

**WATER SECTOR CAPACITY BUILDING AND ADVISORY
SERVICES PROJECT (WCAP)**

ADDITIONAL FINANCING

**ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
(ESMP)**

**FOR STRENGTHENING AND UPGRADING
PROVINCIAL RESEARCH LABORATORIES**



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List of Acronyms

CBD	Convention on Biological Diversity
EA	Environmental Assessment
ECNEC	Executive Committee of National Economic Council
EIA	Environmental Impact Assessment
EPAs	Environmental Protection Agencies
ESMP	Environmental and Social Management Plan
GoP	Government of Pakistan
GPS	Global Positioning System
HRS	Hydraulic Research Station
IBIS	Indus Basin Irrigation System
IEE	Initial Environmental Examination
IRC	Indus River Commission
IRI	Irrigation Research Institute
KVA	Kilo Volt Ampere
PFC	Pat Feeder Canal
PID	Provincial Irrigation Department
PMPIU	Project Management & Policy Implementation Unit
SMHL	Soil Mechanics and Hydraulic Laboratory
UNCED	United Nations Conference on Environment and Development
UNFCC	United Nations Framework Convention on Climate Change
UPS	Uninterrupted Power Supply
WB	World Bank
WCAP	Water Sector Capacity Building & Advisory Services Project

EXECUTIVE SUMMARY

Introduction

The Ministry of Water and Power is implementing the Water Sector Capacity Building and Advisory Services Project (WCAP) with financial assistance from the World Bank (WB). In the context of sustainability of water resources of Indus Basin, it was also considered important to strengthen the capacity of the provincial irrigation research laboratories through imparting training to their staff, upgrading their existing facilities and providing modern equipment in the laboratories, as their research results provide input to federal policy and planning for development and management of water, power and agriculture sectors. Therefore, Provincial Irrigation Departments (PIDs) were asked to submit proposals for strengthening their capacity and upgrading their research facilities. The proposals from PIDs were considered and approved by the Planning Commission of Pakistan. The WB has agreed to provide additional financing (AF) for these activities under WCAP.

The World Bank's operational policy OP 4.01 requires that environmental and social assessment is carried out before commencing any project being considered for WB financing. The national and provincial environmental regulations also require environmental assessment to be carried out prior to commencement of any development project. Therefore, environmental and social assessment of the activities proposed by the provincial irrigation departments has been carried out with the objectives to ensure compliance with WB's environmental and social safeguards and country's environmental regulations. The purpose was to identify and evaluate the environmental and social impacts of the activities; and propose mitigation measures to avoid or manage environmental and social impacts.

The following activities were approved in PC-II by the Executive Committee of National Economic Council (ECNEC) on January 12, 2015 under sub-component A1 (*Capacity Building in regulation, policy and planning*):

- i. Upgrading the Hydraulic Research Station (HRS), Nandipur(Gujranwala) of Irrigation Research Institute (Hydraulic Wing), Lahore to build a world class center of excellence in hydraulic research and related areas;
- ii. Upgrading and strengthening capacity of Soil Mechanics Hydraulic Laboratories (SMHL) at Hyderabad and Karachi of the Directorate for Research and Hydrology in Sindh; and
- iii. Establishment of modern and computerized laboratories for survey, drawing and soil testing at Irrigation Divisions(Dera Murad Jamali and Usta Mohammad) in Balochistan.

For environmental assessment, proposed sites of development under WCAP AF were visited and extent of activities was discussed with respective staff; except the sites in Dera Murad Jamali and Usta Mohammad in Balochistan due to security advice. However, office of the Provincial Coordinator in Quetta was visited and the proposals were discussed. During site visits, environmental and social aspects were identified against a checklist of environmental and social parameters, which were considered in relation to national regulations and WB safeguard policies. Stakeholders were also consulted, particularly the Environmental Protection Agencies. Based on

assessment and consultations, the present Environmental and Social Management Plan (ESMP) has been developed.

Policy, legal and administrative frameworks for environmental assessment

The Government of Pakistan (GoP) has ratified various UN conventions which require establishment of national mechanisms for environmental assessment of projects. Therefore, adequate frameworks of environmental governance at federal, provincial and to some extent local level have been established in the country; these frameworks require environmental assessment of projects to be carried out prior to their commencement. At the national level, GoP has developed its National Environmental Policy, 2005 and National Climate Change Policy, 2012; these policies also recommend conducting environmental assessment of the development projects.

Environmental assessment regulations have been developed under federal and provincial environmental protection laws. Rules for environmental assessment have also been framed under Local Governments' legislations.

For the WB-financed projects, the operational policy OP 4.01 is the umbrella policy through which potential environmental and social impacts are identified and mitigation measures proposed. This policy provides the Bank the basis to screen projects to identify potential impacts and obligates the borrower to conduct environmental and social assessment and avoid or minimize the identified impacts of the project and also to examine the project alternatives. The present ESMP has been prepared in response to the provisions of this Policy.

Description of the planned activities

The planned activities are of national importance as these aim to improve management and development of the Indus River Basin System (IRBS) in the context of economic, social, and environmental change and need for strengthening capacity and upgrading provincial research centers to support policy and planning at federal level.

Upgrading HRS Nandipur will include a technical study by an international expert for setting a benchmark of standards in hydraulic research and identifying gaps with respect to software/equipment and training of staff in comparison with recognized international institutes of hydraulic research to develop it in to a world class center of excellence.

Upgrading SMHL at Karachi and Hyderabad and Training Institute at Kali Mori in Sindh will include provision of equipment and supplies for upgrading the laboratories. The building already exists in SMHL where this equipment will be installed. No new construction is involved; only facility improvement in the existing building will be carried out.

Establishment of laboratories for material testing and surveys in Irrigation Division of Balochistan will include some facility refurbishment within the existing buildings of Irrigation Divisions. The proposed works will include flooring, ceiling, plasters on walls, concealed electrical

wiring, painting and some repair work. The other component is procurement of hardware and equipment and imparting trainings to the staff.

None of the proposed activities involve acquisition of land or displacement of any human settlement or removal of any encroachers. Similarly, no issue of neighborhood disruption is involved as all activities will be undertaken within the office compound of departments.

The objectives of proposed activities are to improve capacity and analytical work standards and range of testing facilities for soil mechanics and hydraulic structures at existing laboratories and research stations of PIDs.

Stakeholder Consultations

Environmental Protection Agencies (EPAs) of Punjab, Sindh and Balochistan were visited and the officials dealing with environmental assessments were consulted and the planned development activities were discussed. They do not have any concerns about the proposed activities; rather, they appreciate the initiative to strengthen and upgrade irrigation research capacity of the various provinces. The staff of HRS Nandipur and SMHL Karachi and Hyderabad was also consulted and planned development activities were discussed with them. They were also appreciative of the proposed interventions and did not raise any concerns regarding environmental and or social aspects of the activities.

Potential environmental and social impacts and mitigation measures

Environmental impacts

The proposed activities do not involve acquisition of land, displacement of people, or large/medium scale construction of new buildings. Only buildings of existing laboratories and corresponding offices will be refurbished to provide a suitable working environment and to accommodate the modern laboratory equipment. The execution of such activities is not likely to have significant adverse environmental and social impacts, but some low to moderate, temporary and reversible impacts are expected. Hence the proposed activities fall under Category B of environmental assessment in accordance with the WB OP 4.01. But according to *Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000*, the planned activities of upgrading facilities by refurbishment of existing infrastructure within existing buildings do not require environmental assessment.

Refurbishing of facilities, laboratories and offices, if not properly managed, might generate a series of environmental and social impacts, such as dust and noise, air pollution, dumping of construction wastes, accidental spillage of machine oil, lubricants, paints, and solvents; and social impact like injuries due to unsafe work practices and conditions.

Upgrading of SMHL (Karachi and Hyderabad), procurement of modern equipment and instruments of material test and hydrology may have some social impacts in terms of unsafe use of machines that may cause some work related injuries.

The establishment of modern computerized survey and material testing laboratories in Divisional Engineers Offices (Usta Mohammad and Dera Murad Jamali) will not have significant adverse environmental impacts as this activity will be limited to refurbishing of the old buildings. The likely environmental impact will be time bound and reversible, low to moderate in nature like dust, noise, and spillage. The social impacts likely to be associated with refurbishment include disturbance to staff and work related occupational health and safety hazards.

Social impacts

The implementation of proposed activities is expected to have both direct and indirect positive social impacts. Direct positive social impacts of institutional capacity building will include improved working conditions in laboratories and offices. This will help in human resource development and productivity enhancement. Indirect positive impacts will relate to overall improvement of quality of water resource management, introduction of advanced technologies and techniques, creating new opportunities for material testing, surveys and hydraulic research. As a result of improved real-time hydraulic modeling and simulation, the hydrodynamics of Indus Basin can be extrapolated more realistically; this in turn will help in controlling the havocs of floods, which bring social catastrophes. The victims of such catastrophes are mostly the poor communities, hence, implementation of proposed activates will indirectly have positive impacts on poor communities. The improved quality of flood control services will have long term impacts on country's socio-economic conditions. The adverse social impacts might be associated with the labor safety and health issues in case the prescribed mitigation measures are not followed by contractors during the rehabilitation work.

