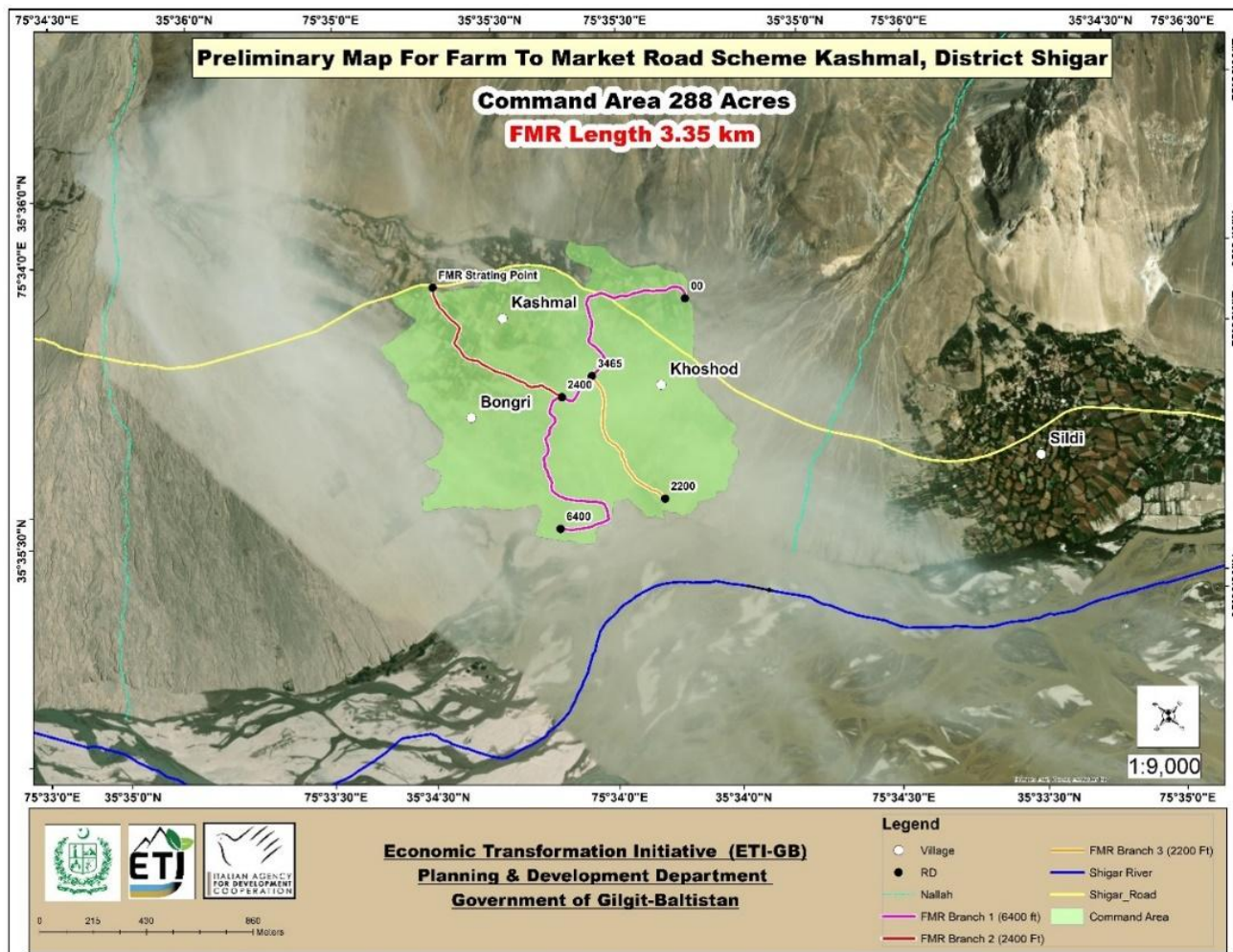


ENVIRONMENTAL IMPACT ASSESSMENT REPORT ON INFRASTRUCTURE SCHEMES IN BALTISTAN REGION, GILGIT-BALTISTAN



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ADB	Asian Development Bank
ADP	Annual Development Programme
AICS	Italian Agency for Development Cooperation
AJK	Azad Jammu and Kashmir
AKDN	Aga Khan Development Network
AKF	Aga Khan Foundation
AKRSP	Aga Khan Rural Support Programme
AOI	Area of Influence
ASTM	American Society for Testing and Materials
BCP	Building Code of Pakistan
BOD	Biochemical Oxygen Demand
C&W	Communication and Works Department
CAD	Computer Aided Design
CBD	Convention on Biological Diversity
CBOs	Community Based Organizations
CCHA	Community Controlled Hunting Area
CDM	Clean Development Mechanisms
CER	Certified Emission Reductions
CITES	Convention on the International Trade of Endangered Species
CKNP	Central Karakoram National Park
COs	Community Organizations
CPEC	China Pakistan Economic Corridor
DAP	Di-Ammonium Phosphate
dBA	Decibels (Equivalent to Scale A)
DHQ	District Headquarters
DRR	Disaster Risk Reduction
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPC	Engineering Procurement Construction
ESMP	Environmental and Social Management Plan
ETI-GB	Economic Transformation Initiative Gilgit-Baltistan
FMR	Farm to Market Road
FYM	Farm Yard Manure
GB	Gilgit-Baltistan
GB-EPA	Gilgit-Baltistan Environmental Protection Agency
GBDMA	Gilgit-Baltistan Disaster Management Authority
GHG	Greenhouse Gases
GLOF	Glacial Lake Outburst Floods
GoGB	Government of Gilgit-Baltistan
GOP	Government of Pakistan
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GT	General Topographic
HH	Households/Household
HPO	Hydro Planning Organization
HR	Human Resources
HSE	Health, Safety and Environment



HSEEMP	Health, Safety and Environment Management Plan
I&LD	Irrigation and Land Development
IEE	Initial Environmental Examination
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
ILO	International Labour Organization
KKH	Karakoram Highway
KNP	Khunjerab National Park
KP	Khyber Pakhtunkhwa
LAA	Land Acquisition Act
LPG	Liquefied Petroleum Gas
m.a.s.l	Meters Above Sea Level
MSDS	Material Safety Data Sheets
MW	Megawatt
NCS	National Conservation Strategy
NDMA	National Disaster Management Authority
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards
NGOs	Non-Governmental Organizations
NOC	No Objection Certificate
NPO	No Project Option
O&M	Operation and Maintenance
OBE	Operating Basis Earthquake
PAPs	Project Affected Persons
PCRWR	Pakistan Council for Research in Water Resources
PCU	Programme Coordination Unit
PD	Project Director
PEPA	Pakistan Environmental Protection Act
PGA	Peak Ground Acceleration
PKR	Pakistani Rupees
PMU	Project Management Unit
PPE	Personal Protective Equipment
RCC	Reinforced Cement Concrete
RE	Resident Engineer
RFT	Running Feet
RNR	Renewable Natural Resources
ROW	Right of Way
SC	Supervisory Consultant
SFA	Social Framework Agreement
SMT	Scheme Management Team
SOPs	Standard Operating Procedures
SPSS	Statistical Package for Social Sciences
SSESMP	Site-Specific Environmental and Social Management Plan
SSHSM	Site-Specific Health and Safety Management Plan
TMP	Traffic Management Plan
TORs	Terms of Reference
UC	Union Council
UNFCCC	United Nations Framework Convention on Climate Change
WAPDA	Water and Power Development Authority
WHO	World Health Organization
WPD GB	Water and Power Department, Gilgit-Baltistan

EXECUTIVE SUMMARY

The Economic Transformation Initiative, Gilgit-Baltistan (ETI-GB) is a development program of the Planning and Development Department, Government of Gilgit-Baltistan, co-financed by the International Fund for Agricultural Development (IFAD) and the Italian Agency for Development Cooperation (AICS) with a total amount of USD 133.75 million. The program aims to improve incomes and reduce poverty and malnutrition in rural areas by enhancing agriculture incomes and employment for at least 100,000 rural households.

This Environmental Impact Assessment (EIA) report has been prepared for seven infrastructure projects in District Baltistan, Gilgit-Baltistan. Each project has been assessed for its environmental and social feasibility in accordance with the GB Environmental Protection Act 2014 and the Pakistan EPA Review of IEE and EIA Regulations 2000. The projects fall under Category D (Transport) and Category C (Irrigation) of Schedule II, requiring an EIA prior to commencement of construction.

Table 1 Project Summary

S.NO	Project Name	District	Type	Length (km)	Total Cost (M)	Beneficiaries (HH)
1	Alchori	Shigar	FMR	3.29	31,460,636	470
2	Kashmal	Shigar	FMR	3.29	30,859,238	76
3	Khubanistan	Shigar	FMR	3.50	33,066,802	250-300
4	Sadpara	Skardu	FMR	5.03	46,055,279	300
5	Upper Sadpara	Skardu	ILD	5.49	37,594,194	170
6	Khaplu Broq	Ghanche	FMR	8.35	85,032,225	1,020
7	Hal di	Ghanche	ILD	3.50	24,801,750	268
		Grand Total		32.45	288,870,124	~2,554

Feasibility Status of Projects:

Project	District	Feasibility Status
Alchori FMR	Shigar	Feasible
Kashmal FMR	Shigar	Feasible
Khubanistan FMR	Shigar	Feasible
Khaplu Broq FMR	Ghanche	Feasible
Hal di ILD	Ghanche	Feasible
Sadpara FMR	Skardu	Feasible
Upper Sadpara ILD	Skardu	Feasible

All projects are located in the Baltistan Region (Shigar, Ghanche, and Skardu Districts), Gilgit-Baltistan. The region is characterized by mountainous terrain with slopy topography. The major crops in the area include potato, wheat, maize, peas, capsicum, green vegetables, and alfa-alfa. Major fruits include apples, grapes,

apricots, cherries, and almonds. Approximately 90% of the population is engaged in agriculture and livestock rearing as their primary livelihood source.

Key findings of all the projects:

- No significant deforestation is involved in any project
- Controlled blasting is not anticipated as hard rock is not prominently present along any alignment
- No resettlement is required for any project
- No compensation for land is required as communities have voluntarily provided land (RoW submitted with NOC)
- No heritage or archaeological sites have been identified
- NOCs and no-conflict certificates have been provided by the communities and district administration
- DRR charges at 2% of construction cost have been allocated for all projects
- For ILD schemes, communities have agreed to payback 50% of project cost within three cropping seasons

All seven schemes are determined to be environmentally and socially feasible and are recommended for approval.

CHAPTER 1

1. INTRODUCTION

1.1. PROJECT BACKGROUND

The Economic Transformation Initiative, Gilgit-Baltistan (ETI-GB) is a development program of the Planning and Development Department, Government of Gilgit-Baltistan, co-financed by the International Fund for Agricultural Development (IFAD) and the Italian Agency for Development Cooperation (AICS) with a total amount of USD 133.75 million. With an overall development objective, the program aims at improving incomes and reducing poverty and malnutrition in the rural areas of Gilgit-Baltistan by enhancing agriculture incomes and employment for at least 100,000 rural households. The programme aims to bring over 70,000 acres of land under cultivation and construct 700 kilometers of Farm-to-Market Roads (FMRs) in all districts of Gilgit-Baltistan.

The seven proposed projects in the Baltistan Region are initiatives under this program. The villages covered include:

- **District Shigar:** Alchori, Kashmal, Khubanistan
- **District Skardu:** Sadpara, Upper Sadpara
- **District Ghanche:** Khaplu Broq, Haldi

The proponent of all projects is ETI-GB, which has conducted these Environmental Impact Assessments (EIAs) to assess the social and environmental feasibility of the proposed roads and irrigation channels.

1.2. NEED FOR EIA STUDY

Under the Pakistan Environmental Protection Act (PEPA-1997) and its amended version adopted by the Gilgit-Baltistan Environmental Protection Agency (GB-EPA), i.e., the Gilgit-Baltistan Environmental Protection Act 2014, an Environmental Impact Assessment (EIA) is mandatory for any project with an investment exceeding PKR 50 million. The Act states:

"No proponent of a Project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the Project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained approval from the Federal Agency in respect thereof."

Furthermore, according to the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations 2000, the proposed projects fall under Category D (Transport) of Schedule II, thereby requiring an EIA prior to the commencement of construction irrespective of the project cost. Although the estimated costs of these projects range from PKR 6.58 million to PKR 40.45 million, which are below the PKR 50 million threshold, the Schedule II classification independently mandates an EIA for transport projects of this nature.

All other rules, regulations, and laws related to the projects along with the legal and administrative framework have been included in Chapter 2 of this report.

1.3. STRUCTURE OF THE REPORT

This EIA Report has been prepared in accordance with the Gilgit-Baltistan Environmental Protection Agency's sectoral guidelines for development projects. The structure of this report follows the prescribed

format, comprising an Executive Summary (Chapter 1), a detailed Project Description (Chapter 3), Baseline Environment (Chapter 5), Impact Assessment (Chapter 8), and a comprehensive Environmental and Social Management Plan (Chapter 9), which includes mitigation measures, monitoring, training, and environmental costing.

1.4. OBJECTIVES OF THE PROJECT

The prime objective of these EIA studies is to meet the statutory requirements of the GB Environmental Protection Act 2014 and to facilitate the GB-Environmental Protection Agency (GB-EPA) in granting the No Objection Certificates (NOCs) for the proposed projects.

The specific objectives of these EIA reports are:

- To establish baseline data on the physical, biological, and socio-economic environment of each project area
- To identify potential environmental and social impacts and propose mitigation measures within an Environmental Management Plan (EMP)
- To document public consultation and community participation, incorporating stakeholder views into project planning
- To ensure compliance with applicable environmental regulations and provide clear recommendations to decision-makers

1.5. NATURE, MAGNITUDE AND LOCATION OF THE SCHEMES

The four proposed projects are rural infrastructure schemes of varying scales, all located in Baltistan region.

The seven proposed projects are rural infrastructure schemes across the Baltistan Region:

Alchori FMR is a 3.29 km jeepable road in District Shigar, benefiting 470 households across 544 acres.

Kashmal FMR is a 3.29 km jeepable road in District Shigar, benefiting 76 households across 288 acres.

Khubanistan FMR is a 3.50 km jeepable road in District Shigar, benefiting 250-300 households across 377 acres.

Khaplu Broq FMR is an 8.35 km jeepable road in District Ghanche, benefiting 1,020 households across 1,800 acres.

Haldi ILD is a 3.50 km irrigation channel in District Ghanche, benefiting 268 households across 151 acres.

Sadpara FMR is a 5.03 km jeepable road in District Skardu, benefiting 300 households across 490 acres.

Upper Sadpara ILD is a 5.49 km irrigation channel in District Skardu, benefiting 170 households across 326 acres.

The detailed technical descriptions, including topography, components, construction aspects, and cost breakdowns, are provided in Chapter 3: **Project Descriptions**

1.6. LEGAL FRAMEWORK

The Environmental Impact Assessments have been conducted in accordance with the Gilgit-Baltistan Environmental Protection Act 2014, the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations 2000, and the National Environmental Quality Standards (NEQS). The detailed legal framework is provided in Chapter 2 of this report.

1.7. APPROACH AND METHODOLOGY ADOPTED

This EIA study has been conducted based on the available information from secondary sources, lined departments, field surveys, village scoping and personal interviews of respondents. The proposed project will be implemented by ETI GB, SMT and the SMT-Contractor Detailed Engineering Design will be prepared by ETI GB Engineers. Following is the approach and methodology adopted to conduct the EIA study:

a) Desk Studies

After the award of the contract, the EIA team acquired various project specific studies, relevant studies to the regions, available maps, Google Earth Imagery of the Area, published reports, previous Feasibility Study Reports, etc. After collecting data, reports, maps, and relevant information, the EIA team initiated the desk studies. The primary objective of this study was to conceptualize the project, familiarize themselves with the project layout and design, assess the project's status, and identify any related issues.

b) Analysis of Alternatives

It is a mandatory requirement for any EIA study to analyze each potential alternative available that could have been developed to meet the objectives and recommend the option which is environmentally and economically feasible. Looking at the length of the FMR and ground situation, the proposed project was found very suitable since it does not interfere with any infrastructure or settlement. This exercise confirmed the justification for the need for the proposed Project.

After the selection of the most feasible project option, based on satellite images and the delineation of the study area / AOI, a detailed environmental survey was carried out within the Study Area. Detailed investigations/surveys were carried out for environmental parameters on which any adverse or positive impacts were envisaged by the implementation of the proposed project. Before the start of field activities, comprehensive checklists, proformas and maps were developed covering the main parameters for the physical, biological and socio-economic environment. Primary and secondary data have been compiled and analyzed to update baseline conditions in the Study Area.

c) Stakeholder Consultations

The EIA team identified project stakeholders during the inception stage and held meetings and e-communications with them during the surveys, to receive feedback on the expected environmental issues related to the project impacts and suggested mitigation measures. Meetings were carried out with the project beneficiaries, relevant departments to discuss the issues/constraints and get their views and feedback to mitigate the potential environmental impacts associated with the implementation and operation of the proposed project.

d) Anticipated Impacts Assessment and Mitigation Measures

A logical and systematic approach was adopted for impact identification and assessment. The process began with the screening and continued through scoping, which identified the key issues and classified them into different categories. The tools which were used for impact assessment are:

- Checklists; and
- Matrices;

Identification of potential environmental and social impacts in terms of their nature, magnitude, extent, location, timing and duration were carried out. The impacts were correlated to the project location, design stage, construction as well as operation stage. Based on the impact prediction methods and public/stakeholder consultations, the EIA team found very slight adverse environmental impacts. The same process was followed for the identification of social impacts. The settlement being far away from the FMR no social adverse impacts were reported.

e) Environmental and Social Management Plan

ESMP has been prepared to ensure the adequacy and effectiveness of the proposed protocol by clearly identifying the roles and responsibilities of the Proponent and the SMT/Community responsible for implementation, monitoring and auditing of ESMP activities under the guidance of other relevant departments wherever necessary. Recommended time-to-time training needs at different stages of the project.

CHAPTER 2

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS**1.1. GENERAL**

This chapter provides an overview of the policy framework and legislation applicable to the proposed Project. The project must comply with all relevant environmental policies, laws, and acts of the Government of Pakistan and the Government of Gilgit-Baltistan.

1.2. SUMMARY OF RELEVANT LEGISLATION

The most significant piece of legislation governing this project is the Gilgit-Baltistan Environmental Protection Act 2014, which mandates this EIA process. Compliance with the National Environmental Quality Standards (NEQS) for air, noise, and water will be strictly enforced during the construction phase. Furthermore, the project's adherence to the Hazardous Substances Rules 2003 will be ensured through specific waste management protocols outlined in the Environmental and Social Management Plan (Chapter 9).

The summary of major relevant strategies, policies, acts and legislation from environmental perspective are briefly described in the table below.

Table 2 Main Strategies/Policies Related to Environment and Relevance to the Project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
1.	National Conservation Strategy, 1992	Pakistan National Conservation Strategy (NCS), approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country.	The core areas relevant to the proposed Project are pollution prevention during construction and conserving biodiversity. Although no major flora/fauna are present, best practices will be followed.
2.	National Environmental Policy, 2005	Provides a framework for addressing environmental issues. Section 5 commits to integrating the environment into development planning.	Clause (b) of sub-section 5.1 states that EIA-related provisions in the Environmental Protection Act will be diligently enforced. This EIA fulfills that requirement.

3.	National Forest Policy, 2015	Aims to foster sustainable development of Renewable Natural Resources (RNR) through maintenance, rehabilitation, and enhancement of sustainable livelihoods.	The project involves removal of minor vegetation. The policy's principles on preserving natural resources and planting trees on farmland are applicable, though no forest area falls within the project boundary.
4	National Climate Change Policy, 2012 (Updated 2021)	Covers measures to address issues in water, agriculture, forestry, biodiversity, and other vulnerable ecosystems. Provides a framework for adaptation and mitigation.	The proposed project, though very small, involves development that will have positive impacts on climate change issues by increasing access to climate-resilient agriculture and supporting the green environment.
5	National Sustainable Development Strategy, 2012	Defines sustainable development and a pathway to a “green economy” in Pakistan’s context. Focusing on integrating economic, social, and environmental dimensions.	This strategy is applicable as the project will help restore the environment through reduced post-harvest waste and improved transportation with minimal environmental burden.
6	National Disaster Risk Reduction Policy, 2013	Covers disaster risk reduction holistically, emphasizing risk assessment and prevention. Led by NDMA in consultation with all provinces and GB.	This policy will be elicited if any unforeseen natural or manmade disaster (landslide, flood, earthquake) occurs during the construction and operation phase.

Table 3 Main Legislation/Acts Related to the Environment and Their Relevance to the Project

S.no	Policy/Strategy	Brief Coverage	Relevance to Project
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1.	Gilgit-Baltistan Environmental Protection Act, 2014	Enacted by the Govt. of GB on May 06, 2016. Part VI relates to environmental examinations and assessments. Applies to air, water, soil, noise pollution, and hazardous waste. Provides framework for species, habitat, and biodiversity conservation.	The provision of the Act is applicable for conducting an EIA according to Section 16 and to obtain environmental approval/NOC from the GB-EPA. The Project will ensure compliance with all relevant sections.
2.	Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000	Sets out policy and procedural requirements for filing an EIA, sustainable development goals, jurisdiction of EPAs, responsibilities of proponents, and schedules of projects requiring IEE/EIA.	The provisions apply for environmental screening. The proposed project falls under Schedule II (Transport), requiring an EIA. After submission, the NOC process will be initiated.
3.	National Environmental Quality Standards (NEQS), 2000	Includes standards for liquid effluent, industrial gaseous emissions, ambient air, drinking water quality, noise levels, and motor vehicle exhaust.	All project phases (construction and operation) must comply with NEQS. Given the project's small scale, compliance is easily achievable.
4.	Guidelines for Environmental Assessment (EPA, 1997)	Includes guidelines for preparation/review of environmental reports, sensitive/critical areas, public consultation, and sectoral procedures.	These guidelines have been followed during the preparation of this EIA report.
5.	Northern Areas Wildlife Preservation Act, 1975	Provides national parks, wildlife reserves, sanctuaries, and regulates hunting.	All activities will be carried out keeping in view the provisions of this Act. No notified protected site exists in or near the project area.
6.	Pakistan Antiquities Act, 1975	Defines "ancient" objects, requires reporting of artefact discoveries, and prohibits construction within 200 feet of protected antiquities.	No notified archaeological site has been identified. However, a Chance Find Procedure will be followed during excavation.
7.	Explosives Act, 1884	Provides regulations for the handling, transportation, and use of explosives.	Under this Act, the SMT-Contractor is bound by regulations for handling, transporting, and using small-scale blasting if required for hard rock sections.
8.	The Protection against Harassment of Women at the Workplace (Amendment) Act, 2022	Addresses sexual harassment at the workplace.	This Act will apply if women are employed for construction. The Contractor will ensure a safe and respectful workplace.

