

Government of Pakistan
Ministry of Communications
National Highway Authority

MORE KHUNDA TO HABO KY BALA DISTRICT NANKANA SAHIB (56 KM)



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Description</u>
APHA	American Public Health Association
ASR	Air Sensitive Receivers
ASTM	American Society of Testing Materials
BDL	Below Detection Limit
BOD ₅	Bio-chemical Oxygen Demand
CC	Construction Contractor
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
COP	Conference of Parties
DO	Dissolved Oxygen
EALS	Environment, Afforestation, Land and Social Section
EC	Environmental Committee
EE	Environmental Engineer
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EPA	Environment Protection Agency
EPC	Engineering Procurement Construction
EPD	Environment Protection Department
EPHE	Environment & Public Health Engineering
ESALs	Equivalent Single Axle Load's
FGDs	Focused Group Discussions
gm	Gram
GOP	Government of Pakistan
GRM	Grievance Redressal Mechanism
GRC	Grievance Redressal Committee
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
LGO	Local Government Ordinance
MCC	Manual Classified Count Survey
mg/L	Milligrams per liter
MSL	Mean Sea Level
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NHA	National Highway Authority
NO ₂	Nitrogen Dioxide
NSR	Noise Sensitive Receivers
°C	Degree Centigrade
OH&S	Occupation Health and Safety

OH & SAS	Occupation Health and Safety Assessment Series
PAPs	Project Affected Persons
PD	Project Director
PEGO	Project Environmental Grievance Officer
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protection Council
PGA	Peak Ground Acceleration
PM ₁₀	Particulate Matter
PPC	Pakistan Penal Code
RAP	Resettlement Action Plan
SC	Supervision Consultant
SO ₂	Sulfur Dioxide
SOP	Standard Operating Procedures
SWM	Solid Waste Management
TA	Technical Assistance
TSS	Total Suspended Solids
UC	Union Council
UNDP	Nation Development Program
UNFCCC	United Nation Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VEC	Valued Environmental Components
VSC	Valued Social Components

Executive Summary

Background

Communication networks play an important role in the economies of the Countries. The development of new roads and upgradation of existing road infrastructure to facilitate the general public with easy access to all parts of Pakistan for trade, tourism, etc. is of top priority of the Government of Pakistan. For this purpose, the National Highway Authority intends to build an intercity arterial network in the underdeveloped areas of the District of Nankana Sahib, Punjab to facilitate the local public with better quality roads. The project has been conceived to improve the local transportation system through upgradation of the existing kutchra road to increase connectivity in trade and communication and to improve economic well-being of the population. It will thereby serve as a tool towards a better economy and reducing poverty in the District of Nankana Sahib.

For this purpose, National Highway Authority (NHA) (herein referred to as the "Client"), has engaged JV of M/s Asif Ali and Associates (Pvt) Ltd, M/s A.A. Associates and M/s Pakistan Engineering Tech (herein referred to as the "Design Consultants" or the "JV") in December 2022 to carry out the task of Feasibility Study & Detailed Design of this Inter-city arterial road between More Khunda & Habo ky Bala through following assignment:

“Feasibility Studies and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib (56 km)”

General

This Report presents the findings of the Environmental Impact Assessment (EIA) Study. It aims at the identification of the possible environmental and social impacts of the proposed project on its surroundings on both short and long term basis, suggesting mitigation measures and identifying the responsible agencies to implement those measures.

The current road and traffic condition from Adda Mangtanwala to Habo By Bala is very poor and uneven. Currently the most of the road is basically a kutchra track only accessible to 4x4 vehicles with small portions of TST road in poor condition which makes it very difficult for driving. Traffic flow is particularly constrained in the Adda Mangtawala area. This poor condition of road contributes to a number of accidents on the proposed project site.

The basic aim of the project is to facilitate the road users commuting from Lahore-Jaranwala road by construction of road from Adda Mangtanwala to Habo By Bala resulting in considerable reduction in travel time and operating cost at the most economical level.

The scope of the EIA Study includes environmental assessment of the project including collection and securitization of data related to physical, biological and socio-economic environment, assessment of impacts which may be caused by the project activities and mitigation measures for the abatement of potential environmental impacts along with the estimate of mitigation cost.

The submission of EIA and its approval from Environmental Protection Agency (EPA) is mandatory according to Punjab Environmental Protection (Amendment) Act. 1997. Section 12 (1) of the PEPA. 1997 states that:

"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 from the Federal Agency approval in respect thereof."

The study has been conducted in accordance with Environmental Protection Agency (EPA) and Government of Pakistan (GOP) Guidelines. The study is based on both primary and secondary data and information. Discussions were held with stakeholders including government officials and community representatives. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

To accomplish the job in time and to produce a quality report, a proper methodology was established as follows:

- Meetings and discussions were held among the members of the EIA consulting team, design engineers and proponent. This activity was aimed at achieving a common ground of understanding of various issues of the study.
- Planning was carried out to assess data requirements and their sources; time schedules and responsibilities for their collection; logistics and facilitation needs for the execution of the data acquisition plan.
- Primary and secondary data were collected through observations during the field survey, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic environmental conditions.
- The impacts of the project on the physical, biological and socio-economic environment prevalent in the project area were visualized at the design, construction and operational phases.
- The adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate them beforehand in the design phase.

Legal and Administrative Frameworks for EIA

The Government of Pakistan (GOP) has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In our current studies the applicable environmental policies are National Environment Policy, 2005;

National Sanitation Policy, 2006; National Climate Change Policy, 2012 and National Resettlement Policy, 2002. The relevant laws, regulations and acts to the proposed project are: Pakistan Environmental Protection Act, 1997; IEE/EIA Regulations, 2000; Pakistan Environmental Assessment Procedures, 1997; Punjab Environmental Protection Act (Amended) 2012; National Environmental Quality Standard (NEQs) 2010; Punjab Local Government Ordinance, 2001; Canal and Drainage Act, 1873; Pakistan Penal Code, 1860; Guidelines for Solid Waste Management (2005); Sectorial Guidelines (1997); The Punjab Wildlife (Protection, Preservation, Conservation & Management Act, 1974); Protection of Tress and Brushwood Act, 1949; Cutting of Tress (Prohibition) Act 1975; Disaster Management Act, 2010; The Motor Vehicles Rules, 2000; National Clean Air Act, 2000; Land Acquisition Act, 1984; Seismic Building Code of Pakistan, 2007; Toxic or Hazardous Waste and Preservation of Cultural Heritage.

The Client / Implementing Agency of the proposed project is National Highway Authority (NHA). The management of NHA will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages of the project.

Project Description

The proposed project site is administratively located in Nankana Sahib District. The proposed project includes construction of road from More Khunda to Habo by Bala District Nankana Sahib. The geographical coordinates at starting point of the road (Adda Mangtanwala) are N 31.35041 E 73.83725 whereas geographical coordinates of the end point of the road (Habo Ky Bala) are N 31.1066 E 73.38274. The total length of the proposed alignment is 60 Km.

The project is expected to be completed within Eighteen (18) months with an estimated capital cost of Rs. 5.680 Billion.

The construction materials of the proposed project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement and cement etc. Estimated water demand and wastewater generation for the proposed project are 9,600 gallons/day and 7680 gallon/day respectively during the construction phase. The solid waste generation during the construction phase of the project is estimated to be 78.12 kg/day. The manpower requirements during construction and operation of the project will be about 80 personnel including managerial staff, skilled and unskilled labor.

Description of the Environment

The existing environment in and around the project area has been studied with respect to the physical, biological and socio-economic conditions.

Physical Environment

The topography of the project area is flat and Ravi River is flowing parallel on the Eastern side. The general height of the area is approximately 187 meters above the Mean Sea Level (MSL). The soil deposits at the project site belong to Chung Fun formation indicating the last glacial cycle. The presence of old channels of Ravi River indicates conformity of the stream oscillation to terrestrial rotation in the deflection of streams. These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with inter-beds of clay and layers or lenses of sand.

The project lies in the District Nankana Sahib. The climate of the district has extremes of climate. The summer season starts from the month of April and continues till October. May and June are the hottest months with day temperature usually ranging from 39 to 41 degree centigrade. The winter season begins from the month of November and continues till March. January is the coldest month with a mean minimum temperature of 5 degree centigrade. Dust storms occur occasionally during the hot season relieving temporarily the intensity of heat. Towards the end of June monsoon conditions appear and during the following two and half months spell of rainy season alternates with intervals of sultry weather.

Land use of the project area is fertile and suitable for crop cultivations. Majority of the adjoining areas of project earn their livelihood, directly or indirectly, from agricultural activities e.g., crop cultivation, livestock rearing, labor in agriculture, agriculture input supply, transportation of agricultural output to the market etc.

For the baseline studies, air, noise and water quality monitoring was conducted by Sustainable Environmental services & Laboratory (SES&L)- Tti Testing Laboratories within the project area and its surroundings. Ambient Air Quality was monitored at selected locations and results observed were within limits set in Punjab Environmental Quality Standards. Air quality monitoring was conducted at selected locations and assessed the parameters; O₃, CO, HF, HNO₃, NO, NO₂, SO₂, TSP, PM₁₀ & PM_{2.5} PM₁₀.

The results show that the concentrations of O₃, CO, HF, HNO₃, NO, NO₂, SO₂, TSP, PM₁₀ & PM_{2.5} PM₁₀ are within the permissible limits specified by the Punjab Environmental Quality Standards.

Noise level monitoring was carried out at the same locations where ambient air quality was monitored. Noise levels measured at selected site at were within compliance.

For the assessment of ground water quality the samples were taken from designated point Kot Hidayat Nankana Sahib Ground Water source.

Comparison of the results obtained showed that Ground Water obtained from selected site at district Nankana sahib had values within permissible limits as per Punjab Environmental Quality Standards. Water can vary greatly in quality depending upon type and quantity of dissolved salts. Salts are present in water in relatively small amounts. These salts originate from dissolution of weathering of the rocks and soil, including dissolution of lime, gypsum and other slowly dissolved soil minerals. The suitability of water is determined not only by the total amount of salts present but also by the kind of salts

Water quality or suitability for use is judged on the severity of problems that can be expected to develop during long-term use. The problems that result vary in both kind and degree and are modified by soil, climate and crop, as well as by the skill and knowledge of water user. The soil problems most commonly encountered and used as a basis to evaluate water quality relate to salinity, water infiltration rate, specific ion toxicity and a group of other miscellaneous problems. Among analysis of the heavy metals, all metals were also within limits defined by PEQS.

Ecological Environment

The ecological survey of the project site revealed that about 600 trees will be cut by the construction of the proposed project.

In the area common mammals are dogs, cats, house rats and bats. Domestic livestock that was observed during field visit include buffalo, cattle, goats, sheeps, and donkeys that are used by the local residents for their living and mobilization purposes. House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) and lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are observed in the proposed project site.

Socioeconomic Environment

According to District Census Report (DCR), Nankana Sahib; 2017. The total population of Nankana Sahib district was 1,354,986 as enumerated in March, 2017 with an intercensal percentage increase of 29.6 since March, 1998 when it was 1,044,865 souls. The average annual growth rate was 1.4 percent during this period. The total area of district is 2,216 square kilometers which gives population density of 611.5 per square kilometer observed in 2017.

Punjabi is the predominant language being spoken by majority (98.83 percent) of the population of the district. The economically active population as enumerated in the latest census (i.e. 1998 census) was 22.2 percent of the total population i.e. the population exposed to the risk of entering the economically active life at any time.

A socio-economic survey was carried out in the project area to get the response about the perceived impacts and preferences towards the project implementation. A sample of 50 respondents was taken on the basis of random sampling technique, which included shop keepers, residents, pedestrians, drivers and students etc. Majority of the respondents (92%) favored the Project, keeping in view its importance and only 8% cases/ responses were against the construction of the proposed project.

Impacts and Mitigation Measures

To get one sight overview of the nature of the impacts, their scale and significance; an Environmental Impact Matrix have also been developed for construction and operation phases.

The construction of the proposed project will have both positive and negative impacts during the construction and operational phases, for which proper mitigation measures are prepared. During the field survey, significant efforts were made to identify the main social, cultural and environmental issues related to the construction of the proposed project. Following is the list of main issues and concerns which have been considered in the study report:

- About approximately 28 kanal of land would be acquired for the execution of the project which is moderate impact of the project as the adjacent agricultural land will be affected.
- Traffic congestion and time delays will occur during the construction phase of the project, which is temporary adverse impact as these time delays will be reduced during operational phase;
- Access to the cultural and religious resources (mosques and shrines) will be another problem during construction phase;
- About 600 trees/plants will be directly affected for the construction of More Khunda which is adverse impact of the project;
- Air quality will also be deteriorated by the dust generation and from the asphalt and batching plant during the construction phase, however, this impact will be positive during the operational phase as the main objective of the project is to ease the traffic which will be resultant to reduce the air deterioration;
- Noise levels will also be high during the construction phase however, this impact will also be temporary in nature;
- During the construction phase of the proposed project, improper traffic management may result in traffic jams and cause inconvenience to the people passing due to movement of vehicles carrying construction materials and different construction activities. This impact is temporary and moderate negative in nature;
- Soil erosion is another major problem of the proposed project area which may arise during construction phase of the project;

- Disturbance to the public movement during construction especially the students and the residents residing at the proposed site, which is a temporary but moderate adverse impact during the construction phase;
- Disruption of existing public utilities during construction phase;
- Oil spillages from construction machinery, resulting in soil and drinking/spring water contamination; and
- Health and safety problems of the workers may also arise during the construction and operational phases of the proposed project.

All the adverse impacts of the proposed project have properly been mitigated and a comprehensive Environmental Management Plan (EMP) has been formulated. The implementation of EMP will help to reduce the adverse impacts of the proposed project.

After the completion of the proposed project, the road users will get the following benefits:

- Reduced accidents caused by poor condition of road;
- Reduced travelling time;
- Reduced the fuel consumption and transportation cost caused poor condition of road;
- Create job opportunities for laborer's and semi-skilled staff during constructional phase; and
- Reduced air emissions from vehicular exhaust especially in case of traffic congestion

Results of the EIA Study have shown that overall, the project is environmentally feasible. Most of the environmental impacts are moderate adverse in nature except land acquisition, tree cutting, business loss of the directly affected, nuisance for the residents during construction phase, which are major adverse impacts of the project.

However, these impacts can be mitigated by the implementation of Environmental Management Plan (EMP).

Overall, the impacts related to construction phase could be minimized by the implementation of the proper mitigation measures. The total cost of Environmental Mitigation and Monitoring Plan including the Tree Plantation cost is **Rs. 10,980,000.**

Proposed Monitoring

The project has negative and positive impacts on biological, physical, socioeconomic and ecological fronts which will be mitigated through the proper preventive and control measures. To evaluate the efficacy of the preventive control measures regular monitoring of the project activities will be carried out during construction and operation phase of the project. The Punjab Environmental Quality standards of

ambient air, noise, water and motor vehicle exhaust will be complied with, their monitoring will be carried out quarterly, biannually and annually depending upon the magnitude of the impact. The O₃, CO, HF, HNO₃, NO, NO₂, SO₂, TSP, PM₁₀ & PM_{2.5} PM₁₀ in ambient air will be monitored at site. Noise will be monitored especially in front of sensitive receptors. Water quality of the surface water bodies crossing the road will be monitored on bi-annual basis. Detail discussion is made on the issue in Section 7 of the Main Report.

SECTION - 1

INTRODUCTION

1.0 Project Background

The district of Nankana Sahib is located about 75 kilometers (47 mi) west of Lahore and about 53 kilometers (33 mi) east of Faisalabad. Until 2005, it was part of Sheikhupura District. National highway Authority (NHA), Government of Pakistan, is constructing new roads and improving the existing roads in Pakistan to improve intercity transport and improving trade with other countries.

The overall objective of the project road is to design a carpeted road from More Khunda to Habo ky Bala in District Nankana Sahib (56 km) to provide a safe and smooth traffic facility to the commuters of the project area. The project road will greatly benefit the road users by reduction in the vehicle operating cost due to better pavement surface condition. Lahore-Jaranwala Road Intersects at starting point of Alignment at Adda Mangtanwala. Moreover, traffic using Jaranwala- Sayedwala road also intersects this project road.

The current road condition from Adda Mangtanwala to Habo By Bala is very poor and uneven. Currently the most of the road is basically a kutchra track only accessible to 4x4 vehicles with small portions of TST road in poor condition which makes it very difficult for driving. Carriageway width is particularly constrained in the Adda Mangtanwala area. This poor condition of road contributes to a number of accidents on the proposed project site

Keeping in view above mentioned facts, National Highway Authority (NHA) have taken initiative for construction of road from More Khunda to Habo by Bala for easement to traffic. The basic aim of the project is to facilitate the road users commuting from Lahore-Jaranwala Road by construction of road from Adda Mangtanwala to Habo by Bala resulting in considerable reduction in travel time and operating cost at the most economical level.

To comply with IEE/EIA regulations 2000 as per Punjab Environmental Protection (Amendment) Act (PEPA) 2012, M/s Asif Ali and Associates (Pvt) Ltd was entrusted with the assignment of carrying out an Environmental Impact Assessment (EIA) Study

for “Feasibility Studies and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib (56 km)”.

Subsequently the Joint Venture of M/s Asif Ali & Associates (Pvt.) Ltd, A.A. Associates & Pakistan Engineering Tech has been assigned by the NHA, the task of submission of the EIA Report to the EPA.

The EIA will ensure that environmental consequences are considered at all stages of the project. In addition, the EIA will assist the proponent to minimize the potential adverse impacts of the project. The EIA methodology promotes a practical and dynamic process of environmental protection that allows significant adverse impacts to be avoided or mitigated throughout the entire planning and design process.