Environmental and Social Management Plan (ESMP)

All the above-mentioned potential adverse impacts are site specific, relatively minor and can be efficiently managed during implementation of activities. The ESMP includes mitigation plans, the integration of environmental management cost in the bill of quantities of contractors, orientation of ESMP implementation team, monitoring and third part validation. For mitigation of environmental and social impacts of planned activities, the environmental and social impact mitigation plan with defined roles and responsibilities has been prepared, which will be implemented by the contractors and supervised by the Executive Engineers, and overseen by Team Leader, WCAP at Project Management and Policy Implementation Unit (PMPIU). Cost of ESMP implementation has been estimated as PKR 1.36 million.

1. INTRODUCTION

1.1 Introduction

The Ministry of Water and Power plans to upgrade and modernize the existing facilities of provincial irrigation research laboratories and associated facilities under its Water Sector Capacity Building and Advisory Services Project (WCAP). The proposed activities will also include refurbishing the existing facilities and infrastructure of the laboratories, which can have some negative environmental and social impacts. To address the potentially negative environmental and social impacts of the proposed activities, the present environmental and social management plan has been prepared, in accordance with the World Bank Operational Policy 4.01. The ESMP identifies the potential environmental and social impacts of the proposed activities, suggests appropriate mitigation measures, defines monitoring requirements, describes documentation protocols, and specifies sensitization and awareness raising needs for effective implementation of ESMP.

1.2 Background

The Government of Pakistan is implementing WCAP, a project of highly technical nature aiming to improve management and investment planning of water resources in the Indus River Basin. The irrigation system of Indus River Basin comprises of three major reservoirs, 16 barrages, 2 head-works, 2 siphons across major rivers, 12 inter river link canals, 45 canal systems (24 in Punjab, 14 in Sindh, five in Khyber Pakhtunkhwa and two in Balochistan) and more than 107,000 water courses. The aggregate length of the canals is about 56,073 Km. Watercourses, farm channels and field ditches cover another 1.6 million kilometers. The World Bank has also financed USD 38 Million towards implementation of this project.

For sustainability and security of water, food and energy resources, a number of projects and studies have been carried out for strengthening process of policy, planning, development and management of water resources, hydropower and agriculture. In the context of sustainability of water resources of Indus Basin, it is also important to strengthen the institutional capacity of the relevant institutions and organizations through imparting training to the relevant staff, upgrading their existing facilities by providing modern equipment in the laboratories, establishing databases and reporting cells. Therefore, Provincial Irrigation Departments (PIDs) were asked to submit their proposals for strengthening their capacity and upgrading their facilities in November, 2014, which were included in the PC II and approved by Executive Committee of National Economic Council (ECNEC) on January 12, 2015. The World Bank, based on the performance and achievements of WCAP, has agreed to provide additional financing of US\$ 35 million for activities, which were approved in the PC-II by ECNEC.

Under this additional financing to WCAP, Project Management and Policy Implementation Unit (PMPIU) at Federal Flood Commission, Ministry of Water and Power, Government of Pakistan intends to establish, upgrade and modernize the existing field stations, laboratories for material testing, irrigation, hydraulics, soil mechanics and survey facilities to strengthen the provincial institutions responsible for water resources development and management.

World Bank's Operational Policy (OP 4.01) requires that environmental and social assessment of the proposed activities is carried out prior to availing the Bank's financing facility. The national and provincial environmental regulations also require environmental assessment to be carried out prior to commencement of any development project. Therefore, an environmental and social assessment has been carried out against the terms of reference detailed in Annex-A and the present ESMP has been developed in accordance with the requirements of the WB safeguard policies.

1.3 Development objectives

The objectives of the activities planned under sub-component 1 of component A of approved PC II for additional financing to WCAP are to strengthen capacity and analytical work by upgrading the facilities of testing soil mechanics and hydraulics at existing provincial laboratories and research stations.

1.4 Development indicators

The implementation of the proposed activities will improve the working conditions and testing facilities, which in turn will improve the standards of research and investigations on soil mechanics and hydraulic structures related to Indus Basin. The development impact will be judged on the basis of the following indicators on sites:

1.4.1 Output Indicators

- i. Benchmarking of standards of hydraulic research and identification of gaps to upgrade HRS, Nandipur.
- ii. Upgrading and strengthening capacity of SMHL (Karachi and Hyderabad), Sindh by provision of modern testing equipment.
- iii. Establishment of modern computerized Survey and Material Testing Laboratories at Pat Feeder Canal Division and Kirthar Canal Division in Balochistan.

1.4.2 Impact Indicators

- i. Development of HRS Nandipur as a world class institute of hydraulic research for policy and planning of water resources management in the country.
- ii. Improved management of irrigation and protection of embankments for flood control in Sindh through improved hydraulic and soil mechanic studies.
- iii. Improved management of efficient canal irrigation in Balochistan through establishment of survey and martial testing facilities.

1.5 Objectives of ESMP

The objectives of preparation of this ESMP are to:

- i. Identify and evaluate environmental and social impacts of proposed activities.
- ii. Propose measures to avoid, mitigate, or manage such impacts; where residual impacts remain, compensate for or offset, as appropriate.
- iii. Ensure compliance with environmental regulations and WB's OP 4.01.

1.6 Scope of work

The scope of environmental and social assessment is limited to the following activities proposed for upgrading and modernization of existing facilities approved under sub-section 1 of section A of PC II for additional financing of WCAP:

- i. Upgrading of Hydraulic Research Station Nandipur.
- ii. Upgrading and strengthening capacity of Soil Mechanics and Hydraulics Laboratories at Karachi and Hyderabad.
- iii. Establishment of modern and computerized Survey and Material Testing Laboratories at Irrigation Divisions in Balochistan.

1.7 Approach and Methodology

An initial environmental screening was performed by reviewing the activities included in the proposals for upgradation of existing facilities received from provincial research institutions. Then all sites of proposed development activities were visited and extent of activities was discussed with respective staff. The two sites in Balochistan, Offices of Divisional Engineers (Dera Murad Jamali and Usta Mohammad) could not be visited due to security concerns. However, office of the Provincial Coordinator in Quetta was visited and the proposals for development were discussed. The extent of facility refurbishment was explained with the help of layout plans and photographs of both sites to identify significant environmental aspects.

Significant environmental aspects at each site were identified against a checklist of environmental and social parameters, potential impacts were assessed in the light of environmental regulations, WB's OP 4.01, and WB's Environment, Health and Safety Guidelines (EHS Guidelines).

Stakeholders were consulted, particularly the Environmental Protection Agencies. Based on that screening and consultations, environmental and social management guidelines were developed for the proponents to apply while implementing the proposed activities.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS FOR ENVIRONMENTAL ASSESSMENT

2.1 Introduction

This section deals with the relevant international agreements ratified by the Government of Pakistan, environmental policies of the Government of Pakistan and the World Bank. Legal, regulatory and administrative framework instituted by the Government of Pakistan for environmental assessment to protect the environment and the people. All the relevant provisions of these policy and legal frameworks have been duly considered in this EA study. In addition to this, the roles and responsibilities of the proponent as well as the provincial Environmental Protection Agencies (EPAs) have also been covered in this section.

2.2 International obligations

There are multilateral environmental agreements (MEAs) signed by the Government of Pakistan, which require establishment of authorities at national levels for implementation of the agreements.

2.2.1 United Nations Agenda 21

The Government of Pakistan is a signatory to the Agenda 21 since 1992. The Principle 17 of the United Nations' Agenda 21 established that EIA as a national instrument shall be undertaken for proposed activities that are likely to have significant adverse impact on the environment and are subject to a decision of competent national authority.

2.2.2 United Nations Convention on Biological Diversity

The UN Convention on Biological Diversity was signed by Pakistan in 1992 and ratified by the Cabinet on 26 July, 1994. The Convention on Biological Diversity (CBD) is an international agreement adopted at the Earth Summit, in Rio de Janeiro, in 1992 and was signed by more than 150 government leaders. The Convention is now one of the most widely ratified international treaties on environmental issues, with 188 member countries including Pakistan. The Article 14 of the CBD specifically requires environmental impact assessments (EIAs) to consider impacts on biodiversity and take mitigation measures.

2.2.3 United Nations Framework Convention on Climate Change, 1992

The Cabinet of the Government of Pakistan ratified United Nations Framework Convention on Climate Change (UNFCCC) on 26 July, 1994. More than 175 states have now ratified the Convention and so are legally bound by it. The treaty came into force on 21 March 1994 and was negotiated in a little over two years and concluded at the 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro. It concentrates on controlling the emission of greenhouse gases, such as carbon dioxide and methane. It is aimed at stabilizing changes in the climate to prevent global warming and a rise in sea level. Change in climate influences the ecology, which in turn also influences what the country cultivates and exports, and hence its balance-of-

payments position. The clause (f) of section 1 of the Article 4 of UNFCCC specifically requires impact assessments of projects.

2.3 National Policy Framework

The Ministry of Climate Change (formerly Ministry of Environment) is the responsible authority for policy making on environmental protection in Pakistan.