9.	Employment of Children Act, 1991	Prohibits employment of children under age 14 in any hazardous employment, including construction.	The Contractor will be contractually bound to prohibit child labor on the project site.
10.	National Disaster Management Act, 2010	Strengthened the Disaster Management system in Pakistan. following the 2010 floods.	The GB Disaster Management Authority (GBDMA) is responsible. The Contractor will follow guidelines of the updated Contingency Plan.
11.	Hazardous Substances Rules, 2003	Describes handling, transportation, and disposal of hazardous substances and waste, including safety precautions for workers.	This rule applies due to potential handling of fuel, lubricants, and chemicals during construction. Proper storage and disposal will be ensured.
12.	Building Code of Pakistan, 2007	Applies to engineering design of building-like structures and related components.	These codes will be used in the structural design of culverts, retaining walls, and the truss bridge.
13.	GB Disaster Management Act, 2018	An independent disaster management law for Gilgit-Baltistan catering to its peculiar geographical needs.	This Act will be elicited if any unforeseen natural or manmade disaster occurs during construction or operation.
14.	The Gilgit-Baltistan Forest Act, 2019	For protection, rehabilitation, sustainable use, conservation, and management of forests, including watersheds, rangelands, and riverbeds.	As defined in the Act, the project is directly concerned with socio-economic and ecological aspects. ESIA is essentially required.
15.	Gilgit-Baltistan Climate Change Strategy and Action Plan – 2017 (Revised 2023)	Addresses GB's vulnerability to climate change impacts (GLOFs, droughts, melting glaciers) due to its fragile mountain ecosystem.	A careful assessment confirms this project will not contribute negatively to climate change. It will support climate-resilient agriculture and improve access.
16.	The Exclusive Fishery Zone (Regulation of Fishing) Act, 1975	Provides for the regulation of fishing within the exclusive fishery zone of Pakistan.	Since the project does not permanently extract water from a natural stream and no major fishery exists, no negative impact is anticipated.
17.	The Gilgit-Baltistan Local Government Bill, 2014 (Fourth Schedule, Sections 117, 118)	Lists offences against cutting trees, disposal of chemicals, etc., and their procedural matters.	The recommendations under this Bill will be fully complied with, including prohibitions on illegal tree cutting and proper chemical disposal.

1.3. COMPLIANCE PROCEDURE FOR OBTAINING NOC FROM GB EPA

The Review of IEE and EIA Regulations 2000 provides the necessary details for the preparation, submission, and review of EIA reports. The proposed project falls under Schedule II (Transport), which requires an EIA to initiate the process of NOC from GB-EPA.

The prescribed procedure for review of the EIA by GB-EPA is as follows:

1. Upon submission, GB-EPA will confirm the document is complete within ten working days.
2. GB-EPA will communicate its approval or otherwise within a period of four months from the date the EIA is filed complete in all respects.
3. If no communication is received within this period, the EIA shall be deemed to have been approved, to the extent it does not contravene the provisions of the Act.

The proponent (ETI-GB) will submit this EIA report to GB-EPA. GB-EPA will review the report within 90 days of filing. The project can only commence construction after obtaining NOC/Environmental approval from GB-EPA.

1.4. INTERNATIONAL PROTOCOL/CONVENTIONS

Pakistan is a signatory to several international environmental conventions. The major protocols relevant to the proposed project are provided in the Table below.

Table 4 International Agreements/Conventions Relevant to the Project

Sr. No.	Agreement/Convention	Ratification	Relevance to Project
1.	Convention on Biological Diversity (CBD), 1994	Signed 1992, ratified 1994.	Aims for conservation of biological diversity. This applies as the project will avoid any significant impact on the limited local biodiversity.
2.	UN Framework Convention on Climate Change (UNFCCC), 1992	Ratified 1994	Provides framework for addressing climate change; emissions during construction will be minimized
3.	Kyoto Protocol, 1992	Ratified 2005	aims to reduce greenhouse gases. The project's small scale and reliance on local labor and minimal machinery will result in negligible GHG emissions.
4	Paris Agreement, 2015	Ratified 10 November 2016	Aims to strengthen global response to climate change; projects support climate-resilient agriculture
5	Rio Declaration on Environment and Development, 1992	Signed 13 June 1992, Ratified 1 June 1994	Principles of sustainable development and public participation apply

CHAPTER 3

3. PROJECT DESCRIPTION

3.1. GENERAL

This chapter presents the technical details of the seven proposed projects including rationale, location, accessibility, components, construction aspects, implementation schedule, and project cost.

SUMMARY OF THE PROJECT PROFILES

Parameter	Alchori FMR	Kashmal FMR	Khubanistan FMR	Khaplu Broq FMR	Sadpara FMR	Haldi ILD	Upper Sadpara ILD
District	Shigar	Shigar	Shigar	Ghanche	Skardu	Ghanche	Skardu
Type	FMR	FMR	FMR	FMR	FMR	ILD	ILD
Length (KM)	3.29	3.29	3.50	8.35	5.03	3.50	5.49
Width (ROW)	16.50 ft	16.50 ft	16.50 ft	16.50 ft	16.50 ft	N/A	N/A
Gradient	1:10	1:10	1:10	1:10	1:10	1:300	1:170
Command Area (Acre)	544	288	377	1,800	490	151	326
Beneficiary HH	470	76	250-300	1,020	300	268	170
Const. Period	20 Months	18 Months	20 Months	20 Months	20 Months	20 Months	20 Months
Total Cost (PKR (M))	31.46	30.86	33.07	85.03	46.06	24.80	37.59

DISTRICT SHIGAR PROJECTS

District Shigar is located in the Baltistan region of Gilgit-Baltistan, bounded on the north by the Karakoram Range, on the east by Kharmang District, on the south by Skardu District, and on the west by Gilgit District. The district headquarters is at Shigar. The three projects in this district are Farm-to-Market Roads.

3.2. PROJECT 1: ALCHORI FARM TO MARKET ROAD

3.2.1. Rationale

The Alchori Farm-to-Market Road initiative aims to strengthen critical road infrastructure to support key value chains, connecting approximately 544 acres of production area to the main valley road in Tehsil Shigar, District Shigar. Currently, farmers face high transport costs and significant post-harvest losses due to poor

road conditions. The FMR will connect the command area with the village and then to Valley Road Alchori Road, allowing villagers to carry inputs, farm machinery, and travel from village to farm area, and bring produce to markets.

3.2.2. Project Location

The proposed project site is situated in Alchori Village, Union Council Alchori, Tehsil Shigar, District Shigar, Gilgit-Baltistan. The distance from the District Headquarters at Shigar is approximately 20 kilometers. The village has an approximate population, with approximately 470 beneficiary households. The command area of 544 acres is currently under cultivation, with major crops including wheat, maize, peas, potato, capsicum, green vegetables, and Alfa-Alfa. Major fruits include apples, grapes, apricots, and almonds. A considerable part of the population depends on livestock farming like Bulls/Cows, Goat/Sheep for income and diet (milk and meat).

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.525916°	75.644033°	7,980 ft
Starting Point (Main Road)	35.531565°	75.658926°	8,374 ft
Ending Point	35.520075°	75.634349°	7,800 ft

3.2.3. Accessibility

The proposed project site is accessible from the main valley road. The distance from the nearest main road to the scheme is approximately 15 km from Shigar town. Currently, the existing track is a poor condition pony track that becomes difficult to traverse during adverse weather conditions.

3.2.4. Topography and Strata

The proposed project site is located in an area that falls under a double agriculture cropping zone, with approximately 90% of the population engaged in growing crops and vegetables. The topography along the proposed 3.29 kilometer alignment consists of soft strata, slopy terrain, and flat terrain. No hard rock is present, and no forest cover exists along the alignment.

Terrain Type	Percentage
Soft strata	40%
Slopy terrain	40%
Flat terrain	20%

The project area falls within a high seismic zone (Zone 3), and the design has incorporated appropriate slope stabilization and drainage measures to address these geological constraints.

3.2.5. Project Components

The project design is a jeepable shingle road with associated protection and drainage structures. It is a 16.50 ft. wide road with two lanes of 8.25 ft. each, producing a maximum gradient of 1:10. The FMR has been provided with culverts and side drains where it interferes with the waterways.

Some of the salient features of the Engineering design of FMR are mentioned below in Table

Table 5 FMR Alchori Salient features of the Engineering Design

Sr.No.	Item	Description
1	Total Length of the FMR	3.29 KM
2	Width (ROW)	16.50 ft
3	Lane Width	8.25 ft (02 Lanes)
4	Type of FMR	Jeepable Road (Pony Track to Jeepable)
5	Linkage to Main Road	Alchori Valley Road
6	Gradient	1:10
7	Cropping Zone	Double Cropping Zone
8	Command Area	544 Acres
9	Beneficiary Households	470
10	Construction Period	20 Months

3.2.6. Land Acquisition

The community has expressed willingness to provide land for the scheme without compensation, and an undertaking on legal stamp paper has been provided. No resettlement or evacuation is required, and no compensation for land or other property is involved. The community has submitted RoW with NOC.

3.2.7. Construction Aspects

The workforce will be sourced locally (skilled and unskilled labor available locally). Construction materials including crush, sand, cement, and steel will be procured from local markets in Shigar. No controlled blasting is required as no hard rock is present. Water will be sourced from nearby natural streams. Stone masonry work will be executed manually, but filling and cutting work can be executed by machine.

3.2.8. Project Implementation Schedule

The proposed project construction schedule spans a period of approximately 20 months, with working limited to 10 months per year due to weather constraints.

3.2.9. Cost of the Project

The estimated cost of the proposed Project is Rs. 31,460,636; break up given below:

Table 6 Alchori FMR Estimated Cost

Construction of Farm to Market Road (FMR) Alchori, District Shigar.		
S. No	Description	Amount (Rs)
A	Construction of Culverts (RCC Culverts, Side Drain, Causeways)	28,731,174

Total (Rs.)	28,731,174
Contingencies 3% of Construction Cost (Rs.)	861,935
HR Cost 4.5% of Construction Cost	1,292,903
DRR Cost @2% of Construction Cost	574,623
<i>DRR Cost Allocation for EMP</i>	574,623
<i>Balance from Contingency Cost (if required)</i>	31,156
Environmental Management Cost as % of Project Cost	1.83%
G.Total (Rs.)	31,460,636

3.3. PROJECT 2: KASHMAL FARM TO MARKET ROAD

3.3.1. Rationale

The Kashmal Farm-to-Market Road initiative aims to strengthen critical road infrastructure to support key value chains, connecting approximately 288 acres of production area to the main valley road in Tehsil Shigar, District Shigar. Currently, farmers face high transport costs and significant post-harvest losses due to poor road conditions.

3.3.2. Project Location

The proposed project site is situated in Kashmal Village, Union Council Alchori, Tehsil Shigar, District Shigar, Gilgit-Baltistan. The distance from the District Headquarters at Shigar is approximately 25 kilometers. The village has approximately 76 beneficiary households. The major crops are maize, wheat, peas, capsicum, green vegetables and Alfa-Alfa.

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.581499°	75.579912°	7,625 ft
Starting Point (Main Road)	35.580289°	75.585885°	7,883 ft
Ending Point	35.577870°	75.574756°	7,642 ft

3.3.3. Topography and Strata

The topography along the proposed 3.29 kilometer alignment consists of mixed and soft strata. No hard rock is present, and no forest cover exists along the alignment.

Terrain Type	Percentage
Soft strata	40%

Slopy terrain	35%
Flat terrain	25%

3.3.4. Project Components

The project design is a jeepable shingle road with associated protection and drainage structures. It is a 16.50 ft. wide road with two lanes of 8.25 ft. each, producing a maximum gradient of 1:10.

Some of the salient features of the Engineering design of FMR are mentioned below in Table

Table 7 Kashmal Farm to Market Road Salient features of the Engineering Design

Sr.No.	Item	Description
1	Total Length of the FMR	3.29 KM
2	Width (ROW)	16.50 ft
3	Lane Width	8.25 ft (02 Lanes)
4	Type of FMR	Jeepable Road (Pony Track to Jeepable)
5	Linkage to Main Road	Kashmal Valley Road
6	Gradient	1:10
7	Cropping Zone	Double Cropping Zone
8	Command Area	288 Acres
9	Beneficiary Households	76
10	Construction Period	18 Months

3.3.5. Land Acquisition

The community has expressed willingness to provide land for the scheme without compensation, and an undertaking on legal stamp paper has been provided. No resettlement or evacuation is required.

3.3.6. Construction Aspects

The workforce will be sourced locally (skilled and unskilled labor available). Construction materials will be procured from local markets. No controlled blasting is required. Stone masonry work will be executed manually, but filling and cutting can be done by machine.

3.3.7. Project Implementation Schedule

The proposed project construction schedule spans a period of approximately 18 months.

3.3.8. Cost of the Project

The estimated cost of the proposed Project is Rs. 30,859,238; break up given below;

Table 8 Estimated Cost of Kashmal FMR

Construction of Kashmal FMR, District Shiger.		
S. No	Description	Amount (Rs)
A	Construction of Culverts (RCC Culverts, Bridge)	28,181,952
	Total (Rs.)	28,181,952
	Contingencies @ 3% of Construction Cost (Rs.)	845,459
	HR Cost @4.5% of Construction Cost	1,268,188
	DRR Cost @2% of Construction Cost	563,639
	<i>DRR Cost Allocation for EMP</i>	563,639
	Environmental Management Cost as % of Project Cost	1.83%
	G.Total (Rs.)	30,859,238

3.4. PROJECT 3: KHUBANISTAN FARM TO MARKET ROAD

3.4.1. Rationale

The Khubanistan Farm-to-Market Road initiative aims to strengthen critical road infrastructure to support key value chains, connecting approximately 377 acres of production area to the main valley road. The village was recently renamed Khubanistan, the Urdu translation of its local name, meaning "Land of the Apricot," reflecting its strong association with apricot production.

3.4.2. Project Location

The proposed project site is situated in Khubanistan (Pharingbama) Village, Union Council Alchori, Tehsil Shigar, District Shigar, Gilgit-Baltistan. The distance from the District Headquarters at Shigar is approximately 12 kilometers. The village has approximately 250-300 beneficiary households. The major crops are maize, wheat, peas, capsicum, green vegetables and Alfa-Alfa.

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.503403°	75.659053°	7,496 ft
Starting Point (Main Road)	35.506669°	75.664205°	7,565 ft
Ending Point	35.499277°	75.668747°	7,530 ft

3.4.3. Topography and Strata

The topography along the proposed 3.50 kilometer alignment consists of mixed and soft strata. No hard rock is

present, and no forest cover exists along the alignment.

Terrain Type	Percentage
Soft strata	35%
Slopy terrain	45%
Flat terrain	20%

3.4.4. Project Components

The project design is a jeepable shingle road with associated protection and drainage structures. It is a 16.50 ft. wide road with two lanes of 8.25 ft. each, producing a maximum gradient of 1:10.

Some of the salient features of the Engineering design of FMR are mentioned below in Table

Table 9 FMR Khubanistan Salient features of the Engineering Design

Sr.No.	Item	Description
1	Total Length of the FMR	3.50 KM
2	Width (ROW)	16.50 ft
3	Lane Width	8.25 ft (02 Lanes)
4	Type of FMR	Jeepable Road (Pony Track to Jeepable)
5	Linkage to Main Road	Khubanistan Valley Road
6	Gradient	1:10
7	Culverts	RCC Culverts, Pipe Culverts
8	Side Drain	Rectangular Masonry Drain
9	Allied Structure	Stone Masonry Retaining Walls and Breast Walls
10	Carriageway Slope	2% towards hillside
11	Command Area	377 Acres
12	Beneficiary HH	250-300

3.4.5. Land Acquisition

The land has been acquired as per the criteria of ETI-GB with the community. Land ownership in the project area is communal. The community has expressed willingness to provide land for the scheme without compensation, and an undertaking on legal stamp paper will be provided before execution. No resettlement or evacuation is required, and no compensation for land or other property is involved.

3.4.6. Cost of the Project

The estimated cost of the proposed Project is Rs. 33,066,802; break up given below;

Table 10 Estimated Cost of FMR Khubanistan

Construction of Farm to Market Road (FMR) Khubanistan, District Shiger.		
S. No	Description	Amount (Rs)
A	Construction of Culverts (RCC Culverts, Bridge)	30,197,992
	Total (Rs.)	30,197,992
	Contingencies @ 3% of Construction Cost (Rs.)	905,940
	HR Cost @4.5% of Construction Cost	1,358,910
	DRR Cost @2% of Construction Cost	603,960
	<i>DRR Cost Allocation for EMP</i>	603,960
	Environmental Management Cost as % of Project Cost	1.83%
	G.Total (Rs.)	33,066,802

DISTRICT SKARDU PROJECTS

District Skardu is bounded by Shigar District to the north, Kharmang to the east, Astore to the west, and the Indian-administered region of Ladakh to the south. The district headquarters is at Skardu. The two projects in this district are the Sadpara FMR and the Upper Sadpara ILD.

3.5. PROJECT 4: SADPARA FARM TO MARKET ROAD

3.5.1. Rationale

The Sadpara Farm-to-Market Road initiative aims to strengthen critical road infrastructure to support key value chains, connecting approximately 490 acres of production area to the main valley road. Currently, farmers face high transport costs and significant post-harvest losses due to poor road conditions. The area offers significant potential for the cultivation of high-value cash crops, including peas, turnips, potatoes, and vegetables. The FMR will connect the command area with Sadpara village and subsequently link it with the Sadpara Valley Road.

3.5.2. Project Location

The proposed project site is situated in Sadpara Village, Union Council Sadpara, Tehsil Skardu, District Skardu, Gilgit-Baltistan. The distance from the District Headquarters at Skardu is approximately 50 kilometers. The village has approximately 300 beneficiary households. The major crops are maize, wheat, peas, capsicum, green vegetables and Alfa-Alfa.

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.187104°	75.603594°	10,853 ft
Starting Point (Main Road)	35.187447°	75.616886°	9,382 ft
Ending Point	35.188033°	75.598875°	11,000 ft

3.5.3. Topography and Strata

The topography along the proposed 5.03 kilometer alignment consists of hard rock (approximately 5,000 ft on upper side) and mixed strata on the lower side.

Terrain Type	Percentage
Soft strata	30%
Slopy terrain	60%
Flat terrain	10%

3.5.4. Project Components

The project design is a jeepable shingle road with associated protection and drainage structures. It is a 16.50 ft. wide road with two lanes of 8.25 ft. each, producing a maximum gradient of 1:10. The road includes 06 Nos of RCC Culverts, 04 Nos of Causeways, and 16,500 RFT Side drain.

Some of the salient features of the Engineering design of FMR are mentioned below in Table

Table 11 FMR Sadpara, Salient features of the Engineering Design

Sr.No.	Item	Description
1	Total Length	5.03 KM
2	Width (ROW)	16.50 ft
3	Lane Width	8.25 ft (02 Lanes)
4	Type	Compacted Shingle Jeepable Road
5	Linkage to Main Road	Sadpara Valley Road
6	Gradient	1:10
7	RCC Culverts	06 Nos.
8	Causeways	04 Nos.
9	Side Drain	16,500 RFT

10	Allied Structure	Stone Masonry Retaining Walls and Breast Walls
11	Carriageway Slope	2% towards hillside
12	Command Area	490 Acres
13	Beneficiary HH	300
14	Construction Period	20 Months

3.5.5. Cost of the Project

The estimated cost of the proposed Project is Rs. 46,055,279; break up given below;

Table 12 Estimated Cost of FMR Sadpara

Construction of Farm to Market Road (FMR) Sadpara, District Skardu.		
S. No	Description	Amount (Rs)
A	Construction of Culverts (RCC Culverts, Bridge)	42,842,120
	Total (Rs.)	42,842,120
	Contingencies @ 3% of Construction Cost (Rs.)	1,285,264
	HR Cost @4.5% of Construction Cost	1,927,895
	DRR Cost @2% of Construction Cost	856,842
	<i>DRR Cost Allocation for EMP</i>	856,842
	Environmental Management Cost as % of Project Cost	1.86%
	G.Total (Rs.)	46,055,279

3.6. PROJECT 5: UPPER SADPARA IRRIGATION AND LAND DEVELOPMENT (ILD)

3.6.1. Rationale

The Upper Sadpara Irrigation and Land Development scheme aims to bring approximately 326 acres of barren land under cultivation by constructing a 5.49 km irrigation channel. The villagers/inhabitants have very low landholding due to extreme shortage of land; they are restricted to limited cultivation. The scheme has very positive economic impact on beneficiaries, having potential to elevate annual income through agriculture value chain development by increasing the landholding with an average of 1.86 acres per household. The project will utilize the Sadpara Nallah water source to irrigate the command area, significantly enhancing agricultural productivity and livelihoods for 170 households.

3.6.2. Project Location

The proposed project site is situated in Upper Sadpara Village, Union Council Shigri Khurd, Tehsil Skardu, District Skardu, Gilgit-Baltistan. The distance from the District Headquarters at Skardu is approximately 15 kilometers. The village has approximately 170 beneficiary households. The major crops are maize, potato, wheat, peas, green vegetables and Alfa-Alfa.