1.1 Scope of Study

The scope of this EIA Study aims at collection and scrutinization of data related to physical, biological and socio-economic environment of the project area and to prepare the baseline environmental profile. It also aims at the identification, prediction and evaluation of the possible environmental impacts of the proposed project on its immediate surroundings on both short and long-term basis. Based on the nature and levels of those impacts, appropriate mitigation measures are proposed in this EIA Report

1.2 Study Objectives

The specific objective of the EIA Study for “Feasibility Studies and Detailed Design for construction of road from More Khunda to Habo by Bala District Nankana Sahib (56 km)” includes the following:

- Collection and scrutinization of data related to physical, biological and socio economic environment of the project area and to prepare baseline environmental profile;
- Identification, prediction and evaluation of potential environmental impacts of the proposed project;
- Suggesting mitigation measures to minimize the adverse impacts of the project; and
- Preparation of an Environmental Management Plan (EMP).

1.3 Need of EIA Study for the Proposed Project

EIA is mandatory according to the Punjab Environmental Protection Act (Amended), 2012. Section 12 (1) of the Punjab PEPA (Amended), 2012 states that

"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 from the Federal Agency approval in respect thereof. "

According to the Pakistan Environmental Protection Agency (Pak-EPA) (Review of IEE and EIA) Regulations 2000, the proposed project falls under category D (Transportation) of Schedule II, which requires EIA before commencement of construction.

1.4 The Proponent and Consultant

The proponent of the project is National Highway Authority (NHA) while the Consultant is the Joint Venture of M/s Asif Ali & Associates (Pvt.) Ltd., A.A. Associates & Pakistan Engineering Tech.

The contact details are given as under:

a) Proponent Contact Address

The General Manager (Planning)
National Highway Authority (NHA),
27 Mauve Area, G-9/1, Islamabad
Tel: +92 51 9032705

b) Lead Consultant Contact Address

M/s Asif Ali & Associates (Pvt.) Ltd.
139, G-Block, First Floor, Commercial Area, Phase 1,
Defence Housing Authority, Lahore
Tel: 042-35690824-5

1.5 Study Team

A multidisciplinary team was formulated to conduct the EIA study. The team comprised the following professionals:

Usman Riaz	Director / Team Leader
Dr. Kiran Farhan	Senior Environmentalist
Salman Akhtar	Senior Environment Engineer
Muhammad Maaz	Environmental Engineer
Hassan Tariq	Environmentalist
Muhammad Hamza	Sociologist

1.6 Brief Description of the Project

This newly proposed road is located in Nankana Sahib district between Adda Mangatanwala & Habo Ky Bala (near River Ravi). Currently the most of the road is basically a kutchra track only accessible to 4x4 vehicles with small portions of TST road in poor condition which makes it very difficult for driving. The road is in poor condition and has several narrow sections.

PROJECT LAYOUT

The project alignment starts at Adda Mangtanwala and passes along numerous towns and villages including More Khunda, Bunga Gillan, Morah, Kot Allah Ditta, Lurka Khurd, Hindoke, Bara Ghar, Mehran, Jamke, Roaday Malkay, Faridabad, Syed Wala, Ruppia , Kotli Faqerandi and terminates at Pindi Cherry

Major road junction on this project road includes Lahore-Jaranwala Road & Jaranwala-Mangtawala Road, Bai Pheru-Halla Road, More Khunda Bypass, Syed Wala-Bara Ghar-Bucheki Road and Syed Wala Road. The alignment marked on satellite imagery is given as **Figure 1.1** below.

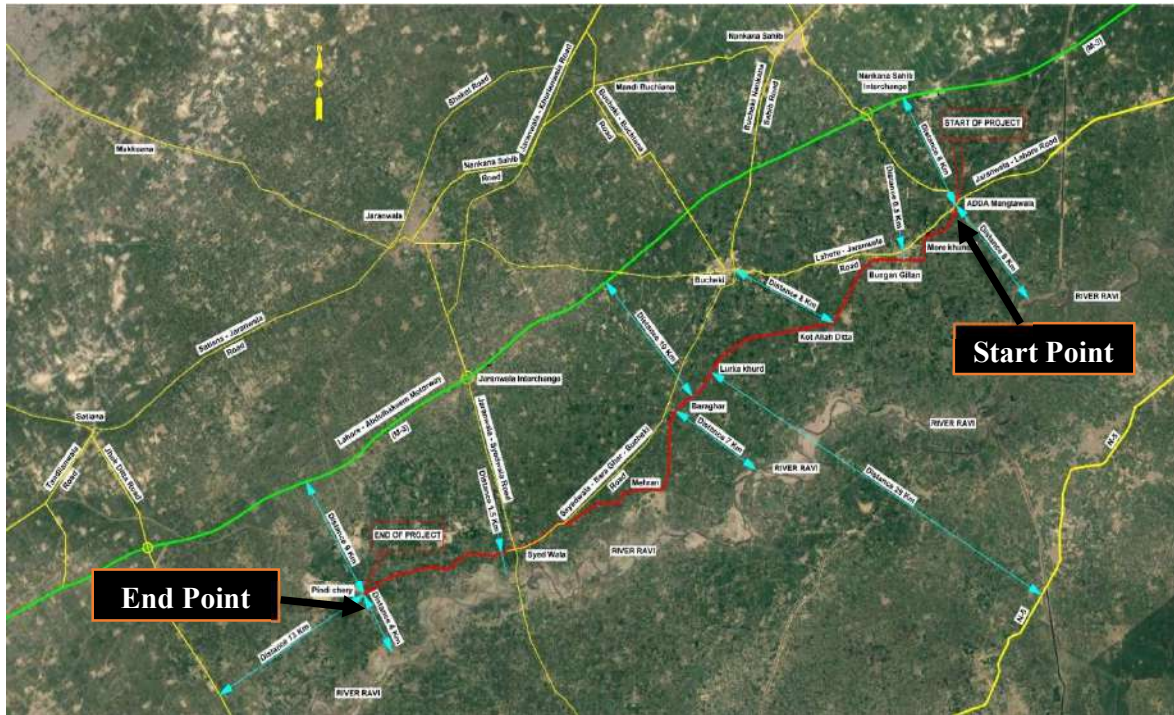


Figure 1.1 Project Location Map

KEY FEATURE OF ROAD

The cross-section of the new construction shall be 7.3 m wide carriageway with 2.5 m shoulders with 0.5 rounding, Design speed of 100 Km/hr.

Key features of the project road are given below:

Design speed	:	100 Km/hr.
Length of project	:	60 km
No. of lanes	:	Two lanes either side
Lane Width	:	3.65m

1.7 Study Approach & Methodology

1.7.1 Study Approach

The study was conducted in accordance with Environmental Protection Agency (EPA), Government of Pakistan (GOP) Guidelines, 2000. The study was based on both primary and secondary data and information. Discussions were held with

stakeholders including government officials, community representatives and a wide range of local residents. The main purpose of this approach is to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

1.7.2 Methodology

The following methodology was adopted for carrying out the EIA study of the proposed Project:

a) Orientation

Meetings and discussions were held among the members of the EIA Consulting Team. This activity is aimed at achieving a common ground of understanding of various issues of the study.

b) Planning for Data Collection

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the EIA Consulting Team. The plan included; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection; and indication of the logistics and other supporting needs for the execution of the data acquisition plan.

c) Data Collection

In this step, primary and secondary data was collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic conditions. These activities were as under:

- Site Reconnaissance;
- Analysis of Maps and Plans;
- Literature Review;
- Desk Research;
- Public Consultations;
- Field Observations & Studies; and
- Laboratory Analyses.

i) Physical Environment

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

Geology, Topography, Soils

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

Hydrology and Drainage

A literature review was conducted to identify the components of the hydrological cycle that are likely to impact on the project and the possible impacts that the project could have on the hydrologic cycle. Field assessments included a determination and verification of all the existing inflows into the drain (if any) along the proposed site, assessment of drainage issues, interviews with local community members, and round-table discussions with stakeholders.

Air Quality

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed construction on air quality conditions. Ambient air quality was continuously monitored for Carbon Monoxide (CO), Sulphur Dioxide (SO₂), Nitrogen Dioxides (NO₂), Particulate Matter (PM₁₀), for 24 hours by a certified testing laboratory.

Noise

Noise level readings were monitored at two sampling point for 24 hours on continuous basics by a certified environmental lab.

Water Quality

The objective of the water quality monitoring is to determine water quality situation before construction. It has been observed that the surface water and air quality are the most important environmental variables to be affected in this project. The extent of surface water and groundwater contamination in the project area was assessed based on the test results of chemical and microbiological parameters for surface and groundwater. Dissolved oxygen (DO), pH and conductivity measurements were taken in situ at all sampling stations. Analyses were performed in certified environmental laboratory.

ii) Biological Environment

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

Flora

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

Fauna

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

iii) Socio-Cultural Environment

The consultants utilized a combination of desk research, field investigations, census data, structured interviews, maps, reports to generate the data required for description of the existing social environment and assessment of the potential impact of the construction of the proposed project. Data were gathered on the following aspects of the social environment:

- Land use and Municipal Status
- Traffic, Transportation and Access Roads
- Demographics

- Livelihoods
- Poverty
- Education
- Health
- Social Setup
- Community Facilities
- Solid Waste Management
- Proposed Developments

d) Identification and Evaluation of Environmental Impacts

The impacts of the proposed project on the physical, biological and socio-economic environment prevalent in the project area were visualized at the design, construction and operational phases.

e) Mitigation Measures and Implementation Arrangements

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

1.8 Structure of the Report

Section 1: **Introduction** briefly presents the project background, objectives, methodology and need of the EIA study.

Section 2: **Policy, Legal and Administrative Framework** comprise policy guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed Project.

Section 3: **Description of the Project** furnishes information about the location of the proposed Project, cost and size of the project, its major components and alternatives considered for the proposed project to select at the preferred alternative for detailed environmental assessment.

Section 4: **Environmental Baseline Profile** establishes baseline conditions for physical, biological and socio-economic conditions prevalent in the project area.

Section 5: **Public Consultation** identifies the main stakeholders and their concerns rose through scoping sessions, and deals with the measures to mitigate the social impacts.

Section 6: **Anticipated Environmental Impacts and Mitigation Measures** identifies, predicts and evaluates impacts of the project activities during the construction and operation stages and deals with the measures proposed to mitigate potential environmental impacts of the proposed project.

Section 7: **Environmental Management and Monitoring Plan** outlines institutional arrangements for the implementation of the proposed mitigation measures, training needs of the staff for implementation of the mitigation measures, monitoring requirements and monitoring cost.

Section 8: **Conclusions and Recommendations** provide the outcome of the study and major observations of EIA and suggestions for environmental management and pollution control.

SECTION – 2

POLICY, LEGAL & ADMINISTRATIVE FRAMEWORKS

2.0 General

This section deals with the existing environmental policy as well as legal and administrative framework interrelated to carrying out the Environmental Impact Assessment (EIA) of “Feasibility Studies and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib (56 km)”. All the pertinent environmental policies and guidelines of Pak-EPA and legal frameworks have been duly conferred in this section. In addition, the roles and responsibility of the proponent as well as the Environmental Protection Agency (EPA) Punjab have been discussed in this section.

The proposed project requires an EIA in accordance with the Punjab Environmental Protection (Amendment) Act (PEPA), 1997 and IEE/EIA Regulation, 2000.

2.1 Policy Framework

The ministry of environment is the responsible authority for policy making on environmental protection in Pakistan.

2.1.1 National Environment Policy, 2005

In March 2005, Government of Pakistan (GOP) presented its National Environmental Policy, which comprises a predominant framework for addressing the environmental issues. Section 5 of the policy obligates for amalgamation of environment into development planning as instrument for succeeding the objectives of National Environmental Policy. It further states in clause (b) of subsection 5.1 that EIA related provisions of Punjab Environmental Protection (Amendment) Act, 1997, will be conscientiously enforced for all development projects. It also provides wide-ranging guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental assets.

2.1.2 National Sanitation Policy, 2006

The National Sanitation Policy of Pakistan provides a broad framework and policy guidance to the Federal Government, Provincial Governments, federally Administrated Territories and the local governments, to enhance and support sanitation coverage in the country through formulation of their sanitation strategies plans and programs at all respective levels for improving the quality of life of the people of Pakistan and the physical environment necessary for healthy life.

2.1.3 National Climate Change Policy, 2012

The National Climate Change Policy was approved by the Federal Cabinet on 26 September 2012. With an overall goal, to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development, the Policy puts forward comprehensive policy objectives of sustained economic growth, integration of climate change into inter-related national policies, pro-poor gender sensitive adaptation and cost-effective mitigation, water, food and energy security, DRR, effective decision making and coordination, creating awareness, building capacities, and conservation of natural resources and long term sustainability. It also seeks effective use of financial opportunities, and public and private sector investment in adaptation measures.

2.1.4 National Resettlement Policy, 2002

In March, 2002 Pakistan Environmental Protection Agency (Pak-EPA), GOP has issued its National Resettlement Policy, which explains the basis for compensation, rehabilitation and relocation of the affectees. It also explains the requirements and implementation of Resettlement Action Plan (RAP).

2.2 Legal Framework

GOP has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing

developmental projects. Following are the excerpts of these laws and procedures relevant to the proposed project.

2.2.1 Punjab Environmental Protection Act (Amended), 1997

Pakistan Environmental Protection Act (PEPA) was propagated on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance of 1983. Section 12 of the Punjab Environmental Protection Act Amended (2012) states that "No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an Initial Environmental Examination Study or, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA) Study, and has obtained Environmental Approval from provincial Agency.

2.2.2 Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000

These regulations provide lists of the projects requiring IEE and EIA. They also briefly describe the preparation and review of environmental reports. These regulations are attached as Annexure-1 and are also accessible at official website of EPD, Punjab.

2.2.3 Pakistan Environmental Assessment Procedures, 1997

Pakistan Environmental Assessment Procedures (1997) is, in fact, a compendium, which contains the following, sets of statistics and information significant to the proposed project.

a) Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

It refers to environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and authorization by the concerned environmental protection agencies.

b) Guidelines for the Preparation and Review of Environmental Reports

These guidelines are developed to facilitate both the proponents and decision makers to formulate reports (inclusive of all the information

contained therein) and carry out their review so as to take cognizant decisions

2.2.4 National Environmental Quality Standards (NEQS), 2010

Pakistan Environmental Protection Council (PEPC) first approved these standards in 1993. They were later revised in 1995, 2000 and 2010. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. Results of environmental monitoring (ambient air, water and noise) conceded out at different locations in study area are compared with NEQS values and are conversed in later chapter of the report. The National Environmental Quality Standards (NEQS), 2010 are openly available at official website of EPA, Punjab.

The ambient air, noise and drinking water quality standards are attached as **Annexure-IV**.

2.2.5 Other Relevant Laws/Policies/Guidelines

a) Punjab Local Government Ordinance, 2001

Environmental protection is federalized subject under Punjab Local Government Ordinance (LGO), 2001. Despite any specific provisions, every local government may execute functions conferred by or under the Punjab LGO, 2001 and in performance of such functions may implement such powers, which are necessary and appropriate. Until different provisions, rules, regulations or bylaws are made, the local governments may exercise such powers as are specified in the Sixth Schedule of Punjab LGO, 2001. Environmental protection is sequential at 48 of the Sixth Schedule.

b) Guidelines for Solid Waste Management (2005)

Guidelines for Solid Waste Management have been issued as a draft by the Pakistan Environmental Protection Agency in coordination with JICA and UNDP. These guidelines explain the waste generation, discharge and composition.

c) Canal and Drainage Act, 1873

This Act entails provisions for the prevention of pollution of natural or man-made water bodies.

d) Sectorial Guidelines (1997)

Pakistan Environmental Assessment procedure deals with general guidelines as well as the sectorial guideline for the Environmental Assessment Studies. The sectorial guidelines have been given for different categories of the projects and deals with the procedure requirements of Environmental Assessment.

e) Pakistan Penal Code, 1860

This states the penalties for violations concerning pollution of air, water bodies and land.

f) The Punjab Wildlife (Protection, Preservation, Conservation & Management) Act, 1974

This Act provides for the protection, preservation, conservation and management of wildlife in the Province of Punjab. This act defines the wildlife sanctuary, game reserves, protected areas and national parks. It also defines the rules and responsibilities of the relevant authorities and the relevant personnel to protect the ecological resources. It also describes the penalties and punishments on offenses against the sections given in the act.

g) Protection of Trees and Brushwood Act, 1949

This Act prohibits cutting or chopping of trees and brushwood without permission of the Forest Department.

h) Cutting of Trees (Prohibition) Act, 1975

This act forbids cutting of trees without acquiescence of the Forest Department.

i) Disaster Management Act, 2010

The Disaster Management Act, 2010 to offer an effective National Disaster Management System and for matters associated therewith or

incidental thereto and to overawed unforeseen situations. The act is administered by federal government which provides guidelines for the provision of disaster management plans, offer necessary technical assistance to the Provincial Governments and Provincial Authorities as well for preparing their disaster management plans in case of any mishap. This Act is valid to the subject project in case of any unseen situation.

j) The Motor Vehicles Rules, 2000

Subject to the provisions of this Act, and the rules and regulations, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards customary under clause (g) of sub-section (I) of section 6.

k) National Clean Air Act, 2000

The Clean Air Act legislation aims to control vehicular emissions, pollution from industry and indoor air pollution in rural areas.

l) Land Acquisition Act, 1894

This act deals with the procurement of private properties for public purposes. There are 55 sections in this act mainly dealing with area notifications, surveys, acquisition, compensation, appointment awards, dispute resolution, penalties and exemptions.

m) Seismic Building Code of Pakistan 2007

This code stipulates the minimum requirements for seismic safety of building and structures and the provisions of the Building Code of Pakistan (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.

Construction of buildings in defilement of the Building Code shall be considered as violation of professional engineering work specified under clause (XXV) of section 2 of the Act. This Code is applicable to the subject project as it includes the formation of structures.

2.3 Occupational Health & Safety

Construction and operational activities can distress the occupational health of the workers. Quantitative national standards with respect to the above aspect are yet to be developed in Pakistan. However, guidance in qualitative terms can be obtained from the Labor Laws (Amended) Ordinance, 1972 and Pakistan Factories Act (1934).