2.3.1 National Environment Policy, 2005

In March, 2005 Government of Pakistan launched its National Environmental Policy, which provides an overarching framework for addressing the environmental issues. Section 5 of the policy commits for integrating environment into development planning as instrument for achieving the objectives of National Environmental Policy. It further states in clause (b) of subsection 5.1 that EIA related provisions [section 12] of Environmental Protection Act of 1997 will be diligently enforced for all development projects.

2.3.2 National Climate Change Policy, 2012

In September, 2012 Government of Pakistan launched its National Climate Change Policy, environmental assessment is integrated in the preamble of the policy. The policy commits for taking appropriate measures for mitigation and adaptation to climate change through tools of environmental assessment.

2.4 World Bank Safeguard Policies

In 1998, the World Bank grouped ten of its key environmental and social policies into a set of “safeguard policies” which together are designed to provide minimal protections to the environment and vulnerable populations from negative effects of the Bank financed operations. The bank, for modernization and consolidation, has revised such policies in April, 2013. The World Bank Safeguard Policies establish mandatory standards and procedures that the borrower and the Bank must follow in preparing and implementing the bank financed projects.

2.4.1 Operational Policy 4.01 (1999)revised, 2013: Environmental Assessment

This is the umbrella policy through which potential social and environmental impacts are identified and the mitigation measures are proposed. The assessment process determines whether other safeguard policies apply. This policy provides the Bank mandate to screen projects in order to identify potential impacts early in the project cycle and categorize projects according to the level of impacts. The categories trigger varying requirements regarding pre-project studies, participation, and information disclosure. The borrower is required to conduct assessment and avoid or minimize the identified impacts of the project and also to examine the project alternatives. The borrower is required to assess not only impacts of immediate project area, but project’s “area of influence” (e.g., access roads, power lines, pipelines) as well as unplanned developments (spontaneous settlements, logging, etc.) induced by the project.

Since the proposed activities under WCAP AF are likely to have localized and reversible negative environmental and or social impacts of low to moderate intensity, this Policy is triggered and the project is classified as Environment Category B. The present ESMP has been prepared in accordance with this Policy.

2.4.2 Operational Policy 4.04 (2001): Natural Habitats

This policy establishes limits on Bank - financed projects that may impact areas with high degrees of plant and animal species and that have not been essentially modified by human activity. There will be no intervention in natural habitat; therefore OP 4.04 is not triggered.

2.4.3 Operational Policy 4.09 (1998): Pest Management

This policy promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides and sets conditions on the acquisition and use of pesticides. Since the proposed activities do not include procurement or use of agro-chemicals hence this OP is not triggered.

2.4.4 Operational Policy 4.10 (2005): Indigenous Peoples

This policy establishes standards and procedures when projects affect indigenous communities. Since the planned activities do not affect indigenous people hence this OP is not triggered.

2.4.5 Operational Policy 4.11 (1986) revised, 2013: Physical Cultural Property

This policy requires Bank projects to avoid damage to and assist in the preservation of cultural property, such as sites having archeological, paleontological, historical, religious and unique cultural values. Since the planned activities will not affect any physical cultural property hence this OP is not triggered.

2.4.6 Operational Policy 4.12 (2001) Involuntary Resettlement

This policy establishes standards and procedures for projects that displace people from their homes or cause economic displacement due to loss of land, buildings, or sources of income. Since none of the planned activities will involve resettlement hence this OP is not triggered.

2.4.7 Operational Policy 4.36 (2002): Forests

This policy establishes minimum standards on the types of forest projects that the Bank will finance. It provides for financing of commercial logging and plantations under restricted conditions. Since no intervention will be in any forest area hence this OP is not triggered.

2.4.8 *Operational Policy 4.37 (1999): Safety of Dams*

This policy establishes procedures and safety requirements for construction of new dams and for projects that depend of safe functioning of existing dams. Since no construction of dam is planned hence this OP is not triggered.

2.4.9 *Operational Policy 7.50 (2001): Projects on International Waterways*

This policy seeks to reduce potential conflict between states that border an international waterway (or a bay, gulf, etc.) over projects that may affect the use or pollute the waterway. Since feasibility study for a hydropower project is planned on Indus, which is an international waterway hence this OP is triggered.

2.4.10 *Operational Policy 7.60 (2001): Projects in Disputed Areas*

This policy establishes minimal rules for Bank - financing of projects in areas disputed by two or more states. Since no activity is planned in any disputed area hence this OP is not triggered.

2.5 Legal Framework

Pakistan has a comprehensive legal framework at federal, provincial and local level for the protection and conservation of environment. Following are the excerpts of these laws and procedures relevant to the proposed activities.

2.5.1 *Federal Environmental Law*

Pakistan Environmental Protection Act, 1997 was promulgated on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance of 1983. Section 12 of the Act provides for environmental assessment study: Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) prior to commencement of construction or operation of a project.

2.5.2 *Provincial Environmental Laws*

- i. *Balochistan Environment Protection Act, 2012* is the comprehensive law dealing with environmental matters in Balochistan, section 15 of which requires environmental assessment of projects prior to commencement.
- ii. *Punjab Environmental Protection (Amendment) Act, 2012* is the comprehensive law dealing with environmental matters in Punjab, section 12 of which requires environmental assessment of projects prior to commencement.
- iii. *Sindh Environmental Protection Act, 2014* is the comprehensive law dealing with environmental matters in Sindh, section 17 of which requires environmental assessment of projects prior to commencement.
- iv. *Balochistan Local Government Act, 2010 under clause (h) of Section 86* requires for environmental assessment of projects at planning stage.
- v. *Punjab Local Government Act, 2013* provides for protection of environment and control of pollution in section 48 and clause (h) of section 72 (Development Planning) also requires environmental impact assessment of projects. The clause (l) of Section 87 provides powers

to Municipal Corporations for control of air, water and soil pollution in accordance with federal and provincial laws and standards.

2.6 Regulatory framework

The provisions of environmental assessment in federal and provincial laws are implemented through specific regulations on environmental assessment. Provincial environmental laws have been legislated after 18th amendment in the constitution in 2010, which has devolved the subject of environment to provinces. The process of making rules and regulations at provincial level is still in process. Therefore, the federal regulations are adopted for the time being till the provincial rules and regulations are made. However, the province of Sindh has made the certain regulations.

- i. *Pakistan EPA (Review of IEE/EIA) Regulations, 2000* provide lists of projects requiring IEE and EIA and a brief description about preparation and review of environmental reports.
- ii. *Sindh EPA (Review of IEE/EIA) Regulations, 2014* regulate the implementation of section 17 Sindh Environmental Protection Act, 2014.

2.7 World Bank Group Environmental, Health and Safety Guidelines

The WBG EHSGs provide performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment. The EHS guidelines provide guidance on the following aspects.

- i) Air Emissions and Ambient Air Quality
- ii) Energy Conservation
- iii) Wastewater and Ambient Water Quality
- iv) Water Conservation
- v) Hazardous Materials Management
- vi) Waste Management
- vii) Noise
- viii) Contaminated Land

3. DESCRIPTION OF ACTIVITIES

3.1 Introduction

The planned activities approved under sub-component 1 of component A of PC II for additional financing to WCAP are of national importance as these aim to improve policy and planning capacity through upgrading and modernizing the provincial research facilities, whose research results provide input for policy and planning at federal level. The objective is strengthening institutional capacity for improved development and management of the Indus Basin Irrigation System (IBIS) in the context of economic, social, and environmental change.

The planned activities will include i) a technical study by some international expert for benchmarking and to identify gaps for technical upgrading and capacity building of staff of the Hydraulic Research Station, Nandipur (Gujranwala) to become a world class center of excellence in hydraulic research; ii) provision of modern equipment for upgrading and strengthening of soil mechanics and hydraulics laboratories in Karachi and Hyderabad, iii) supply of hardware, software and equipment for establishing modern computerized survey and material testing laboratories with interior refurbishing of facilities at Kirthar and Pat Feeder Canal Division in Balochistan. For strengthening of capacity of staff, training component is also included in the activities. There will be no civil work in Punjab and Sindh and no new construction in Balochistan, only small scale refurbishment of interiors. The details of activities are presented in the following sections.

3.2 Benchmarking, Technical Upgradation and Capacity Building of the Irrigation Research Institute (Hydraulic Wing) and Hydraulic Research Station, Nandipur (Gujranwala)

Irrigation Research Institute (IRI), Irrigation Department, Government of Punjab was established in 1924 and is the oldest and unique institution in the South Asia. The IRI is catering the need of tackling the multifarious problems related to planning, operation and management of water resources. The IRI is catering for the needs of all four provinces of the country and the other departments of federal government such as Water and Power Development Authority, National Highway Authority, Pakistan Railways and Oil and Gas Development Company Limited. Physical models for almost all the major hydraulic structures in the county were run, tested and optimized at this station. The Institute has also conducted experimental model testing studies for hydraulic structures developed in Republic of Yemen and Iran in Middle East and tested a spillway for Libya. The IRI plays an important role in the maintenance and efficient working of the vast irrigation system of the country. The malfunctioning of any part of the system is at once brought to the notice of the Institute which after model study suggests means and ways to rectify the fault in design of hydraulic structure for proper working of the system in the shortest possible time.

