Ec	TDS	Ca	Hardness	Mg	Alk	HCO3	CO3	Cl	Na	K	So4	No3	Total Coliform
S.N O	Name of Site/ Source	Unobj	Unobj	Unobj	5 NTU	6.6-8.5	uS/cm	ppm	Mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	0 cfu/100ml
							NGVS	<1000	100	<500	50	NGVS	NGVS	NGVS	250	200	10	250	≤50.0	
1	Site 1 (Channel)	Obj.	Muddy	Obj.	52.0	7.76	1120	703	44	300	45	3.9	195	0	170	146	1	175	0.8	32
2	Site 2 (Channel)	Obj	Muddy	Obj	54.0	7.72	1122	695	44	300	46	3.9	195	0	170	144	1	170	0.8	30
3	Site 3 (Channel)	Obj	Muddy	Obj	63.0	7.73	1132	690	44	310	49	3.6	190	0	160	139	1	188	0.8	29
4	Site 4 (Setting Pond)	Obj	Muddy	Obj.	58.0	7.73	1126	700	46	295	44	3.7	185	0	170	144	1	181	0.7	28
5	Site 5 (Setting Pond)	Obj	Muddy	Unobj	55.0	7.75	1128	713	45	300	48	3.8	190	0	170	148	1	186	0.7	22
6	Site 6 (Setting Pond)	Obj	Muddy	Unobj	55.0	7.75	1130	712	45	300	45	3.8	190	0	170	148	1	185	0.6	23
7	Site 7 (Sibi Town Ph1)	Obj	Unobj	Unobj	36.0	7.72	1136	717	45	310	48	3.8	190	0	170	146	1	190	0.6	26
8	Site 8 (Sibi TownPh-II)	Obj	Unobj	Unobj	34.2	7.72	1138	712	45	310	48	3.8	190	0	165	144	1	192	0.6	27