2.4 ISO 18001 Occupation Health and Safety Assessment Series (OHSAS)

OHSAS 18001 is an Occupation Health and Safety Assessment Series for health and safety management systems to help organizations to control occupational health and safety risks. The OHSAS specifications are applicable to any institute that desires to establish an OH&S management system to eradicate or reduce risk to employees and other interested parties who may be exposed to the risks allied with the project activities. As the subject project is a construction of bus terminal cum commercial complex and involves various health and safety issues to construction labor, therefore these ISO 18001 guidelines will be applicable and pertinent.

2.5 Labor and Health and Safety Legislation

The Constitution of Pakistan contains a range of provisions with regards to labor rights, in particular:

- Article 11 of the Constitution prohibits all forms of slavery, forced labor and child labor;
- Article 17 provides for a fundamental right to exercise the freedom of association and the right to form unions;
- Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; and
- Article 37(e) makes provision for securing just and humane conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

Labor law is controlled at both provincial and national levels with compulsory employment agreements containing the terms set out by the labor laws. There are various laws containing health and safety requirements including: Mines Act 1923; Factories Act 1934; Factories Rules; Hazardous Occupations Rules 1963; Provincial Employees Social Security Ordinance 1965; and Workmen's Compensation Act 1923.

No single comprehensive piece of legislation deals with occupational or community safety and health.

2.6 Toxic or Hazardous Waste

Protection of the environment with regards to toxic and hazardous waste is covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within the Provincial limits.

2.7 Preservation of Cultural Heritage

The Antiquities Act, 1975, administered by the Provincial Government, is aimed at safeguarding the preservation of cultural heritage, destruction, damage or defacement of antiquities is an offence under the act.

2.8 Administrative Framework

2.8.1 National Highway Authority (NHA)

The client of the proposed project is National Highway Authority (NHA). The management of NHA will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages of the project.

2.8.2 Environmental Protection Agency, Punjab

Pakistan Environmental Protection Council is the apex inter-ministerial and multi-stakeholders decision-making body, which is headed by Prime Minister. While Pakistan Environmental Protection Agency is meant for the putting into

practice of environmental laws in Pakistan. They have vicarious powers to provincial environmental protection agencies for review, approval and monitoring of environmental examination/assessment projects. EPA Punjab will be liable for reviewing the report, issuing Environmental Approval and overall/broad based monitoring of the proposed project actions.

2.8.3 Rules of Business for District Environment Office under Punjab LGO, 2001

National Reconstruction Bureau has formulated the following rules of business for District environment offices:

- To regulate motor vehicles subject to the provisions of the Pakistan Environmental Protection Act, 1997 and the rules and regulations made there-under;
- To ensure, guide and assist the proponents of new projects in submission of Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) to Director General, EPA for approval;
- To ensure implementation of environmental protection and preservation measures in all development projects at the District level and to sensitize government agencies on environmental issues;
- To identify the needs for legislation in various sectors of the environmental matters;
- To provide information and guidance to the public on environment;
- To encourage the formation and working of non-governmental organizations, to prevent and combat pollution and promote sustainable development; To undertake regular monitoring of projects and to submit progress reports to Director General, EPA for publication in the annual report.

SECTION – 3

DESCRIPTION OF THE PROJECT

3.0 Rationale of the Project

The district of Nankana Sahib is located about 75 kilometers (47 mi) west of Lahore and about 53 kilometers (33 mi) east of Faisalabad.

The Proposed Section i.e. More Khunda & Habo ky Bala is a part of Nankana Sahib. The existing road condition from Adda Mangtanwala to Habo By Bala is very poor and uneven. Currently the most of the road is basically a kutchra track only accessible to 4x4 vehicles with small portions of TST road in poor condition which makes it very difficult for driving

Traffic Survey Analysis

Traffic studies are intended to provide necessary input data for determination of the magnitude and pattern of the traffic for the proposed project through the design period.

In order to assess the vehicle-wise traffic volume expected to use the proposed project road, traffic count survey were undertaken in 2022. The traffic count survey was conducted at three (03) locations; the details of these locations with type / duration of surveys conducted are given in **Table 3.1**.

Table 3.1 Traffic Count Survey Details

Sr No.	Location	Survey Type	Duration
1.	Adda Mangtanwala	MCC*	24 Hours
2.	More Khunda	MCC	24 Hours
3.	Sayedwala	MCC	24 Hours

***MCC: Manual Classified Count Survey**

The traffic categories noted during the count survey were: animal drawn vehicles, cycles, motorcycles, rickshaws, cars, trucks, buses, tractors trolleys and car carriers. The vehicle wise summary of traffic counts at above mentioned locations are given in **Table 3.2**.

The traffic forecasts of the proposed road (from More Khunda to Habo Ky Bala) have been made for twenty (20) years i.e. 2024-2044. Other factors like Vehicles on Roads in Pakistan, Registered Vehicles in Pakistan, Population and Gross Domestic Production (GDP) etc. have also been considered. The estimated growth in accumulated yearly traffic for various types of vehicles is given in **Table 3.3**.

Table 3.2 Summary of Classified Daily Traffic Counts

Sr. No	Location	Animal Drawn Vehicles & Bicycles	Motorcycles & Rickshaws	Cars & Pickups	Mini Buses & Wagons	Buses & Flying Coaches	Trucks	Tractors	Total Traffic
1	Adda Mangtanwala	264	3661	1868	1180	425	1313	722	9,433
2	More Khunda	651	3251	1839	691	434	1377	500	8743
3	Sayedwala	652	6352	2058	870	155	460	369	10916

Table 3.3 Estimated Accumulated Yearly Traffic Growth

Sr. No.	Year Description	Year	AD Vehicles	Bicycle	Motorcycle & Rickshaws	Car & Pickups	Mini Buses & Wagons	Buses & Flying Coaches	Trucks		Tractor (Agri.)	Tractor Trolleys	Trailer Units		Total
									Trucks (2 Axle)	Trucks (3 Axle)			4-Axle	5-Axle & above	
1	Base Year	2022	30	33	1,075	143	7	-	12	-	33	31	-	-	1,364
2	Cons. Year 1	2023	29	32	1,094	145	7	-	12	-	34	31	-	-	1,384
3	Cons. Year 2	2024	28	31	1,130	149	7	-	12	-	35	32	-	-	1,424
4	Inclusion of Diverted Traffic in above Traffic	2024	66	80	2,166	485	51	5	55	7	64	115	2	1	3,097
5	Op Year 1	2025	65	78	2,260	505	53	5	57	7	66	119	2	1	3,218
6	Op Year 2	2026	64	76	2,358	526	55	5	59	7	69	124	2	1	3,346
7	Op Year 3	2027	63	74	2,461	548	57	5	61	8	72	129	2	1	3,481
8	Op Year 4	2028	62	73	2,568	571	59	6	63	8	75	134	2	1	3,622
9	Op Year 5	2029	61	72	2,680	595	61	6	65	8	78	139	2	1	3,768
10	Op Year 6	2030	60	71	2,797	620	63	6	67	8	81	144	2	1	3,920
11	Op Year 7	2031	59	70	2,919	646	65	6	69	9	84	150	2	1	4,080
12	Op Year 8	2032	58	69	3,046	673	68	6	71	9	87	156	3	1	4,247
13	Op Year 9	2033	57	68	3,179	701	71	6	73	9	90	162	3	1	4,420
14	Op Year 10	2034	56	67	3,317	730	74	7	75	9	93	168	3	1	4,600
15	Op Year 11	2035	55	66	3,461	760	77	7	77	10	97	174	3	1	4,788
16	Op Year 12	2036	54	65	3,612	791	80	7	79	10	101	181	3	1	4,984
17	Op Year 13	2037	53	64	3,769	824	83	7	81	10	105	188	3	2	5,189
18	Op Year 14	2038	52	63	3,933	858	86	7	83	11	109	195	3	2	5,402
19	Op Year 15	2039	51	62	4,104	894	89	8	85	11	113	202	3	2	5,624
20	Op Year 16	2040	50	61	4,283	931	92	8	88	11	117	210	3	2	5,856
21	Op Year 17	2041	49	60	4,469	970	96	8	91	12	121	218	3	2	6,099
22	Op Year 18	2042	48	59	4,663	1,010	100	8	94	12	126	226	3	2	6,351
23	Op Year 19	2043	47	58	4,866	1,052	104	8	97	12	131	235	4	2	6,616
24	Op Year 20	2044	46	57	5,078	1,096	108	9	100	13	136	244	4	2	6,893
AADT (2024-2044)			1,176	1,413	71,989	15,786	1,592	140	1,590	201	2,015	3,613	57	29	99,601
TOTAL AADT (2024-2044)			429,240	515,745	26,275,985	5,761,890	581,080	51,100	580,350	73,365	735,475	1,318,745	20,805	10,585	36,354,365

3.1 Type and Category of the Project

This project is construction of road from More Khunda to Habo Ky Bala with an estimated cost of PKR 5.680 Billion. Hence, it lies in Schedule II at classification D (2) of IEE/EIA Regulations that requires an Environmental Impact Assessment (EIA) to be submitted to EPA and get it approval under section 12 of Pakistan Environmental Protection Act 1997 (amended 2012).

3.2 Benefits of the Proposed Project

By construction of road from More Khunda to Habo Ky Bala following project benefits will be achieved:

- Reduced accidents caused by poor condition of road;
- Reduced travelling time;
- Reduced the fuel consumption and transportation cost caused by poor condition of road
- Create job opportunities for laborers and semi-skilled staff during constructional phase; and
- Smooth Traffic flow

3.3 Project Alternatives

3.3.1 General

Punjab EPD requires project proponents to consider alternative options and strategies with lesser or minimal adverse impacts on environment but able to meet the objectives of the project for which the EIA is being prepared. This document pertains to EIA of construction of road from More Khunda to Habo by Bala. As a result, alternative options have been considered in the context of the overall project. The exercise is based on developing a list of alternatives and shortlisting based on objectives and project requirements, required to develop a reasonable number of options for consideration followed by evaluation of alternatives leading to the selection of the preferred

alternative.

The report identifies potential environmental impacts of each alternative, develops comparative analysis matrix with respect to transportation objectives and environmental impacts to suggest the most feasible alternative that can be taken up for development.

3.3.2 Alignment options

Consultants arranged site visit to find best possible options of the alignment in view of economic, social and technical factors. Consultants' team of Engineers and Surveyors explored four options which are given below:

3.3.3 Option I:

First alignment option is the one that has been proposed in the RFP. This alignment starts from Adda Mangtawala and traverses along the right bank of the canal through More Khunda, Bara Ghar, Syed Wala & Pindi Chery and ends at Habo Ky Bala. The Design Consultants observed that the alignment is mostly a Kutcha track from Adda Mangtawala to Adda Faridabad. From Adda Faridabad to Pindi Chery a good condition undivided two-lane road is present, as shown in the road inventory. From Pindi Chery, a 6.3 km long paved road in poor condition is present till Habo Ky Bala.

At the start of the project alignment at Adda Mangtawala, for about 500m the available Right of Way lies within the Canal and thus NOC will have to be taken from the Irrigation Department in order to form embankment and protection works in the Canal or acquisition of private land may be needed for construction on the right side. About 9.5 km section from Adda Mangtawala to Bungan Gillan runs parallel to Lahore-Jaranwala road in close vicinity of about 300 to 1300m.

The Design Consultant is of the view that for the section from Adda Mangtawala to Faridabad, construction of complete road structure & widening is required. However, for 16 km long road section from Adda Faridabad to Pindi Chery only widening & resurfacing shall be required. The total length of the alignment is approx. 63.8 km with 47.8 km kutcha track requiring construction of complete road structure & 16 km section requiring geometric improvements & localized resurfacing, where needed. This alignment option provides a link to the project road at the start with Lahore-Jaranwala Road giving the project road access towards Lahore in the east & Nankana Sahib Interchange at Motorway M-3 in the north. At Adda Faridabad, the project road crosses Jaranwala-Syed Wala Road giving the project road access to Jaranwala Interchange at

M-3 in the west and to Okara in the south. However, no major connection is present at the end of the alignment.

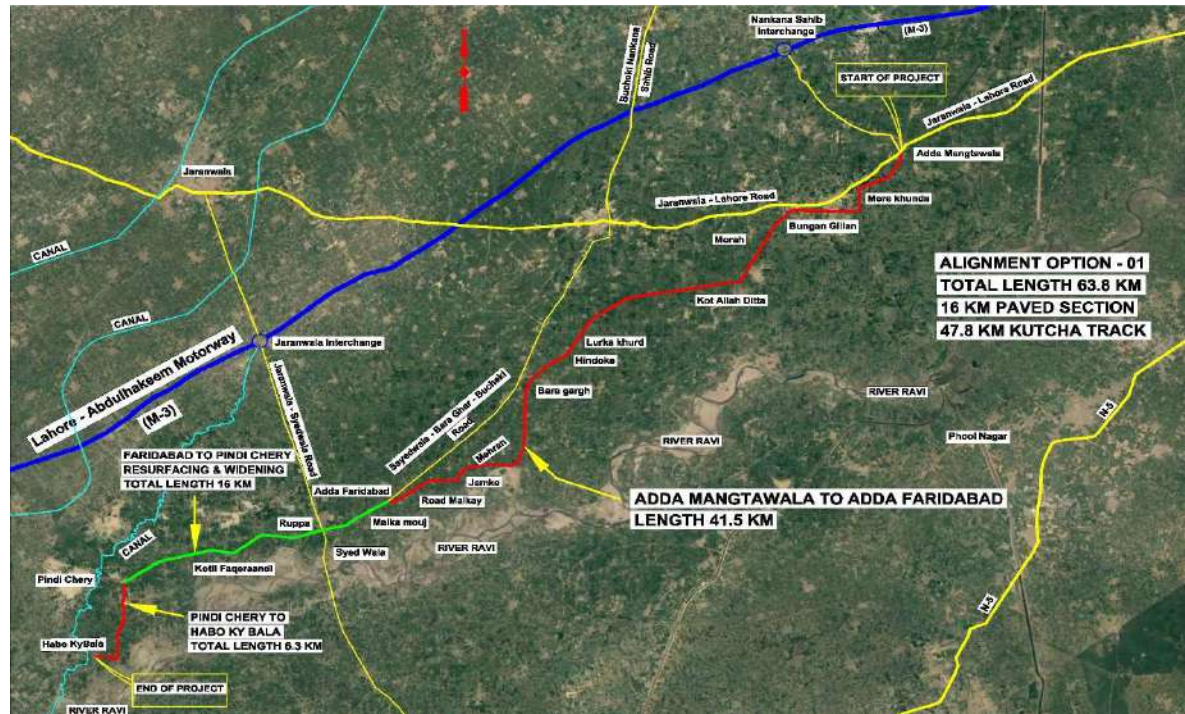


Figure 3.1: Map of Alignment Option I

3.3.4 Option II:

In the TORs, the alignment of the project road is proposed to start at Adda Mangtawala. However, the Design Consultants observed that the project road may directly be connected to Nankana Sahib Interchange of M-3 through 9.7 km section of Nankana Sahib road between Adda Mangtawala & Nankana Sahib Interchange on M-3. This section of Nankana Sahib Road passes through Khiaaray Kalan Kot Bhattian & Chokhian Wal. It is a metaled road and only geometric improvements & resurfacing will be required in this section.

From here onwards the alignment will move along the right bank of the canal towards Pindi Chery passing through More Khunda, Bara Ghar, Adda Faridabad & Syed Wala. The road section between Adda Mangatwala & Ada Faridabad is major a kutch track with small sections of paved road in poor condition. Approx. 16 km section from Adda Faridabad to Pindi Chery is a good condition undivided two-lane road. For this section, the Design Consultants suggests only geometric improvements with localized resurfacing, where needed. From Pindi Chery the alignment is suggested to be extended

towards Habo ky Bala. The 6.3 km road section between Pindi Chery & Habo ky Bala is an existing road in poor condition.

The total length of this alignment is approx. 73.5 km, with 25.7 km section needing geometric improvements with localized resurfacing & 47.8 km section requiring construction of complete road structure. This alignment option thus provides a direct connection to Nankana Sahib Interchange on Motorway M-3, access to Lahore via Lahore-Jaranwala Road, access to Jaranwala Interchange at M-3 in the west and to Okara in the south while crossing Jaranwala-Syed Wala Road.

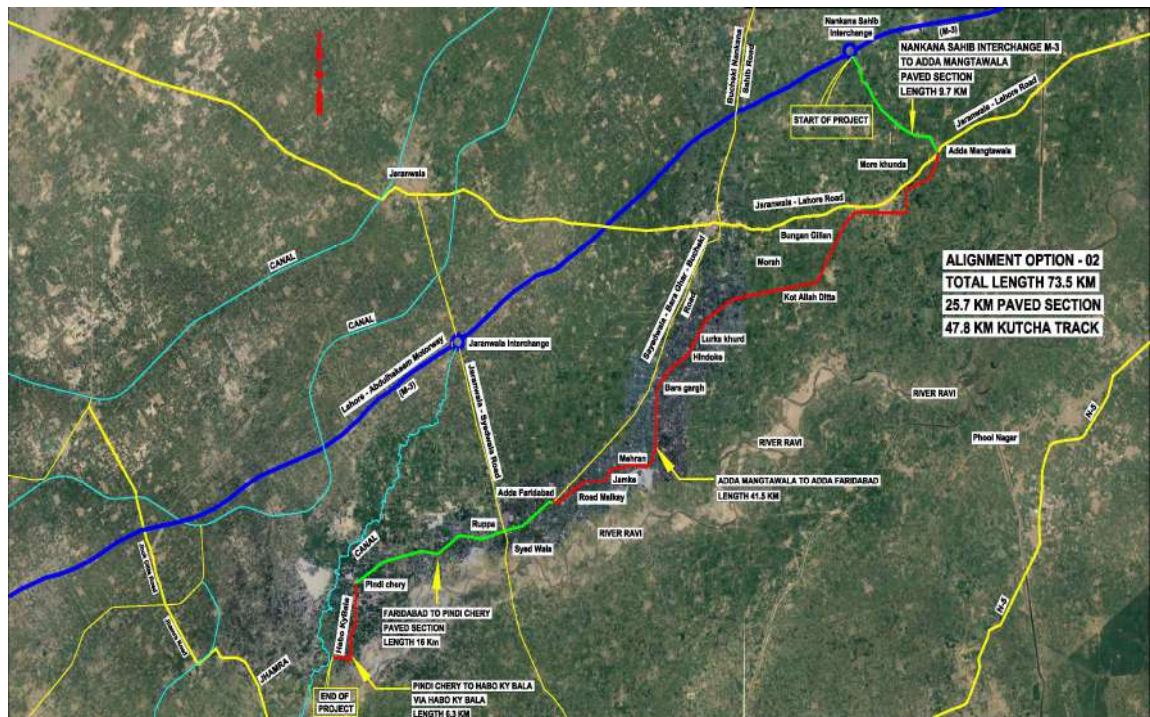


Figure 3.2: Map of Alignment Option II

3.3.5 Option III:

The Design Consultants have observed during their visit that from Adda Mangtawala to More Khunda there is an issue of Right of Way lying within the water channel as discussed in the section 3.3.3 above. However, this can be avoided by starting the project road from Bungan Gillan near More Khunda instead of Adda Mangtawala as the Lahore-Jaranwala Road from Adda Mangtawala to Bungan Gillan is running parallel in close vicinity to the project road. Lahore-Jaranwala Road therefore can be used for traffic to access Adda Mantawala & More Khunda.