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.192295°	75.591530°	11,500 ft
Starting Point (Main Road)	35.201098°	75.574813°	11,960 ft
Ending Point	35.189485°	75.598687°	10,580 ft

3.6.3. Historical Context

This channel was constructed by the community in the past. Due to bed slope issues, the channel became non-functional. The new design addresses this issue with proper slope (1:170).

3.6.4. Project Components

The project design includes lined channel, HDPE pipe, inlet and outlet chambers, covered channel, culverts and cover slab and cross-drainage structures.

Some of the salient features of the Engineering design of FMR are mentioned below in Table

Table 13 ILD Upper Sadpara, Salient features of the Engineering Design

Sr.No.	Item	Description
1	Channel Length	5.49 KM (2.78 km lined + 2.71 km HDPE pipe)
2	Channel Type	Lined Channel / HDPE Pipe
3	Slope	1:170
4	Source of Water	Sadpara Nallah
5	Water Availability Period	May to Nov
6	Required Discharge	1.92 cusec
7	Total Command Area	326 Acres
8	Moderate Plain Area	13 Acres
9	Sloppy Area	234 Acres
10	Moderate Sloppy Area	47 Acres

11	Steep Sloppy Area	32 Acres
12	Beneficiary HH	170
13	Landholding per HH (existing)	1.86 Acre
14	Cropping Zone	Single Cropping Zone
15	Construction Period	20 Months

3.6.5. Payback Mechanism

As per program policy, the beneficiary community is bound to deposit 50% of Project Incurred Cost in Joint Account of community within three cropping seasons as payback. Poor, women headed households and vulnerable will be exempted. The payback amount will be used for sustainability and maintenance of the irrigation channel.

3.6.6. Cost of the Project

The estimated cost of the proposed Project is Rs. 37,594,194; break up given below;

Table 14: Estimated Cost of ILD Upper Sadpara

Construction of Irrigation and Land Development (ILD) Upper Sadpara, District Skardu.		
S. No	Description	Amount (Rs)
A	25,823,695	34,332,597
	Total (Rs.)	34,332,597
	Contingencies @ 3% of Construction Cost (Rs.)	1,029,978
	HR Cost @4.5% of Construction Cost	1,544,966
	DRR Cost @2% of Construction Cost	686,651
	<i>DRR Cost Allocation for EMP</i>	686,651
	Environmental Management Cost as % of Project Cost	1.83%
	G.Total (Rs.)	37,594,194

DISTRICT GHANCHE PROJECTS

District Ghanche is the easternmost district of Gilgit-Baltistan, bounded by Skardu District to the west, the Shyok River to the north, and the Indian-administered region of Ladakh to the south and east. The district headquarters is at Khaplu. The two projects in this district are the Khaplu Broq FMR and the Haldi ILD.

3.7. PROJECT 6: KHAPLU BROQ FARM TO MARKET ROAD

3.7.1. Rationale

The Khaplu Broq Farm-to-Market Road initiative aims to strengthen critical road infrastructure to support key value chains, connecting approximately 1,800 acres of production area to the main valley road. This is the largest project in terms of command area and beneficiaries. The FMR will connect the agricultural command area with Khaplu Broq village and subsequently link it with the Valley Road, allowing villagers to carry inputs, farm machinery, and travel from village to farm area, and bring produce to markets.

3.7.2. Project Location

The proposed project site is situated in Khaplu Broq Village, Union Council Khaplu, Tehsil Khaplu, District Ghanche, Gilgit-Baltistan. The distance from the District Headquarters at Khaplu is approximately 5 kilometers. The village has approximately 1,020 beneficiary households. The major crops are maize, wheat, peas, capsicum, green vegetables and Alfa-Alfa.

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.132814°	76.385708°	10,390 ft
Starting Point (Main Road)	35.132814°	76.385708°	9,130 ft
Ending Point	35.132160°	76.397866°	10,600 ft

3.7.3. Topography and Strata

The topography along the proposed 8.35 kilometer alignment consists of soft strata, slopy terrain, and flat terrain. No hard rock is present, and no forest cover exists along the alignment.

Terrain Type	Percentage
Soft strata	25%
Slopy terrain	50%
Flat terrain	25%

3.7.4. Project Components

The project design is an 8.35 km jeepable road with associated protection and drainage structures. The FMR is 16.50 ft wide with two lanes of 8.25 ft each, gradient 1:10.

Table 15 FMR Khaplu Broq Salient features of the Engineering Design

Sr.No.	Item	Description
1	Total Length	8.35 KM
2	Width (ROW)	16.50 ft

3	Lane Width	8.25 ft (02 Lanes)
4	Type	Compacted Shingle Jeepable Road
5	Linkage to Main Road	Khaplu Valley Road
6	Gradient	1:10
7	Culverts	RCC Culverts, Pipe Culverts
8	Side Drain	Rectangular Masonry Drain
9	Allied Structure	Stone Masonry Retaining Walls and Breast Walls
10	Carriageway Slope	2% towards hillside
11	Command Area	1,800 Acres
12	Beneficiary HH	1,020
13	Cropping Zone	Transitional Cropping Zone
14	Command Area	1,800 Acres
13	Construction Period	20 Months

3.7.5. Cost of the Project

The estimated cost of the proposed Project is Rs. **85,032,225**; break up given below;

Table 16 Estimated Cost of FMR Khaplu Broq

Construction of Farm to Market Road (FMR) Khaplu Broq, District Ghanche.		
S. No	Description	Amount (Rs)
A	Construction of Culverts (Causeways, Culverts, Dry work)	77,655,000
	Total (Rs.)	77,655,000
	Contingencies @ 3% of Construction Cost (Rs.)	2,329,650
	HR Cost @4.5% of Construction Cost	3,494,475
	DRR Cost @2% of Construction Cost	1,553,100
	<i>DRR Cost Allocation for EMP</i>	1,553,100
	Environmental Management Cost as % of Project Cost	1.83%
	G.Total (Rs.)	85,032,225

3.8. PROJECT 7: HALDI IRRIGATION AND LAND DEVELOPMENT (ILD)

3.8.1. Rationale

The Haldi Irrigation and Land Development scheme aims to bring approximately 151 acres of barren land under cultivation by constructing a 3.50 km irrigation channel. The villagers/inhabitants have very low landholding due to extreme shortage of land; they are restricted to limited cultivation. The scheme has very positive economic impact on beneficiaries, having potential to elevate annual income through agriculture value chain development by increasing the landholding. This channel was constructed by the community in the past but due to bed slope issues, it became non-functional.

3.8.2. Project Location

The proposed project site is situated in Haldi Village, Union Council Thagus, Tehsil Mashabrum, District Ghanche, Gilgit-Baltistan. The distance from the District Headquarters at Khaplu is approximately 25 kilometers. The village has approximately 268 beneficiary households. The major crops are maize, potato, wheat, peas, green vegetables and Alfa-Alfa.

Geographic Coordinates

Location Point	Latitude (N)	Longitude (E)	Elevation (Approx)
Command Area	35.256615°	76.414576°	9,200 ft
Starting Point (Main Road)	35.27087°	76.431028°	9,427 ft
Ending Point	35.259731°	76.411166°	9,220 ft

3.8.3. Topography and Strata

The topography along the proposed 3.50 kilometer alignment consists of boulders and mixed strata of soil and loam. The gradient of the channel is designed at 1:300 to ensure proper water flow.

Command Area Classification	Acres
Plain Area	79
Sloppy Area	71
Steep Sloppy Area	06
Total	151

3.8.4. Project Components

The project design includes lined channel, inlet and outlet chambers, and cross-drainage structures.

Some of the salient features of the Engineering design of FMR are mentioned below in Table

Table 17 ILD Haldi, Salient features of the Engineering Design

Sr.No.	Item	Description
1	Channel Length	3.5 KM
2	Channel Type	Lined Channel
3	Slope	1:300
4	Required Discharge	1.92 cusec
5	Total Command Area	151 Acres
6	Beneficiary HH	268
7	Landholding per HH (existing)	0.56 Acre

3.8.5. Payback Mechanism

Same as Upper Sadpara ILD, the beneficiary community is bound to deposit 50% of Project Incurred Cost in Joint Account of community within three cropping seasons as payback. Poor, women headed households and vulnerable will be exempted. The payback amount will be used for sustainability and maintenance of the irrigation channel.

3.8.6. Cost of the Project

The estimated cost of the proposed Project is Rs. 24,801,750; break up given below;

Table 18: Estimated Cost of ILD Haldi

Construction of Irrigation and Land Development (ILD) Haldi, District Ghanche.		
S. No	Description	Amount (Rs)
A	25,823,695	22,650,000
	Total (Rs.)	22,650,000
	Contingencies @ 3% of Construction Cost (Rs.)	679,500
	HR Cost @4.5% of Construction Cost	1,019,250
	DRR Cost @2% of Construction Cost	453,000
	<i>DRR Cost Allocation for EMP</i>	453,000
	Environmental Management Cost as % of Project Cost	1.83%

G.Total (Rs.)	24,801,750
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COMMAN ASPECTS FOR ALL SCHEMES

The following aspects are common across all seven projects and are described collectively to avoid repetition.

3.9. LAND ACQUISITION

The land has been acquired as per the criteria of ETI-GB with the communities. Land ownership in the project areas is communal/private. The communities have expressed willingness to provide land for the schemes without compensation, and undertakings on legal stamp paper will be provided before execution. A no-conflict certificate and undertaking from communities for providing free of cost Right of Way (RoW) has been obtained. No resettlement or evacuation is required, and no compensation for land or other property is involved.

3.10. CONSTRUCTION ASPECTS

For all seven projects, the workforce will be sourced locally (10-15 persons per project) from the respective villages and surrounding areas. Skilled and unskilled labor is available locally, ensuring that employment benefits accrue to the communities and minimizing the need for outside labor. Construction materials including crush, sand, cement, and steel will be procured from local markets.

No controlled blasting is required for most projects as hard rock is not prominently present along the alignments. For the Sadpara FMR, which has approximately 5,000 ft of hard rock on the upper side, mechanical excavation methods (such as rock breakers and excavators) will be employed. Stone masonry work will be executed manually, while filling and cutting work can be executed by machine where feasible.

Water for construction will be sourced from nearby natural streams. All machinery and vehicles will be properly maintained to minimize environmental impacts. The contractors will be required to comply with the Environmental and Social Management Plan (ESMP) and all applicable environmental regulations.

3.11. PROJECT IMPLEMENTATION SCHEDULE

The construction schedules for the projects range from 18 to 20 months, as detailed in the project profiles. Working periods are limited to 8-10 months per year due to weather constraints, particularly snowfall during winter months (typically December to February). The construction will be planned to avoid the heavy snowfall season where feasible.

3.12. SITE LAYOUT AND CONSTRUCTION FACILITIES

A temporary construction site will be established near the project alignment. This site will be small-scale, given the use of local labor. The site will include:

- A small material stockpile area for sand, cement, and aggregates.
- A security and store room for construction materials and tools.
- A designated area for the storage and maintenance of machinery and equipment.
- A temporary waste collection point for solid waste.
- A small sanitation facility (portable toilet) for the workforce.

The exact location of the site will be finalized in consultation with the Scheme Management Team (SMT) to avoid agricultural land and natural drainage channels.

CHAPTER 4

4. PROJECT ALTERNATIVES

4.1. GENERAL

The No Project Option means that none of the seven proposed projects would be constructed, and existing conditions would continue unchanged.

4.2. NO PROJECT OPTION (NPO)

The No Project Option means that none of the seven proposed projects would be constructed, and existing conditions would continue unchanged.

Under the No Project Option:

Alchori FMR: 470 households would continue to face high transport costs, post-harvest losses, and poor access to markets and healthcare.

Kashmal FMR: 76 households would continue to face high transport costs and poor market access.

Khubanistan FMR: 250-300 households would continue to face poor road conditions and transportation challenges.

Khaplu Broq FMR: 1,020 households would continue to face transportation difficulties, with significant post-harvest losses on 1,800 acres of command area.

Haldi ILD: 268 households would be unable to cultivate 151 acres of barren land due to lack of irrigation water.

Sadpara FMR: 300 households would continue to face poor road conditions and transportation challenges.

Upper Sadpara ILD: 170 households would be unable to cultivate 326 acres of barren land due to lack of irrigation water.

From an environmental perspective, the No Project Option would mean no construction-related disturbance to the existing topography, and no temporary impacts from dust, noise, or worker presence. However, these limited environmental benefits are far outweighed by the adverse social and economic consequences.

The adverse social and economic impacts of the No Project Option are severe and far-reaching. Approximately 2,554 households across the seven project areas would continue to suffer from High transportation cost, Significant post-harvest losses due to delayed and unreliable transportation, Limited access to healthcare, education, and other social services, limited economic opportunities, Continued isolation, and Safety risks.

Taking into account the substantial socio-economic benefits of the proposed projects including improved market access, reduced transportation costs, reduced post-harvest losses, enhanced agricultural productivity, improved access to health and education services, employment opportunities during construction, and enhanced livelihoods for approximately 2,554 households, it may be concluded that the No Project Option should be rejected for all seven projects.

4.3. PROJECT LAYOUT ALTERNATIVES

For each of the seven proposed projects, the command area is fixed by the location of existing agricultural land (for FMRs) or the barren land to be brought under cultivation (for ILD schemes). The starting point is fixed by

the existing road network or the water source (for ILD schemes). Therefore, the general corridor for each project is largely predetermined by these fixed points.

The following considerations were made during the feasibility studies. For the FMR schemes (Alchori, Kashmal, Khubanistan, Khaplu Broq, and Sadpara), the alignments were selected to minimize environmental disturbance by avoiding forest cover and sensitive areas. The routes were designed to follow the most stable terrain, avoiding areas with potential for landslides and erosion. The alignments take into account the existing cultivation patterns to ensure maximum benefit to the command areas. Communities were consulted on the alignments and have voluntarily provided land for the right-of-way.

For the ILD schemes (Haldi and Upper Sadpara), the channel alignments were designed to follow the most feasible gradient (1:300 and 1:170 respectively) to ensure proper water flow to the entire command area. The routes were selected to minimize disturbance to existing land uses and settlements. The designs incorporate necessary cross-drainage structures (culverts, cover slabs) to prevent disruption of natural drainage. Communities were consulted on the alignments and have voluntarily provided land for the right-of-way.

The total length of each project ranges from 3.29 km to 8.35 km, and the command areas and starting points are fixed. Considering that the communities have already agreed to the current alignments and provided land voluntarily, there exists limited justification for alternative alignment options. The proposed alignments are considered the most feasible from technical, social, environmental, and economic perspectives. Minor variations in alignment were considered during the feasibility studies to avoid challenging terrain features and minimize environmental disturbance, but the current alignments were determined to be optimal.

CHAPTER 5

5. DESCRIPTION OF THE ENVIRONMENT

5.1. GENERAL

This chapter describes the baseline conditions of the physical, biological, and socio-economic environment in the project areas. All seven projects are located in the Baltistan Region (Shigar, Skardu, and Ghanche Districts), Gilgit-Baltistan, and share similar regional characteristics while exhibiting some district-specific variations.

5.2. PHYSICAL ENVIRONMENT

Baseline studies were undertaken for geo-environmental aspects that may be affected by project activities. The geological baseline studies provide a database of physical parameters that are used to predict and monitor the effects of the project on the environment.

5.2.1. Geography

The Baltistan region is located in the eastern part of Gilgit-Baltistan, bordered by the Karakoram Range to the north, the Deosai Plains to the west, the Indian-administered region of Ladakh to the south and east, and the Shyok and Indus Rivers flowing through the region. The region is characterized by high mountain peaks, deep valleys, and glaciated terrain. The three districts covered by the projects are:

- District Shigar is bounded on the north by the Karakoram Range, on the east by Kharmang District, on the south by Skardu District, and on the west by Gilgit District. The district headquarters is at Shigar town, located at an elevation of approximately 2,300 meters (7,546 feet) above sea level.
- District Skardu is bounded by Shigar District to the north, Kharmang to the east, Astore to the west, and the Indian-administered region of Ladakh to the south. The district headquarters is at Skardu city, located at an elevation of approximately 2,228 meters (7,310 feet) above sea level.
- District Ghanche is the easternmost district of Gilgit-Baltistan, bounded by Skardu District to the west, the Shyok River to the north, and the Indian-administered region of Ladakh to the south and east. The district headquarters is at Khaplu, located at an elevation of approximately 2,600 meters (8,530 feet) above sea level.

5.2.2. Climate

The project areas experience a high-altitude continental mountainous climate characteristic of the Karakoram and Himalayan regions. The climate is characterized by cold, dry winters and mild to warm summers.

Temperature: Winters are severe, with temperatures often falling below freezing, particularly from December to February. Summer temperatures are moderate, with average temperatures ranging between 10°C and 25°C, depending on altitude. The higher elevation areas such as Sadpara (10,853 ft) and Upper Sadpara (11,500 ft) experience cooler temperatures throughout the year compared to the lower elevation areas such as Khubanistan (7,496 ft).

Precipitation: Precipitation is moderate and occurs mainly during winter and spring months. The region receives both snowfall and rainfall, with snowfall being the dominant form of precipitation during winter. The average annual precipitation ranges from 200 mm to 400 mm, varying by altitude and location.

5.2.3. Seismicity

The project areas fall within Seismic Zone 3 (high hazard) as per the Building Code of Pakistan and the Seismic Zoning Map of Pakistan. The Peak Ground Acceleration (PGA) ranges from 0.16g to 0.24g for a 475-year return period. The region has significant historical seismic activity due to the active tectonic setting of the Karakoram and Himalayan ranges. All structures, including the roads and irrigation channels, are designed to withstand these seismic forces, adhering to the seismic provisions of the Building Code of Pakistan (2007). The project area's seismic vulnerability has been accounted for in the engineering design through appropriate slope stabilization measures, retaining walls, and drainage structures.

5.2.4. Hydrology and Water Resources

The Baltistan region is drained by the Indus River and its tributaries, including the Shyok River, the Shigar River, and numerous glacial streams. The region contains some of the largest glaciers outside the polar regions, including the Baltoro, Biafo, and Hispar glaciers. These glaciers are a critical source of water for irrigation and domestic use in the region.

The ILD schemes draw water from the Sadpara Nallah (Upper Sadpara ILD) and other perennial streams fed by glacial melt. The Haldi ILD scheme utilizes the existing water source in the area. The water availability period is typically from May to November, coinciding with the cropping season. The FMR schemes include adequate cross-drainage structures (culverts, causeways, and side drains) to ensure that natural drainage channels are not disrupted, and road surface water is safely conveyed away from the carriageway.

5.3. BIOLOGICAL ENVIRONMENT

5.3.1. Flora

No forest cover is present along any of the project alignments. The areas consist of agricultural land, barren land, and scattered vegetation. Major crops in the command areas include wheat, maize, peas, potato, capsicum, green vegetables, and Alfa-Alfa. Major fruits include apples, grapes, apricots, cherries, and almonds. Apricot production is particularly significant in the region, with Khubanistan village being named "Land of the Apricot." The region also has natural pastures in the higher elevation areas.

The vegetation in the surrounding areas includes scattered shrubs and grasses adapted to the high-altitude, semi-arid conditions. The Sadpara and Upper Sadpara areas, being at higher elevations, have more limited vegetation cover compared to the Shigar and Ghanche areas.

5.3.2. Fauna

According to local communities, wildlife species found in the vicinity of the project area include:

- Mammals: Ibex, wolf, snow leopard, Himalayan Brown bear, marmots, and various species of pikas.
- Birds: Chukar partridge, Himalayan snowcock, golden eagle, lammergeier, and various other bird species.

No endangered species have been identified within the immediate project areas, and the projects do not fall within any protected area. Wildlife populations are generally located in the higher elevation areas away from the agricultural command areas.

5.3.3. Aquatic Ecology

The region's streams and rivers support various fish species including brown trout and indigenous fish species. However, no significant commercial fishery exists in the immediate project areas. The ILD schemes draw water from streams for irrigation purposes, but the water is returned to the natural drainage system through the command area. The FMR schemes include culverts and causeways that maintain natural water flow in drainage channels. Construction activities will be scheduled to avoid high-flow seasons where feasible.

5.3.4. Protected Areas

No project falls within any national park, wildlife sanctuary, game reserve, or other protected area.

5.4. SOCIO-ECONOMIC ENVIRONMENT

The socio-economic aspects were studied concerning human and economic development and quality of life values of the population in the Project Area. Human and economic development mainly focuses on population and communities, infrastructure availability, institutions, transportation networks, prevailing land use, power sources, and agricultural patterns. Quality of life includes socio-cultural values, public health situation, recreational resources and development, and archaeological, historical, and cultural sites. Baseline information was gathered from literature, study reports, district census reports, and through field surveys comprising interviews and meetings by the Consultant's social team, using survey tools. The same methodology was applied consistently across all seven project areas

5.4.1. Approach and Methodology for the Study

The methodology for the socio-economic study was developed after a thorough review of the Terms of Reference (TORs), the quantum of work and expected outputs, and the prescribed period of study. The survey primarily used quantitative methods and included supplementary qualitative information and analysis wherever possible. The design of the assessment was limited to measuring the overall socio-economic condition of the population living in the area of influence (socio-economically) of the proposed project areas.

The study employed a mixed-method approach combining household surveys, group consultations, and key informant interviews. The household survey was conducted using structured questionnaires designed to capture demographic information, income sources, expenditure patterns, asset ownership, and access to social amenities. Group consultations were held with community members to gather collective perspectives on the proposed project, identify potential social issues, and record expectations and concerns. Key informant interviews were conducted with community elders, local leaders, and representatives of relevant government departments.

Table 19 Survey Objectives, Key Indicators, and Methods

Sr. No.	Objectives	Key Indicators	Method	Tools
1	Demographic Profile, Occupation, Income, Expenditures, Asset Ownership	Demographic Information (Age, Education, Health Status, Work Status), Income Levels and Sources, Expenditure Amounts and Sources, Available Social Amenities (Electricity, Water, LPG, etc.)	Sample Household Interviews	Socio-economic Proforma

2	Availability of Social Amenities, Perception about Proposed Project	Availability, Use, and Sources of Household Facilities (Water, Sanitation, Fuel), Availability, Access, and Use of Public Facilities (Education, Health, Sanitation, Civil Acts Registration)	Sample Household Interviews, Community Discussions	Household Interviews, General Discussions with Local Community Members
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5.4.2. GPS Verification

During the field surveys, GPS coordinates were recorded for all key physical, biological, and socio-economic features, including villages, water sources, agricultural land, and identified areas of interest. This data was used to create the project location maps presented in Annex-1

5.4.3. Literature Review

The available information, data, reports and studies related to the project was reviewed after mobilisation. The literature review included the following documents.