The Hydraulic Research Station (HRS) Nandipur, Gujranwala spread over an area of 100 acres along the left side of Upper Chenab Canal is the backbone of IRI. One third of the total area is occupied by offices and residences constructed for the staff. The remaining area is divided into 22 hydraulic model trays of different sizes. Its vision is to build a world class Center of Excellence in hydraulic research and allied areas; which is responsive to changing global scenario, and need for

sustaining and enhancing excellence in providing technological solutions for optimal and safe design of water resource structures.

Its mission is to be in the forefront in the areas of its activities with world class standards. To fulfill its mission and commitments to the emerging challenges before the nation and to be able to take up works from other developing countries as well, there is a need for continuous strengthening and upgradation of the infrastructure facilities and to develop new areas of competence. For this purpose, IRI plans to initiate an exercise on benchmarking to identify the gaps compared to the other similar institutes in the world and prepare a road map to bridge the gaps and meet country's need for applied and basic research studies in water resources, power sector and coastal engineering with world class standards. To this end, the IRI has been entrusted to conduct a technical study under the WCAP. The study will be conducted with the following objectives:

- i. To develop competence in deployment of latest technologies and to undertake new areas of research to meet the future needs for development of water resources projects in the country; and
- ii. To disseminate information, skills and knowledge for capacity building and mass awareness.

For this study, it is planned to engage an international consultant to assist IRI in the following areas:

- i. Systematically review the research infrastructure of IRI (Hydraulic Wing) to identify the gaps for making it a world class institute.
- ii. Conducting performance benchmarking regarding the quality of service currently delivered by IRI (Hydraulic Wing).
- iii. Identifying development of infrastructure facility by way of acquiring latest equipment and software and upgradation of existing facilities.
- iv. Planning for strengthening of existing areas of research and suggesting new areas of expansion in the sphere of activities of IRI (Hydraulic Wing).
- v. Planning for developing capacity of researchers by way of identifying areas and training institutions abroad in the thrust areas of research.

Expected outcome of the study will be upgradation of HRS, Nandipur regarding instrumentation will enhance the working capabilities/capacity of scientist working on hydraulic model studies of rivers, barrages, bridges and dams etc. by using these most modern electronic equipment for measurements based on computerized software operations will produce more precise results as are being used in international laboratories like Hydraulic Research Wallingford, UK, Delft Hydraulics, Netherlands and ETH Laboratories Switzerland.

3.2.1 Benchmarking of IRI (Hydraulic Wing, HRS, Nandipur)

The following tasks will be accomplished in the study:

- a) Comprehensive review of international agencies/institutes/organizations with similar mandate as IRI (Hydraulic Wing) and establish international benchmark.

- b) Status of IRI (Hydraulic Wing) will be determined vis-à-vis international benchmark.
- c) Gaps will be identified in the areas of research and the mandate of the Institute.
- d) Areas of expansion and upgradation of personnel, technology, infrastructure and equipment will be suggested.
- e) New areas of research keeping in view the national and international trends will be identified.
- f) Training programs in relevant areas will be identified.

3.2.2 Strengthening of IRI (Hydraulic Wing, HRS, Nandipur) with software/equipment and its areas of activities

- a) A benchmark of various infrastructure of the Institute and technological upgradation of different sections of IRI (Hydraulic Wing) will be marked.
- b) Specifications for the state of the art equipment along with cost will be drawn.
- c) Potential institutions for imparting trainings will be identified.
- d) Potential suppliers of the equipment globally will be identified.
- e) Proprietary equipment, if any will be identified.

3.2.3 Training of personnel at IRI (Hydraulic Wing, HRS, Nandipur)

- a) Specialized subject areas vis-à-vis institutions/organizations abroad for training of officials and detail the training course needs will be identified.
- b) IRI(Hydraulic Wing) will be assisted in corresponding with institutes for taking their consent for specialized trainings.
- c) An implementation schedule for training of personnel in national and international institutes over a period of five years during the period (2014-19) including financial implications will be drawn up.

International experts who may be invited to impart trainings at IRI (Hydraulic Wing) in the identified specialized subject areas will be identified.

3.3 Upgrading and Strengthening Soil Mechanics and Hydraulics Research Laboratories, Karachi and Hyderabad and Training Institute in Sindh

Upgrading and strengthening of Soil Mechanics and Hydraulics Laboratories (SMHL), Karachi and Hyderabad is planned under the sub-component 1 of component A of approved PC II for additional financing to WCAP. Under this activity, procurement of equipment for SMHL (Karachi and Hyderabad) will be made. The buildings already exist in SMHL where this equipment will be installed. There will be no construction work.

The Directorate of Research and Hydrology is the research wing of Irrigation Department, Government of Sindh and is an important functionary of the department as it provides the facilities of research, river survey, model studies and soil testing for the department as well as to other agencies. The functions of Research and Hydrology are carried out through following technical wings/branches:

- a) Research Division, Head Quarter at Karachi

- b) Soil Mechanic and Hydraulics Laboratory, Karachi
- c) Soil Mechanic and Hydraulics Laboratory, Hyderabad
- d) Land Reclamation Office, Hyderabad

3.3.1 *SMHL Karachi*

Soil Mechanics and Hydraulic Laboratory (SMHL) Karachi was built in 1962 over an area of five acres in Mahmoodabad, Karachi. Most of the equipment has been out dated and is out of order only few types of equipment are in working condition and existing research facilities are quite insufficient to cope with the latest problems.

3.3.2 *SMHL Hyderabad*

Soil Mechanics and Hydraulic Laboratory (SMHL) at Field Research Station; spread over 20 acres of land in Hyderabad. SMHL has been carrying out model studies of rivers, barrages, canals, river course, river bund protection and different important type of barrages and bridges since 1962. Now after more than fifty years, all its equipment and instruments has gone out of order and the lab is non-functional.

3.3.3 *Training Institute, Kali Mori, Hyderabad*

Capacity building and refresher courses for Assistant Executive Engineers, Sub-Engineers, Darogha, Aabdar and hydraulic machine operators are conducted. Currently, there are two Hydraulic Trays at the Institute with a model of Guddu Barrage and Sukkur Barrage used for demonstration to the trainees of Irrigation Department. Due to increase in the level of water table, the real time water level cannot be maintained in trays as it does not give accurate discharges.

3.4 Establishment of modern/computerized laboratories, for survey, drawing and soil testing at Irrigation Divisions of Balochistan

There are two Irrigation Divisions (Pat Feeder Canal and Kirthar Canal) comprising of 26 sub-divisions linked to IBIS in Balochistan. But there is no laboratory facility for testing of material and surveys. Therefore, establishment of modern/computerized laboratories, for survey, drawing and soil testing at both Irrigation Divisions of Balochistan is planned under sub-component 1 of component A of approved PC II for additional financing to WCAP. Under this activity, there will be four tasks described below.

3.4.1 *Facility Refurbishment*

Under this activity, Drawing Branch, Accounts Branch, Correspondence Branch at existing Divisional Engineer's Offices in both divisions will be refurbished. The refurbishment work will include flooring, ceiling, tiling, and internal electrical works; ii) computer laboratories will be established at divisional levels equipped with basic lab infrastructure such as data network cables, furniture, fixtures, iii) installation of 1.5 ton air-conditioner; iv) installation of telephone and internet facilities in both divisions.

Pat Feeder Canal Division, Dera Murad Jamali: The existing office of the Irrigation Department at Dera Murad Jamali, district Naseerabad was established over an area of 30 acres to look after the operation of Pat Feeder Canal. The building was constructed in 1969 at the time of

construction of Pat Feeder Canal (PFC) in Balochistan. The building hosts two offices; Pat Feeder Canal Division and Irrigation Circle, Dera Murad Jamali. The total area is 30 acres secured by a boundary wall. The covered area of the block, where laboratories will be established is 60x90 feet. There are 12 rooms of different sizes in the block as shown in layout plan in Figure 3.1. The total staff strength is 103. There are residences of officers and junior staff, a park and a primary school on campus. The plan is to refurbish one block of 60x90 ft. covered area, from interior with new floorings, fall ceilings and concealed electrical fittings; and upgrade the Irrigation Division with the establishment of two laboratories modern computerized survey lab and a materials testing. A portable generator 5 kVA will also be installed for backup power supply to the laboratory. This improved working environment will help in swift investigation and testing of material with quality control. The computerized survey lab will be established in the existing Drawing Branch room of Division (16'x20'). The material testing laboratory will be established in the Drawing Branch room of Circle (16'x25'). There will be no new construction; only refurbishment of the existing buildings will be carried out.

Kirthar Canal Division, Usta Mohammad: The existing office of the Irrigation Department at Usta Mohammad, district Jafarabad was established to look after the operation of Kirthar Canal in Balochistan. The building was constructed in 1970 over an area of 10 acres. There are offices and staff residences. The building hosts two offices; Kirthar Canal Division and Irrigation Circle, Usta Mohammad. The total area is five acres and covered area of the block to be refurbished is 63x82 feet. There are 12 rooms of different sizes in the block as shown in layout plan in Figure 3.2. The total staff strength is 59. The modern computerized survey laboratory will be established in existing Drawing Branch room of Division (12'x23). The material testing laboratory will be established in the Correspondence room of Circle (12'x20'). There will be no new construction; only refurbishment of the existing buildings will be carried out.