Starting the project at Bungan Gillan instead of Adda Mangtawala will not only resolve the issue of Right of Way but will also save cost of about 9.8 km road section that can be utilized elsewhere. Another observation made by the Design Consultants during the site visit and desk studies is to give direct connection to the project road with Nankana Sahib Interchange by connecting Nankana Sahib Interchange with Bungan Gillan near More Khunda via 11.2 km long local road passing through Khiaray Kalan & Pipal Wala. This 11.2 km long section is an existing paved road and is suggested for geometric improvements, widening & localized resurfacing, where needed. The intersection on Lahore-Jaranwala Road at Baggan Gillan shall be improved.

From Bungan Gillan, the road shall traverse along Kot-Allahditta & Bara Garh till Adda Faridabad. From here onward, a 16 km paved road is present in good condition till Pindi Chery and is suggested for geometric improvements & localized resurfacing. However, a 12.5 km road section is suggested to extend from Pindi Chery to Jhamra Road at Chak 595 GB via Sial More. This extension shall give a straight and shortest connection to the project road with the Jhamra Road.

The total length of the proposed alignment comes to be approximately 60 km, with 16 km road section needing geometric improvements & 44 km road section needing construction of complete road structure.

The proposed alignment option provides a direct connection to the Nankana Sahib Interchange at Motorway M-3 and access to Lahore at Lahore-Jaranwala Road. At Adda Faridabad, the project road crosses Jaranwala-Syed Wala Road giving the project road access to Jaranwala Interchange at M-3 in the west and to Okara in the south. At the end of the alignment, the project road is connected with Jhamra Road on Chak 595 GB, giving the project road access to Faisalabad in the west.

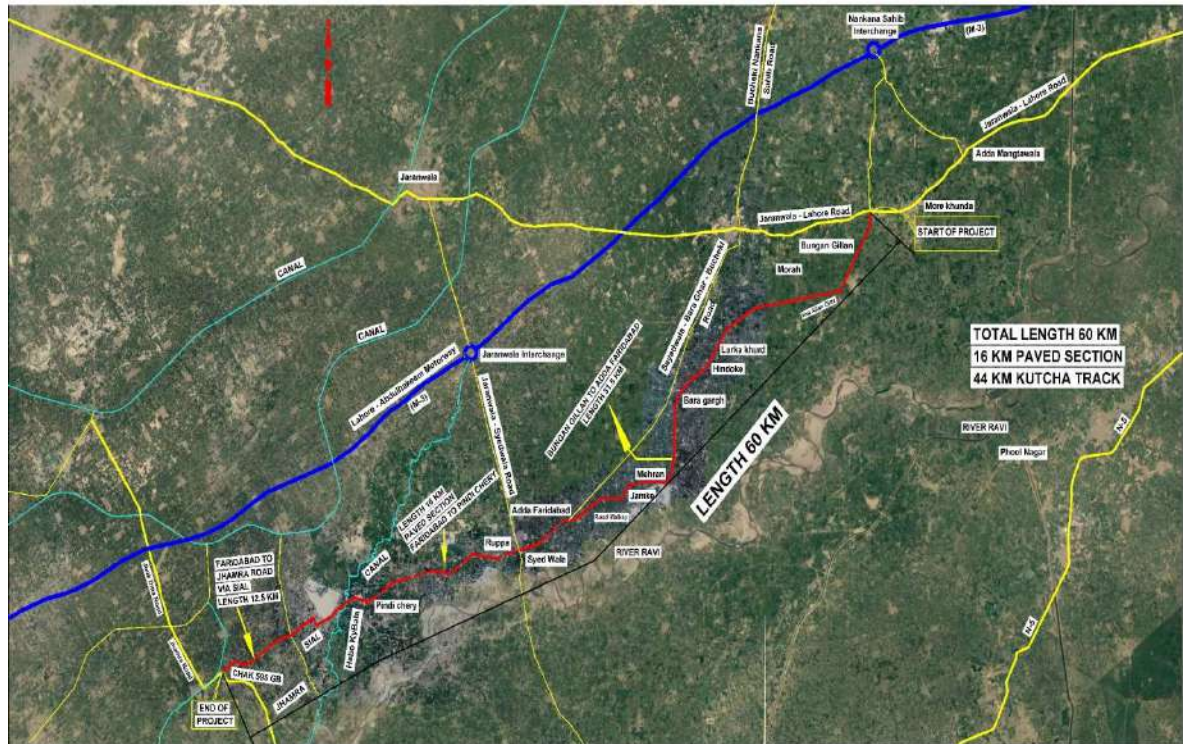


Figure 3.3: Map of Alignment Option III

3.3.6 Option IV:

As explained in section 3.3.5 above, the project is suggested to start at Nankana Sahib Interchange M-3 and is connected to Bungan Gillan via an 11.2 km local paved road passing through Khiaray Kalan & Pipal Wala. This 11.2 km section is suggested for geometric improvements & localized widening & resurfacing, where needed. The intersection on Lahore-Jaranwala Road at Baggan Gillan shall be improvement.

From Bungan Gillan, the road traverses along Kot-Allah ditta & Bara Garh till Adda Faridabad. From here onward, a 16 km paved road is present in good condition till Pindi Chery and this section is suggested for geometric improvements & localized resurfacing only. From Pindi Chery the alignment shall be extended towards Jhamra road at Jhamra, passing through Pindi Chery & Habo ky Bala. The 6.2 km road section between Pindi Chery & Habo ky Bala is in a deteriorated paved condition. From the bridge of Habo Ky Bala, a kutchha track of 2.9 km is present till GPS Khairwala School. From there, a 4.2 km long recently built single lane road is present. The total length of this alignment is approx. 72 km, with 27.2 km paved section needing geometric improvements with

localized resurfacing & 44.8 km section requiring construction of complete road structure.

The proposed alignment option provides a direct connection to the Nankana Sahib Interchange at Motorway M-3 and access to Lahore at Lahore-Jaranwala Road. At Adda Faridabad, the project road crosses Jaranwala-Syed Wala Road giving the project road access to Jaranwala Interchange at M-3 in the west and to Okara in the south. At the end of the alignment, the project road is connected with Jhamra Road on Chak 595 GB, giving the project road access to Faisalabad in the west.

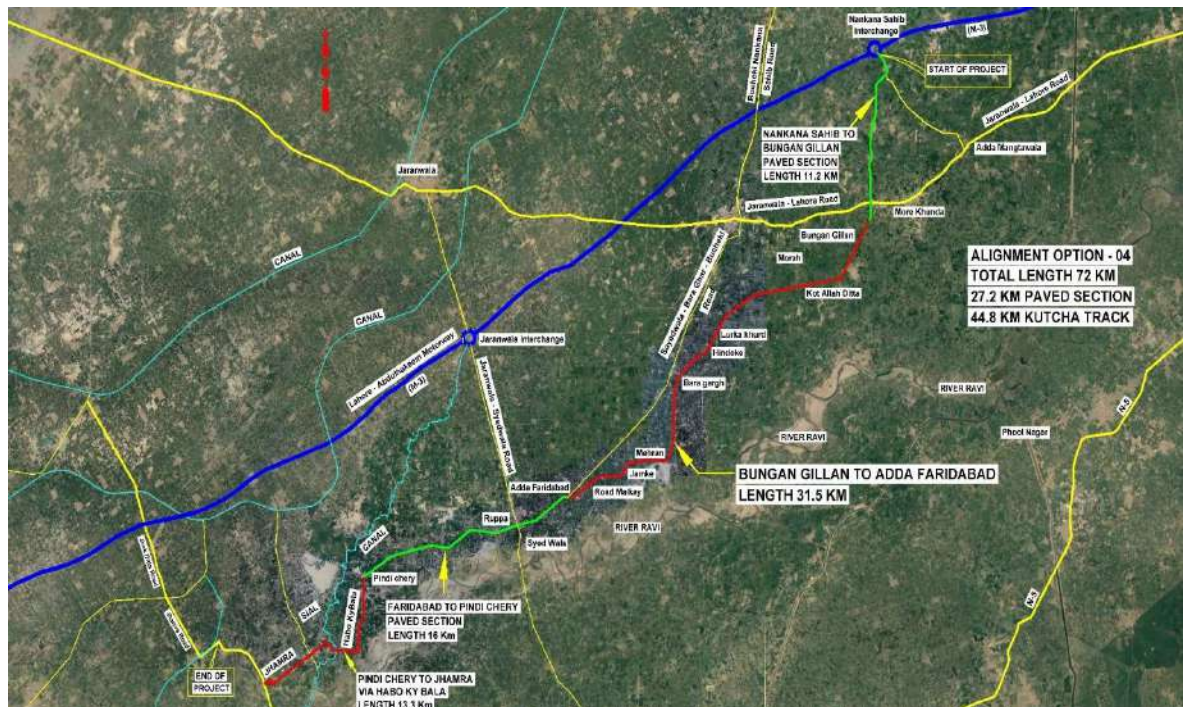


Figure 3.4: Map of Alignment Option IV

3.3.7 Consultants' Recommendation

Considering advantages/disadvantages of above four proposed options for alignment, the Consultants recommend Option III because:

- It is away from populated area
- It provides more connectivity at major intersections & nearby road network.
- Its estimated construction cost is lesser than that of other alignment options

3.4 Location of the Project Area

The proposed project site is administratively located in Nankana Sahib District. The proposed project includes construction of road from More Khunda to Habo by Bala District Nankana Sahib. The geographical coordinates at starting point of the road (Adda Mangtanwala) are N 31.35041 E 73.83725 whereas geographical coordinates of the end point of the road (Habo Ky Bala) are N 31.1066 E 73.38274. The total length of the proposed alignment is 60 Km. **Figure 3.5** shows the location map of the proposed project Site.

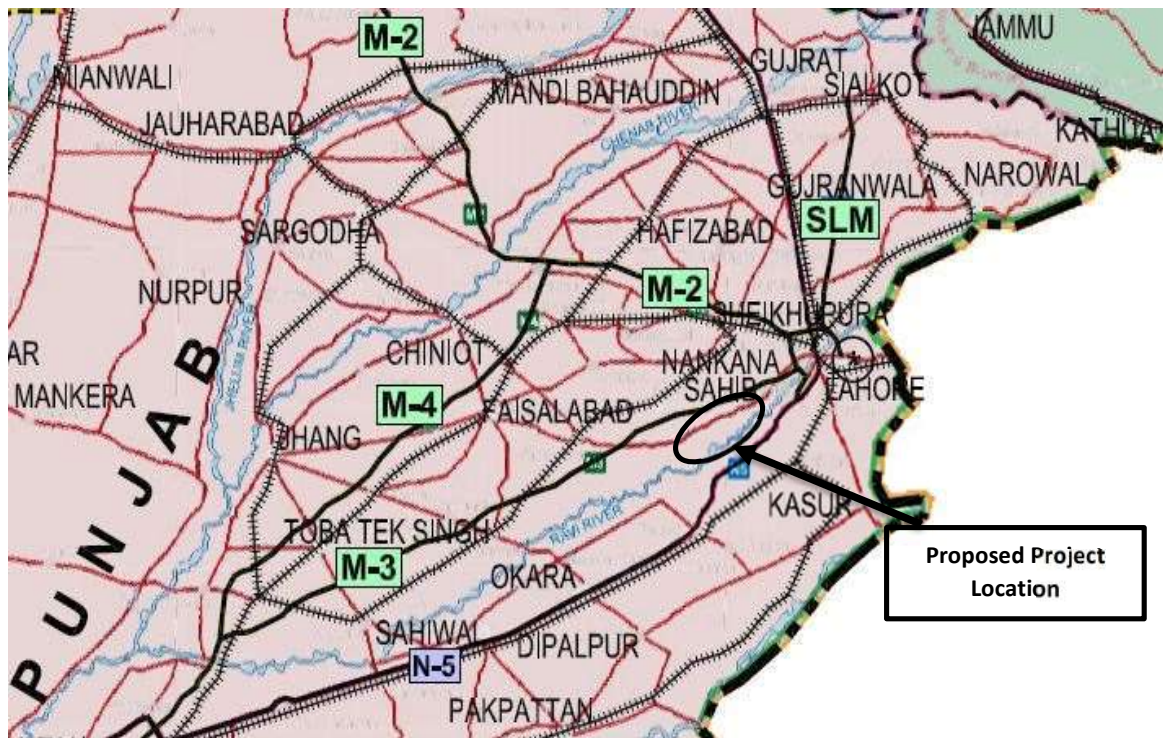


Figure 3.5 Location Map of the proposed Project

3.5 Vegetation Features

As climate of Nankana Sahib is semi-arid and subtropical, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per phyto-geographical classification of the area.

The proposed project will require acquisition of agricultural land for the construction of connecting roads. The present vegetation features of the project site is agriculture fields which will be cleared before construction of roads. Detailed ecological features of the site are discussed in Section-4.

3.6 Project Administrative Jurisdiction

The proposed project lies in the Nankana Sahib District in Punjab Province. The project site falls in administrative jurisdictions of the Nankana Sahib.

3.7 Road Access

The project can be accessed from Lahore-Jaranwala Road & Jaranwala-Mangtawala Road. It can also be accessed from Jaranwala- Seyedwala Road.

3.8 Government Approvals

It is 60 km long road project which involves the interaction with other government agencies/departments at planning as well as construction stages. The approval from following agencies/departments is needed for the following:

a. Deputy Commissioner

The acquisition of the land for this project is to be done through Deputy Commissioner of the respective districts under Land Acquisition Act 1894, Land Acquisition Rules 1983 and other prevalent rules and regulations.

b. Environmental Protection Department

Environmental approval under section 12 of Pakistan Environmental Protection Act 1997 (amended in 2012) and IEE/EIA Regulations 2000 is required from EPA Punjab.

c. WAPDA

This project will involve relocation of the electricity transmission lines for which Lahore Electric Supply Company (LESCO) is required to issue the necessary approvals.

d. PTCL

This project will involve relocation of the telecom transmission lines for which PTCL is required to issue the necessary approvals.

e. Forest Department

This project will involve in cutting of trees for which Forest Department is required to issue the necessary approvals.

f. Sui Northern Gas (Pvt.) Ltd. (SNGPL)

This project will involve relocation of the gas pipelines for which SNGPL is required to issue the necessary approvals.

3.9 Project Implementation Schedule

The project is expected to be completed within Eighteen (18) months. Project Schedule is shown in **Figure 3.6**.

3.10 Cost of the Project

The estimated capital cost of the proposed project is Rs. 5.680 billion.

3.11 Economic Benefits of the Project

Economic benefits of the project are summarized below:

Economic Internal Rate of Return :	17.61%
Benefit Cost Ratio :	1.51
Net Present Worth :	625.48 Million

3.12 Land Acquisition

The proposed project will require acquisition of agricultural land for the construction of connecting roads. The details for the land acquisition areas and utilities prepared based on the proposed alignment are attached as **Annexure VI**.

3.13 Restoration & Rehabilitation Plans

One of the major impacts of the project arises out of the acquisition of land from the land owners and the resulting displacement of their families and disturbances in the livelihoods of the affected persons (AP) in the project area. Affected persons (AP) will be compensated according to land use i.e. agriculture land will be paid according to respective schedule of rates while built up area will be compensated accordingly. Utilities which will be affected during construction will be restored to their original state. The said impact is negative and permanent and its mitigation measures are explained in Section-6 in detail.

3.14 Components of the Project

The various project components include construction of road from More Khunda to Habo by Bala District Nankana Sahib. **Figure 3.7** shows the typical cross-sectional plan of the proposed project.