- Feasibility study reports provided by ETI-GB for all seven projects
- District census reports for Shigar, Skardu, and Ghanche districts
- Project area location maps and satellite imagery
- Existing value chain assessment reports for the area
- Previous EIA and social assessment reports for similar projects in Gilgit-Baltistan
- Relevant policies and programs of the Government of Gilgit-Baltistan related to rural development and agriculture.

5.4.4. Developing Survey Instruments

The Terms of Reference (TORs) highlighted the importance of collecting primary data; hence, the consultants designed questionnaires covering the various types of information regarding socio-economic aspects, poverty indicators, and availability of social amenities. The survey instruments were developed specifically for each project area, considering the local context, language, and cultural sensitivities.

5.4.5. Implementation of Data Collection Survey

The Terms of Reference (TORs) highlighted the importance of collecting primary data; hence, the consultants designed questionnaires covering the various types of information regarding socio-economic aspects, poverty indicators, and availability of social amenities. The survey instruments were developed specifically for each project area, considering the local context, language, and cultural sensitivities.

- a. Household Interviews (Face to face structured interviews)
- b. Group Consultations (Focus Group Discussions)
- c. Key Informant Interviews (In-depth Semi-Structured Interviews)
- d. Direct Observation (Field visits and Observations)

5.4.6. Findings of Socio-Economic Survey

The main objective of the socio-economic survey was to analyze the socio-economic and cultural characteristics of the intended project beneficiaries to understand their interrelationships, dynamics, and

inequalities, and to identify opportunities and constraints in accessing the project benefits by all beneficiaries or a segment of them (based on gender, ethnicity, level of income, and geographical remoteness).

The key findings of the socio-economic survey across all four project areas are summarised below:

- All seven communities have expressed strong support for their respective projects and have voluntarily agreed to provide land for the right-of-way without compensation
- Approximately 90% of the population across all project areas is engaged in agriculture and livestock rearing as their primary livelihood source
- Major crops grown in the command areas include wheat, maize, peas, potato, capsicum, green vegetables, and Alfa-Alfa. Major fruits include apples, grapes, apricots, cherries, almonds, and mulberries
- For the ILD schemes (Haldi and Upper Sadpara), communities have agreed to payback 50% of the project cost within three cropping seasons
- No social issues related to religion, caste, politics, land acquisition, or pastures have been reported in any of the project areas

5.4.7. Demography of Sampled Households

The socio-economic survey was conducted to understand the demographic and socio-economic characteristics of the population in each project area. Separate household surveys were carried out for each of the seven villages (Alchori, Kashmal, Khubanistan, Khaplu Broq, Haldi, Sadpara, and Upper Sadpara). The findings presented below represent the aggregated data collected from these surveys.

a) Gender Composition

Across all project areas, the survey revealed that the male and female populations are generally balanced, with a slightly higher proportion of females in some villages. The average household size across all project areas ranges from 6 to 8 persons per household, reflecting the typical joint family system prevalent in the region

b) Age Group

The age distribution across all project areas indicates a young population, with most respondents falling in the 21 to 45 years age bracket. This suggests a potentially active workforce that can benefit from the improved economic opportunities that the proposed projects will bring.

c) Education Level

Education is one of the key factors in assessing the socio-economic condition of any area. Based on the sample surveys, the literacy rate across the project areas is moderate, with educational attainment limited by the availability of schooling facilities in these remote mountainous areas.

It is to note that if a person could read a newspaper or a journal of the same standard and could write a simple letter in any language is considered as literate.

d) Source of Income

Most respondents living near the project areas are engaged in agriculture as their primary source of income. This is consistent across all four project areas, with approximately 90% of households relying on agriculture and livestock rearing for their livelihood. Other occupations include government

service, business, private employment, and construction labor.

e) Monthly Household Income

Across all project areas, the average annual per farmer revenue from cash crops ranges from PKR 40,000 to PKR 50,000. This income is expected to increase significantly with improved market access provided by the proposed roads and bridges.

f) Source of Drinking Water

Springs are the primary source of drinking water for the local communities across all project areas. According to the local people, the water is generally clean and safe for drinking purposes. Some villages also have community-managed water schemes.

g) Satisfaction about Water Quality

During the survey, respondents were asked about the quality of drinking water. The data revealed that the majority of respondents across all project areas were satisfied with the quality of the water.

Table 20 Satisfaction about water quality

S.no	Satisfaction Level	Percentage of Households (%)
1	Satisfied	85%
2	Partially Satisfied	10%
3	Not Satisfied	5%
	Total	100%

h) Source of Energy for Cooking and Heating

Across all project areas, wood and other biomass (dung, crop residues) are the primary sources of energy for cooking and heating, particularly during winter months. LPG is used by some households during summer months but is less common in winter due to transportation difficulties and cost.

Table 21 Source of Energy in different seasons

S.no	Source of Energy	Percentage of Households (%) (Winter)	Percentage of Households (%) (Summer)
1	Wood only	50%	40%
2	Wood + Other biomass (dung, crop residues)	45%	30%
3	LPG + Wood	5%	30%
	Total	100%	100%

i) Basic Social Amenities

The survey revealed that electricity is available in all project areas, though satisfaction levels vary. Water supply is available to most households through springs and community-managed schemes. Basic Health Units (BHUs) are available at the union council level. Schooling facilities are available in or near the villages. Mobile service is available in all areas. However, no formal sewerage system exists in any of the project areas.

Table 22 Basic Social Amenities in the Proposed Project Areas

S.no	Social Amenity	Available (%)	Satisfactory (%)
1	Electricity	100%	70%
2	Water Supply	95%	80%
3	Basic Health Unit (BHU)	Yes (at UC level)	60%
4	Schooling (Primary/Middle)	100%	75%
5	Mobile Service	100%	80%
6	Sewerage System	0%	N/A

j) Mode of Transportation

It was observed that most respondents travel by the existing poor condition jeepable roads when moving between their villages and the main road. In the absence of proper roads, some communities rely on human resources and animals for transportation of goods.

5.4.8. Gender Aspect/ Roles and Responsibilities

The importance of gender equality, women's empowerment, and the realization of women's rights in achieving sustainable development has been increasingly recognized in recent decades. This recognition is evident in several international norms and agreements, including Principle 20 of the Rio Declaration on Environment and Development (1992), which states that the full participation of women is essential to achieving sustainable development.

In the context of the project areas in Baltistan, gender roles remain largely traditional, with clear distinctions between the responsibilities of men and women. These roles vary slightly across the seven villages but follow similar patterns.

a) Roles and Responsibilities for Men

Men in the project areas are primarily responsible for activities outside the household. These include managing agricultural land, preparing fields for cultivation, marketing agricultural produce in local markets, earning cash income through government employment, business, or labor, representing the household in community meetings and local governance, and making major decisions regarding land, livestock, and household expenditures. Men also participate in fetching firewood and fodder for livestock, though this is often shared with women.

b) Roles and Responsibilities for Women

Women in the project areas are primarily engaged in domestic work. Their responsibilities include cooking, cleaning, washing, and maintaining the household, caring for children and elderly family members, fetching drinking water from springs or community schemes, collecting firewood for cooking and heating (particularly in winter), assisting in agricultural activities such as sowing, weeding, and harvesting, and processing and preserving fruits and vegetables for household consumption. Women also participate in livestock rearing, including milking animals and cleaning shelters.

c) Constraints Faced by Women

Women in the project areas face several constraints that limit their participation in economic activities and decision-making. These include limited mobility due to cultural norms and the absence of safe and reliable transportation, heavy domestic workload that leaves little time for income-generating activities, lower literacy rates compared to men, limited access to credit, markets, and agricultural extension services, and limited representation in local institutions and decision-making bodies.

d) Potential Project Impacts on Gender Roles

The proposed roads and irrigation channels are expected to have differential impacts on men and women. Improved road access may reduce the time and effort required for men to transport produce to markets, thereby freeing up time for other productive activities. For women, the improved roads may facilitate access to health facilities for emergencies and childbirth, enable easier transport of domestic goods and firewood, provide opportunities to sell processed fruits and vegetables in markets, and improve access to training and extension services offered by ETI-GB.

For the ILD schemes, women will benefit from increased agricultural productivity as more land becomes available for cultivation, potentially increasing household food security and income. However, the projects may also have unintended negative impacts on women. Increased vehicular movement may raise safety concerns for women walking along the roads. The influx of outside workers during construction may create social tensions if cultural norms regarding interaction with women are not respected. Contractors will be required to follow a Code of Conduct that respects local cultural norms, particularly concerning women's privacy.

e) Women's Participation in Various Activities

Based on the socio-economic surveys and community consultations conducted across the seven project areas, the participation of women in various activities is presented in the table below. It is important to note that "participation" refers to engagement in the activity, not necessarily control over resources or decision-making related to that activity.

Table 23 Women Participation in Various Activities

S.No.	Activity	Participation Level (%)	Remarks
1	Household (cooking, cleaning, washing)	100%	Primary responsibility
2	Child Caring	100%	Primary responsibility
3	Employment / Business	<5%	Limited to small-scale home-based activities
4	Farming (sowing, weeding, harvesting)	80%	Assist men; rarely control land or income

5	Social Obligations (marriages, functions)	100%	Significant but unrecognized labor
6	Local Representation (councils, political gatherings)	<5%	Very limited due to cultural norms
7	Vegetable Cultivation (ETI-GB trained)	30-40%	Training provided in some villages
8	Fruit Processing and Packaging	30%	Small-scale, for household use or local sale

f) Men's Participation in Various Activities

Based on the socio-economic surveys, the participation of men in various activities across the project areas is presented in Table below.

Table 24 Men Participation in various activities

S.No.	Activity	Participation Level (%)	Remarks
1	Agricultural land preparation	100%	Primary responsibility
2	Crop cultivation (plowing, sowing)	100%	Primary responsibility
3	Marketing of produce	100%	Travel to Villages and other markets
4	Government/Business/Private Employment	8-10%	Limited opportunities in the area
5	Construction labor	2-5%	Seasonal migration for work
6	Livestock rearing (grazing, feeding)	70%	Shared with women
7	Firewood and fodder collection	60%	Shared with women
8	Household decision-making	90%	Primary decision-makers
9	Community representation	95%	Dominant role in local institutions

g) Recommendations for Gender-Inclusive Project Implementation

To ensure that the proposed projects benefit both men and women equitably, the following measures are recommended:

- Contractors will be required to follow a Code of Conduct that respects local cultural norms, particularly concerning women's privacy and safety

- Awareness sessions on the project's benefits and grievance mechanism should be conducted separately for women, given cultural constraints on mixed-gender gatherings
- The projects should support women's access to value chain activities, including fruit processing, packaging, and small-scale businesses, by improving transportation to markets
- For the ILD schemes, women should be involved in decisions regarding land use and crop selection on the newly developed agricultural land

5.4.9. Archeology and Cultural Heritage

No heritage or archaeological sites have been identified within the project areas. However, given the historical significance of the Baltistan region, which has been a crossroads of Tibetan, Central Asian, and South Asian cultures, the possibility of chance finds during excavation cannot be entirely ruled out. A Chance Find Procedure has been included in the Environmental and Social Management Plan (Chapter 9) to address any archaeological discoveries that may occur during construction.

CHAPTER 6

6 PUBLIC CONSULTATION

6.1. GENERAL

Public consultation is not a mere regulatory formality but a fundamental component of any credible environmental assessment. For all four proposed projects, meaningful engagement with stakeholders served to improve project design, enhance environmental soundness, and secure social acceptability. The EIA process was deliberately structured to include those who would be directly affected by or have a legitimate interest in the projects, recognizing that local communities possess invaluable knowledge about their environment, livelihoods, and social dynamics.

This chapter documents the outcomes of stakeholder consultation sessions conducted for all four projects. Under the GB Environmental Protection Act 2014 and the Pakistan EPA Review of IEE and EIA Regulations 2000, public consultation is mandatory for development projects. Moreover, the adequacy of consultation and information disclosure is a key criterion for determining compliance with national and international safeguard policies. For these projects, consultations were carried out in each of the seven villages and with relevant government departments during the EIA field survey period.

6.2. OBJECTIVES

The consultation process was designed to achieve several interconnected objectives. The objectives are as below

First and foremost, it aimed to build trust between the proponent (ETI-GB) and the local community. Without trust, even the most well-designed project can face resistance or failure. Second, consultations sought to identify public concerns early in the project cycle so that these could be addressed in the project design and mitigation measures rather than becoming sources of conflict later. Third, the process aimed to tap into local knowledge about the area's environmental and social conditions, which no amount of desk study can replicate.

Beyond these immediate goals, consultation also served to inform stakeholders about the project's features, timeline, and potential impacts. It provided a platform for those who might otherwise remain unheard including women, elderly residents, and small landholders to express their views. By involving the community in shaping the project, the consultation process helped create a sense of ownership, which is critical for long-term sustainability. Finally, transparent consultation reduces the risk of conflict by identifying contentious issues early and working through them to find acceptable solutions. When people see that their ideas can genuinely influence a project, they gain confidence in both the proponent and the process

6.3. STAKEHOLDER IDENTIFICATION

The first step in the consultation process was identifying who needed to be consulted. For all seven projects, stakeholders were categorized into primary and secondary groups. Primary stakeholders are those directly affected by the projects. This group includes the residents of each village, the farmers who cultivate the command areas, the landowners along the proposed alignments, and the beneficiary households who will benefit from improved road access and irrigation facilities. Women were specifically included as a distinct group within the primary stakeholders because their roles in agriculture and domestic work differ significantly from those of men.

Secondary stakeholders are those who have a regulatory or advisory role in project implementation. This group includes the Gilgit-Baltistan Environmental Protection Agency (GB-EPA), which will issue the environmental approvals; the Forest Department (where applicable); the Communication and Works

Department, which will take over road maintenance after construction; the Agriculture Department, which supports value chain development; the Water Management and Irrigation Department (WM&ID), which will provide technical support for the ILD schemes; and the district administrations in Shigar, Skardu, and Ghanche, which oversee local governance.

A list of the major stakeholders consulted during this EIA is provided in the Table below.

Table 25 Stakeholders Consulted for the Proposed Schemes

S.No	Stakeholder Category	Specific Stakeholders	Nature of Interest
1	Primary (Local Community)	Village residents, farmers, landowners of Alchori, Kashmal, Khubanistan, Khaplu Broq, Haldi, Sadpara, and Upper Sadpara	Directly affected; will use the roads/channels; donated land voluntarily
2	Primary (Beneficiaries)	Approximately 2,554 households across seven project areas	Will gain improved market access, reduced transport costs, and increased agricultural productivity
3	Secondary (Regulatory)	GB-Environmental Protection Agency	Responsible for issuing NOC and monitoring EMP compliance
4	Secondary (Line Departments)	Forest Department, Agriculture Department, C&W Department, WM&ID Department	Provide clearances, technical support, and maintenance
5	Secondary (Administrative)	District Administrations (Shigar, Skardu, Ghanche)	Local governance and administrative oversight

6.4. METHODS OF CONSULTATIONS

The consultation process employed multiple methods to ensure broad participation and to accommodate the preferences and constraints of different stakeholder groups. Group consultations were held in central locations in each village, where the project was explained in the local language (Balti and Urdu). These open meetings allowed for general discussion, questions, and collective expression of views. Separate group sessions were held with men and women, respecting cultural norms that discourage mixed-gender gatherings in formal settings.

Individual interviews were conducted with selected community members, including landowners, farmers, and elderly residents. This method allowed those who might be reluctant to speak in group settings to express their views privately. Key informant interviews were held with community elders, local leaders, and representatives of government departments. These interviews provided deeper insights into local history, social dynamics, and technical constraints.

Walkover surveys along the entire alignments of each project were conducted with community members. This was perhaps the most valuable method, as it allowed the EIA team to see the terrain, identify potential issues on site, and hear directly from landowners about specific concerns related to their property. Throughout the consultation process, information was conveyed verbally in the local language, as written materials would have been inaccessible to many community members due to limited literacy.

6.5. FINDINGS OF THE CONSULTATION PROCESS

The consultation process revealed strong and consistent support for the proposed projects across all seven villages. Community members expressed a clear understanding of the project's benefits and a willingness to cooperate with ETI-GB and the contractor during construction. No significant opposition or major concerns were raised during any of the consultation sessions.

a) Support for the Project and Land Donation.

All communities demonstrated their commitment to the projects by voluntarily agreeing to provide land for the right-of-way without any compensation. The land along the proposed alignments is predominantly communal or private, and the affected landowners were present at the consultation meetings to express their consent. Written undertakings on legal stamp paper have been provided. This level of community support is noteworthy and significantly reduces the social risk typically associated with infrastructure projects.

The communities have also submitted formal resolutions and No Objection Certificates (NOCs) to the ETI-GB Regional Coordination Unit - Baltistan (RCU-BLN) office, requesting the implementation of the schemes. These documents demonstrate the formal and documented consent of the communities.

b) Environmental Concerns

When asked about potential environmental impacts, community members did not raise any major concerns. Across all FMR projects, they acknowledged that the alignments pass through areas with minimal vegetation and that any minor vegetation removal is an acceptable trade-off for the benefits the roads will bring. The communities confirmed that no forest cover is present in any project area, and no significant deforestation is involved.

For the ILD schemes (Haldi and Upper Sadpara), the communities noted that the existing channels were constructed by the community in the past but became non-functional due to bed slope issues. They expressed strong support for the rehabilitation and reconstruction of these channels, which will bring barren land under cultivation.

No hard rock requiring blasting is present in any of the FMR projects. For the Sadpara FMR, which has hard rock sections, mechanical excavation methods will be used, and the communities did not raise any concerns regarding blasting.

c) Social and Land Issues

No social conflicts related to religion, caste, politics, or land disputes were reported during the consultations across any of the seven project areas. All communities described themselves as cohesive and united in their support for the projects. All resolvable issues, particularly those related to land ownership along the alignments, have already been addressed through community dialogue. The district administrations have been informed of the communities' consent through formal NOCs attached to the project applications.

For the ILD schemes, the communities confirmed that there are no water right conflicts associated with the proposed projects. The water sources are sufficient to benefit both existing downstream users and the new command areas.

d) Women's Perspectives

Consultations with women were conducted separately, as cultural norms discourage mixed-gender gatherings. Women across all project areas confirmed their primary roles in domestic work, child care, and assistance in agricultural activities. They expressed hope that the improved roads would make it easier to access health facilities in Shigar, Skardu, and Khaplu, particularly for emergencies and childbirth.

Some women who had received ETI-GB training in vegetable cultivation saw the roads as an opportunity to sell their produce in the market more easily. Women also recognized the potential benefits of the ILD schemes, as increased agricultural productivity would improve household food security and income. However, women also noted that their heavy domestic workload leaves little time for income-generating activities, and they requested that the projects not create additional burdens on them.

e) Willingness to Implement the EMP

All communities assured the EIA team that they would fully cooperate in implementing the Environmental Management Plans. Scheme Management Teams (SMTs), which have been formed from among the community members of each village, will take responsibility for overseeing EMP compliance during construction and for maintaining the roads and channels after completion. The communities specifically committed to bearing the expenses of plantation as directed by the EPA, the Forest Department (where applicable), and ETI-GB.

f) Value Chain Potential and Economic Benefits

During consultations, communities highlighted the significant value chain potential of their respective areas. The villages have strong potential for agricultural production, including high-value crops such as potato, peas, capsicum, and green vegetables, as well as fruits including apricot, apple, grapes, cherries, and almonds. The proposed FMRs will enhance market accessibility and boost agricultural production by enabling farmers to transport their produce efficiently to markets. The ILD schemes will bring barren land under cultivation, increasing landholding per household and elevating annual incomes.

6.6. ISSUES RAISED AND RESPONSES PROVIDED

While no major opposition emerged, several questions and requests were raised during the consultations across the four project areas. These are summarized in the table below along with the responses provided by the EIA team.

Table 26 Issues Raised During Consultations and Responses Provided

S.NO	Issues Raised	Response Provided
1	Will blasting damage nearby houses or cause injury?	No blasting is required for any of these projects. For the Sadpara FMR, which has hard rock sections, mechanical excavation methods (rock breakers and excavators) will be used. All work will be done using mechanical and manual methods.
2	Who will maintain the roads and channels after construction?	The roads will be handed over to the GB Communication and Works Department. The irrigation channels will be maintained by the community through the SMTs. The community SMTs will assist in minor repairs for the roads as well.
3	Will the roads be usable during	The roads are designed for year-round use. However,

	winter?	heavy snowfall may occasionally block access, as with other roads in the region. The working period is limited to 8-10 months per year due to weather constraints.
4	Will women be employed in construction?	Preference will be given to local labor. Women may be employed in roles that do not conflict with cultural norms, such as cooking for workers or light manual work.
5	What happens if a tree on my land is cut?	No significant tree cutting is required for any project as there is no forest cover. Minor vegetation removal will be managed with community consent.
6	How will grievances be addressed?	SMTs will be formed in each village to handle complaints. The grievance redress mechanism is described in Chapter 7 of this report.
7	Will the irrigation channel have sufficient water? (Haldi and Upper Sadpara)	Yes, the water sources are perennial and have sufficient discharge (1.92 cusec required). The channels are designed to ensure proper water flow to the entire command area. The water availability period is May to November, coinciding with the cropping season.
8	Will the ILD schemes affect existing downstream water users?	No, the water sources have sufficient capacity to benefit both existing users and the new command areas. Communities have confirmed no water right conflicts.
9	What is the cost sharing arrangement for the ILD schemes?	The communities have agreed to payback 50% of the project cost within three cropping seasons. Poor, women-headed households, and vulnerable groups will be exempted from the payback. The payback amount will be used for sustainability and maintenance of the channels.