3.4.2 Procurement of Miscellaneous Equipment Hardware

Survey hardware comprising of Total Station, Global Positioning System, level machines, basic soil testing equipment and instruments such as concrete compression test machine, a digital 32X or higher level machine, jack hammer and a KVA generator will be procured.

3.4.3 Procurement of Computer Hardware

Computer hardware comprising of a laptop computer, four desktop computers, two heavy duty LaserJet network printers, one A4 and one A3 size; a flatbed scanner, a 3 Mb wired/wireless router, 2 KVA uninterrupted power supply unit and a heavy duty photocopier will be procured for each division.

3.4.4 Human Resource Development and Trainings

The relevant survey staff will be provided trainings on conducting field surveys, drawing maps with Auto Cad, modeling and design with Eagle Point.

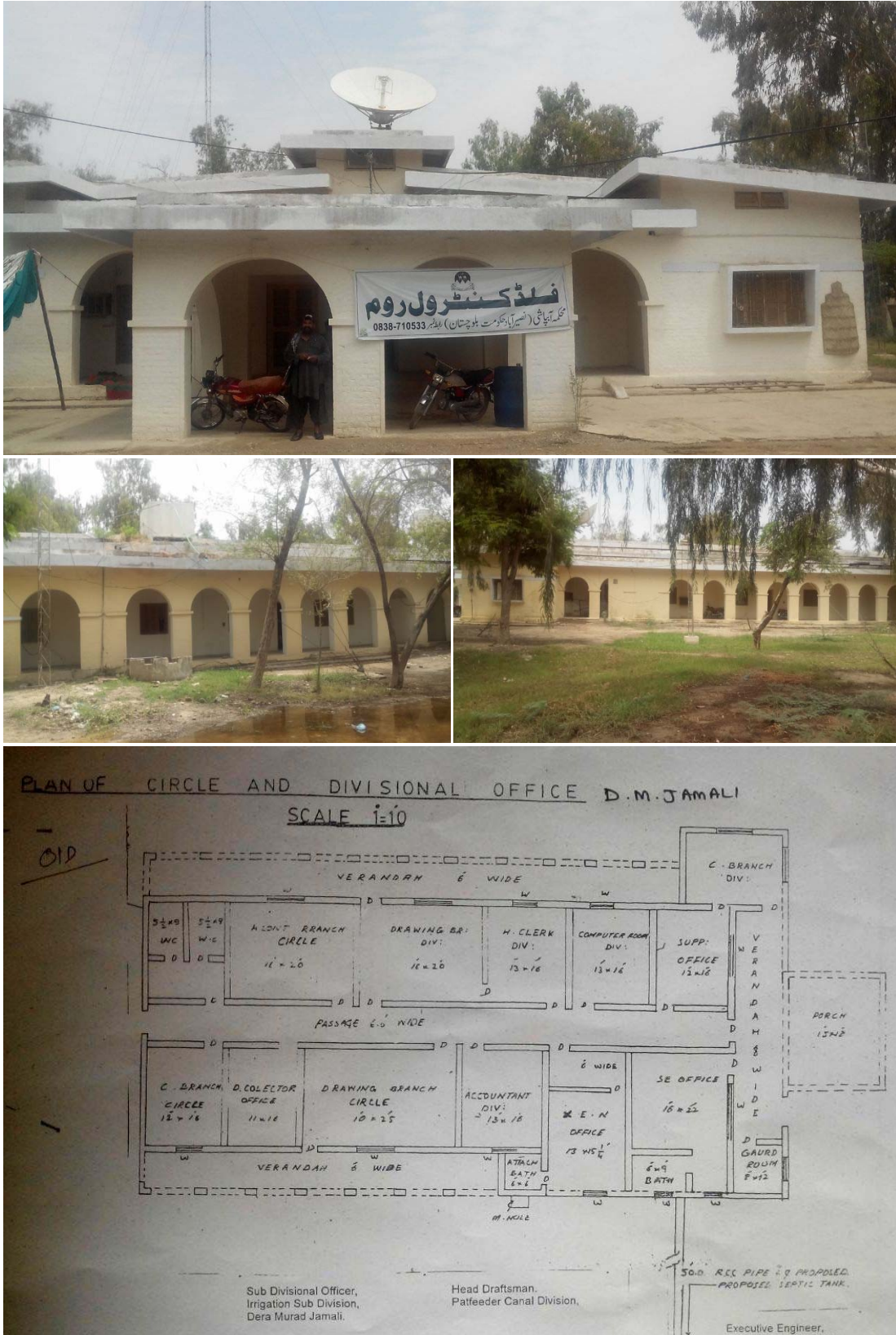


Figure 1: Elevation, sides and layout of building of PFC Division

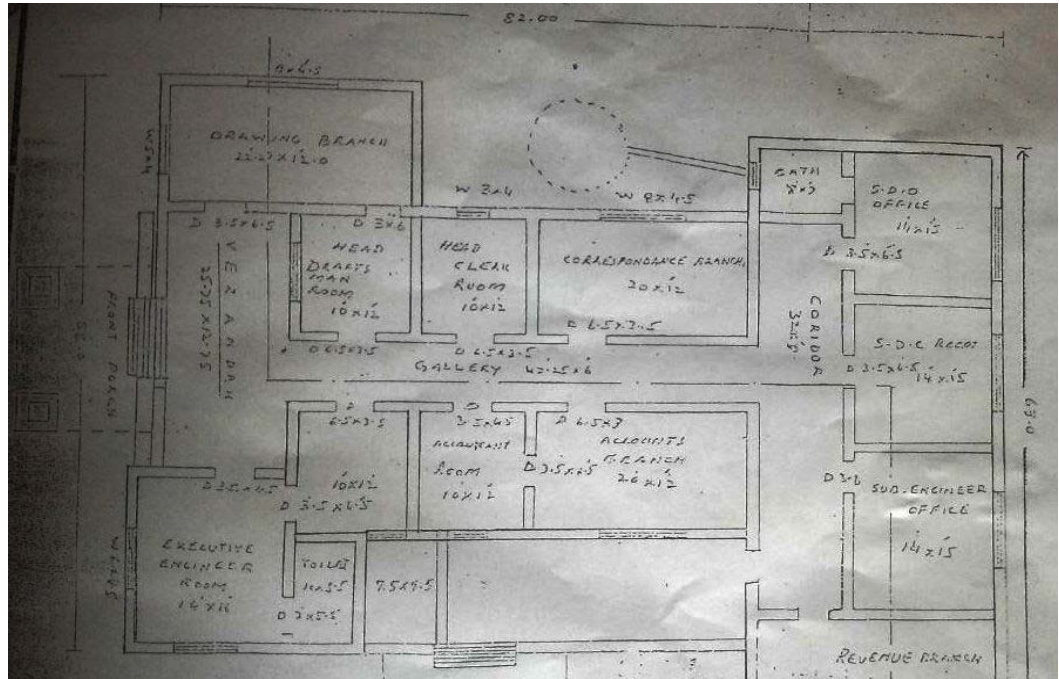


Figure 2: Elevation, sides and layout of building of Kirthar Canal Division

4. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Introduction

This section deals with the assessment of environmental impacts of planned activities and their mitigation measures. The planned activities do not involve any new construction. Only two existing blocks will be refurbished to provide a suitable ambiance for establishment of modern computerized survey and material testing laboratories at Irrigation Divisions in Balochistan. The other component is training and capacity building. The implementation of such activities is not likely to have significantly adverse environmental impacts, but some low to moderate, temporary and reversible impacts are anticipated.

4.2 Potential Impacts of Benchmarking, Technical Upgradation and Capacity Building of the IRI (Hydraulic Wing) and Hydraulic Research Station, Nandipur (Gujranwala)

Under this activity, a technical study will be conducted to establish benchmark of standards and identify gaps with respect the human and technical capacity of HRS, Nandipur (Gujranwala) to become a center of excellence in hydraulic research and other areas of irrigation. Such activity is beyond the scope of environmental assessment and no adverse environmental impact is anticipated. However, in pursuance of the recommendations of this study, envisaged infrastructural development for technical upgrading of HRS, Nandipur through expansion might have some impact on environment for which a separate environmental assessment will be carried out prior to start any project of infrastructure development and necessary mitigation measures will be taken.