The components of the proposed project are as follows:

3.14.1 Geometrics

No. of lanes	: Two lanes either side
Design Speed	: 100 KPH
Carriageway Width	: 7.3m, with either side each lane of 3.65 width
Shoulder cross slope	: 4%
Cross slopes traveled way	: 2%
Fill slopes	: 2:1 Horizontal: Vertical
Design life of road	: 10 years

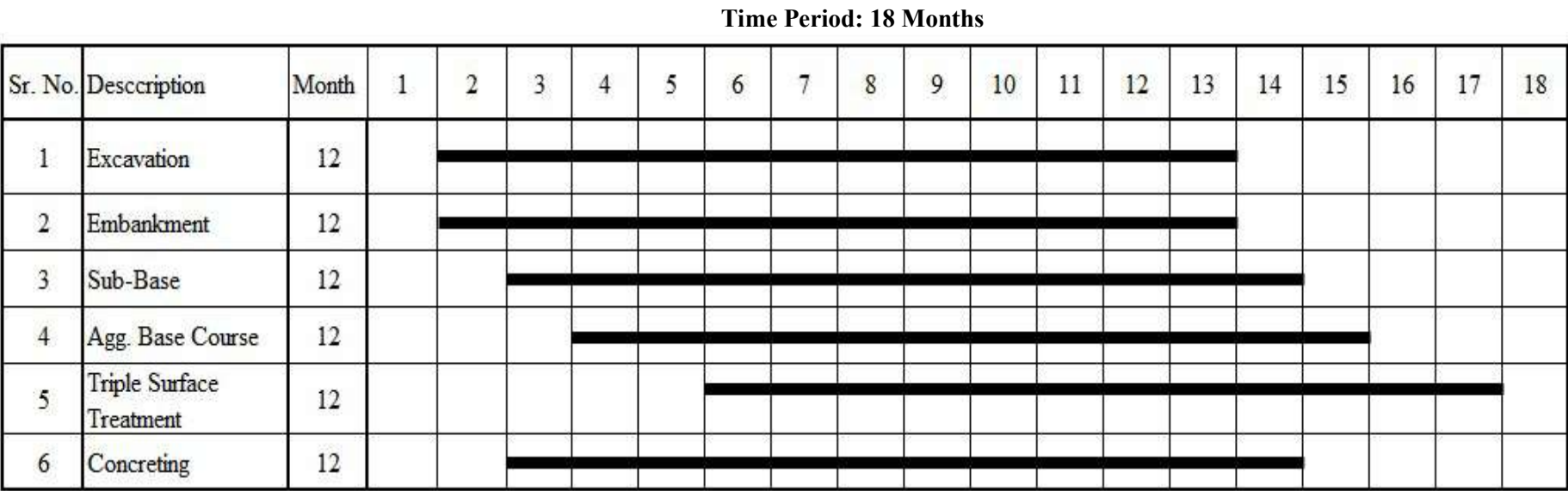


Figure 3.6 Proposed Schedule of Activities of Project

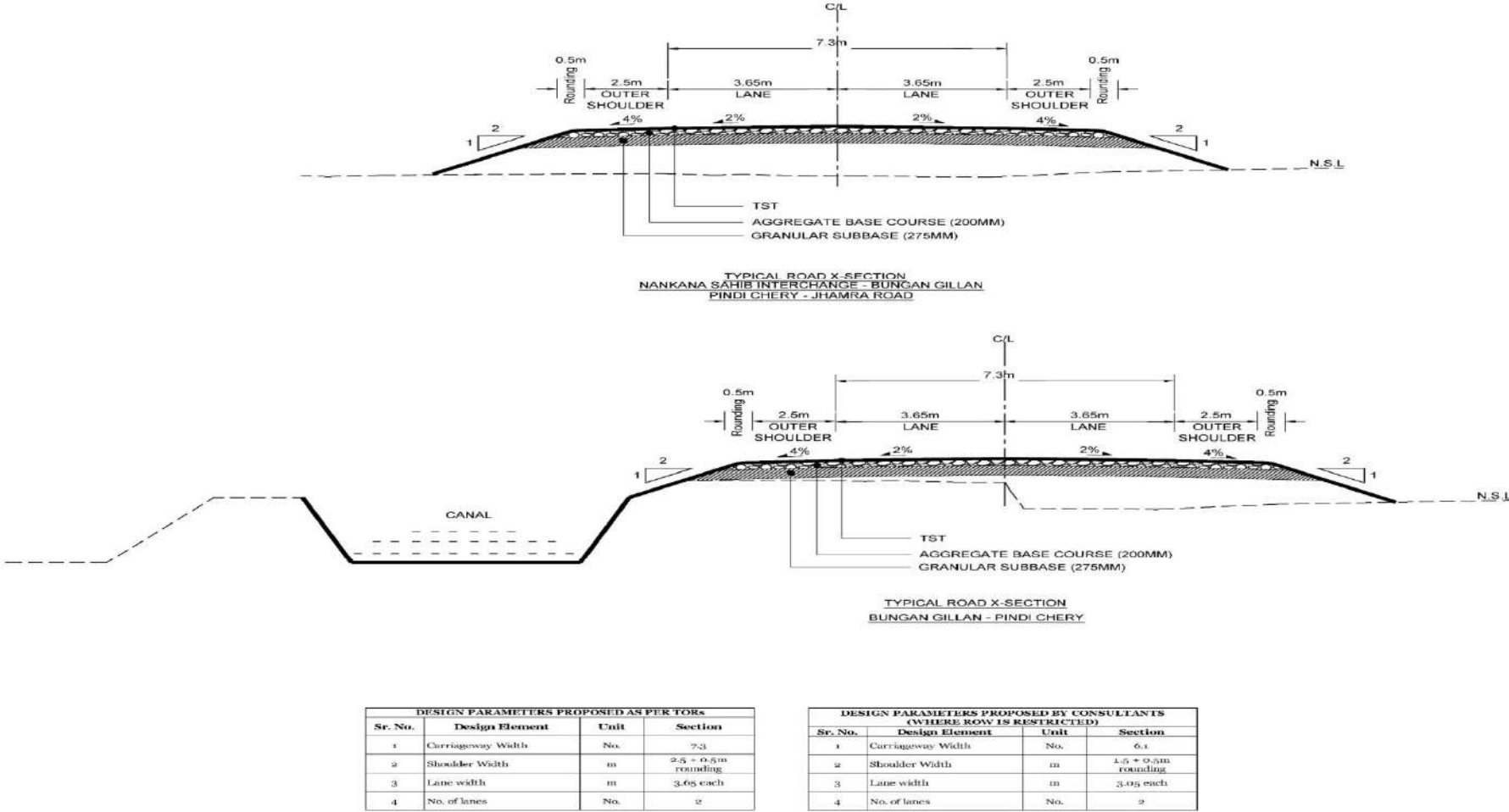


Figure 3.7 Typical Cross-sectional plan of the proposed project

3.14.2 Codes and Standards

The following codes and standards have been considered and adopted for the design of the project road:

- Geometric Design AASHTO
- Material & Testing AASHTO-ASTM
- Pavement Design AASHTO

3.14.3 Civil Works

Design of civil work is as under:

Pavement Design

Design Life: 10 Years

Design CBR: A design CBR value of 6.3% is adopted at sub-grade level in widening / new construction

Tentative Pavement Thickness

Based on 1,658,611 ESALs calculated from the traffic data, the proposed pavement thickness for construction road subject to enforcement of load restrictions is given as:

Option -I: Based on AASHTO Design:

- Asphaltic Wearing Course 50 mm
- Aggregate Base Course 200 mm
- Granular Subbase 350 mm

Option-II: Based on Road Note 31 Design:

- Triple Surface Treatment
- Aggregate Base Course 200 mm
- Granular Subbase 275 mm

Pavement thickness calculated for Shoulders:

- Triple Surface Treatment
- Aggregate Base Course 200 mm
- Granular Subbase 275 mm

3.15 Manpower Requirements

The manpower requirement during construction of the project will be Eighty (80) including managerial staff, skilled and unskilled labour which will be arranged by Engineering Procurement Construction (EPC) Contractor.

3.16 Traffic Management Plan

Road will be constructed in various sections and stages and there will be no blockage of road for locals. However, alternate routes shall be provided along the road for locals by the proponent where necessary.

Small to medium size population centers in the vicinity of the proposed alignment may face problem due to movement of vehicles carrying construction materials. The increased traffic load may cause further deterioration of the existing condition of the road. The movement of vehicles along the haulage routes may cause soil compaction and alteration of percolation, vegetation pattern and damage to properties and utilities. The Traffic Management plan is attached in Annex- IX.

3.17 Water Consumption

Calculation for Water Consumption

Water Requirement = 180 L/day/Capta

Total Water Requirement = No. of persons X 180 L/day

As no of persons required for project are 80

So, Total Water Requirement = 80 X 180 L/day

= 14,400 L/day

The water consumption during the construction phase of the project is estimated to be **14,400 Liter/day**. A water balance sheet showing hierarchy of total water requirement is shown in **Figure 3.8**

3.18 Waste Water Generation

Wastewater Generation Rate = Total Water Consumption X 0.8

$$= 14,400 \times 0.8$$

Wastewater Generation Rate = 11,520 L/day

The waste water generation is estimated to be **11,520 Liter/day** during the construction phase of the project. Portable toilets with septic tanks will be proposed as various and temporary labor camps will be established as per requirement. The design of septic tank is shown in **Figure 3.9**.

3.19 Solid Waste Generation

The solid waste generation comprises of two parts: labor and raw materials.

For calculation of labors

$$= \text{No of persons} \times 0.5 \text{ Kg/day/Capta}$$

$$= 80 \times 0.5$$

$$= 40 \text{ Kg/day}$$

For calculation of raw materials please find in attached Annex-**VII**

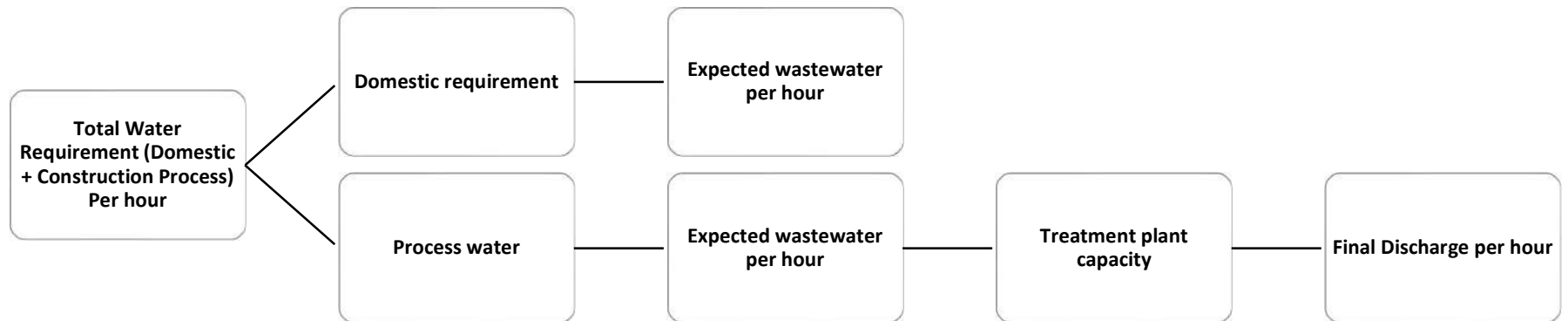


Figure 3.8 Water Balance Sheet

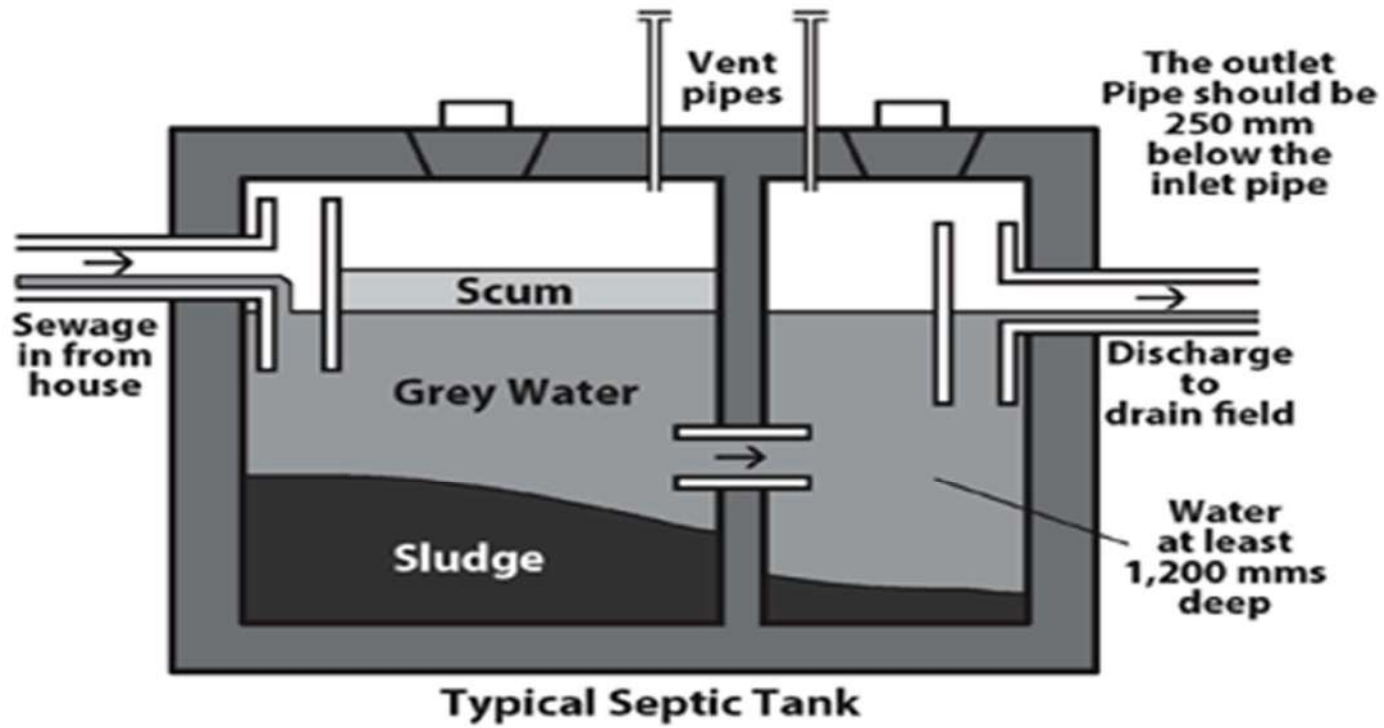


Figure 3.9 Septic Tank

3.20 Energy Sources

Currently, the project site and surrounding areas face an issue with the electric power supply as there is no source of hydropower and other energy sources located in major towns/villages. Other energy sources in the Project area are kerosene and LPG, obtained from Petrol stations and LPG dealers in the district.

3.21 Construction Materials

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

3.22 Construction Camps

Camp sites will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. Final locations will be selected by the contractor in consent with supervision consultant after approval from NHA.

3.23 Expected Equipment's for Construction

The list of the machinery and the equipment expected to be used for the proposed project is provided in **Table 3.4**.

Table 3.4 Machinery and Equipment Requirement for the Proposed Project

Type of Machinery and Equipment	Type of Machinery and Equipment
Dump Truck	Self-Propelled Pneumatic Roller
Front End Loader	Asphalt Distributor
Dozer	Batching Plant
Grader	Concrete Transit Truck
Vibratory Roller	Concrete Pump
Water Tankers	Excavator
Aggregate Spreader	Water Pumps
Three Wheel Rollers	Cranes
Tandem Roller	Vibrators

Asphalt Plant	Generators
Paver	-

SECTION-4

ENVIRONMENTAL BASELINE PROFILE

4.0 General

The environmental baseline study is intended to establish a data base against which potential project impacts can be predicted and managed later. The EIA of the proposed project “Feasibility Studies and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib (56 km)” covers a comprehensive description of the project area; including regional resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the proposed project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Further, interviews were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project. Various Government Departments were also visited for the collection of relevant data and obtaining their views on the proposed project.

4.1 Physical Resources

4.1.1 Topography

The project site is located within an alluvial plain, naturally flat and level having no hills and valleys. The general height of the area is approximately 187 meters above the Mean Sea Level (MSL). **Figure 4.1** represents the topography of the Project area.

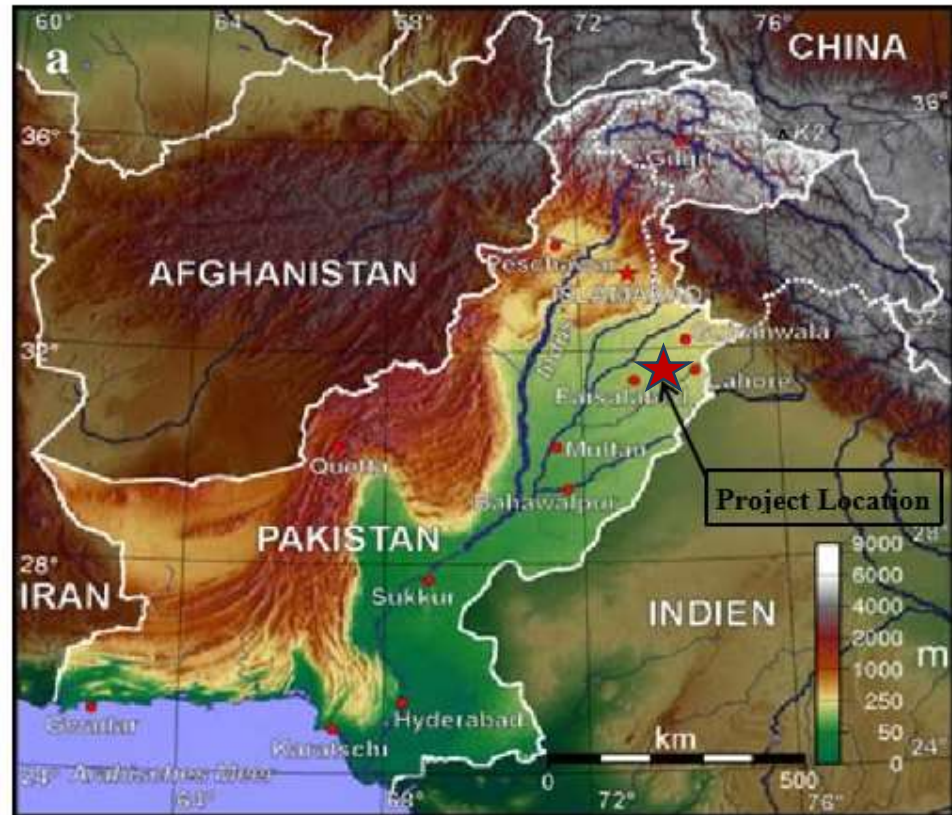


Figure 4.1 Topography of the Study Area

4.1.2 Regional Geology

The soil deposits at the project site belong to Chung Fun formation indicating the last glacial cycle. It was followed by the period of melting of glaciers, resulting in deposition of clay, silt and sand deposits in late Pleistocene to recent. With gradual withdrawal of the sea during the late tertiary time, shallow water and possibly deltaic deposits were laid down. It became a vast flood plain on which debris of numerous streams have mingled to load it with huge thickness of alluvial material derived from the Himalaya. Though, there is no evidence of any glaciations in the area, the series of great climatic changes during the Pleistocene period had impact on the sedimentation in physiography of this region.