6.7. ONGOING CONSULTATION DURING PROJECT IMPLEMENTATION

Consultation cannot end with the submission of the EIA report. ETI-GB and the SMTs are committed to maintaining dialogue with the communities throughout the project lifecycle. During the pre-construction phase, each SMT will meet with relevant line departments and ETI-GB to finalize project-specific plans.

During the construction period (ranging from 18 to 20 months), contractors will hold monthly progress meetings with the SMTs and ETI-GB to discuss environmental compliance, safety, and any community concerns that may arise. If grievances are filed, the SMTs will hold additional meetings as needed to resolve them.

After construction, the SMTs will convene annual review meetings with ETI-GB and the EPA to assess the roads' and channels' condition and any long-term environmental or social issues. For the ILD schemes, the SMTs will also oversee the collection and management of the payback funds as per the agreement with ETI-GB.

CHAPTER 7

7. GRIEVANCE REDRESS MECHANISM**7.1. GENERAL**

The grievance redress mechanism (GRM) is an essential component of any development project where ongoing risks or adverse impacts are anticipated, even when those risks are minimal. For all seven proposed projects, the GRM serves as a structured, transparent, and accessible process for receiving, evaluating, and resolving complaints from project-affected persons and other stakeholders. While the environmental and social assessments have confirmed that no major adverse impacts requiring resettlement or compensation are anticipated for any of the projects, the establishment of GRMs demonstrates ETI-GB's commitment to accountability, fairness, and responsive project management.

The primary objective of the GRM is to implement and maintain a procedure for handling environmental and social concerns raised by project stakeholders. This procedure is scaled to each project's identified risks and adverse impacts, which for all projects are limited to temporary construction-related nuisances such as dust, noise, temporary access disruption, and potential safety concerns. The GRM focuses on stakeholders including the local communities of each village, farmers and landowners along the alignments, and the approximately 2,554 beneficiary households across all seven project areas.

7.2. THE SCHEME MANAGEMENT TEAM (SMT)

The Scheme Management Teams (SMTs) will be constituted by the beneficiary communities of each project once the schemes are approved and prior to the commencement of construction activities. Each SMT will be composed of respected community members including landowners, farmers, and local leaders who have the trust of the broader community. SMTs will be constituted for each of the seven villages: Alchori, Kashmal, Khubanistan, Khaplu Broq, Haldi, Sadpara, and Upper Sadpara.

The communities have already established Village Agriculture Cooperatives (VACs) and other community organizations during the project preparation phase. These organizations have been instrumental in organizing and managing community consultations, resolving all resolvable issues related to land acquisition, ensuring that all affected landowners voluntarily agreed to provide land without compensation, and obtaining formal NOCs from the district administrations in Shigar, Skardu, and Ghanche. The minutes of these meetings and attendance records have been documented and are attached as annexures to this report. This pre-emptive resolution of issues is noteworthy, as it means that the GRMs will likely be used for minor, temporary concerns rather than major disputes.

The primary responsibility of each SMT will be to deal with all project-related matters in their respective village, including the receipt and resolution of grievances of all sorts. Each SMT will serve as the first point of contact for any project-affected person who wishes to register a complaint about the project's environmental performance, construction activities, or any other concern.

Once constituted, each SMT will be responsible for reviewing, considering, and resolving grievances related to environmental and social issues during the implementation of their respective project. They will collaborate with ETI-GB and, when necessary, with the contractor to address complaints promptly. If needed, the SMTs will conduct field visits to verify and review the issues in dispute. The SMTs will also be responsible for helping and collaborating with the GB-EPA in monitoring environmental issues as and when required, as prescribed in the Environmental and Social Management Plan (ESMP). For the ILD schemes (Haldi and Upper Sadpara), the SMTs will also oversee the collection and management of the payback funds as per the agreement with ETI-GB.

7.3. PROCEDURE FOR FILING COMPLAINTS

The grievance redress procedure has been designed to be simple, accessible, and timely, and will be identical for all seven projects. Once the SMTs are constituted, any affected person can register a complaint through a written application submitted to their respective SMT. The application can be written by the complainant themselves or by a literate person on their behalf. For those who cannot write, the SMT will accept oral complaints and record them in writing, reading the complaint back to the complainant for confirmation. A copy of the complaint will be simultaneously endorsed to the concerned Resident Engineer of ETI-GB for information and coordination.

Upon receipt of a complaint, the SMT will acknowledge receipt within three working days. The SMT will then review the complaint, consult with the relevant parties (which may include the contractor, ETI-GB staff, or other community members), and deliver its decision within thirty days of registration of the complaint. The SMT's meetings will be held in locations agreed upon by the members, typically in the village to ensure accessibility for all complainants.

If the affected person does not receive a response from the SMT within thirty days of registering the complaint, or if the complainant is not satisfied with the SMT's decision, they can appeal to the concerned ETI-GB Resident Engineer. The Resident Engineer will act on the complaint or grievance within two weeks of the day of its filing. The Resident Engineer will review the matter in consultation with the SMT and may conduct site visits or request additional information as needed.

If the affected person remains dissatisfied with the decision of the Resident Engineer, the complaint can be referred to higher authorities within ETI-GB or to relevant government departments for resolution.

7.4. TYPES OF GRIEVANCES ANTICIPATED

For all seven projects, the range of potential grievances is limited due to the small scale of the projects, the absence of resettlement, the voluntary donation of land by the communities, and the minimal environmental footprint. Nevertheless, the GRMs are designed to address any of the following issues that may arise during project implementation.

During the construction phase, community members may file complaints related to dust and air pollution from excavation, material handling, and vehicular movement. Noise and vibration from construction machinery may cause temporary disturbance to nearby residents. Traffic movement and temporary access disruption may inconvenience community members during construction. Water quality concerns could arise if construction activities inadvertently affect natural drainage channels or water sources, though the project designs include culverts, causeways, and side drains specifically to prevent this.

Waste disposal practices may generate complaints if the contractor disposes of excavated material or construction debris improperly. The contractor is strictly prohibited from dumping waste into natural drainage channels or agricultural land. Disturbance to flora and fauna, though unlikely given the absence of significant wildlife habitat, could also be a source of grievance. Health and safety concerns related to machinery operation or inadequate signage may arise. Finally, any failure by the contractor to comply with the Environmental and Social Management Plan or applicable legal standards would be grounds for a grievance.

During the operational phase, grievances may relate to road safety, drainage issues, or the maintenance of any planted vegetation. For the ILD schemes, grievances may relate to water distribution, channel maintenance, or the management of the payback funds. The SMTs will continue to function during the operational phase to address such concerns, in coordination with the Communication and Works Department (for roads) and the community (for irrigation channels).

The table below shows the types of grievances anticipated and responsible parties, applicable to all seven projects.

Table 27 The types of grievances anticipated and responsible parties.

S.No.	Category	Potential Grievance	Responsible for Resolution
1	Environmental	Dust, noise, air pollution from construction	SMT
2	Environmental	Water pollution or drainage blockage	SMT
3	Environmental	Improper waste disposal	SMT
4	Environmental	Non-compliance with EMP	ETI-GB / EPA
5	Social	Nuisance from construction activities	SMT
6	Social	Traffic disruption and access issues	SMT
7	Social	Health and safety concerns	SMT
8	Social	Damage to crops or property during construction	SMT
9	Operational (Roads)	Road safety and drainage issues	SMT
10	Operational (ILD)	Water distribution and channel maintenance	SMT / Community
11	Operational (ILD)	Management of payback funds	SMT / ETI-GB
12	Operational	Tree plantation survival and maintenance	SMT / Forest Department

7.5. CONFIDENTIALITY AND NON-RETALIATION

The GRM is founded on principles of confidentiality and non-retaliation. Complainants have the right to have their identity protected, and the SMT will ensure that complaints are handled discreetly. No person filing a complaint will be subjected to any form of retaliation, discrimination, or adverse treatment by ETI-GB, the contractor, or any community member. This commitment is essential to ensure that legitimate concerns are raised without fear of reprisal.

7.6. RECORD KEEPING AND REPORTING

Each SMT will maintain a formal register of all complaints received for their respective project. For each complaint, the register will record the date of receipt, the name of the complainant (if disclosed), the nature of the grievance, the actions taken to address it, the date of resolution, and the satisfaction level of the complainant. Anonymous complaints will also be recorded, although resolution may be more difficult if the complainant cannot be contacted for follow-up.

The complaint registers will be reviewed periodically by ETI-GB and will be made available for inspection by the GB-EPA upon request. Summary information on complaints received and resolved will be included in the quarterly environmental monitoring reports submitted to ETI-GB and the EPA.

7.7. ACCESSIBILITY AND AWARENESS

For the GRMs to be effective, the communities must be aware of their existence and understand how to use them. Each SMT will make the grievance mechanism public through community consultations and, where appropriate, through information leaflets or posters during implementation. Given the limited literacy in the area, the primary mode of communication will be verbal explanations during community meetings. Each SMT will also ensure that contact information for the SMT members (phone numbers) is widely known within their respective village.

The ETI-GB Resident Engineer's contact information will also be made available to all communities as an escalation point. The communities have already been informed during the consultation process that the GB-EPA serves as the final avenue of appeal for environmental complaints.

7.8. SPECIAL PROVISIONS FOR VULNERABLE GROUPS

Recognizing that some community members may face additional barriers to accessing the GRM, the mechanism includes special provisions for vulnerable groups. Women who may be reluctant to approach the predominantly male SMT can register complaints through a designated female community member if one is available, or through the ETI-GB field staff. Elderly or disabled persons unable to travel to SMT meetings can request that SMT members visit them at their homes. For those unable to write, oral complaints will be accepted and recorded. These provisions ensure that the GRM is truly accessible to all members of the community, not just those with mobility, literacy, or social privilege. In addition, for the ILD schemes, the payback mechanism includes exemptions for poor, women-headed households, and vulnerable groups. Any grievances related to the payback mechanism will be handled through the same GRM process, with the SMT ensuring that the exemptions are properly implemented.

7.9. GRM FLOWCHART

The following flowchart illustrates the grievance redress mechanism process applicable to all seven projects.



CHAPTER 8

8. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**8.1. GENERAL**

This chapter identifies the potentially significant beneficial as well as adverse impacts of the pre-construction, construction, and operational phases of the seven proposed projects on the physical, ecological, and socio-economic domains of the environment. Moreover, appropriate, technically viable, and economically feasible mitigation measures have been suggested for each potentially adverse impact. The chapter also highlights the positive impacts that justify the projects' continuation despite the manageable negative consequences.

The selection of an appropriate methodology for impact assessment is critical for the outcome of any EIA study. For all seven projects, a combination of screening checklists, expert judgment, and community consultation was used to identify, categorize, and evaluate impacts. The notion of significance was based on criteria including extent, duration and frequency, intensity, reversibility, probability, and legal restrictions. Based on these criteria, potential significance was classified as none (absence of impact), slight (no mitigation necessary), medium or moderate (mitigation required), and high or significant (impact could stop the project from proceeding).

8.2. METHODOLOGY FOR IMPACT IDENTIFICATION

Based on the findings of desk studies, site visits, and community consultations, screening checklists were prepared to identify potentially significant adverse environmental impacts during the construction and operation phases of the proposed projects. The objective of the impact screening was to assess the significance of issues related to the atmosphere, climate, water resources, land resources, ecological environment, socio-economic environment, transport, infrastructure, natural risks, and hazards. After the compilation of baseline information, the screening checklists were used to identify both positive and adverse impacts.

The notion of significance was applied systematically to each identified impact. For an impact to be classified as significant, it had to meet one or more of the following criteria: extensive geographical spread, long duration or high frequency, high intensity, irreversible consequences, high probability of occurrence, or violation of legal restrictions. Impacts that did not meet these criteria were classified as slight or medium, requiring either no mitigation or routine mitigation respectively.

Table 28 Criteria for Assessing Impact Significance

S.No.	Criterion	Description
1	Extent	Whether the impact is localized, regional, or widespread
2	Duration and Frequency	Whether the impact is short-term, long-term, permanent, intermittent, or continuous
3	Intensity	The magnitude or severity of the impact
4	Reversibility	Whether the impact can be reversed or is permanent
5	Probability	The likelihood of the impact occurring
6	Legal Restriction	Whether the impact violates any environmental law or

		standard
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8.3. POSITIVE IMPACTS OF THE PROJECT

All seven proposed projects are expected to generate several significant positive environmental and social benefits. These positive impacts form the justification for the projects and significantly outweigh the manageable negative impacts.

8.3.1. Environmental Benefits

Positive impacts anticipated from these projects include an increase in transportation efficiency for agricultural produce, which will reduce post-harvest losses and the associated environmental footprint of wasted food. The improved roads and irrigation channels will facilitate better land management practices, as farmers will have easier access to their fields for cultivation, irrigation, and harvesting. The reduced reliance on animal transport and the improved efficiency of motorized transport will, over time, reduce the per-unit carbon footprint of agricultural produce transported from the areas.

For the ILD schemes (Haldi and Upper Sadpara), the projects will convert barren land to productive agricultural land (151 acres and 326 acres respectively), significantly enhancing agricultural productivity and contributing to food security in the region. The improved irrigation facilities will also promote sustainable agricultural practices and reduce pressure on existing cultivated areas.

8.3.2. Impacts on Social Life

The roads and irrigation channels will facilitate the movement of people, goods, and services, significantly improving the quality of life for approximately 2,554 households across all seven project areas. Currently, farmers pay significant amounts to transport their produce to the main roads. After the projects are completed, these costs are expected to decrease substantially, directly increasing household incomes. The drudgery of carrying goods on foot or by animal will be reduced, and comforts will be added to farmers' lives. Access to healthcare facilities in Shigar, Skardu, and Khaplu will become faster and more reliable, which is particularly important for emergencies and childbirth. Access to educational institutions will also improve, enabling children to attend school more regularly. Poverty will be alleviated as incomes rise and economic opportunities expand. The projects will also enable women and youth to participate more actively in value chain activities including fruit processing, packaging, and small-scale businesses.

8.4. PRE-CONSTRUCTION PHASE IMPACTS

The pre-construction phase includes activities such as site surveys, engineering investigations, and finalization of alignments. For all seven projects, these activities do not involve drilling, blasting, or deep sampling. All data collection and information gathering are non-destructive. No mitigation is required for this phase, as the impacts are negligible. The communities have already been consulted on the alignments, and land donation has been voluntarily agreed, so no pre-construction social conflicts are anticipated.

8.5. CONSTRUCTION PHASE IMPACTS

The construction phase impacts are mostly temporary and their magnitude is subject to the engineering management practices adopted during construction. Such impacts are related to soils, noise, air quality, waste generation, and disruption to the biological environment. Considering the magnitude and duration of the projects, it has been assessed that there will be very little surface water contamination, public health concerns, or interruption of communications. Below is a detailed discussion of each anticipated impact and the corresponding mitigation measures, applicable across all seven projects.

8.5.1. Soil Erosion and Landslide Risk

All project areas include slopy terrain ranging from 35% to 50% of the alignment. Excavation, cutting, and filling activities during construction may trigger localized soil erosion and slope instability, particularly if work is carried out during the monsoon or spring snowmelt season when the soil is saturated.

The mitigation measures for soil erosion and landslide risk include the construction of dry stone masonry retaining walls and breast walls as per the approved engineering designs. These walls will be provided in filling areas and cut sections where slope stability is a concern. A 2-inch thick concrete coping of (1:2:4) ratio will be provided at the top of these walls to protect them from weather damage. Expansion and contraction joints will be provided at every 10 to 15 feet interval to prevent thermal damage. Proper drainage structures including side drains, culverts, and causeways will be constructed to safely convey runoff and prevent water from saturating the soil. Excavation will be minimized to the extent possible, and cut slopes will be stabilized immediately after excavation rather than left exposed. Construction activities will be planned to avoid the heavy rainfall and snowmelt seasons where feasible.

8.5.2. Removal of Forest Cover and Vegetation

The alignments of the proposed projects traverse through areas with minimal vegetation. No significant forest cover is present in any project area. The removal of any vegetation has minor ecological implications.

The mitigation measure for vegetation removal is to limit clearing to the immediate right-of-way only. Where minor vegetation removal is unavoidable, the communities have been consulted and have provided their consent. No compensatory plantation is required as no forest cover is affected.

8.5.3. Dust and Air Pollution

Excavation, material handling, and vehicular movement will generate dust and air pollutants. Dust from the unpaved roads and from material stockpiles may affect air quality in the immediate vicinity of the construction sites. However, the nearest residential areas are at sufficient distances from the schemes.

The mitigation measures for dust and air pollution include regular water sprinkling on active work areas, haul roads, and material stockpiles. Trucks transporting construction materials will be covered to prevent dust from blowing off. All machinery and vehicles will be maintained in good working condition to minimize exhaust emissions. Open burning of waste materials at construction sites is strictly prohibited. Compliance with National Environmental Quality Standards (NEQS) for air quality will be ensured.

8.5.4. Noise and Vibration

Construction machinery including excavators, compactors, loaders, and other equipment will generate noise during daytime working hours. The nearest residential areas are at sufficient distances from the schemes, which will significantly attenuate noise levels. Nevertheless, temporary disturbance to the communities may occur.

The mitigation measures for noise and vibration include restricting construction activities to daytime hours only (typically 9:00 AM to 5:00 PM). Nighttime work is not planned and will not be permitted. All machinery will be maintained in good working condition with proper silencers. Compliance with NEQS for noise levels will be ensured.

8.5.5. Waste Generation and Disposal

Construction activities will generate debris, excavated material, and limited waste from workers. If not

properly managed, this waste could contaminate soil, block natural drainage channels, or create unsightly conditions. However, given the small scale of the projects and the local sourcing of labor, waste quantities will be limited.

The mitigation measures for waste management include reusing excavated material for backfilling wherever possible. Excess spoil will be disposed of only at designated sites approved by the communities and ETI-GB. Dumping of waste materials into natural drainage channels or agricultural land is strictly prohibited. Solid waste from workers will be collected in containers and disposed of properly. Construction waste including damaged or spoiled materials will be removed from the sites upon completion of construction. Contractors will be required to maintain clean and hygienic worksites.

8.5.6. Impact on Natural Drainage

Some alignments include natural drainage channels that carry runoff from rainfall and snowmelt. Construction activities could temporarily block these channels, causing water to pond or divert onto agricultural land. Long-term blockage could affect the hydrology of the command areas.

The mitigation measures include the construction of culverts, causeways, and bridges as per the approved engineering designs. These structures are specifically designed to convey water across the alignments without interruption. A 2% slope has been provided along the carriageway towards the hillside to direct road surface water to the side drains. The side drains will channel water to the culverts and causeways for safe discharge. Contractors will ensure that no excavated material or debris is dumped into drainage channels during construction.

8.5.7. Occupational Health and Safety

Workers on the construction sites face risks including injuries from machinery operation, falls from heights, and exposure to dust and noise. While the workforces will be small (10 to 25 persons per project) and primarily local, these risks must be systematically managed.

The mitigation measures for occupational health and safety include the provision of mandatory Personal Protective Equipment (PPE) including helmets, safety boots, gloves, goggles, earplugs, and dust masks for all workers. Contractors will ensure that PPE is worn at all times on the worksites. Safety training will be provided to all workers before construction begins, covering topics such as safe operation of machinery, working at heights, and emergency procedures. First-aid kits will be available at the worksites, and first-aid trained persons will be present during working hours. Warning signs and barricades will be installed at hazardous locations. Formal emergency procedures will be developed for each construction site in case of accidents.

8.5.8. Community Health and Safety

The communities residing near the project sites face limited risks from construction activities. However, there may be risks related to traffic movement and unauthorized access to construction sites, particularly by children.

The mitigation measures for community health and safety include traffic management measures including signage and flag persons to control vehicle movement on existing roads during construction. Construction sites will be restricted from entry by irrelevant people, particularly children, elderly, and disabled persons. Contractors will coordinate with the SMTs to address any community safety concerns that arise.

8.5.9. Labor Influx and Social Issues

Since the workforce will be sourced locally from the respective villages and surrounding areas, there will be no influx of outside workers. This significantly reduces the risk of social conflicts, cultural misunderstandings, or

pressure on local resources. The contractor will still be required to respect local cultural norms and ensure that all workers follow a code of conduct.

8.5.10. Child Labor Prohibition

The Employment of Children Act 1991 prohibits the employment of children below the age of 14 years in any hazardous employment, including construction. The ILO Minimum Age Convention (No. 138) sets the basic minimum age for employment at 14 years in developing countries.

The mitigation measures include a contractual clause binding the contractor to prohibit child labor on the project site. The contractor will be required to verify the age of all workers and maintain identity cards. Awareness will be created among the local community about the adverse impacts of child labor. The SMT will monitor the worksite to ensure compliance.

8.5.11. Hard Rock Management (FMR Sadpara)

The Sadpara FMR has approximately 5,000 ft of hard rock on the upper side of the alignment. Controlled blasting is not anticipated as mechanical excavation methods (such as rock breakers and excavators) will be employed to remove hard rock sections. Contractors shall ensure that rock excavation is carried out safely with proper measures to minimize noise, vibration, and dust. Slope stabilization measures shall be implemented immediately after rock excavation to prevent rockfalls and ensure road safety. The contractor shall develop a site-specific rock excavation plan approved by the Resident Engineer before commencing work on hard rock sections.

8.5.12. Community Payback Obligations (ILD Schemes)

For the Haldi and Upper Sadpara ILD schemes, the communities have agreed to payback 50% of the project cost within three cropping seasons. While this is not an environmental impact per se, the collection and management of payback funds could create social tensions if not managed transparently. The SMTs will oversee the collection and management of the payback funds as per the agreement with ETI-GB. Poor, women-headed households, and vulnerable groups will be exempted from the payback. The payback amount will be used for sustainability and maintenance of the irrigation channels.

8.6. RISK ASSESSMENT

A preliminary risk assessment has been conducted for the construction and operation of the proposed projects. The assessment focuses on events that could lead to significant environmental or social harm.