4.3 Potential Impacts of Upgrading and Strengthening Soil Mechanics and Hydraulics Research Laboratories, Karachi and Hyderabad and Training Institute in Sindh

Under this activity, soil sampling and testing instruments and equipment will be procured for already existing laboratories. The procurement and supplies do not require environmental assessment. Most of the instruments are manually or mechanically operated while some of the equipment will need electric power and will not require chemicals other than normal salt, lime and water, hence they are not expected to release any fumes or chemical effluent in to the environment. Such equipment will be used for performing tests of physical nature like compaction tests, relative density, direct shear, rigid wall constant and falling head hydraulic conductivity, flexible wall hydraulic conductivity, unconfined compression, and permeability consolidation. Therefore, environmental impact at operational stage will not be significant as chemical effluent will not be used or released in performing these tests. However, negligible impacts are anticipated like noise, vibration and dust, which may be generated while using some of the equipment, which will be mitigated by following the prescribed precautions and procedures of the equipment. However, some social impact due to unsafe use of equipment at operational stage are expected, which will be mitigated by taking occupational health and safety measures, imparting training to staff and assuring compliance with safe work practices.

The toilet waste from the entire facility is discharged in the City sewerage system. The proposed activities under WCAP AF will not require any additional toilet facilities.

4.4 Potential Impacts of Establishment of modern computerized survey and material testing laboratories at Irrigation Divisions in Balochistan

The establishment of modern computerized survey and material testing laboratories will not have adverse environmental impact as the activity will be limited to refurbishing of the interiors of single floored building blocks, which do not occupy more than 10 percent of the total area of compounds/campuses of Irrigation Divisions in Usta Mohammad and Dera Murad Jamali. However, some localized environmental impact of low to moderate intensity, temporary and reversible in nature, such as dust, spillage of paints and noise of drilling machines are anticipated, which will be mitigated with good housekeeping measures such as sprinkling water, stock piling of material, disposal of debris and scarified material during work and after the work.

Refurbishing activities will also generate solid and liquid wastes including drywall, machine oil, paints, solvents, minor spills of fuel and other materials are likely to occur during refurbishment. Improper handling of on-site wastes and response to spills could result in adverse effects on the microenvironment and people. Refurbishing activities, if not properly managed, might generate a series of environmental impacts, such as dust and noise, dumping of construction wastes, accidental spillage of machine oil, lubricants, paints, and solvents.

Such low to moderate environmental impacts of refurbishing work will also be mitigated through orientation on safe work practices and good housekeeping measures with supervision. Certain noisy jobs may be carried out after office hours or on weekends.

The equipment planned to be procured for establishment of modern computerized survey laboratories is mainly computer hardware; four desktop computers, two printers, one scanners and a photocopier. The use of such hardware will not generate any chemical effluent in the environment but the use of papers in the printers and photocopier will have indirect impact on forests, which provide cellulose for paper making; the toner of the printers and copier has black carbon, which on inhalation may be harmful for users and the empty cartridges will generate solid waste. Used printer cartridges are among the most environmentally damaging things that are usually thrown away. If a printer cartridge goes in the trash, it will spend next 100 or more years in a landfill or dump as there is no landfill site in and around these districts of Balochistan. Therefore, it is expected to be dumped with other garbage and the ink of toner stored in the used printer cartridge leaches into the soil or water, which can poison the environment for centuries.

Laser printer toner cartridges contain nothing environment friendly; chemically coated metal drums, plastic parts, metal springs, and mixture of ground plastic and coloring agents that forms the toner itself. Dumped toner cartridge turns into 3.5 pounds of waste that may take between 450 and 1,000 years to break down. Approximately 97 percent of these components can be recycled or reused, so throwing empty consumables in the trash contributes to an e-waste problem.

For mitigation of such environmental impacts, many ink cartridge makers such as HP, Dell and Epson have started including a special envelop inside the package for sending back the used cartridges. Therefore, this envelop need to be kept safe until the cartridge's life is expired, then the used cartridge will be sealed and sent to manufacturer's agent in Karachi, Pakistan.

The equipment planned to be procured for establishment of soil testing laboratories for hydraulic research is mostly mechanical as tests of soil mechanics and hydraulics are physical in nature and mostly related to soil texture and movement in water rather than soil's chemical composition. Therefore, no release of fumes and effluent is expected at the operational stage. Hence, significant environmental impacts at operational stage of such equipment are not expected.

The toilet waste from the entire facility is discharged in the City sewerage system. The proposed activities under WCAP AF will not require any additional toilet facilities.

5. SOCIAL IMPACT ASSESSMENT AND STAKEHOLDER CONSULTATION

5.1 Introduction

This section deals with the assessment of social impact, their mitigation measures and stakeholders consultation. The planned activities do not involve any acquisition of land or displacement of people or deprivation of economic users. The planned activities will provide improved working conditions and socio-economic uplift due to development of institutions involved water resources management.

5.2 Benchmarking, Technical Upgradation and Capacity Building of the Research Institute (Hydraulic Wing) and Hydraulic Research Station, Nandipur (Gujranwala)

Under this activity upgradation and expansion of IRI (HW) and HRS, Nandipur will be carried out based on a technical study to be conducted to establish benchmark of standards and identify gaps with respect to human and technical capacity of HRS, Nandipur (Gujranwala) to become a center of excellence in hydraulic research and other areas of irrigation. No adverse social impact is anticipated of this scientific study rather its findings and recommendation will lead to institutional development.

5.3 Upgrading and Strengthening Soil Mechanics and Hydraulics Research Laboratories, Karachi & Hyderabad and Training Institute in Sindh

The process of procurement of equipment for soil mechanics and hydraulic laboratories is not expected to have any significant social impact. However, at operational stage, some mild and manageable social impacts related to occupational safety and health of laboratory staff, like minor injuries, back sprains and electric shocks are expected, if the laboratory staff is not trained on occupational safety and health at workplace. Such impacts may be mitigated by providing personal protection equipment and training to the staff, enforcing safe work practices by the management and supervision by the safety champion or focal person.

5.4 Establishment of modern computerized survey and material testing laboratories at Irrigation Divisions in Balochistan

The refurbishment for establishment of modern computerized survey and material testing laboratories might have some social impact such as disturbance of office staff during this activity. Please refer to the layout plans of both offices in Figure 1 and 2, the rooms of Drawing Branch and Correspondence Branch, where the laboratories will be established, in both divisions are opened on two sides, inside and outside of the blocks. The movement of labor and material for refurbishment works will be through the Veranda and not from the inside.

The Drawing branch rooms are not currently being used by staff, only old tables and drawing boards are lying idle there. This stuff will be shifted and room will be refurbished. In case, office space for some staff is still needed, there is vacant bungalow of Executive Engineer on campus at Dera Murad Jamali, where the staff will be provided office space during activity and similarly, couples of staff quarters are also vacant at Usta Mohammad. The refurbishment activity will be

carried out room by room, not all at a time, so the all staff will not be disturbed. The block is single floored, therefore no question of floor disturbance. The other social impact might be associated with occupational health and safety risks at workplace in case the safe work practices are not followed by labors and supervised by the contractor. At operational stage, some social impacts on health of workers like slip, trip or injury are expected if unsafe practices or unsafe conditions were not controlled. Such social impacts may be mitigated by training of staff, use of PPE and supervision by the respective Assistant Director of the laboratory.

However, the implementation of planned activities is expected to generate a number of both direct and indirect positive social impacts. Direct positive social impacts of institutional capacity building will improve working conditions in laboratories and offices. This will help in human resource development and productivity enhancement. Indirect positive impacts will relate to overall improvement of quality of water resource management, introduction of advanced technologies and techniques, creating new opportunities for material testing, surveys and hydraulic research. As a result of improved real-time hydraulic modeling and simulation, the hydrodynamics of Indus Basin can be extrapolated more realistically; this in turn will help in controlling the havocs of floods, which bring social catastrophes. The victims of such catastrophes are mostly the poor communities, hence, implementation of proposed activates will indirectly have positive impacts on poor communities. The improved quality of flood control services will have long term impacts on country's socio-economic conditions.

5.5 Stakeholder's Consultation

A mission from July 5 – 11 was carried out for on-site environmental assessment of planned activities approved under sub-component A of component 1 of approved PC II for additional financing of WCAP. Employees of the research laboratories were consulted, in case there is any issue with implementation of the planned activities.

5.5.1 Benchmarking, Technical Upgradation and Capacity Building of the Research Institute (Hydraulic Wing) and Hydraulic Research Station, Nandipur (Gujranwala)

On Saturday, 11 July, 2015, Visit to Irrigation Research Institute, Nandipur and meeting with Chief Engineer, Waqar Hussain Waraich and SDO, Field Sub-Division was held, which was followed by an onsite visit to the existing facilities at the Field Research Station.

The District Officer (Environment) at Gujranwala Rana Asghar Ali was consulted and planned activities were explained. He informed that for such technical study in Punjab, there is no regulatory requirement. He also consulted his Director at Lahore on telephone, Director (EIA) of EPA Punjab Nasimur Rehman, he responded that we have nothing to do with such activity, except as a result of recommendation in this study some new development will commence.

5.5.2 Upgrading & Strengthening Soil Mechanics and Hydraulics Research Laboratories, Karachi & Hyderabad and Training Institute in Sindh

On Tuesday, 7th July, 2015 a meeting with Chief Engineer (Kotri Barrage), Ahmad Junaid Memon, Director, Hydrology and Research in Sindh, Zulfiqar Ali Nizamani and Executive

Engineer (Research Division) Mumtaz Ali Soomro was held in the office of the Chief Engineer, Hyderabad to discuss the plan of upgrading Soil Mechanics and Hydraulics Laboratories at Hyderabad and Karachi. A meeting with the Director and staff of the Irrigation Institute, Kali Mori was held for consultation about the planned upgrading of laboratory through supply of modern equipment.