The project area is located in Rachna Doab and trends south-western to a topographic relief difference of 69.2 m. The average slope is 0.3 m/Km. Due to

relatively flat topography surface and sub-surface drainage conditions in the project area are poor which in the past gave rise to water table due to increased recharge from the unlined irrigation channels and deep percolation from agriculture fields. In order to control the rise in water table, a network of drainage channels have been constructed to drain the area during monsoon. These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with interbeds of clay and layers or lenses of sand. The Project Area does not have any valuable minerals. Scientific in depth, investigations have failed to discover any minerals till to- date

These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with interbeds of clay and layers or lenses of sand. Project site is located in meander belt deposits.

4.1.3 Soil

The soil in the Project Area is cohesion less and is of alluvial type deposited by Ravi River. Various soil layers below the ground level includes: silt, silty clay, silty sand, poorly graded sand with silt, lean clay etc. Soil Map of the Project Area is given in **Figure 4.2**.

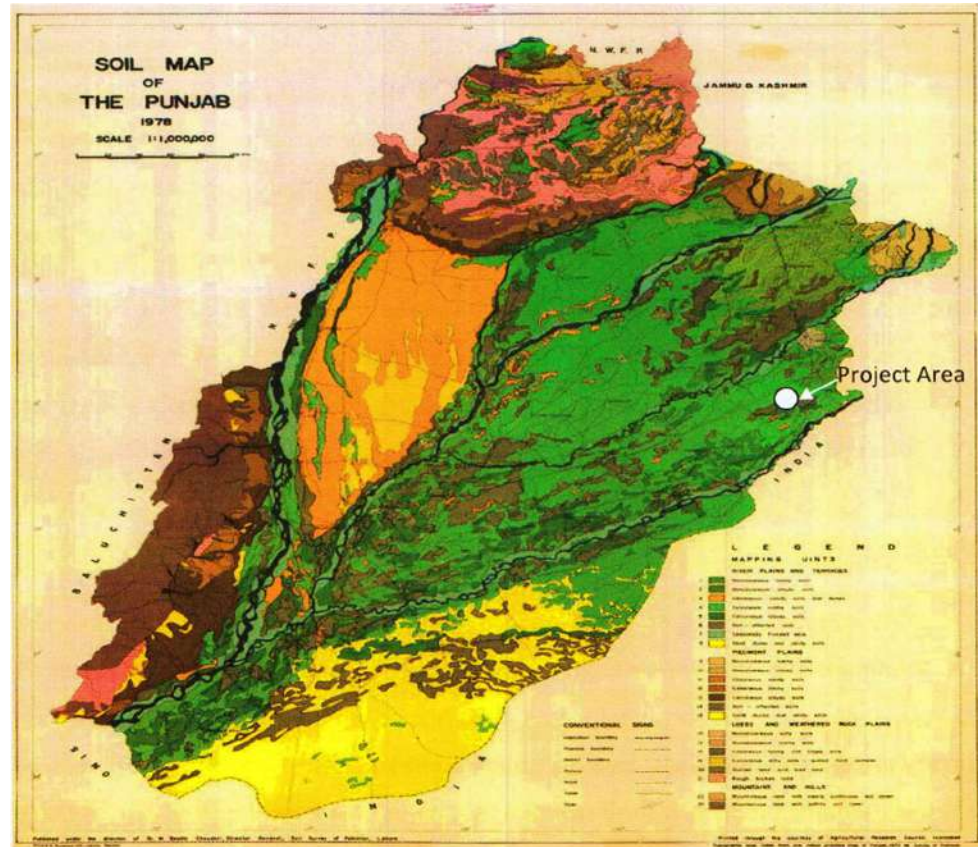


Figure 4.2 Soil Map of the Study area

4.1.4 Climate and Meteorology

Seasonal climatic conditions must be considered for the design and execution of the Project. The climate including air, temperature, precipitation and humidity is an influencing factor, affecting the construction and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes and precipitation must be considered. The Project area has extreme climate: it has hot summer and cold winters. Nankana Sahib district belongs to the Rechna Doab area, which is a subtropical, continental lowland designated as a semi-arid area. The climate is characterized by large seasonal fluctuations of temperature and rainfall. Summers are long and hot, usually lasting from April through September with maximum temperatures ranging from 21 °C to 49 °C. The winter season lasts from December through February, with maximum temperature ranging from 21 °C to 27 °C during the day and sometimes falling below zero at night.

The annual average rainfall in the district is about 650 mm. **Table 4.1** summarizes month-wise temperature, precipitation and wind speed and while **Figure 4.3** and **4.4** show the graphical presentation of precipitation and temperature in the study area.

Table 4.1 Meteorological data of the project area

Month	Temperature (°C)			Precipitation (mm)	Wind Speed (Knots)
	Avg. High	Avg. Low	Daily Mean		
January	19.4	4.4	11.9	14	5
February	22.4	7.4	14.9	15	6
March	27.3	12.6	19.9	21	6
April	33.8	18.1	25.9	14	7
May	38.9	23.3	31.1	13	7
June	40.7	27.4	34.0	26	7
July	37.3	27.4	32.3	102	8
August	36.3	26.9	31.6	91	7
September	36.0	24.2	30.1	33	7
October	33.6	17.6	25.6	6	6
November	27.5	10.4	18.9	3	4
December	21.8	5.7	13.3	8	4
Yearly	31.25 (Avg)	17.12 (Avg)	24.16 (Avg)	346	6 (Avg)

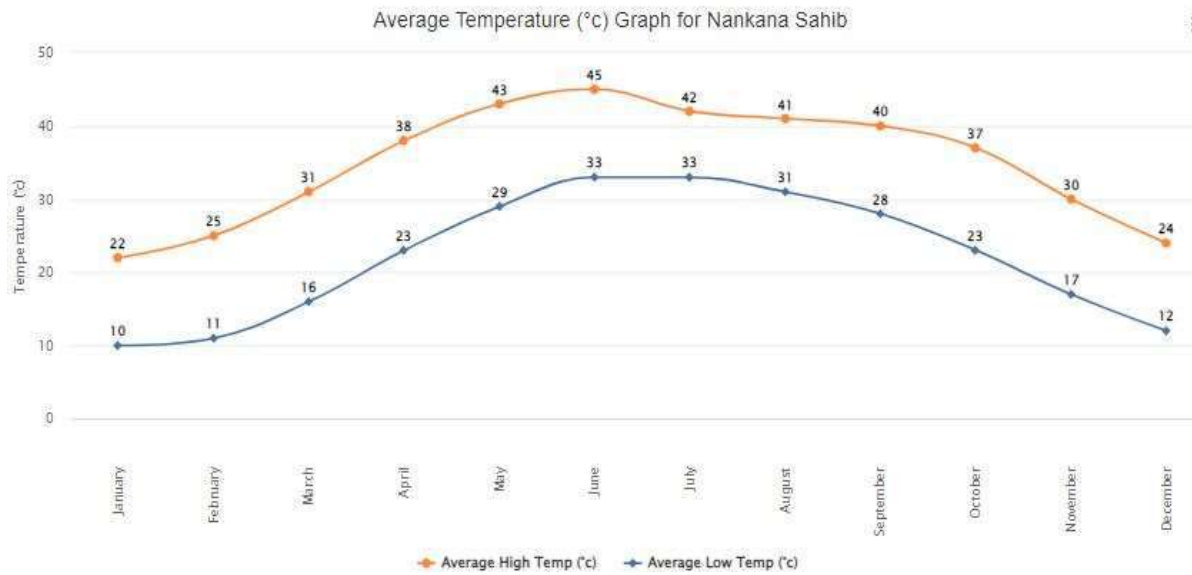


Figure 4.3 Maximum and Minimum Temperature in the Project area

Table 4.2 Average Monthly Precipitation

Month	Rainy days	Average Rainfall
January	4	17
February	5	19
March	6	28
April	6	14
May	5	16
June	5	28
July	11	154
August	10	125
September	5	54
October	2	8
November	2	5
December	3	11
Total	64	479

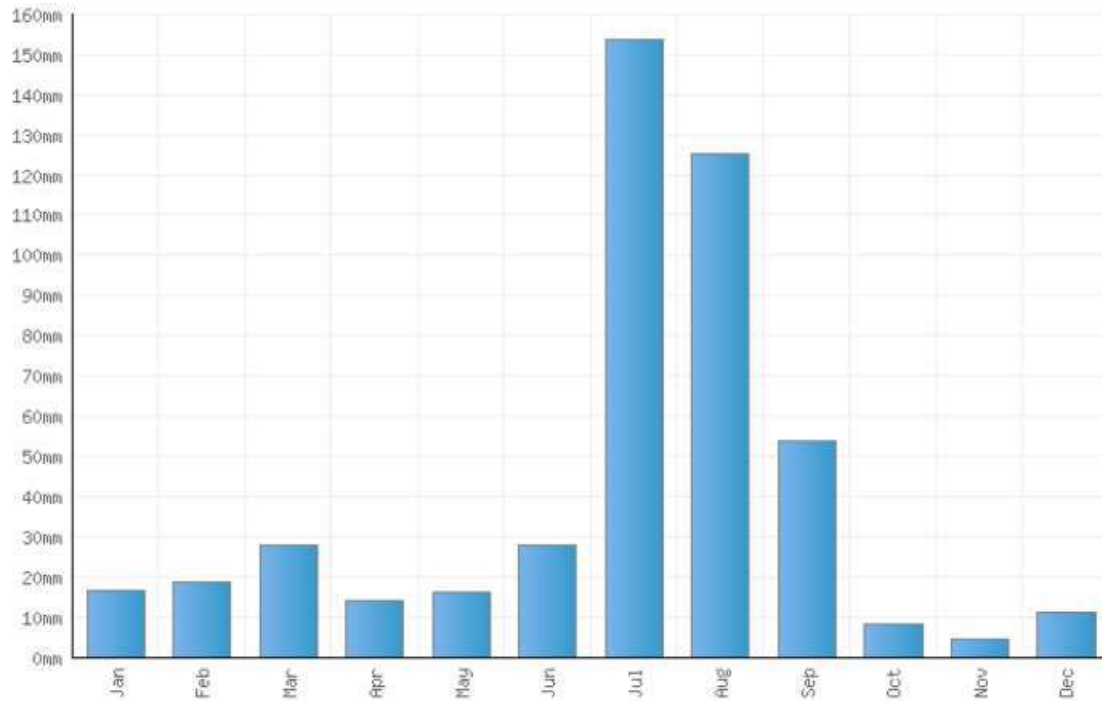


Figure 4.4 Mean Rainfall in the Project Area

Based on climatic elements, five seasons are recognized in the project area:

i). Pre-monsoon Season

Pre-monsoon refers to the period from April to June prior to the setting in of the monsoon. This is the hottest and the driest season, with persistent dry and hot winds. Day time temperature rises to 40.4°C. The water table falls to the maximum depth.

ii). Monsoon Season

Monsoon is the main rainy period, which starts at the beginning of July, reaches its climax in August and gradually, subsides in September. High intensity Rainfall causes soil erosion which is a function of erosivity and erodibility. The cool monsoon winds followed by heavy showers lower the temperature to great extent. The part of rain percolates into the soil and is conserved in the subsoil and part adds to the groundwater. The conserved moisture in the soils is generally sufficient to rejuvenate the vegetation. All plants grow rapidly and nature towards the end of the season. With the start of monsoon season, the rivers flow at their peak level. The groundwater level

is improved toward the end of the season in September and October.

iii). Post-monsoon Season

Post monsoon season refers to autumn (October-November). The temperature starts falling but the extreme aridity prevents plants to flower early and set seed toward mid-seasons. Groundwater level rises as a result of infiltration from rainfall.

iv). Winter Season

Winter refers to the period from December to January. The lowest temperatures ($< 2^{\circ}\text{C}$) and cold winds characterize this season. The plants become dormant and most of them dry out. Most of the trees shed their leaves and few remain green or partly green. Sometimes this season becomes severe due to cold Siberian winds. Groundwater level declines in this season due to low flows in the rivers and no or little rains which usually fall in light showers causing little soil erosion.

v). Spring Season

Spring refers to the period from February to March. Temperatures become pleasant. The mean maximum temperature is 27°C with the highest precipitation of 41.2 mm and relative humidity of 57.6 percent. Some light showers of rain may also fall without generating run off. The vegetation sprouts again because of conserved moisture from winter and spring rains, if any. The water table starts falling.

4.1.5 Environmental Parameters for Monitoring

The environmental parameters like air quality, noise level surface water, wastewater and ground water were monitored at the Proposed Project Site on 17th and 18th August, 2023 for analyzing the quality of air, ground water, surface water, wastewater and level of noise at the Proposed Site, for establishing the baseline profile of the area.

Table 4.3 represents the coordinates and monitoring points of environmental parameters taken at the Proposed Project Site.

Table 4.3 Monitoring Location for Ambient Air, Noise Monitoring & Ground water

Sr. No.	Monitoring	Monitoring Location	GPS Coordinates	Date
1.	Ambient Air Quality Monitoring	Feasibility Study and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib.	31°10'35.25"N 73°36'47.14"E	17-08-2023 to 18-08- 2023
2.	Ambient Noise Quality Monitoring			
3.	Ground water Quality Analysis			

4.1.1.1 Air Quality

Nankana Sahib district is mostly rural with only 18.1% of its population living in urban areas (2017 Census). There is very little industrialization, due to which air quality is generally good. The only source of air pollution in the district is dust and emissions from vehicular traffic.

The sampling procedures were based on the methods equivalent of United State Environmental Protection Agency USEPA.

- The air quality monitoring was carried out at reference points with the help of Mobile Air Quality Monitoring Equipment. The Analyzers and technique of monitoring are equivalent with the requirement of USEPA and EU Standards.
- The exact sampling site was finalized during the site visit with consent of client.
- The ambient air quality was monitored by online analyzers continuously for 24 hours at individual sampling point.
- Dust monitoring which includes Particulate Matter (PM10 & PM2.5) was monitored using USEPA Equivalent Continuous Monitors.

In this section results of Ambient Air Monitoring (O3, CO, HF, HNO3, NO, NO2, SO2, TSP, PM10 & PM2.5) measured at identified project's site to get an overview of the ambient air quality are discussed. The ambient air quality results at specified location are as following:

As per Punjab Environmental Quality Standards, all values were monitored on 17-08-2023 to 18-08-2023 during 24-hours continuous analysis except Carbon Monoxide, which was analyzed for 08 hours.

The detailed air pollutant data has been given in **Annexure-I**, while the average concentrations of the air pollutants are given in **Table 4.4**. **Figure 4.5** shows, a view and sampling point of ambient air quality monitoring in the project area.

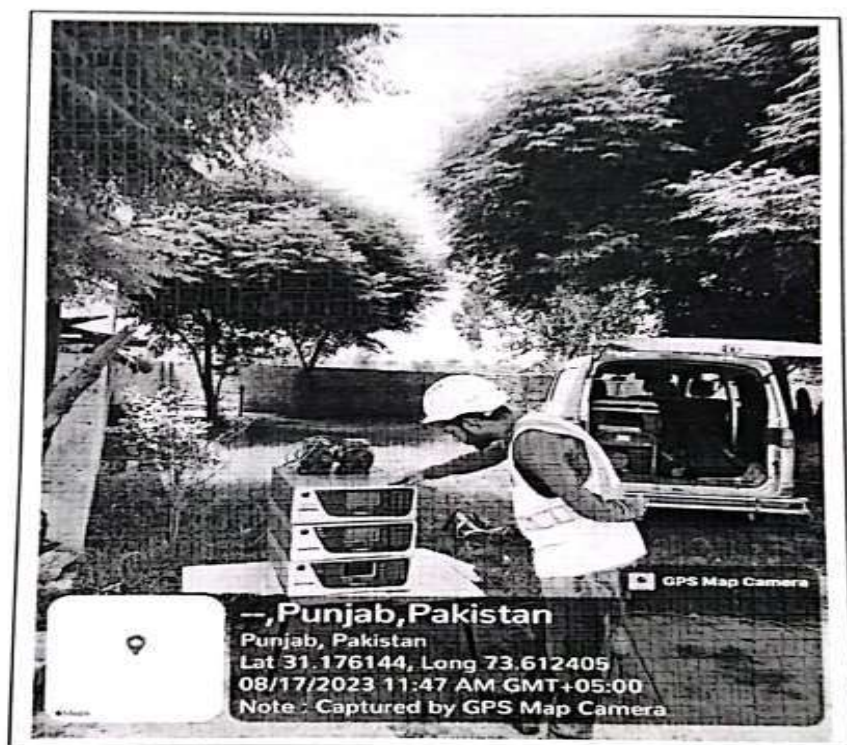


Figure 4.5 A view of ambient air quality monitoring in the project area

Table 4.4 Ambient Air Quality Monitoring Results

Parameter	Unit	Results
Air Temperature	°C	38
Air Humidity	% rH	44

Parameter	Unit	Monitoring Duration	PEQS	Results
Ozone	$\mu\text{g}/\text{m}^3$	01 Hours	130	8
Carbon Monoxide (CO)	mg/m^3	08 Hours	5	1.89
Nitrogen Oxide (NO)	$\mu\text{g}/\text{m}^3$	24 Hours	40	25.10
Nitrogen Dioxide (NO ₂)	$\mu\text{g}/\text{m}^3$	24 Hours	80	61.66
Sulfur Dioxide (SO ₂)	$\mu\text{g}/\text{m}^3$	24 Hours	120	30.57
Particulate Matter (PM _{2.5})	$\mu\text{g}/\text{m}^3$	24 Hours	35	32.33
Particulate Matter (PM ₁₀)	$\mu\text{g}/\text{m}^3$	24 Hours	150	123.59

*Average of CO for 08 hours

Ambient Air Quality was monitored at selected locations and results observed were within limits set in Punjab Environmental Quality Standards.

4.1.1.2 Noise level

A set of three readings was collected from identified point as average of which is reported, for noise measurement sound level meter was utilized, having level range from 15 dB to 235dB with minimum detection limit of 0.1 dB. Noise was monitored instantaneously at four boundaries and in the mid-section of the room and value was averaged to get representative reading. Class 01 Sound Level Meter with A weighting was utilized.

The hourly and average noise level results at specified location during day & night time are stated as follows in **Table 4.5**. The detailed noise level monitored results are attached as **Annexure II** respectively.