8.6.1. Natural Hazards

- Earthquake: The project area is in Seismic Zone 3. A major earthquake could cause ground shaking leading to landslides and structural damage to roads, retaining walls, and irrigation channels. Mitigation: Engineering design adheres to seismic codes. Emergency response procedures are outlined in the ESMP.
- Glacial Lake Outburst Flood (GLOF) / Flash Flood: The Baltistan region is susceptible to GLOF events and flash flooding. Heavy rainfall or snowmelt could cause river levels to rise suddenly. Mitigation: The project designs include adequate cross-drainage structures (culverts, causeways, side drains) to withstand high flow events. Construction will be avoided during heavy rainfall seasons where possible. A 2% slope is provided on the carriageway to direct water away.
- Heavy Snowfall: The region experiences heavy snowfall during winter months, which could block roads and disrupt construction activities. Mitigation: Construction is planned for 8-10 months per year to avoid the heavy snowfall season (December to February). The roads are

designed for year-round use with appropriate drainage.

8.6.2. Accidents

- Construction Machinery Accidents: Operation of machinery near slopes or in confined areas presents a risk of rollovers or accidents. Mitigation: Workers will be trained in safe operation. All machinery will be properly maintained.
- Road Traffic Accidents: During the operational phase, the new roads may increase vehicle speed and accidents involving pedestrians. Mitigation: Speed limits will be enforced through signage. Awareness sessions on road safety will be conducted for the community.

8.6.3. Social Risks

- Conflicts: Given the local workforce, the risk of major social conflict is low. However, minor disputes over resource use or accidental damage to crops could occur. Mitigation: The grievance redress mechanism (GRM) and Scheme Management Teams (SMTs) are established to resolve issues swiftly.

8.7. OPERATIONAL PHASE IMPACTS

During the operational phase, the roads will be used by tractors, jeeps, and other vehicles, primarily during daytime hours and seasonally during sowing and harvesting periods. The irrigation channels will provide water to the command areas, enabling agricultural production. The impacts during this phase are expected to be minimal.

8.7.1. Air Quality

The air quality of the areas will be slightly impacted during sowing and harvesting seasons when vehicle movement is highest. However, the roads are compacted shingle roads, not asphalt, so no bitumen-related emissions will occur. The impact is assessed as low adverse and temporary.

8.7.2. Noise

No significant noise pollution is anticipated during the operational phase. The volume of traffic will be low, consisting primarily of agricultural vehicles. Most movement will occur during daytime hours only. The nearest residential areas are at sufficient distances, which will attenuate noise significantly. The impact is assessed as negligible.

8.7.3. Change in Land Use

During the operational phase, the projects are expected to positively influence land use patterns within the command areas by improving access to agricultural lands and markets. Enhanced connectivity will facilitate transportation of agricultural produce, reduce travel time and transportation costs, and encourage farmers to make more effective use of existing cultivated lands. For the irrigation schemes (Haldi ILD and Upper Sadpara ILD), the projects will convert barren land (151 acres and 326 acres respectively) to productive agricultural land, significantly enhancing agricultural productivity. Improved accessibility may also support diversification into higher-value crops, fruit orchards, and small-scale agribusiness activities such as produce collection, grading, and marketing. The projects are not expected to cause significant adverse land use changes, as the roads and channels primarily serve existing agricultural and residential areas. Rather, they are anticipated to strengthen agricultural productivity and economic opportunities by improving access to inputs, services, and markets.

8.7.4. Flora and Fauna

During the operational phase, there will be minimal effect on flora. No significant impact on fauna is anticipated, as the areas do not support critical wildlife habitat and the roads are in already modified

agricultural landscapes. Strict control will be exercised to prevent poaching of any wildlife species that may be present. The impact is assessed as insignificant.

The table below shows briefly the potential impacts of the schemes on the environment and the mitigation measures.

8.8. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT MATRIX

The table below shows briefly the potential impacts of the scheme on the environment and mitigation measures.

Environmental Impact Assessment

Table 29 Environmental and Social Impact Assessment Matrix

S.N O	Project Phase	Project Activity	Potential Environmenta l Impact	Duration of Impact	Severit y	Extent	Reversibili ty	Probabil ity	Significanc e
A. Pre-Construction Phase									
1	Pre-Constructi on	Site Surveys & Engineering Investigatio ns	Disturbance to vegetation and soil	Short-term (1-2 months)	Low	Localiz ed	Reversible	Low	Slight
2	Pre-Constructi on	Alignment Finalization & Land Donation	Potential social conflict over land use	Short-term (During planning)	Low	Localiz ed	Reversible	Low	Slight
3	Pre-Constructi on	Resource Planning & Material Sourcing	Depletion of local construction materials	Short-term (Procureme nt stage)	Low	Localiz ed	Reversible	Medium	Slight
B. Construction Phase									
4	Constructi on	Excavation, Cutting & Filling Activities	Soil erosion and slope instability	Temporary (4-16 months)	Medium -High	Localiz ed	Reversible with mitigation	Medium	Medium
5	Constructi on	Excavation, Cutting & Filling Activities	Landslide risk	Temporary (18-20 months)	Medium -High	Localiz ed	Reversible with mitigation	Medium	Medium
6	Constructi	Land	Loss of minor	Permanent	Low	Localiz	Irreversible	High	Slight

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	on	Clearing & Vegetation Removal	vegetation and shrubs	(Irreversible)		ed			
7	Constructi on	Material Transport & Hauling	Dust and air pollution	Intermittent (Throughou t construction)	Medium	Localiz ed	Reversible	High	Medium
8	Constructi on	Machinery Operation & Equipment Use	Noise and vibration pollution	Intermittent (Daytime, throughout construction)	Low	Localiz ed	Reversible	High	Slight
9	Constructi on	Material Stockpiling & Waste Disposal	Waste generation and improper disposal	Temporary (Throughou t construction)	Low	Localiz ed	Reversible	Medium	Slight
10	Constructi on	Constructio n of Culverts, Causeways & Drains	Temporary blockage of natural drainage channels	Short-term (During construction)	Low	Localiz ed	Reversible	Low	Slight
11	Constructi on	Hard Rock Excavation (Sadpara FMR)	Noise, vibration, dust from mechanical rock breaking	Intermittent (During rock sections)	Medium	Localiz ed	Reversible with mitigation	Medium	Medium
12	Constructi on	Worker Presence &	Occupational health and	Temporary (Throughou	Medium	Localiz ed	Reversible	Medium	Medium

Environmental Impact Assessment

		Activities	safety risks	t construction)					
13	Constructi on	Vehicle Movement & Site Access	Community health and safety risks	Intermittent (Throughou t construction)	Low	Localiz ed	Reversible	Low	Slight
14	Constructi on	Labor Employment (Local)	No outside labor influx; minimal social impact	Temporary (Throughou t construction)	None	N/A	N/A	N/A	None
15	Constructi on	Employment of Workers	Potential child labor violation	Temporary (Throughou t construction)	Low	Localiz ed	Reversible	Low	Slight
16	Constructi on	Constructio n Activities	Gender- sensitive issues (women's safety, cultural norms)	Temporary (Throughou t construction)	Low- Medium	Localiz ed	Reversible	Low	Slight
17	Constructi on	Excavation Activities	Chance finding archaeological/ cultural artifacts	Short-term (If discovered)	Low	Localiz ed	Reversible	Low	Slight
C. Operational Phase									
18	Operation	Vehicle Movement	Air quality degradation	Long-term (Operationa	Low	Localiz ed	Reversible	Medium	Slight

Environmental Impact Assessment

		on FMR	(dust emissions)	1 life)					
19	Operation	Vehicle Movement on FMR	Noise pollution from vehicular traffic	Long-term (Operational life)	Negligible	Localized	Reversible	Low	None
20	Operation	Improved Access to Agricultural Land	Change in land use patterns	Long-term (Operational life)	Medium (Positive)	Localized	Reversible	High	Medium (Positive)
21	Operation	Improved Access to Markets	Increased agricultural productivity	Long-term (Operational life)	High (Positive)	Localized	Reversible	High	Significant (Positive)
22	Operation	Increased Vehicular Movement	Road safety risks (accidents, pedestrian safety)	Long-term (Operational life)	Low	Localized	Reversible	Low	Slight
23	Operation	Road & Channel Usage	Impact on flora and fauna (if any)	Long-term (Operational life)	Insignificant	Localized	Irreversible	Very Low	None
24	Operation	Road/Channel Maintenance	Temporary disturbance during maintenance	Intermittent (During maintenance)	Low	Localized	Reversible	Medium	Slight
D. Cumulative and Induced Impacts									
26	Operation	Economic Development & Market Access	Increased economic opportunities for ~2,554 HH	Long-term (Operational life)	High (Positive)	Regional	Reversible	High	Significant (Positive)

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27	Operation	Improved Access to Healthcare & Education	Enhanced quality of life and social well-being	Long-term (Operational life)	High (Positive)	Regional	Reversible	High	Significant (Positive)
28	Operation	Women's Economic Empowerment	Increased participation in value chain activities	Long-term (Operational life)	Medium (Positive)	Localized	Reversible	Medium	Medium (Positive)
29	Operation	Reduced Post-Harvest Losses	Reduced food waste and improved food security	Long-term (Operational life)	High (Positive)	Regional	Reversible	High	Significant (Positive)

8.9. EMPLOYMENT OPPORTUNITIES

During the construction phase, the projects will create employment opportunities for approximately 10 to 25 workers per project, all of whom will be sourced locally from the respective villages and surrounding areas. This temporary employment will provide income to local households during the construction periods (ranging from 18 to 20 months). After completion of construction, employment opportunities will decrease significantly, but the improved roads and irrigation channels will enable new employment in agriculture, value chain activities, transport, and small businesses. Women and youth are expected to benefit particularly from opportunities in fruit processing, packaging, and small-scale businesses along the roads and in the newly developed agricultural areas (for ILD schemes).

CHAPTER 9

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

9.1 GENERAL

This Environmental and Social Management Plan (ESMP) provides a comprehensive framework for managing environmental and social risks and impacts throughout the project lifecycle, from pre-construction through operation and maintenance. It establishes clear roles, responsibilities, and procedures for the implementation of mitigation measures, monitoring activities, and stakeholder engagement.

The ESMP has been prepared in accordance with the requirements of the GB Environmental Protection Act 2014, the Pakistan EPA Review of IEE and EIA Regulations 2000, and relevant international best practices.

9.2 OBJECTIVES OF ESMP

The primary objectives of the Environmental and Social Management Plan are:

1. To effectively manage, mitigate, and monitor all potential environmental and social impacts
2. To ensure compliance with applicable environmental regulations and safeguard requirements
3. To establish a clear institutional framework with defined roles and responsibilities
4. To provide a systematic monitoring and reporting mechanism
5. To ensure adequate resources are allocated for environmental and social management
6. To promote stakeholder engagement and community participation

9.3 SCOPES OF ESMP

The ESMP covers the following key areas for all four proposed projects:

Environmental Management

- Air Quality, noises, Vibration control
- Water quality and drainage management
- Waste management and disposal
- Soil conservation and erosion control
- Biodiversity and vegetation protection

Social Management

- Community engagement and consultation
- Grievance redress mechanism
- Occupational and community health & safety
- Gender inclusion and vulnerable group protection

- Cultural heritage preservation
- Labor standards and working conditions

Social Management

- Community engagement and consultation
- Grievance redress mechanism
- Occupational and community health & safety
- Gender inclusion and vulnerable group protection
- Cultural heritage preservation
- Labor standards and working conditions

Institutional Arrangements

- Implementation responsibilities and accountability
- Monitoring, reporting, and compliance protocols
- Training and capacity building
- Budget allocation and resource management

9.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN MATRIX

The Environmental and Social Management Plan matrix presented in the table below provides a comprehensive overview of the impacts, mitigation measures, responsible parties, and monitoring frequency for each phase of the projects. The matrix covers the design and pre-construction phase, the construction phase, and the operational phase. For each identified impact, the matrix specifies the mitigation measure to be implemented, the party responsible for implementation, and the party responsible for monitoring compliance.

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Table 30 Environmental and Social Management Plan Matrix

S.No	Activity / Impact	Severity	Mitigation Measure	Responsibility Implementation	Responsibility Monitoring	Monitoring Frequency
A. Design / Pre-Construction Phase						
1	Route alignment and design	Low-Medium	Alignment finalized in consultation with communities; design incorporates retaining walls, culverts, causeways, and side drains as per site requirements	ETI-GB / Engineer	ETI-GB	Design review Completion
2	Forest cover clearance	None	No forest cover is present in any project area	-	-	-
3	Land acquisition	None	Communities have voluntarily donated land; NOCs attached to applications	SMT / ETI-GB	District Administration	Documentation Verification
4	Seismic consideration	Medium	Project areas fall in Seismic Zone 3 (high hazard); structures designed to withstand earthquake forces	ETI-GB / Engineer	ETI-GB	Design review completion
5	Resource conservation planning	Low	Use efficient machinery; source materials locally where possible; minimize waste	ETI-GB/Contractor	ETI-GB	Pre-Construction planning review
B. Construction Phase						

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6	Soil erosion and landslides	Low-Medium	Construct retaining walls and breast walls as per design; provide proper drainage (side drains, culverts, causeways); minimize unnecessary excavation	Contractor	SMT / ETI-GB	Weekly
7	Vegetation removal	Low	Limit clearing to immediate ROW only; obtain community consent where required	Contractor	SMT	Weekly
8	Dust and air pollution	Low	Regular water sprinkling on active work areas and haul roads; cover material trucks; maintain machinery; prohibit open burning	Contractor	SMT / ETI-GB	Daily
9	Noise and vibration	Low	Restrict construction to daytime hours (9 AM - 5 PM); use well-maintained machinery with silencers	Contractor	SMT / ETI-GB	Weekly
10	Waste generation and disposal	Low	Reuse excavated material for backfilling; dispose of excess spoil at designated sites only; prohibit dumping into drainage channels or agricultural land	Contractor	SMT / ETI-GB	Weekly
11	Natural drainage impact	Low	Construct culverts, causeways, and bridges as per design; provide 2% slope towards hillside; ensure no blockage of drainage channels	Contractor	RE / ETI-GB	Weekly

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12	Water quality	Low	Avoid construction during high flow season where feasible; prevent debris entry into water channels	Contractor	RE / ETI-GB	Weekly
13	Hard rock excavation (Sadpara FMR)	Medium	Use mechanical excavation methods (rock breakers, excavators); no blasting; implement immediate slope stabilization; develop site-specific rock excavation plan	Contractor	RE / ETI-GB	Daily during rock sections
14	Occupational health and safety	Low-Medium	Provide mandatory PPE (helmets, boots, gloves, goggles, masks); conduct safety training; provide first-aid kits; install warning signs	Contractor	SMT / ETI-GB	Daily
15	Community health and safety	Low	Implement traffic management; restrict site access to unauthorized persons	Contractor / SMT	ETI-GB	Weekly
16	Labor influx	None	Workforces sourced locally; no outside labor influx expected	Contractor	SMT	Daily
17	Child labor prohibition	Low	Contractual clause prohibiting child labor; verify age of workers; maintain identity cards	Contractor / SMT	ETI-GB	Monthly
18	Gender-sensitive implementation	Low-Medium	Ensure women's safety and privacy; provide awareness sessions; respect cultural norms; provide separate	ETI-GB/ Contractor	SMT / ETI-GB	Monthly

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29	Environmental compliance monitoring	-	Monthly reports by Site Engineers; quarterly reports by ETI-GB; annual reports to EPA	Site Engineer/ETI-GB	GB-EPA	Monthly/ Quarterly/Annually
30	Social compliance monitoring	-	Monthly grievance review; community satisfaction surveys	SMT / ETI-GB	GB-EPA	Monthly/ Annually
31	Training and capacity building	-	Contractor supervisory staff training; worker safety training; SMT training; community awareness sessions	Contractor/ETI-GB / SMT	ETI-GB	Before construction/ Annually

9.5 PROJECT-SPECIFIC ESMP MEASURES

The table below highlights ESMP measures that are specific to individual projects.

Project	Specific Impact / Activity	Severity	Mitigation Measure	Responsibility
Sadpara FMR	Hard rock excavation (approx. 5,000 ft on upper side)	Medium	Use mechanical excavation (rock breakers, excavators); no blasting; implement immediate slope stabilization; develop site-specific rock excavation plan; install warning signs; conduct daily safety inspections	RE
Upper Sadpara ILD	Channel alignment with hard rock (750 ft), mixed strata (4,000 ft), and soft strata (3,000 ft)	Low-Medium	Use mechanical excavation for hard rock sections; implement slope stabilization; ensure proper channel lining to prevent erosion	WM&ID
Hal di ILD	Channel alignment with boulders and mixed strata of soil and loam	Low	Use mechanical excavation where needed; ensure proper channel lining; implement drainage structures to prevent erosion	WM&ID

9.6 ENVIRONMENTAL MONITORING PLAN

9.6.1. General

Environmental monitoring along with the implementation of the various plans already highlighted during the construction and operation stages will be carried out to meet the following objectives. The first objective is to monitor the actual project impacts on the physical, ecological, and socio-economic indicators in compliance with the provisions of the EIAs and ESMPs. The second objective is to recommend mitigation measures for any unforeseen impact or where the impact level exceeds those anticipated. The third objective is to ensure compliance with legal and community obligations including safety at the construction and operation stages. The fourth objective is to ensure the safe disposal of excess construction materials, solid waste, and effluents.

The main emphasis of monitoring during the operational phase will be to appraise the adequacy of the EIAs concerning the projects' predicted long-term impacts on the areas' physical, biological, and socio-economic environments. It will also evaluate the effectiveness of the mitigation measures proposed in the ESMPs and recommend any improvements if required. The monitoring program will compile periodic incident and accident data to support analysis that will help in minimizing future risks.

ETI-GB, as the executing body, will ensure two types of monitoring during the execution of the project activities. The first is compliance monitoring, which ensures that the proposed measures in the ESMPs are adhered to as per applicable guidelines and NEQS. The second is effects monitoring, which establishes baseline values for environmental parameters such as air quality, water quality, and noise levels and tracks changes over time.

9.6.2. Monitoring Strategy

All compliance monitoring will be executed by the contractors during the construction stages of the projects, under the supervision of the ETI-GB Site Engineers. The contractors will be required to maintain daily records of environmental compliance activities including water sprinkling, waste disposal, PPE usage, and any other relevant activities. The ETI-GB Site Engineers will conduct weekly inspections to verify compliance and will prepare weekly reports.

Effects monitoring for parameters such as air quality, water quality, and noise levels will be carried out by the

SMTs in coordination with the GB-EPA. Given the small scale of the projects and the minimal anticipated impacts, effects monitoring will be limited to quarterly visual inspections and, if any concerns arise, targeted sampling may be conducted.

During the operational and maintenance stage, compliance and effects monitoring will be carried out by the SMTs and ETI-GB as internal monitoring agencies. The GB-EPA will conduct periodic reviews and may conduct independent monitoring as deemed necessary.

Table 31 Environmental Monitoring Plan

Parameter	Monitoring Method	Frequency	Responsible Party	Reporting To
Dust / Air quality	Visual inspection; water sprinkling log review	Daily	Contractor	ETI-GB Site Engineer
Noise	Visual inspection; community feedback	Weekly	Site Engineer	ETI-GB
Erosion control	Site inspection of retaining walls and drains	Weekly	Site Engineer	ETI-GB
Waste disposal	Inspection of disposal sites	Weekly	Site Engineer	SMT / ETI-GB
Drainage structures	Inspection of culverts and causeways	Weekly	Site Engineer	ETI-GB
Worker safety	PPE inspection; safety training records	Daily	Contractor	Site Engineer
Hard rock excavation (Sadpara)	Site inspection; equipment inspection; safety audit	Daily	Site Engineer	ETI-GB
Tree plantation	Survival count and health assessment	Quarterly	SMT /Forest Dept.	ETI-GB / EPA
Grievances	Complaint registers review	Monthly	SMT	ETI-GB
ILD payback management	Financial review; beneficiary verification	Monthly	SMT	ETI-GB

9.6.3. Reporting Mechanism

The contractors will submit monthly environmental compliance reports to the ETI-GB Site Engineers. These reports will include details of water sprinkling activities, waste disposal quantities and locations, any accidents or incidents, and any complaints received from the communities. The Site Engineers will review the reports and conduct field verification as needed.

The Site Engineers will prepare and submit quarterly environmental monitoring reports to the ETI-GB Programme Coordination Unit (PCU). These reports will summarize compliance status, any non-compliances observed and corrective actions taken, results of any monitoring activities, and status of grievances.

Annual reports will be submitted to the GB-EPA for the duration of the construction periods. After construction, the SMTs will submit annual reports on road and channel condition for the first three years of operation.

9.7 COMMUNICATION AND DOCUMENTATION

The contractors will submit monthly environmental compliance reports to the ETI-GB Site Engineers. These reports will include details of water sprinkling activities, waste disposal quantities and locations, any accidents or incidents, and any complaints received from the communities. The Site Engineers will review the reports and conduct field verification as needed.

The Site Engineers will prepare and submit quarterly environmental monitoring reports to the ETI-GB Programme Coordination Unit (PCU). These reports will summarize compliance status, any non-compliances observed and corrective actions taken, results of any monitoring activities, and status of grievances.

Annual reports will be submitted to the GB-EPA for the duration of the construction periods. After construction, the SMTs will submit annual reports on road and channel condition for the first three years of operation.

9.8 ENVIRONMENTAL MANAGEMENT AND MITIGATION COST

Implementation of the recommendations of the EIAs during the construction phases is the responsibility of the contractors under the supervision of ETI-GB and the SMTs. The costs for environmental management and monitoring will be part of the contract documents between ETI-GB and the contractors. The contractors will not be paid for environmental compliance activities unless they are properly documented and verified.

The estimated costs for the implementation of environmental monitoring and management for each project are presented in the table below. These costs cover PPE and safety equipment, water sprinkling for dust control, environmental training and awareness programs, waste management, monitoring and reporting, and contingencies.

The Environmental Management Cost for all projects is allocated exclusively from the DRR Cost (2% of Construction Cost). This allocation ensures that environmental management is adequately funded in accordance with the project's disaster risk reduction provisions.