The Regional Director (Hyderabad) of Sindh EPA Munir Ahmad Abbasi and his Assistant Director Shafiullah Laghari were consulted and they responded that the cases of environmental assessment are dealt from Head office of EPA at Karachi.

On Wednesday, 8th July, 2015, the SMHL, Karachi was visited for consultation with, Executive Engineer (Research Division) Mumtaz Ali Soomro and In-charge of the SMHL, Ghulam Akbar Junejo. The staff was consulted and all were happy to learn about this development activity.

Deputy Director (IEE) at EPA Office Karachi Waris Ali Gabol was consulted, and he informed that in case of supply of equipment, we only ensure that used equipment carrying hazardous waste in violation of Basel Convention is not being procured. For new equipment, there is no requirement of approval from EPA.

5.5.3 Establishment of modern computerized survey and material testing laboratories at Irrigation Divisions in Balochistan

Offices of Irrigation Divisions Dera Murad Jamali and Usta Mohammad could not be visited due to security advice. However, office of the Provincial Coordinator in Quetta was visited and the proposals for development were discussed. The extent of facility refurbishment was explained with the help of layout plans and photographs of both sites to identify significant environmental aspects

The Director (Enforcement) Tahir Khan Durrani and Deputy Director (NEQS) Muhammad Khan Uthmankhel were consulted and they were also informed about the extent of planned activities. They also informed that for such minor facility refurbishment, there is no need of environmental approval.

6. ENVIRONMENTAL and SOCIAL MANAGEMENT PLAN

6.1 Introduction

This section presents Environmental and Social Management Plan (ESMP) for activities planned related to sub-component A1 of component A of the revised PC II approved by ECNEC on January 12, 2015 for additional financing of WCAP. The execution of activities planned by the Provincial Irrigation Departments (PIDs) will not include any large scale physical intervention or new construction. Upgradation and capacity building of IRI (HW) and HRS, Nandipur, District Gujranwala in Punjab will comprise of benchmarking, technical upgradation through procurement and installation of equipment (hardware and software) and capacity building, hence, no physical intervention. Upgradation and strengthening capacity of SMHRL at Hyderabad and Karachi in Sindh will comprise of procurement and installation of equipment in the existing buildings, which will need some very small scale repair work for installation of new equipment and establishment of computerized survey, drawing and soil testing laboratories in Balochistan will require civil work for refurbishment of existing building. A checklist of mitigation measures to be taken for implementation of activities, with roles and responsibilities is provided in Environmental and Social Impact Mitigation Plan (Table 1).

6.2 Institutional Arrangements for Implementation of ESMP

The institutional arrangement for implementation of ESMP for benchmarking, technical upgradation and capacity building in Irrigation Department, Government of Punjab is not required at this stage since the planned activity is a technical study to identify areas of expansion and upgradation with respect to instruments and equipment (hardware and software) to be implemented under WCAP.

The institutional arrangement for implementation of ESMP for strengthening and upgrading of SMHRL in Irrigation Department, Government of Sindh is that the respective Assistant Director of SMHRL will implement the ESMP and the respective Deputy Director of SMHRL will supervise the implementation of ESMP during installation stage and operational stage of equipment. The respective Assistant Director of SMHRL will generate a weekly report on compliance of ESMP and occupational health and safety at workplace and the respective Deputy Director will generate a monthly report and submit to Director Hydrology and Research of Irrigation Department, Government of Sindh and this report will be included in the monthly progress report.

The institutional arrangement for implementation of ESMP for establishment of computerized survey and soil testing laboratories in Irrigation Department, Government of Balochistan is that the PID Balochistan will implement the ESMP through contractor and the respective Executive Engineer of Irrigation Department; Government of Balochistan will supervise its implementation. The contractor will generate compliance reports on monthly basis and submit to the respective Executive Engineer and this compliance report will be included in the monthly progress report.

6.3 Integration of ESMP in the Tender Document

The implementation of ESMP will be mentioned in the tender document prepared by the respective provincial irrigation department and accordingly the cost of its implementation will be integrated in bids by the contractors. A checklist of mitigation measures with roles and responsibilities considering environmental and social aspects and impacts of facility refurbishment, installation and use of equipment is provided in Table 1. The same checklist will be used as part of the contract for refurbishment work, installation and use of equipment. The technical study for benchmarking and upgradation of IRI (HW) and HRS, Nandipur, District Gujranwala will not require any physical intervention hence no ESMP is required for the time being. The strengthening and upgrading of SMHRL, Karachi and Hyderabad will require supply of equipment and small repair work to install the new equipment, hence application of ESMP is limited to installation and use of equipment. However, establishment of laboratories in Irrigation Divisions in Balochistan, civil work will be required; hence the contractor will arrange training on implementation of ESMP to his team on site, so that they can promote compliance with ESMP prepared for the site, as well as OP 4.01 of World Bank.

6.4 Training for implementation of ESMP

Although the activity is not labor intensive and the laboratory staff is experienced but for capacity enhancement of laboratory staff, the vendor/supplier of equipment in consultation with respective Deputy Director of SMHRL will provide training to the relevant staff on safe handling, operation and care of equipment. The Director Hydrology and Research in Sindh will supervise the training.

The contractor with the consultation of respective Executive Engineer of PID of Balochistan will organize training session(s) on implementation of ESMP for his workers and supervisory staff involved in the refurbishment work in Balochistan. This will also include providing awareness and complying with the instructions about occupational health, safety and environment at work place. For operational stage, capacity building of laboratory staff, human resource development and training is one of the components of the activity (sub-section 3.4.4).

6.5 Monitoring of implementation of ESMP

The implementation of ESMP will be monitored by the respective Deputy Director of SMHRL in Sindh through a checklist provided in this ESMP and a monitoring report will be generated on the status of compliance and any corrective action recommended on monthly basis and this monitoring report will be included in monthly progress report to Irrigation Department.

The implementation of ESMP will be monitored by the Executive Engineer of respective Irrigation Division in Balochistan through a checklist provided in this ESMP and a monitoring report will be generated on the status of compliance and any corrective action recommended on monthly basis and this monitoring report will be included in monthly progress report to Irrigation Department.

6.6 Grievance Redress Mechanism

The extent of activities of refurbishment of facilities, upgrading and modernization of existing provincial irrigation, hydraulic research, soil mechanics and soil testing laboratories has no effect on local people. However, the employees, suppliers and contractors might have some grievances. If there is a grievance, respective PID will be first informed of the grievance. In case, if the grievance is not addressed, then the Team Leader, WCAP at PMPIU may be contacted.

6.7 Third Party Validation

A Third Party Validation (TPV) of the implementation of ESMP will also be carried out by an independent consultant engaged by PMPIU on the basis of the checklist provided in this ESMP and the record maintained throughout the year; and the report will be submitted to the PMPIU for onward transmission to the World Bank for clearance. An amount of PKR 0.5 million has been estimated for TPV in this ESMP.

6.8 Mitigation Measures

A checklist of mitigation measures for anticipated environmental and social impacts of the refurbishment work, installation and use of equipment is developed. Such measures will be implemented in execution of activities. The environmental and social aspects impacts were considered while making this checklist of mitigation measures in Table 1. The same checklist will also be used for compliance monitoring and TPV.

6.9 Cost of Environmental and Social Management Plan

The cost of implementation of ESMP has been estimated as PKR 1.36 Million, which will include costs incurred on training sessions, provision of personal protection equipment, life and fire safety equipment and disposal of rubble and waste. Payments to resource persons to conduct training sessions and hiring a consultant for TPV have also been included. Brief description of cost of implementation of ESMP estimated as PKR 1.36 million is given in Table 2.