Table 4.5 Hourly and Average Values of 24 Hours Noise Monitoring

Sr. No	Time	Unit	Average Value	PEQS Standard for Commercial Area
1	11:00 AM	dB(A)	53.5	65
2	12:00 PM	dB(A)	53.25	65
3	1:00 PM	dB(A)	56	65
4	2:00 PM	dB(A)	59.5	65
5	3:00 PM	dB(A)	55.7	65
6	4:00 PM	dB(A)	56.6	65
7	5:00 PM	dB(A)	56.9	65
8	6:00 PM	dB(A)	63.9	65
9	7:00 PM	dB(A)	60.1	65
10	8:00 PM	dB(A)	61	65
11	9:00 PM	dB(A)	56.6	65
12	10:00 PM	dB(A)	58.5	55
13	11:00 PM	dB(A)	56	55
14	12:00 AM	dB(A)	54	55
15	1:00 AM	dB(A)	52.2	55
16	2:00 AM	dB(A)	51	55
17	3:00 AM	dB(A)	50.1	55
18	4:00 AM	dB(A)	49.5	55

19	5:00 AM	dB(A)	51	55
20	6:00 AM	dB(A)	54.3	65
21	7:00 AM	dB(A)	55.8	65
22	8:00 AM	dB(A)	57.8	65
23	9:00 AM	dB(A)	60	65
24	10:00 AM	dB(A)	59	65
Average Day Time			57.49	65

24-hours Noise Monitoring was conducted at selected site and compared with Punjab Environmental Quality Standards. Noise levels measured at selected site at were within compliance

4.1.1.3 Ground Water Sampling

Ground water samples for chemical analysis was collected in new HDPE / Teflon Sampling containers. Separate sample was collected for microbiological aliquot, Heavy metal analysis sample aliquot and inorganic analysis sample aliquot. Major physical parameters were analyzed onsite such as pH, Turbidity, Color.

Microbiological Sampling was performed after sterilization of water source as per WHO & USEPA guidelines and sample was collected in Sterilized glass containers. Sample was transported using Ice boxes with temperature under 4oC to maintain sample integrity. Sample Chain of custody was maintained from sampling location to Laboratory to ensure sample integrity. Analysis was performed as per standard methods. **Table 4.6** shows the results of groundwater analysis. **Figure 4.6** represents sampling location point of ground water monitoring in the project area. The detailed water sample monitored results are attached as **Annexure III** respectively.



Figure 4.6 A General View of Ground Water Sample Collection

Table 4.6 Analysis Results of Ground Water

Sr. No.	Parameter	Method	Unit	MDL	PEQS Limit	Results
1.	Taste	Sensory Evaluation	-	-	Not objectionable	Acceptable
2.	Odor	Sensory Evaluation	-	-	Not objectionable	Acceptable
3.	Color	APHA 2120 C	Pt/Co	. 5	. 15	5
4.	Turbidity	APHA 2130 B	NTU	. 5	< 5	< 5
5.	pH Value @ 25 °C	APHA 4500 H+B	pH Unit	0.01	6.5-8.5	7.53
6.	Conductivity	APHA 2510 B	uS/cm	-	N.S	484
7.	Total Dissolved Solids (TDS)	APHA 2540 C	mg/L	5	< 1000	260
8.	Fluoride	APHA 4500 D	mg/L	0.02	≤ 1.5	0.1
9.	Nitrates NO3	APHA 4500 NO3-E	mg/L	0.04	≤ 50	0.29
10.	Nitrite, NO2	APHA 4500 NO2-B	mg/L	0.001	≤ 3	0.005
11.	Residual Chlorine	APHA 4500 Cl G	mg/L	0.01	N.S	N.D
12.	Cyanide	APHA 4500 CN-E	mg/L	0.002	≤ 0.05	N.D

13.	Total Hardness (as CaCO ₃)	APHA 2340 C	mg/L	4	< 500	229
14.	Chloride	APHA 4500 Cl B	mg/L	1	< 250	7
15.	Phenolic Compound	APHA 5330 D	mg/L	0.05	N.S	N.D
16.	Aluminum (Al)	APHA 3111 / 3120 B	mg/L	0.1	≤ 0.2	N.D
17.	Antimony (Sb)	APHA 3111 / 3120 B	mg/L	0.005	≤ 0.005	N.D
18.	Arsenic (As)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
19.	Barium (Ba)	APHA 3111 / 3120 B	mg/L	0.1	0.7	N.D
20.	Boron (B)	APHA 3111 / 3120 B	mg/L	0.1	0.3	N.D
21.	Cadmium (Cd)	APHA 3111 / 3120 B	mg/L	0.003	0.01	N.D
22.	Chromium (Cr)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
23.	Copper (Cu)	APHA 3111 / 3120 B	mg/L	0.5	2	N.D
24.	Iron (Fe)	APHA 3111 / 3120 B	mg/L	0.1	8	N.D
25.	Lead (Pb)	APHA 3111 / 3120 B	mg/L	0.01	. 0.05	N.D
26.	Manganese (Mn)	APHA 3111 / 3120 B	mg/L	0.1	. 0.5	N.D
27.	Mercury (Hg)	APHA 3112 / 3120 B	mg/L	0.001	. 0.001	N.D
28.	Nickel (Ni)	APHA 3111 / 3120 B	mg/L	0.01	. 0.02	N.D
29.	Zinc (Zn)	APHA 3111 / 3120 B	mg/L	0.1	5	N.D
30.	Selenium (Se)	APHA 3111 / 3120 B	mg/L	0.005	0.01	N.D
31.	Sodium (Na)	APHA 3111 / 3120 B	mg/L	1	N.S	36.5
32.	Potassium (K)	APHA 3111 / 3120 B	mg/L	1	N.S	2.1
33.	Total Coliform	APHA 9222 B	Cfu/100ml	-	Absent	Absent
34.	Fecal E. Coli	APHA 9222 D	Cfu/100ml	-	Absent	Absent
35.	Fecal Streptococci / Enterococci	APHA 9230 C	Cfu/100ml	-	Absent	Absent

Comparison of the results obtained showed that Ground Water obtained from selected site at district Nankana sahib had values within permissible limits as per Punjab Environmental Quality Standards. Water can vary greatly in quality depending upon type and quantity of dissolved salts. Salts are present in water in relatively small amounts. These salts originate from dissolution of weathering of the rocks and soil, including dissolution of lime, gypsum and other slowly dissolved soil minerals. The suitability of water is determined not only by the total amount of salts present but also by the kind of salts.

Water quality or suitability for use is judged on the severity of problems that can be expected to develop during long-term use. The problems that result vary in both kind and degree and are modified by soil, climate and crop, as well as by the skill and knowledge of water user. The soil problems most commonly encountered and used as a basis to evaluate water quality relate to salinity, water infiltration rate, specific ion toxicity and a group of other miscellaneous problems. Among analysis of the heavy metals, all metals were also within limits defined by PEQS.

4.1.6 Seismology

According to Seismic Zoning Map of Pakistan included in the Pakistan Building Code Seismic Provisions (2007), the project site falls in Zone 2A (Lower limit of moderate damage). Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16g.

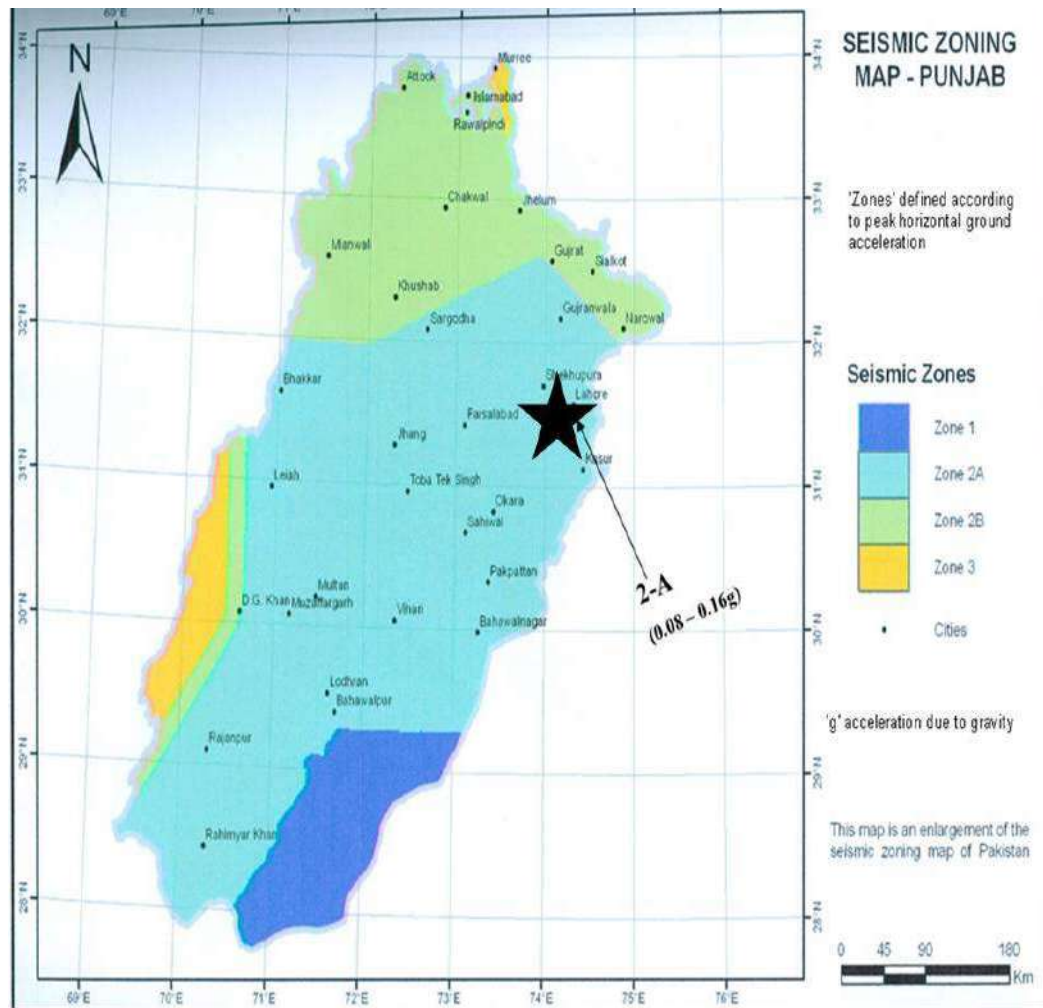


Figure 4.7: Seismic Zoning Map of Punjab

4.1.7 Solid Waste

The concerned district waste management company will be responsible in the proposed project site for the management of solid waste by ensuring efficient collection, transportation, recovery, treatment and disposal of waste generated at site.

4.1.8 Land use Pattern

The land use along the road is lush green agriculture farms where rice, wheat, fodder and fruits are grown. Construction of road will require acquisition of the land on the alignment of the road. The major present land use of the project site is agricultural land, some area of mango farms, private property etc.

4.2 Ecological Resources

As climate of Nankana Sahib is semi-arid and subtropical, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per phyto-geographical classification' of the area. The proposed project will require acquisition of agricultural land for the construction of connecting roads. The present vegetation features of the project site is agriculture fields which will be cleared before construction of roads.

4.2.1 Flora

a) Natural Shrubs and Herb

The project area has bushes and trees grown on the boundaries of the agriculture fields and in the environs of the tube wells, the place which also serves as a resting place for the farmers. Due to presence of canals existing in the project area, linear plantation including road side and canal side plantation are commonly seen. Moreover, native plants and animals can be seen along the highway also.

The most common flora of the district is the karir (*Capparis aphylla*), jhand (*Prosopis spicigera*), vann (*Salvadora obeoides*), shisham (*Dalbergia sissoo*), kikar (*Acacia Arabica*), peepal (*Ficus religiosa*), bohar (*Ficus indica*), poplar (*Populus*), shirin (*Albizia lebbek*), lana (*Sida rupestris*), lani (*Salsola foetida*), babul (*Acacia nilotica*), semal or silk cotton tree (*Bombax ceiba*), aak (*Calotropis procera*), and ber (*Ziziphus mauritania*). Grasses, and shrubs include dab (*Desmostachya bipinnata*), kai (*Saccharum spontaneum*), kundar (*Typha angustata*), and nar (*Phragmites karka*) as well as shrubs like lai (*Tamarix dioca*), jawanha (*Alhaji maurorum*), water cabbage (*Pistia stratiotes*), water hyacinth (*Eichhornia crassipes*), reed (*Phragmites*), lotus (*Nelumbo nucifera*), Sugar cane (*Saccharum rotundus*), coconut (*Nucifera*), and bulrush (*Typhadomigensis*).

b) Trees

During site visit of the proposed project site, a variety of trees species along the roadsides has been observed. **Table 4.7** shows the tree species found in and around the proposed area including their Local and Botanical names.

Table 4.7 Common Non Fruit Trees (Forest Trees) in the project Area

Sr. No.	Local name	Biological Name
1.	Piloo	Salixtetrasperma
2.	Shahtoot	Morusalba
3.	Shishum	DalbergiaSisoo
4.	Peeples	FicusReligiosa
5.	Lasoor	Cordiaallam
6.	Bohar	Ficusbengalensis
7.	Bohree	Ficus Specie
8.	Dharek	Meliaazedarach
9.	Kikar	Rosales
10.	Mango	Mangiferaindica
11.	Poplar	Populusdeltoides
12.	Jaman	SyzygiumJambulenum
13.	Ber	Ziziphusmauritiana
14.	Phagwara	Ficus palmate
15.	Sharin	Albiziaprocera
16.	Eucalyptus	Eucalyptus
17.	Ber	Zizyphus jujube
18.	Neem	Sapindus
19.	Jand	Broussonetia papyrifera

General view of the floral species present in the project area is shown in **Figure 4.8**.



Figure 4.8 A General view of the Floral Species in the Project Area

4.2.2 Fauna

a) Mammals

Wild boar, cats, rabbit, foxes and jackals are the only wildlife found in the district. Domestic livestock that was observed during field visit include buffalo, cattle, goats, sheep's, and donkeys that are used by the local residents for their living and mobilization purposes.

b) Amphibians

Amphibians frequently seen in and around the project area, especially during rainy season include common Frog (*Rana tigrina*) and common toad.

c) Birds

House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) are the most common sight in the area. In addition, following birds have also been observed in the area as shown in **Table 4.8**.

Table 4.8 Birds of the Project Area

Sr. No.	Common Name	Scientific Name
1	Nightingale	<i>Pycnontus cafer</i>
2	Parrot	<i>Psittacula krameri</i>
3	Pigeon	<i>Columba livia</i>
4	Hoopoe	<i>Upupa epops</i>
5	Koel	<i>Eudynamys scolopacea</i>
6	Black kite	<i>Mivus migrains</i>

d) Reptiles

Lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are observed in the proposed project site.

4.2.3 Wetlands

There are no significant wetlands in the project study area.

4.2.4 Endangered Species

There are no endangered species of flora and fauna in the project study area.

4.2.5 Wildlife Sanctuaries and Game Reserves

No wildlife sanctuary or game reserves are located in the vicinity of the project study area.

4.2.6 Critical Habitats

No wild life sanctuary or game reserve (Critical Habitats) exists near project study area and therefore it can be quantified that proposed project does not affect any critical habitat as no critical habitat is located close to the Project area.

4.3 Cultural Heritage and Community Structure

There are no official heritage sites or historical and archeologically important sites in the project study.

4.4 Socio-Economic Structure

This section deals with the existing social conditions of the proposed project area. During the desk/ office study, available reports/ documents were comprehensively reviewed. Detailed site visits were conducted by the Consultants' EIA team (Male/Female Sociologists and Environmentalists) to appraise the prevailing socio economic conditions and to assess the impacts of construction of road from More Khunda to Habo by Bala. To achieve the project objectives, it is imperative to study the prevailing socio-economic and socio cultural aspects of their livelihoods. During the

field survey, interviews and meetings were conducted with the local residents of the project area, private land & shop owners, shop keepers (renters), pedestrians, traveller's and drivers from More Khunda to Habo by Bala. Observations were made after giving consideration to the desk/ office study results.

4.4.1 Methodology

Data Source

Data collection for socioeconomic study of the proposed project involved socio-economic baseline survey of the proposed project area.

i. Primary Data

Primary data was collected through socio-economic baseline survey. For the selection of respondents simple random sampling technique was adopted and 50 households residing within the project area and in the vicinity of proposed project were selected. After determining sample size, an interview schedule was developed for the collection of baseline data. This interview schedule included the baseline data/ information (i.e. demographic characteristics, livelihoods, economic conditions, quality of life and land acquisition) that is required for establishing the baseline study and was collected during the socio economic baseline survey.

The collected data was analyzed by a software "Statistical Package for Social Sciences" (SPSS), because it has an easier and quicker access to basic functions and also useful to get the actual and accurate results of baseline data.

Spread sheet for baseline data of EIA study was created in SPSS in the form of quantitative data. After entering, checking, sorting, and transforming the data, the basic operation, data analysis was taken place through descriptive analysis by finding out the percentages and the frequencies of the respondent's views in the form of tables and charts/graphs. These percentages, frequencies and charts/graphs of baseline data were automatically generated by this software.

ii. Secondary Data

Secondary data was collected from District Census Report Nankana Sahib 1998 for socio economic baseline survey.

4.4.2 Political and Administrative Setup

The project area falls in Nankana Sahib District. District Co-ordination Officer (DCO) is the highest ranked administrator of the district. For the collection of revenue and administration, the districts are subdivided into Tehsils. Local governments also administer the area through Union Councils and Tehsils. The total area of the district Nankana Sahib is 2,960 square kilometers.

4.4.3 Study Area

The study area falls in Nankana Sahib Tehsil of District Nankana Sahib. According to population census of 2017, Tehsil Nankana Sahib has a population of 1,354,986 persons of which 690,274 are male while 664,558 are female. Out of total population, 81.9% population live in the urban areas and 18.1% live in the rural areas. In 1998, population of Nankana Sahib Tehsil was 1,044,865 with annual growth rate measured 1.4 percent during the 1998-2017.