Table 32 Estimated Environmental Management Cost (Itemized)

S.no	Item	Alchori FMR (PKR)	Kashmal FMR (PKR)	Khubanistan FMR (PKR)	Khaplu Broq FMR (PKR)	Sadpara FMR (PKR)	Haldi ILD (PKR)	Upper Sadpara ILD (PKR)

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Environmental Mitigation								
A								
1	Water Sprinkling for Dust Control	150,000	150,000	150,000	200,000	150,000	100,000	100,000
2	Retaining Walls & Slope Stabilization	(Included in Design)						
3	Waste Management (collection, segregation, disposal)	100,000	100,000	100,000	150,000	100,000	75,000	75,000
4	Site Restoration & Rehabilitation	100,000	100,000	100,000	150,000	100,000	75,000	75,000
	Sub-Total (A)	350,000	350,000	350,000	500,000	350,000	250,000	250,000
B								
		Workers' Health & Safety (OHS)						
1	Provision of Personal Protective Equipment (PPE)	200,000	200,000	200,000	300,000	250,000	150,000	150,000
2	Site Safety Signage & First-Aid Kits	75,000	75,000	75,000	100,000	100,000	50,000	50,000
3	Sanitation Facilities (Portable Toilets)	50,000	50,000	50,000	75,000	75,000	35,000	35,000
	Sub-Total (B)	325,000	325,000	325,000	475,000	425,000	235,000	235,000
C								
		Capacity Building & Monitoring						
1	Environmental Training & Awareness (Workers & SMT)	100,000	100,000	100,000	150,000	100,000	75,000	75,000
2	Compliance Monitoring & Reporting	150,000	150,000	150,000	200,000	150,000	100,000	100,000
3	Community Engagement & GRM	50,000	50,000	50,000	75,000	50,000	35,000	35,000
	Sub-Total (C)	300,000	300,000	300,000	425,000	300,000	210,000	210,000
	Total (A+B+C)	975,000	975,000	975,000	1,400,000	1,075,000	695,000	695,000
	Contingencies (10%)	97,500	97,500	97,500	140,000	107,500	69,500	69,500
	Grand Total (PKR)	1,072,500	1,072,500	1,072,500	1,540,000	1,182,500	764,500	764,500
	Funding Source							
	DRR Cost @ 2% of Construction Cost	574,623	563,639	603,960	1,553,100	856,842	453,000	686,651
	Balance from Contingency Cost (if required)	497,877	508,861	468,540	(13,100)*	325,658	311,500	77,849
	Total Available	1,072,500	1,072,500	1,072,500	1,540,000	1,182,500	764,500	764,500
*Note: For Khaplu Broq FMR, the DRR allocation (1,553,100) exceeds the estimated EMP cost (1,540,000), so the balance remains within the DRR fund.								

The DRR Cost (2% of Construction Cost) is the primary source for Environmental Management Cost. In cases where the EMP cost exceeds the DRR allocation, the balance amount is covered from the project's Contingency Cost (3% of Construction Cost), as per standard practice.

9.9 ENVIRONMENTAL TRAINING PROGRAM

An environmental training program needs to be conducted for continuous awareness of project beneficiaries and capacity building of SMT members, contractor staff, and ETI-GB field staff. The overall objective of the training program is to create awareness and to train the concerned stakeholders to conserve and protect the ecological balance of the project areas as much as possible at both the construction and operation stages, and to ensure that the requirements of the ESMPs are clearly understood and implemented throughout the project life.

The main training objectives are to implement the mitigation measures as given in the ESMPs, to train supervisory staff to protect the health and safety of workers, to train project staff on how to interact with and involve the concerned communities, to define the roles and responsibilities of the concerned stakeholders according to the ESMPs, and to train stakeholders on the reporting mechanism.

Table 33 Environmental Training Program

S.no	Trainees	Training Content	Timing	Responsibility
1	Contractor supervisory staff	ESMP requirements, mitigation measures, good construction practices, waste management, documentation, hard rock excavation procedures (Sadpara)	Before construction	ETI-GB / EPA
2	Workers (skilled and unskilled)	PPE use, safety procedures, waste disposal, emergency handling, respect for local cultural norms	Before construction	SMT
3	SMT members	GRM procedure, ESMP compliance monitoring, tree plantation maintenance, reporting, ILD payback management (Haldi & Upper Sadpara)	Before construction and during operation	ETI-GB
4	Community (farmers)	Organic farming practices, impacts of chemical inputs, value chain development, tree plantation benefits, ILD maintenance (Haldi & Upper Sadpara)	During operation	

9.10 MANAGEMENT PLANS

Prior to mobilisation, each contractor will develop a site-specific Environmental and Social Management Plan (SSESMP) and a site-specific Health and Safety Management Plan (SSHSMP) relevant to its chosen methodology that meets the requirements of this ESMP. The contract agreements will have appropriate clauses to bind the contractors for these obligations. In addition to the SSESMP and SSHSMP, the following management plans have been prepared as part of the ESMP for better management and implementation during all phases of the proposed projects

Table 34 Supporting Management Plans

S.no	Management Plan	Purpose
1	HSE Management Plan	Occupational health and safety, PPE provision, first aid, emergency response
2	Emergency Preparedness and Response Framework	Response to natural disasters (earthquake, landslide, flood, heavy snowfall) and accidents
3	Waste Management Plan	Collection, segregation, and disposal of solid waste and construction debris
4	Traffic Management Plan	Safe movement of construction vehicles and community traffic during construction
5	Chance Find Procedure	Discovery of archaeological or cultural artifacts during excavation
6	Rock Excavation Plan (Sadpara FMR)	Mechanical excavation procedures, safety protocols, slope stabilization
7	ILD Payback Management Plan (Haldi & Upper Sadpara)	Collection, management, and utilization of payback funds

9.10.1 HSE Management Plan

Workers will be provided with a safe and healthy working environment considering risks inherent to the particular sector and specific classes of hazards in the project area. During the construction phase, the contractor will be responsible for all HSE-related issues and will comply with national laws and international standards for occupational health and safety. All contractor staff will be well informed and trained on HSE policies and guidelines. The contractor will provide adequate health services as well as site first aid services for the workforce. The main priority of the contractor will be to prevent accidents during mobilization and the construction phase. Good quality PPE will be procured from certified vendors, and all workers must wear PPE before commencing any work.

9.10.2 Emergency Preparedness and Response Framework

The framework provides an overview of the procedures to mitigate and control impacts on the communities,

occupational health and safety, the environment, and the projects in the event of emergencies that usually occur suddenly and unexpectedly during the construction and operational phases. Various categories of risks can be envisaged including natural risks (earthquake, flood, landslide, heavy snowfall), construction-related risks (fire, traffic accident, falling, electric shock), and public health risks (communicable diseases). The contractor will develop a site-specific emergency response plan before construction begins, and all workers will be trained in emergency procedures.

9.10.3 Waste Management Plan

Management of solid waste, excavated material, and hazardous waste is a critical environmental responsibility during the construction phase. This plan outlines the procedures for the collection, segregation, storage, transportation, and disposal of all waste generated during project implementation, as well as the final restoration of all temporary construction sites.

A. Excavated Material and Spoil Management

- Excavated material from cut sections, foundation digging, and road shaping will be segregated at the source.
- Excess spoil will be disposed of only at designated disposal sites approved by the SMT and ETI-GB.
- Disposal of spoil into agricultural land, natural drainage channels, or water bodies is strictly prohibited.

B. Hazardous and Construction Waste Management

- Waste oil, lubricants, and other hazardous materials from machinery maintenance will be collected in sealed containers and disposed of at designated hazardous waste facilities or safely removed from the site.
- Empty cement bags, scrap metal, and other construction waste will be collected and sent to recycling facilities or disposed of properly.
- The contractor will be responsible for the clean-up of all construction debris and waste after the completion of the project.

C. Site Restoration and Rehabilitation

- All temporary construction sites (material stockpiles, contractor's workshop) will be restored to their pre-construction condition as much as possible.
- The area will be leveled, and any disturbed topsoil will be spread to allow for natural regeneration of vegetation.
- Natural drainage channels will be cleared of any construction debris.

9.10.4 Traffic Management Plan

Comprehensive traffic management plans will be developed by the contractors mentioning routes to be followed for transportation of construction machinery and materials. The plans will include goals and objectives, purpose and scope, roles and responsibilities, routes to be followed along with necessary maps, transportation timing, and mechanisms to address road accidents if they occur. Traffic signs and flag persons will be used to manage movement on existing roads during construction. Advance notification will be provided to the communities

before any road closure or significant disruption.

9.10.5 Chance Find Procedure

In case of any chance find of archaeological or cultural artifacts during excavation, the contractor will immediately stop work in that area and report through the SMT and ETI-GB to the Archaeology Department, GB. The contractor will secure the site to prevent any damage or loss of removable objects. In case of removable antiquities, a night guard will be arranged until responsible local authorities take over. Work will only resume after authorization from the Archaeology Department. The chance find procedure is attached as an annexure to this report.

9.10.6 Rock Excavation Plan (Sadpara FMR)

For the Haldi and Upper Sadpara ILD schemes, the SMTs will develop and implement a payback management plan in coordination with ETI-GB. The plan will include:

- Formalization of the cost sharing agreement in writing before construction commencement
- Identification of beneficiaries and their landholdings
- Calculation of individual payback amounts
- Exemption of poor, women-headed households, and vulnerable groups
- Establishment of a joint account for payback collection
- Collection schedule over three cropping seasons
- Utilization of payback funds for sustainability and maintenance of the irrigation channels
- Transparent record keeping and reporting to ETI-GB

9.11 Code of Practice

The contractor will develop a code of practice for staff and employees to ensure that the intrusion of workers in the project area does not result in any environmental or social issues between workers and locals. The code of practice will be based on the principles of environmental protection, occupational health and safety, good engineering practices, respect for local culture, integrity, and sound ethical values.

The general code of conduct will include rules and guidelines for workers regarding the use of common resources such as wood, plants, and water sources to ensure their sustainable use. Workers will be required to dispose of waste properly and maintain a sense of hygiene. All workers will be trained in construction safety procedures and will be required to always wear PPE. The contractor will ensure that workers respect local cultural norms, particularly concerning interaction with women. Workers will be instructed not to wear short trousers or short shirts in the village area, as this is considered inappropriate attire. The contractor will maintain close liaison with the SMT and local elders to ensure that any potential conflicts related to common resource utilization are resolved easily.

CHAPTER 10

10 CONCLUSIONS AND RECOMMENDATIONS**10.1. CONCLUSIONS**

The Environmental Impact Assessments for the seven proposed projects in the Baltistan Region (Districts Shigar, Skardu, and Ghanche) have been conducted in accordance with the requirements of the GB Environmental Protection Act 2014, the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, and the relevant guidelines for environmental assessment. This EIA addresses the requirements defined in national and local regulations and fulfils the legal requirements for obtaining environmental approvals from the GB-Environmental Protection Agency.

This EIA study report has been prepared based on the available information at the feasibility stage of the projects, supplemented by primary data collected during field surveys, community consultations, and engineering investigations. The proposed projects will be implemented in public-community participation mode, with the communities having voluntarily donated land for the rights-of-way without compensation. The Detailed Engineering Designs have been prepared by the ETI-GB engineering team after conducting necessary surveys of the sites.

The analysis of alternatives, including the No Project Option and project layout alternatives, has been considered during the EIA studies. The No Project Option was rejected because it would perpetuate the current transportation and irrigation challenges, high costs, and post-harvest losses faced by the communities. The proposed alignments were found to be the most feasible from technical, social, environmental, and economic perspectives.

During the field surveys, significant efforts were made to identify the main physical, ecological, social, cultural, and environmental issues related to the construction and operation of the proposed projects. Various stakeholders including government departments and agencies were also contacted to obtain salient information, along with the beneficiary communities. The key findings of the assessments are summarised below.

Table 35 Summary of Key Findings

Aspect	Finding
Environmental Feasibility	All projects are environmentally feasible with manageable impacts
Forest Cover	No forest cover is present in any project area
Hard Rock / Blasting	No hard rock requiring controlled blasting is present in most projects; Sadpara FMR has hard rock sections where mechanical excavation will be used (no blasting)
Landslide Risk	No significant landslide risk identified in any project; terrain is stable with no possibilities of land slides or erosion
Resettlement	None required for any project
Land Compensation	None; communities voluntarily donated land (RoW submitted with NOC)

Community Support	Strong for all projects; communities in dire need of infrastructure
Total Beneficiary Households	Approximately 2,554 households across all seven projects
Total Command Area	Approximately 3,976 acres across all seven projects
Total Project Cost	Approximately PKR 288.87 million (combined)
District Coverage	Shigar, Skardu, and Ghanche districts
ILD Cost Sharing	Communities for Haldi and Upper Sadpara ILD have agreed to payback 50% of project cost within three cropping seasons
Waste Disposal	Waste generated due to cutting will be utilized in filling; no disposal issues
Water Quality	No impact on water quality anticipated
Heritage Sites	No heritage or archaeological sites identified in any project area

The major anticipated positive impacts of the projects are substantial and far outweigh the negative impacts. The projects will bring comfort to the farming communities by providing better and efficient transportation for agricultural inputs and outputs in these rugged mountainous areas. The proposed projects will also provide skilled and unskilled jobs during the implementation phases and limited numbers of jobs during operation and maintenance. The areas have the potential to produce high-quality fruits and vegetables, but farmers currently cannot fetch good prices because they cannot afford to carry them to market timely and in larger quantities. These projects are expected to resolve this issue positively.

The roads and irrigation channels will enable the production of cottage products and entrepreneurship with easy and efficient market access, particularly for women of the villages. For the ILD schemes (Haldi and Upper Sadpara), barren areas (151 acres and 326 acres respectively) will come under cultivation, which will provide increased production and cease the desertification process. Access to health, nutrition, and education will be improved. The proposed projects will also provide chances to promote tourism in the area, as the broader Baltistan region has potential for tourism due to its natural beauty and cultural heritage.

The anticipated adverse impacts are limited, low to medium severity, and easily controllable through the mitigation measures recommended in this report. These impacts include temporary disturbance due to construction activities including dust, noise, and vibration, which will be limited to the construction periods (ranging from 18 to 20 months). Increased traffic flow and emissions during operation may slightly affect air quality. Noise pollution due to the construction machinery during construction and traffic during operation will be managed through daytime-only working hours and the distances of the settlements from the schemes. Social and cultural conflicts are anticipated to be at very low levels since the beneficiaries belong to the same ethnic and cultural groups and the workforces will be sourced locally.

The impact assessments revealed that with the help of appropriate mitigation and control measures provided in these EIA studies, most of the potential impacts will either be avoided altogether or minimized to acceptable levels. The environmental constraints will have to be monitored by concerned agencies, including ETI-GB in collaboration with GB-EPA where necessary.

Environmental Management Plans have been developed as part of this report which provide detailed mitigation matrices covering impacts, mitigation measures, roles, responsibilities, and timings to avoid, minimize, or mitigate the adverse impacts of the projects. The ESMPs include specific provisions for erosion control, waste management, worker safety, community engagement, hard rock management (Sadpara FMR), and ILD payback

management (Haldi and Upper Sadpara). The total estimated costs for implementing the ESMPs are included in the project budgets under DRR Cost (2% of construction cost) and, where necessary, Contingency Cost (3% of construction cost)

10.2. RECOMMENDATIONS

Based on the findings of this Environmental Impact Assessment, the following recommendations are made for the successful and environmentally sound implementation of the proposed projects.

a) Approval of the Project

All seven projects are found to be economically and financially viable, technically feasible, and environmentally acceptable. They will lead to achieving all the objectives laid down, as discussed under the rationale of the projects. It is strongly recommended that the proposed projects be approved for implementation by ETI-GB and that the No Objection Certificates (NOCs) be issued by the GB-Environmental Protection Agency.

b) Integration of ESMP into Contract Documents

The EIA, ESMP, mitigation and monitoring programs contained herewith should be included within the bidding documents for project work. The bidding documents shall clearly state that the contractor will be responsible for the implementation of the requirements of the ESMP through its own site-specific ESMP and site-specific Health and Safety Management Plan, based on the guidelines provided in this EIA report. This will ensure that all potential bidders are aware of the environmental requirements of the project and its associated environmental costs. The EIA, ESMP, and all its requirements should be added to the contractor's contract, thereby implementing the ESMP as a legal requirement according to the contract. The supervision consultants shall note any non-conformance with the site-specific ESMP and the conditions of environmental approval by GB-EPA. The contractors should be held liable for breach of the contractual obligations of the ESMP.

c) Formation of Scheme Management Teams (SMTs)

The beneficiary communities shall constitute Scheme Management Teams (SMTs) for each of the seven projects upon approval of the schemes and prior to the commencement of construction activities. The SMTs shall be composed of respected community members including landowners, farmers, and local leaders who have the trust of the broader community. The SMTs shall be responsible for overseeing EMP compliance during construction, maintaining the roads and channels after completion, managing the grievance redress mechanism, and, for the ILD schemes, overseeing the collection and management of payback funds.

d) Hard Rock Management (Sadpara FMR)

The Sadpara FMR has approximately 5,000 ft of hard rock on the upper side of the alignment. Controlled blasting is not anticipated as mechanical excavation methods (such as rock breakers and excavators) will be employed to remove hard rock sections. Contractors shall ensure that rock excavation is carried out safely with proper measures to minimize noise, vibration, and dust. Slope stabilization measures shall be implemented immediately after rock excavation to prevent rockfalls and ensure road safety. The contractor shall develop a site-specific rock excavation plan approved by the Resident Engineer before commencing work on hard rock sections. Daily safety inspections shall be conducted during rock excavation activities.

e) Cost Sharing for ILD Schemes

For the Haldi ILD and Upper Sadpara ILD projects, the community has agreed to payback 50% of the project cost within three cropping seasons. This agreement shall be formalized in writing before the commencement of construction, and the SMTs shall oversee the collection and management of the payback funds as per the agreement with ETI-GB. Poor, women-headed households, and vulnerable groups shall be exempted from the

payback. The payback amount will be used for sustainability and maintenance of the irrigation channels. A transparent record keeping and reporting mechanism shall be established for the payback fund management.

f) Training and Capacity Building

All personnel, staff, employees, and the contractor shall undertake appropriate training before construction works to ensure they are aware of their on-site responsibilities with respect to all environmental and social issues. The training program outlined in the ESMP shall be implemented, covering environmental compliance, worker safety, emergency response, community engagement, hard rock excavation procedures (for Sadpara FMR), and ILD payback management (for Haldi and Upper Sadpara).

g) Grievance Redress Mechanism

The Scheme Management Teams (SMTs) shall be formally constituted by the beneficiary communities and empowered to manage the grievance redress mechanisms effectively. Each SMT shall maintain a complaint register and resolve grievances within thirty days. The communities shall be informed of the GRM procedures and contact information.

h) Environmental Monitoring

The environmental monitoring plan outlined in the ESMP shall be implemented rigorously. The contractors shall submit monthly environmental compliance reports to the ETI-GB Site Engineers. Site Engineers shall submit quarterly reports to ETI-GB and GB-EPA. For the Sadpara FMR, daily monitoring of hard rock excavation activities shall be conducted. For the ILD schemes, quarterly monitoring of channel condition and payback fund management shall be conducted.

i) Implementation as Soon as Possible

The proposed projects should be implemented as soon as possible after all necessary approvals, design provisions, and the implementation of the ESMPs are in place. The communities are in dire need of these roads and irrigation channels, and any delay will prolong the transportation challenges, high costs, post-harvest losses, and barren land currently faced by approximately 2,554 households across the seven project areas.

j) Promotion of Value Chain Development

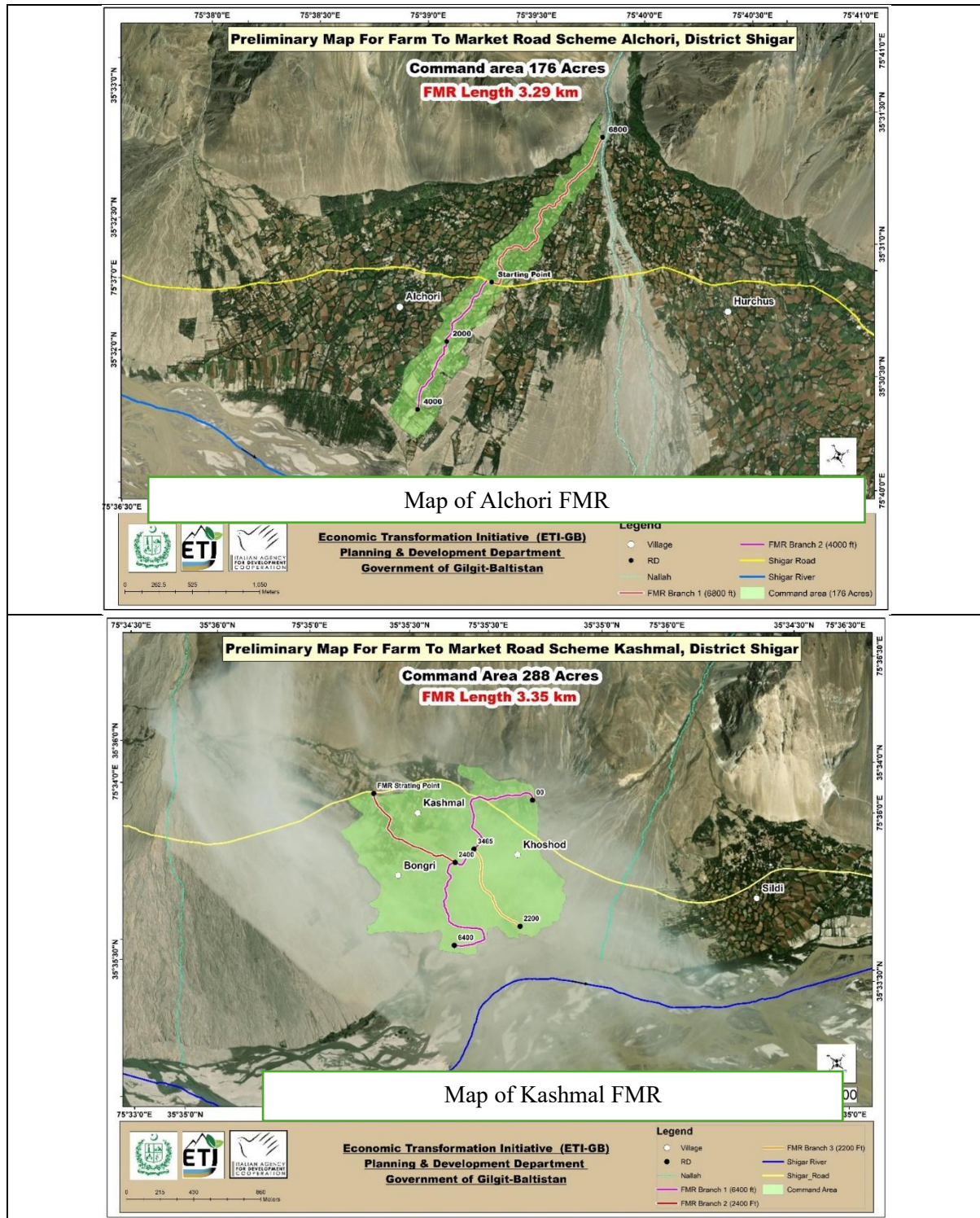
ETI-GB, in coordination with the Agriculture Department and the SMTs, shall promote value chain development activities in the project areas. These include training on organic farming practices, seed multiplication techniques (particularly for the Sadpara area), fruit processing and packaging, and market linkages. The improved road connectivity and irrigation facilities will enable farmers to diversify into higher-value crops and access regional markets. Women shall be specifically targeted for training in fruit processing, packaging, and small-scale businesses.