Table 1: ENVIRONMENTAL AND SOCIAL IMPACT MITIGATION PLAN

Activities	Environmental/Social Aspects	Environmental/Social Impacts	Checklist of Mitigation Measures	Responsibility	Supervision
			<i>The following measures will be taken to mitigate the environmental and social impacts of planned activities</i>		
1. Benchmarking, Technical upgradation of IRI (Hydraulic Wing) and HRS, Nandipur, District Gujranwala in Punjab					
Technical study for IRI (HW) and HRS Nandipur and implementation of its recommendations	Upgrading infrastructure in future	Modification of the physical and environment and impact on people	Environmental and social assessment will be carried out of envisaged infrastructure development under WCAP in pursuance of recommendations of the technical study	Chief Engineer Irrigation Research Institute	Chief, Strategic Planning and Reform Unit, Irrigation Department, Punjab
2. Upgradation and strengthening of SMHRL, Karachi & Hyderabad and Training Institute in Sindh					
Procurement of Equipment	Installation and use of equipment	Occupational injuries; electric shock; and work hours loss due to injuries	<ol style="list-style-type: none"> 1) Relevant staff will be provided training on safe handling of equipment. 2) Where applicable, personal protection equipment (PPE) will be provided and used to eliminate or minimize the risk of personal injury, electric shock or any other work related injury during installation and use of equipment. 3) Standard Operating Procedures will be followed. 	Respective Assistant Director of SMHRL	Respective Deputy Director of SMHRL

Activities	Environmental/Social Aspects	Environmental/Social Impacts	Checklist of Mitigation Measures	Responsibility	Supervision
3. Establishment of modern computerized laboratories for survey, drawing and soil testing in Irrigation Divisions of Balochistan					
<p>a) Facility Refurbishment</p> <ul style="list-style-type: none"> • Removing old floors, plasters on walls or removal of any partition for refurbishment • Cutting and grinding floor tiles at sites for laying new floor • Pneumatic drilling in walls and grooving in the walls for ducting of concealed electrical wiring at sites of refurbishment activities. • Fixing of fall ceiling. • Paint work on walls, windows and doors 	<p>Emission of dust particles in the ambient air and sound of hammering; generation of rubble and debris</p> <p>Sound of floor tile cutting machine and emission of fine dust particles in the air.</p> <p>Sound of drill machines, grinding machine, hammering and emission of fine dust particles in the ambient air.</p> <p>Unsafe work on height</p> <p>Use of chemical paints and waste from paint work.</p>	<p>Ambient air pollution and effect on health of workers and staff due to inhalation, ingestion and adsorption of dust particles in the ear, nose, throat, eyes</p> <p>Disturbance to the staff due to machine noise and effect on the health of workers and staff due to inhalation of fine dust particles, potentially harmful for kidneys.</p> <p>Risk of fall from height and injury</p> <p>Toxic fumes from paints if inhaled will</p>	<ol style="list-style-type: none"> 1) Suppress dust during pneumatic drilling/wall destruction by ongoing water mist and/or installing dust screen enclosures at site. 2) There will be no open burning of any construction or waste material at the site. 3) No unsafe work will be carried out; while working height for electrical wiring and installation of fall ceilings, four legs elevated bench will be used. 4) Lead free paints will be used 5) Necessary demolition work will be limited to restricted times agreed in the permit to work issued by the respective Executive Engineer of PID. 6) The site will establish appropriate erosion and sediment control measures such as hay bales and / or silt fences to prevent sediment from 	<p>Refurbishment Contractor on site</p>	<p>Respective Executive Engineer of PID</p>

Activities	Environmental/Social Aspects	Environmental/Social Impacts	Checklist of Mitigation Measures	Responsibility	Supervision
<ul style="list-style-type: none"> Housekeeping at site of refurbishment 	<p>Solid waste from refurbishment activities.</p> <p>Working conditions and work practices of refurbishment workers.</p>	<p>damage the health of workers and staff.</p> <p>Pollution and nuisance to the public</p> <p>Unsafe conditions and practices may cause work related injuries and ill health of workers.</p>	<p>moving off site and causing disturbance to people.</p> <p>7) Keep demolition debris in controlled area and spray with water mist to reduce dust blowing from debris.</p> <p>8) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and refurbishment activities.</p> <p>9) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers.</p> <p>10) Construction waste will be collected and disposed properly by collector.</p> <p>11) The records of waste disposal will be maintained as proof of proper waste management.</p> <p>12) Whenever feasible the contractor will reuse and recycle appropriate</p>		

Activities	Environmental/Social Aspects	Environmental/Social Impacts	Checklist of Mitigation Measures	Responsibility	Supervision
			<p>and viable materials (except asbestos).</p> <p>13) There will be no excessive idle parking of vehicles at sites.</p> <p>14) Workers will be provided with orientation training on implementation of ESMP and awareness on importance and benefits of safe work practices.</p> <p>15) Ensure safe and continuous access to office facilities during refurbishment activities, if the buildings stay open for the public.</p> <p>16) Post clearly visible warning signs and put barriers at refurbishment sites and the public be warned of all potential hazards.</p> <p>17) Keep surrounding environment and walkways free of debris to minimize dust and disturbance to staff.</p>		
<p>b) Procurement of Hardware for computerized survey lab.</p>	<p>Use of paper for printing and photocopying</p>	<p>Indirect impact on forests as source cellulose, the raw material for paper making</p>	<p>1) Printers and photocopiers with double side printing facility will be procured to minimize the paper consumption and printing on both sides of paper will be ensured by</p>	<p>Respective Executive Engineer</p>	<p>Chief Engineer (Canal Irrigation)</p>

Activities	Environmental/Social Aspects	Environmental/Social Impacts	Checklist of Mitigation Measures	Responsibility	Supervision
	<p>Disposal of empty Toner cartridges from printer and photocopier</p> <p>Power consumption</p>	<p>Chemical-based solid waste generation will cause soil pollution, if not disposed properly.</p> <p>Resource depletion</p>	<p>the department to reduce paper consumption and cost of printing paper.</p> <p>2) Printer and photocopiers with refillable toner cartridge will be procured to minimize the solid waste of cartridges and the cost.</p> <p>3) All hardware with inbuilt facility of setting auto power off, when not in use for certain time will be procured to conserve electricity and cost.</p>		
<p>c) Procurement of equipment for Soil testing lab.</p>	<p>Installation and use of equipment</p>	<p>Work-related injuries, electric shock due to unsafe act or unsafe condition</p>	<p>The relevant staff will be provided training, safe working conditions and PPE. The supervisors will ensure the use of PPE.</p>	<p>Respective Executive Engineer</p>	<p>Chief Engineer (Canal Irrigation)</p>

Table 2:- COST OF IMPLEMENTATION OF ESMP

	Cost Item	Details	Rate	Cost in PKR
1	Training	Hiring of resource person for four training sessions on implementation, monitoring and reporting of ESMP: Two sessions in Balochistan at offices of Divisional Engineers, Usta Mohammad and Dera Murad Jamali, Balochistan. Two in Sindh at SMHRL Karachi and Hyderabad.	25,000	100,000
2	Personal Protection Equipment	Provision of Personal Protection Equipment to workers at two sites during refurbishment and relevant staff of four laboratories during operation of the labs.	25,000	150,000
3	Life and Fire Safety Equipment	Provision of Life and Fire Safety equipment for four laboratories at operational stage; two in Sindh and two in Balochistan.	150,000	600,000
4	Waste Disposal	Hiring of contractor for collection of waste from the sites of refurbishment and its safe disposal in Balochistan	10,000	10,000
5	Third Party Validation	Hiring of consultant including travel, boarding lodging expenses for sites of refurbishment or physical intervention	Lump sum	500,000
	Total			1,360,000

Water Sector Capacity Building and Advisory Services Project (WCAP)

Environmental Assessment of new development proposed activities under
Additional Financing of WCAP

Terms of Reference and Scope of Services

Background

The Government of Pakistan has received a credit of USD 38 Million (SDR 23.4 Million) from the World Bank towards funding Indus 21 Water Sector Capacity Building and Advisory Services Project (WCAP). WCAP is of a highly technical nature project aiming to improve management and investment planning of water resources in the Indus River Basin and strengthening & sustainability of Pakistan's water sector. A number of projects/studies were carried out for strengthening water resources and hydropower planning, development and management on sustainable basis. Also strengthen the capacity of the relevant concerned institutions/organization through imparting training and providing modern equipment and establishing database/reporting cells. The Bank, based on the performance and landmark achievements, has agreed to provide additional financing of US\$ 45.81 Million for which PC-II has been approved by ECNEC on January 12, 2015.

Under this project, PMPIU intends to establish/upgrade the Research Centers/Stations/Laboratories for irrigation, hydraulic, soil mechanics, survey etc. to strengthen the institutions/organization for water resources development and management works/projects in the country. As per World Bank's operational policies and procedures, the social and environmental safeguards have to be ensured prior to avail the Additional Financing. Therefore, short term services of an Environmental Specialist are required to undertake environmental and social impact assessment of proposed new development activities (construction/rehabilitation/up-gradation of office/laboratory buildings) in accordance with the World Banks safeguard policies. He/she should be MSc in Environmental Engineering/ Technology/Sciences from a recognized university with at least 10 years relevant experience.

Objectives/Scope of Work

- i) The overall objective is to undertake environmental and social impact assessment of proposed new construction/rehabilitation/up-gradation of office/laboratory buildings in four Provinces in light of the World Bank safeguard policies under Component A additional financing of WCAP in accordance with the approved PC-II.

- ii) The assignment shall be completed over a period of thirty (30) days starting with the signing of contract.

- iii) Collect all required primary and available secondary environmental, social and natural resources information/data, which are required for assessment of environmental conditions in the development sites.
- iv) Based on all available environmental, social and natural resources information/data gathered from project sites prepare a detailed environmental and social assessment report in accordance with provincial environmental agencies and the World Bank safeguard policies.
- v) Carry out consultation with various stakeholders within relevant Federal and Provincial institutions/organization.
- vi) Finalize the “Environmental and Social Assessment Report” that includes the findings from all the activities to be undertaken accordingly to the scope of work.
- vii) Submit 5 copies the “Draft Final Report” covering all activities (i to v) for review and approval of the Client within twenty one (21) days after commencement of the services.
- viii) Submit final “Environmental and Social Assessment Report” (10 copies along with soft copy on CD) within thirty (30) days after commencement of the services.