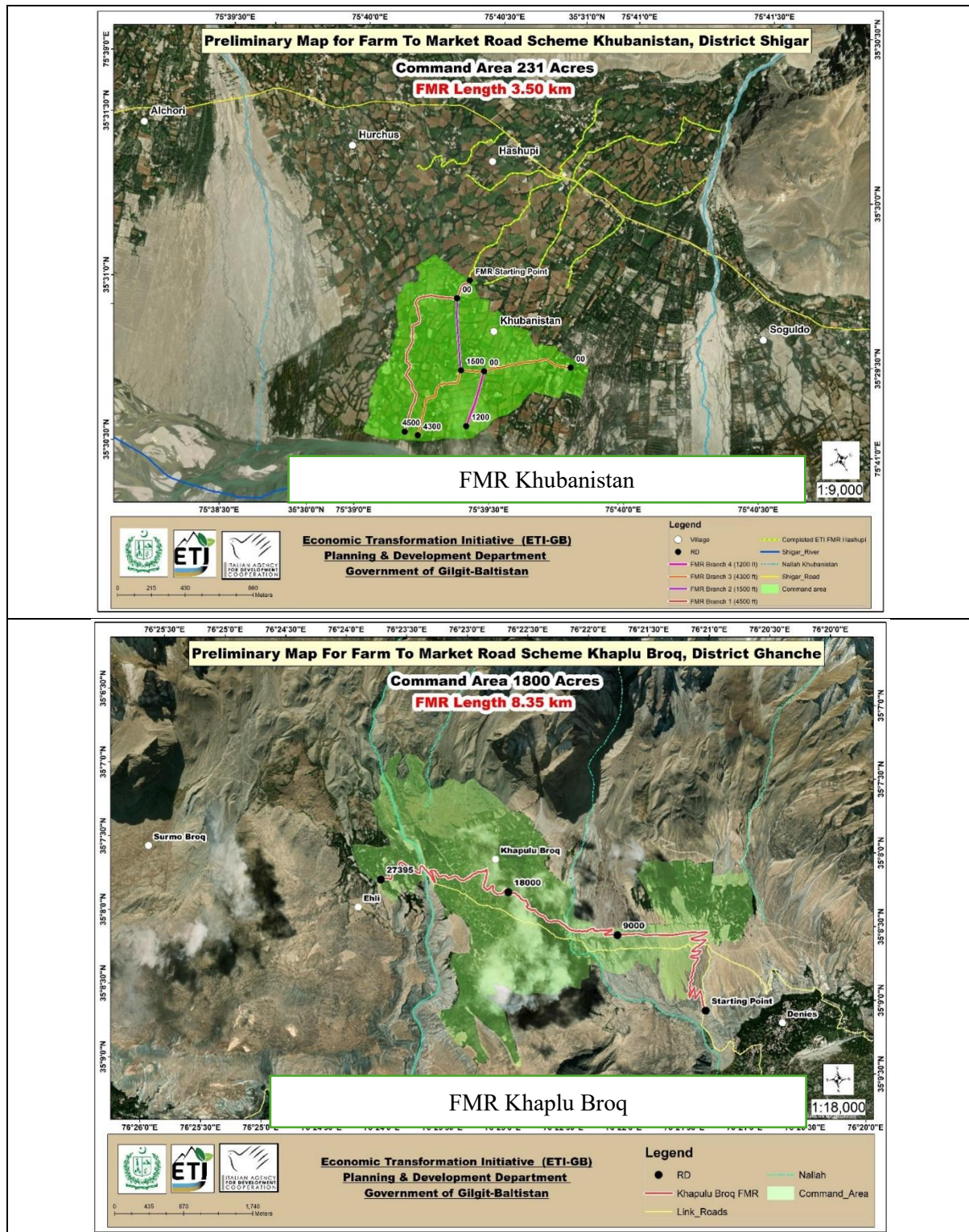
All seven projects are environmentally and socially feasible. The projects are socio-economically viable and environment-friendly if the Environmental Management Plans are implemented in true letter and spirit. The positive impacts of improved market access, reduced transportation costs, reduced post-harvest losses, enhanced agricultural productivity (including conversion of 477 acres of barren land to cultivation through the ILD schemes), and enhanced livelihoods for approximately 2,554 households far outweigh the manageable negative impacts.

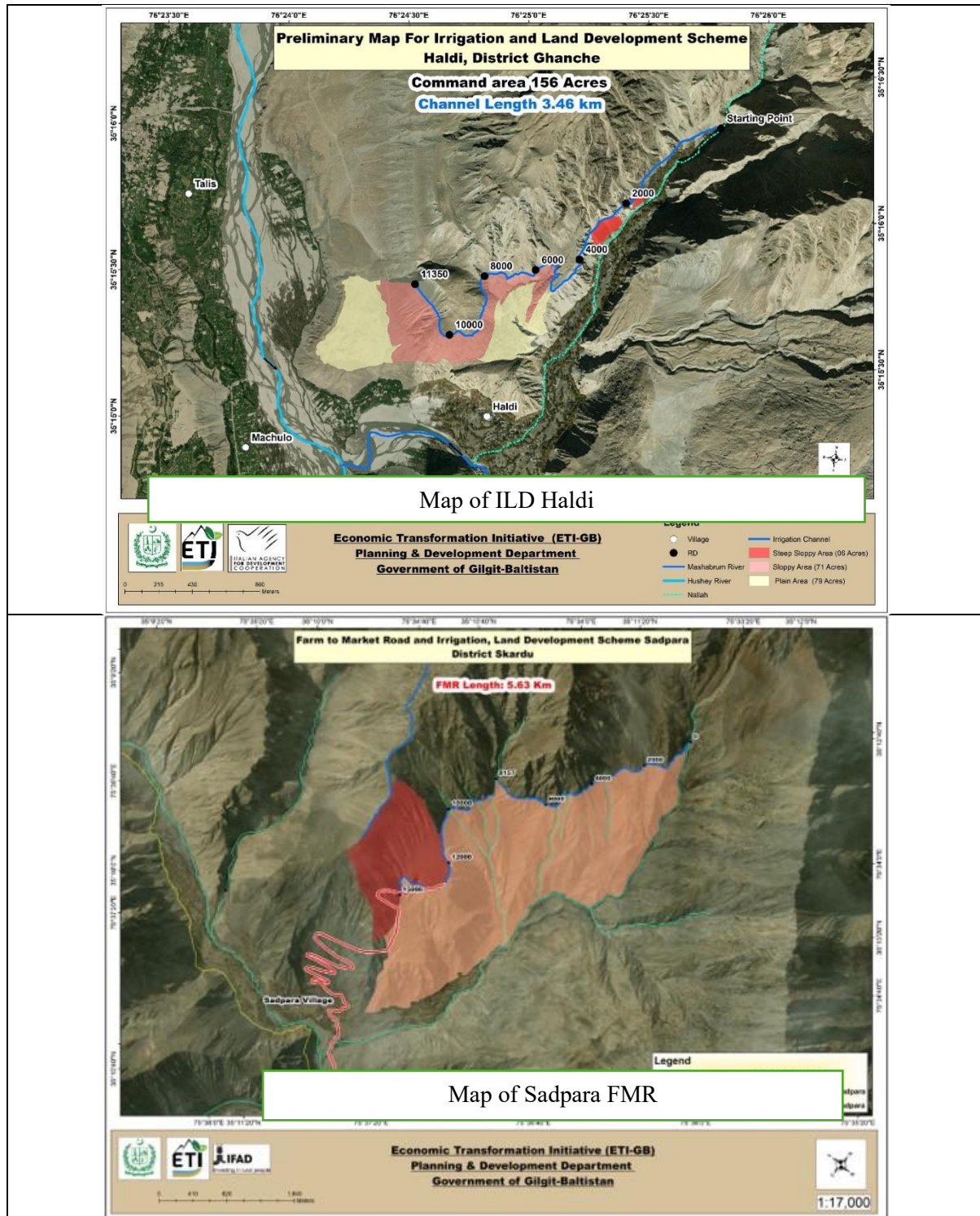
It is therefore recommended that the projects proceed with the approvals and conditions outlined in this report.

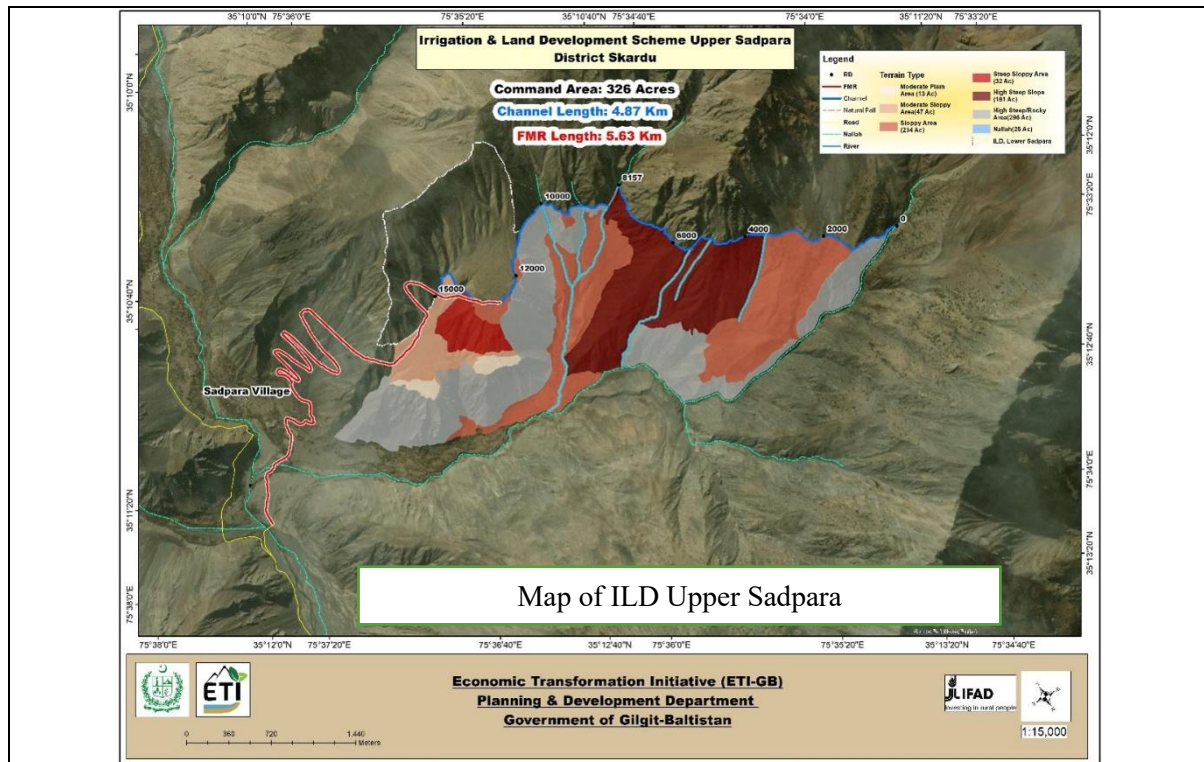
ANNEXURES

Annex-1: Site Location Maps









Annex-2: Community Consultation Attendance Sheet

Date: _____

Venue _____

Time _____

Village: _____

UC _____ Tehsil

Project: I & LD / FMR / BOTH

Sr. No.	Participant's Name	Father's Name	Mobile #	Signature/ Thumb Impression
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Interview Conducted By: _____

Date: __/__/__

Signature.....

Annex-3: Household Survey Form

Economic Transformation Initiative, Gilgit-Baltistan Planning and Development Department, Government of Gilgit-Baltistan

Date: __/__/____ Project: I & LD /
FMR / BOTH

1. Identification

- a. Name of Respondent: _____
- b. Father's Name: _____
- c. Age: _____
- d. Cell #: _____
- e. Village: _____
- f. Union Council: _____
- g. Tehsil: _____
- h. District: _____
- i. Respondent Status in Village _____

2. Family Profile

- a. Total Members: _____
- b. Male Members: _____
- c. Children (<15 yrs.): _____
- d. Male Children: _____
- e. Relation of Respondent with Head of Family: Self / Son /
- f. Occupation of Respondent:
- g. Occupation of Head of Family/Farm Owner:
- h. Education of Head of Family:
- i. Occupation of Family Members (No.)://

3. Education of Family Members (Nos.):

Gender	Illiterate	Non-School-going	Primary	Middle	High	FA	Graduate	Masters	Other
Male									
Female									

4. Transportation Facility:

None / Animal / Motorcycle / Car / Jeep / Other

5. Transportation from Village to DHQs:

6. Agricultural Activities and Economics:

a. Input

Activity	Wheat	Potato	Apricot	Apple	Other	Remarks
Land Preparation Cost/Kanal (RS.)						
Seed kg/ Kanal Plants/ Acre						
Seed/Plant Cost (Rs.)						
Cost Sowing/ Transplanting /Kanal						
Interculture Cost/Kanal						
Fertilizer Bag/Kanal	DAP	Urea	SSP	Other	FYM Trolley/ Kanal	
Cost/Kanal						
Harvesting/Kanal						

b. Output

Item	Unit	Yield Per Kanal	Sale Price/Unit (Rs.)	Total/Kanal (Rs.)	Remarks
Wheat					
Wheat Bhoosa					
Potato					
Apricot					
Apple					
.....					
.....					

7. Income and Expenditure:

Main Source:

Secondary Source: Av.

Monthly Income: Rs.....

Av. Monthly Expenditure: Rs.

8. Expected Benefits of the Project:

a.

b.

c.

9. Probable Adverse Impacts environmental and Socioeconomic:

a. Pre-Construction

Impacts	Suggested Mitigation
Physical:	
Ecological:	
Socioeconomic:	

b. During Construction environmental and Socioeconomic:

Impacts	Suggested Mitigation
Physical:	
Ecological:	
Socioeconomic:	

c. During Operation environmental and Socioeconomic:

Impacts	Suggested Mitigation
Physical:	
Ecological:	
Socioeconomic:	

10. Any Other Relevant Comments/Observations of Farmer;

11. Observations of Interviewer:

Signature of Interviewer: _____ Date: ____/____/____

Name of Interviewer: (_____)

Annex-4: Village Profiling

Economic Transformation Initiative, Gilgit-Baltistan Planning and Development Department, Government of Gilgit-Baltistan

Date: ____/____/____

1. Identification:

- a. Village Name: _____
- b. Union council: _____
- c. Tehsil: _____
- d. District: _____

2. Village Profile:

No. of households	Total Population	Male	Children (<15 yrs.)

3. Av. Monthly Income Rs./HH %

30,000>	30000-45000	45000-60000	60000<	Remarks
..... %	 %	 %	 %	

4. Source of Irrigation Water: Surface / Ground / Others (Specify):

5. Source of Drinking Water:

6. Quality of Drinking Water:

7. Major Water Issue:

8. Community Organizations (CO) No.:

- a. Names: Regd./Un-Regd.
- b. No. functional COs
- c. No. Headed by Female:
- d. Conflicts: Water..... LandOther
- e. Conflict Resolving (by): CO/Number Dar/Religious Head/.....
- f. Total No. of Sponsored/GoGB in the Village:
- g. Total Agricultural Land of Village Kanal
- h. Recoverable Land for Cultivation:..... Acres
- i. Resource Required for Recovery: Water/Machinery/Other

9. Archaeological/Heritage Sites:

10. Occasional/Seasonal/Annual Events of the Village:

11. No. of Masjid/Imambargah/Khankah:

12. Graveyard: Common/Individual/Both

13. Educational Institutions (No.)

Primary & Middle		High		College		Madrassa		Mosque	Vocational/ Other
Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys		

14. Literacy Rate:%

15. Health Facilities (No.)

BHU/BHC /BMC	Hospital	Clinic	Hakim	Medical Store	General Store	Mechanical Workshop

16. Village Electrification Status: Available/Not Available

17. Number of HH with Electricity Connection:

18. Major Source of Energy for Cooking and Heating:

19. No. (HH) of LPG User: Winter% Summer %

20. Recreation etc. TV/Dish/Cable/Internet/Mobile Signal

21. No. of (HH) Mobile Phone Users:..... %

22. Nearby Market: Name DistanceKm

23. Means of Travel & Transport:

24. Village Level Entrepreneurship/Cottage Industry (No.):

Blacksmith	Carpenter	Weaver	Potter	Jeweller	Embroider	Other

25. Women Participation in Various Activities Women Participation in Various Activities

Sr. No.	Activities	Participation Level%
1.	Household	
2.	Child Caring	
3.	Employment / Business	
4.	Farming	
5.	Social Obligations (Marriage, Birthday & Other Functions)	
6.	Local Representation (Counselor / Political Gathering)	

26. Major Issues

- a. RoW:
- b. Land Acquisition:
- c. Be Removed: Trees No.: Houses No.Other:
- d. Other:
- e. Workers: Local % Outsiders % Stay at Site: No.

27. Probable Adverse Impacts of Proposed Project environmental and socioeconomic:

a. Pre-Construction/Planning

Impacts	Suggested Mitigation
Physical:	
Ecological:	
Socioeconomic:	

b. During Construction environmental and Socioeconomic:

Impacts	Suggested Mitigation
Physical:	
Ecological:	
Socioeconomic:	

c. During Operation environmental and Socioeconomic:

Impacts	Suggested Mitigation
Physical:	
Ecological:	
Socioeconomic:	

28. Any Other Relevant Comments/Observations by Villagers:

Signature of Interviewer: _____

Date: ____/____/____

Name of Interviewer: (.....)

Annex-5: Evaluation Of Environmental And Social Impacts

Project/Scheme Title: _____

Location /Address _____

Evaluation of Environmental and Social Impacts

Note:

1. Avoidable through design (Avoidance): Curable
2. Mitigation through contractor's obligation or by communities through Social Framework Agreement (SFA) (Curative): reversible
3. Non-reversible, Permanent change (to be adopted): irreversible

Aspects	Impacts Assessed	Assessment									
		No n e	Slight			Moderate			Significant		
			1□	2□	3□	1□	2□	3□	1□	2□	3□
1. Land and landscape transformation	Site for disposal of waste construction material										
	Land slide, unstable soil or similar unforeseen conditions										
	Location of labor camps, material dumps, equipment yard and approach road.										
	Any natural disasters such as heavy rains, floods and earthquakes										
	Soil contamination from diesel and other spills from construction machinery										
	Damage/blockage of Drain, paths, roads, and cross drainage by moving machinery.										
	Scouring of Earthen embankment or concrete work Edge										
	Release of construction water on unstable slope or any public/private property										
	Release of construction water to any river structure such as bridge/culvert.										
	Any discharge, spill or dumping on any building or house on riverbank.										
	Impact of taking borrow martial from earth borrow site.										
	Impact on paths or road used for transport of construction material.										
	Impact of stone quarrying.										

	Any blasting during Construction										
--	----------------------------------	--	--	--	--	--	--	--	--	--	--

1. Avoidable through design (Avoidance): Curable
- 2. Mitigation through contractor's obligation or by communities through Social Framework Agreement (SFA) (Curative): reversible
- 3. Non-reversible, Permanent change (to be adopted): irreversible

Aspects	Impacts Assessed	Assessment									
		None	Slight			Moderate			Significant		
			1□	2□	3□	1□	2□	3□	1□	2□	3□
	Activities for construction and improvement of proposed road sections disturbing land used by local communities.										
2. Water Resources	Sourcing of construction water and potable water for camps.										
	Impact of surface water.										
	Impact of ground water.										
	Impact of drinking water.										
	Diesel and other fluids spilling over to river water form machinery.										
	Damages from floods of river or streams.										
	Obstruction of flow of water in the river or any stream.										
	Effect on surface flow conditions in rains.										
3. Air Quality and Noise Pollution.	Dust, smoke and other pollutants from construction Machinery including asphalt and concrete batching plant.										
	Dust of other pollutants from stored material and spoil keeps.										
	Smoke from burning of waste material or burning firewood.										
	Noise from use of old or outdate machinery.										
	Noise due to any blasting.										
	Soil compaction due to labor camps and machinery yards.										
4. Biological Resources	Damage to biological resources										
	Damage to Fisheries										
	Impact on (adjacent) open land										
	Impact on any migratory birds.										
	Impact on endangered spices.										
5. Socio–Economic	Existing services education, health, electricity, water supply communication.										

Cultural and Archeological Issues.	Local ethnicity, Tribal Tensions, communal rivalries										
	Impact on area under crops										
	Land ownership / Land tenure system										
	Access to construction material.										

Assessed by:

Date

Annex-6: Community Willingness Documentary Evidence

1. NOCs from the administration
2. Affidavits/Undertakings from the communities