4.4.4 Demographic Characteristics of the Project Area

The total population of Nankana Sahib district was 1,354,986 as enumerated in March, 2017 with an intercensal percentage increase of 29.6 since March, 1998 when it was 1,044,865 souls. The average annual growth rate was 1.4 percent during this period. The total area of district is 2,216 square kilometers which gives population density of 611.5 per square kilometer observed in 2017.

i. Rural and Urban Distributions

The urban population was 246,053 or 18 percent of the total population of the district which grew at an average rate of 2.35 percent during 1998 – 2017.

ii. Religion

The population of the district is predominantly Muslims i.e. 96.68 percent. while Christians were 2.97% of the population.

iii. Ethnic Structure

The main castes and groups of the Nankana Sahib district are Kharal, Jutt, Arrain, Gujjar and Sikh

iv. Mother Tongue

The mother tongue refers to the language used for communication between parents and their children in any household. Punjabi is the predominant language being spoken by majority (98.8 percent) of the population of the district followed by Urdu, Pushto and Siraki

v. Sex Ratio

Sex ratio, i.e. number of males for every 100 females was 103.87 percent recorded in 2017 Census which had decreased from 107.7 in 1998. The ratio was 107.7 percent in rural and 107.0 in urban area of in the district.

vi. Marital Status

The population above 15 years was classified into never married, married, widowed and divorced. 36.2 percent of the total population was never married, 58.6 percent married, 4.9 percent widowed and 0.3 percent divorced. The percentage share of never married male was higher than that of females, being 41.3 percent and 30.3 percent respectively. The percentage of never married females was higher in urban than in rural areas.

Table 4.9 gives details about percentage of population 15 years and above by marital status, sex and rural and urban residence

Table 4.9 Population Percentage Distribution by Marital Status, Sex and Rural/Urban Areas

Marital Status		Nankana Sahib District		
		All Areas (%)	Rural (%)	Urban (%)
Never Married	Both Sexes	36.2	31.5	37.1
	Male	41.3	36.8	42.2
	Female	30.3	25.4	31.2
Married	Both Sexes	58.6	63.2	57.7
	Male	55.5	59.3	54.8
	Female	62.1	67.6	61.1
Widowed	Both Sexes	4.9	5.1	4.9a
	Male	2.9	3.7	2.8
	Female	7.2	6.7	7.3
Divorced	Both Sexes	0.3	0.2	0.3
	Male	0.2	0.2	0.2
	Female	0.4	0.3	0.4

vii. Migration

The total number of life time in-migrants in Nankana Sahib district were 679,676 or 12.5 percent of population of the district. Of total life time in-migrants 364,018 persons settled in towns. Of total district migrants 60.4 percent came from other districts of Punjab, 3.7 percent were from Sindh, NWFP and Balochistan, 0.6 percent from Northern Areas while remaining 35.3 percent were Pakistanis who repatriated from other countries. There is no migrant whose birth place is not reported.

4.5 Economic Conditions**A. Economically Active Population of the Nankana Sahib District**

The economically active population is defined here as the persons working, most of the time during the year preceding the census date i.e. March, 1998, looking for work, laid off and un-paid family helpers assisting their family. The economically active population as enumerated in the last census was 22.2 percent of the total population i.e. the population exposed to the risk of entering the economically active life at any time. Of the total male population 40.6 percent were economically active, while 59.4 percent not economically active, 29.4 percent children under 10 years, 12.7 percent students, 2.5 percent domestic workers while 14.8 percent were land lords, property owners, retired persons, disabled etc. Further details can be seen in **Table 4.10**.

Table 4.10 Percentage of Population by Economic Categories and Sex

Economic Category	All Areas		
	Both Sexes	Male	Female
Economically Active	22.2	40.6	2.2
Not Economically Active	77.8	59.4	97.8
Children Under 10	29.8	29.4	30.4
Students	7.8	12.7	2.4
Domestic Workers	32.0	2.5	64.0
Others	8.2	14.8	1.1
Unemployment Rate	17.7	17.8	16.2

B. Unemployment

Unemployment rate is measured as ratio of looking for work and laid off in total economically active population comprising employed, looking for work, laid off and un-paid family helpers, generally representing in percentage. As per above table, the unemployment rate in the district was 17.7 percent which was mainly due to unemployment amongst male representing 17.8 percent, while female unemployment rate was 16.2 percent. This is because of their small proportion in their total economically active population.

C. Employed Population by Occupations

In 1998 of the total employed persons, 29.7 percent had skilled agricultural and

fishery works. About 45.3 percent had elementary occupations, followed by service workers, shop and market sales workers represented 7.6 percent, craft and related trade workers, 5.7 percent. In rural areas people having skilled agricultural and fishery works were again in majority, followed by elementary occupations and service workers, shop and market sales workers, represented 44.0, 36.0 and 5.4 percent respectively. The highest percentage in urban area is of elementary occupations, followed by service workers, shop and market sales workers and skilled agricultural and fishery workers having 49.7, 17.1 percent respectively. Further details are given in **Table 4.11**.

Table 4.11 Percentage of Employed Population by Occupation & Rural/Urban

Occupation		All Areas	Rural	Urban
No.	Description			
1	Legislators, Senior Officials and Managers	0.1	0.1	0.2
2	Professional	3.0	2.5	4.9
3	Technicians and Associate Professionals	1.7	1.2	3.1
4	Clerks	1.4	1.1	2.2
5	Services Workers and Shop and Market Sales Workers	7.6	4.8	17.1
6	Skilled Agricultural and Fishery Workers	29.7	36.0	8.2
7	Craft and Related Trade Workers	5.7	4.5	9.9
8	Plant and Machine Operators and Assemblers	5.2	5.4	4.5
9	Elementary Occupations	45.3	44.0	49.7
10	Others	0.3	0.4	0.2

D. Industry, Trade and Trade Centers

Nankana Sahib is major part of country in economic production. A network of mills and factories and the vast production of agricultural products make it a substantial contributor to Pakistan's economy. These units manufacture cotton, woolen and silk cloths, carpets and rugs, textile products, lather and rubber foot wears, wearing apparel, pharmaceutical goods, soap, iron and steel products, heating, plumbing and lighting equipment, hardware, miscellaneous fabricated products, agriculture machinery, engines and turbines, textile machinery, printing

machinery, metal working machinery, pumps and compressors, household. There are also a good number of printing and publishing units and body building workshops. Besides, there are units of canning and preservation of food, edible oils, beverages, metal and wood furniture, rubber products, chemicals, glass products, repair of railway equipment, toys, stationary etc.

4.6 Transportation

Two main intercity roads facilitate communication in Nankana Sahib. Motorway on its one side and Grand Trunk Road on the other.

Daewoo Express Bus Service and other bus services operate from the city to the entire country. There is a regular bus/ Hiace service available running from early hours in the morning to late in the night. Daily routes include Sheikhpura and Faisalabad.

Railways

Nankana Sahib district is linked with Lahore and Faisalabad districts through the Pakistan Railway network. There are 3 railway stations in the district, with 2 in Nankana Sahib tehsil, and 1 in Sangla Hill tehsil

4.7 Educational Facilities

Primary level educational facilities are available in almost 100 percent of the villages visited. However, middle and secondary level educational facilities are not available in all villages for which students have to visit nearby villages and towns. Due to poor condition of the existing road the education of girls is badly hampered. The numeric details of these institutes are given in **Table 4.12**

Table 4.12 Population-Institution Relationship

Sr. No	Type of Institutions	Boys/Girls
1	Primary Schools	324/241
2	Secondary Schools	50/34
3	Degree Colleges	07/08
4	Middle Schools	58/84
5	Higher Secondary	04/09
6	University	-

4.8 Health Facilities

Topography survey of the land has been completed and road alignment has been marked on the ground at prominent locations. During the survey, it was observed that people had pretty good idea about the route alignment and the land and structures falling on the ROW of the road. Topographic survey showed that no health institution (BHU, hospital and dispensary) is falling within the ROW completely or partially as a result no demolition of the existing health institutions will take place during the execution of the project.

4.9 Socioeconomic Baseline Survey

The information regarding socioeconomic baseline survey is based on the primary data collected from the project area. Baseline survey was carried out to identify the situation analysis of socioeconomic conditions and impacts & their magnitudes on the affected population. A sample of 50 respondents was selected on the basis of simple random sampling technique, which included Project Affected Persons (PAPs) which further includes private land & shop owners, shop keepers (renters), local residents, factory workers, pedestrians, travellers and drivers etc. During the survey, both males and females were included in the sample. Efforts were made to include the different types of stakeholders according to their stakes in the sample and contact the maximum population during the survey. A social survey form is attached in **Annex-VIII**

4.9.1 Field Survey

A site visit of the proposed project was carried out from August 17 to August 18, 2023. This included the collection of demographic and socio-economic baseline information. During the survey major focus was to collect information about educational levels, economic resources and dependencies, quality of life, availability of facilities, water resources and its use & satisfaction, housing settlement patterns, general health status, perceived impacts of the project, their protective measures, basic needs, the means to safeguard their interests during project implementation and most importantly land acquisition and resettlement issues. A baseline survey was carried out at More Khunda To Habo Ky Bala as shown in **Table 4.13**.

Table 4.13 Baseline Survey of Proposed Project

Sr. No.	Location	District	Educational Institute	Hospitals	Mosques	Total Population (Approx.)
1.	Chak No. 435 GB, Lashari	Faisalabad	1. Govt Elementary School 2. Govt Girls High School, 3. Two Private Schools		Two Jamia Mosques	4,076
2.	Chak No, 595, Jhok Dawat Wala	Faisalabad	1. Govt Boys Primary School 2. Govt Girls Primary School		03 Jamia Mosques	5,261
3.	Chak No. 268 GB, Jhok Rehan,	Faisalabad	1. Govt Boys Primary School 2. Govt Girls Primary School		01 Mosque	2700
4.	Chak No. 366 GB, Jhok Jigan	Faisalabad	1. Govt Girls Primary School	01 Govt Hospital	01 Jamia Masjid	1561
5.	Chak No. 367 GB, Jhok Bhuki	Faisalabad	1. Boys High School 2. Girls Primary School		02 Jamia Mosque	1632
6.	Maoza Sial	Faisalabad	1. Govt Boys		01 Jamia	2353

			Primary School 2. Govt Girls Primary School		Mosque	
7.	Pindi Cherry	Nanakana Sahib	1. Govt Boys Primary School 2. Govt Girls Primary School		03 Jamia Mosque	1665
8.	Chak Lachman	Nanakana Sahib	1. Govt Boys Primary School		01 Jamia Mosque	1200-1300
9.	Thatha Noor Ke	Nanakana Sahib	1. Govt Priary School		01 Jamia Mosque	1326
10	Maoza Rajab	Nanakana Sahib	1. Govt Girls Primary School		01 Jamia Mosque	1239
11.	Dhuni	Nanakana Sahib	2. Govt Boys Primary School		01 Jamia Mosque	1068
12	Chak No 66/14	Nanakana Sahib	1. Govt Boys Primary School 2. Govt Girls Primary School		01 Jamia Mosque	2521
13	Jamke	Nanakana Sahib	1. Govt Boys primary School		01 Jamia Mosque	733
14	Qila Baman Singh	Nanakana			01	1056

		Sahib			Mosque	
15	Chak No. 10/63	Nanakana Sahib	1. Govt Boys primary School	01 hospital	02 mosque	3738
16	Hindoke	Nanakana Sahib	1. Model high School 2. Govt Girls Primary School		02 mosque	1726
17	Harbhan	Nanakana Sahib	1. Girls Primary School		02 mosque	1315
18	More Khunda	Nanakana Sahib	1. Govt High School & College for Boys 2. Girls Primary School 3. Govt Boys primary School 4. More Than three private Schools	03 including private and govt	08 Jamia Mosques	13744
19	Baraghar	Nanakana Sahib	1. Govt High School & College for Boys 2. Girls Primary School 3. Govt Boys primary School	02 Hospital 01 Govt and 01 private	05 Mosque	5151

			4. More Than three private Schools			
20	Syed wala	Nanakana Sahib	1. Govt Boys primary School 2. More than 4 Private schools and Academy	01 Hospital	04 Mosque	3359
21	Bunga Kalan	Nanakana Sahib	1. Govt Boys Primary School 2. Govt Girls Primary School		01 Mosque	3090
22	Lurka Khurd	Nanakana Sahib	1. Govt Boys Primary School		01 Mosque	1115
23	Malka Roaday	Nanakana Sahib	1. Govt Girls Primary School		01 Mosque	1362

4.9.2 Physical and Cultural Heritage

i. Shrine

There is a no shrine near the proposed project area.

ii. Mosques

There are small mosques in nearly all the settlements near the proposed project. Those mosques have been constructed by the local residents with the mutual contributions of the concerned communities.

iii. Graveyards

There is also small level graveyard along project road. The presence of shrines, mosques and graveyards has a very sensitive religious and cultural significance in our society. The disturbance to such properties should be avoided during construction mosques and graveyards has a very sensitive religious and cultural significance in our society. The disturbance to such properties should be avoided during construction.

4.9.3 Recreational Sites

No recreational site is located near the proposed project area.

SECTION – 5

PUBLIC CONSULTATION

5.0 General

This section describes the outcome of the public consultation sessions held with different stakeholders that may be affected by the proposed project. Public consultation is a mandatory part of the EIA process for development projects. The adequacy of the public consultation and information disclosure is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

The consultation process was carried out in accordance with the requirements of Pakistan Environmental Assessment Procedures. The objectives of this process were to:

- a) Involve all stakeholders, especially Project Affected Persons (PAPs), in the consultative and participative process;
- b) Share information with stakeholders on the design and construction of the proposed project and anticipated impacts on the physical, biological and socio-economic environment of the proposed project area;
- c) Understand stakeholders' concerns regarding various aspects of the project, including the existing available facilities and problems, construction of the proposed project and the likely impacts of construction and operation related activities of the proposed project;
- d) Understand the perceptions, assessment of social impacts and concerns of the Project Affected Persons (PAPs) / communities in the vicinity of the proposed project;
- e) Provide an opportunity to the public in the public consultation session to provide valuable suggestions for the project design in a positive manner; and
- f) Reduce the chances of conflict through the identification of controversial issues, and consult them to find up to standard solutions.

5.1 Identification of Main Stakeholders

Stakeholders are those who have a direct or indirect interest in project development, and who will be involved in the consultative process. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The

identification of those indirectly affected is more difficult, and to some extent it will be a subjective judgment. For this reason, it is good practice to have a very wide definition of who should be involved and to include any person or group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of a proposal, but should also include those who can affect the outcome of a proposal.

a) Methods of Public Consultation

Public Consultation was carried out in order to establish stakeholder's opinion regarding project implementation. The following methods were used for public consultation with project stakeholders.

- Interview Survey
- A structured set of questions from representative sample of PAPs
- General / Public Meetings
- Discussion with community, religious leaders, local government representatives, civil society representatives, politicians and teachers
- Rapid Participatory Appraisal
- Site visit by a multidisciplinary team consisting environmental engineer, environmental scientist, social scientist, ecologist and local community representatives to gather information regarding project site
- On-Site Meetings
- Other interested parties including project proponent or contractor

b) Categories of Stakeholders Contacted

Stakeholders are groups or individuals that can affect or take affect from a project's outcome. Affected Communities include population that is likely to be affected by the Project activities. Potential impacts of the Project on the local environment include disturbances and changes to the physical and biological environment, such as, land transformation, noise disturbances, and air and water quality issues. These disturbances can result in indirect socioeconomic impacts, such as, physical or economic displacement. These impacts are expected to reduce with the increased distance from the Project facilities. In addition to the Potentially Affected Communities, nomad

communities frequenting the area, local government and local Non-Government Organization (NGO) officials were also consulted.

The contacted stakeholders belonging to different categories are shown in **Table 5.1**.

Table 5.1 Stakeholders Contacted in the Project Area

Sr. No.	Stakeholder Category
1	Residents
2	Business’/Shop owners
3	Pedestrians
4	Farmers
5	Schools/Colleges/Students
6	Daily Wages Laborer’s
7	Locals

Following areas were consulted for project “Construction of Road from More Khunda to Habo by Bala District Nankana Sahib”.

Table 5.2 Participants involved in the Project Area

Sr. No.	Venue	No of Participants
1	Chak No 435 Lashari	04
2	Chak No 595 Jhok Dawat Wala	03
3	Chak No 268 GB Jhok Rehan	05
4	Chak No 366 GB Jhok Jigan	04
5	Chak No 367 GB Jhok Bhuki	03
6	Moaza Sial	03
7	Pindi Cherry	03
8	Chak Lachman	04
9	Thatta Noor Ke	02
10	Maoza Rajab	02
11	Dhuni	02
12	Chak No 66/14	03
13	Jamke	02
14	Qila Baman Singh	02
15	Chak No 10/63	02

16	Hindoke	03
17	Harbhan	04
18	More Khunda	04
19	Bara Ghar	03
20	Syed wala	03
21	Bunga Kalan	02
22	Lurka Khurd	03
23	Malka Roaday	04

c) Institutional Stakeholders

The institutional stakeholders consulted for the Project include relevant government agencies, NGOs and private sector organizations. Following is the list of institutional stakeholders.

Table 5.3 Govt Departments of Project Area

Sr. No.	Departments
1	Environment Protection Department
2	Irrigation Department
3	Agriculture Department
4	Tehsil Council
5	NGO
6	Environment Expert

Sr#	Participant	CNIC/Designation	Concerns/Remarks	How the concerns are addressed
1	Muhammad Qayum	Assistant Director (Field, Nankana) 0333-4312974	• Regular Monitoring should be conducted during construction. • Testing of Raw materials should be done to check the quality	NHA conducts monitoring twice during construction phase from 3 rd party EPA certified lab.
2	Mr. Sharif	Inspector Faisalabad 03064465688	• Effective CSR methodologies should be implemented • EMP should be implemented and reviewed regularly. • Accidents should be reported to concerned authority	• Community development has been the top most concern of NHA
Irrigation Department				
3	Abdul Waheed	Assistant	• Air pollution should be controlled effectively • Employment opportunities should be ensured. • Plantation should be the priority	• Regular maintenance will be carried out • Any possible air pollution will be controlled effectively by taking appropriate measures • Preference will be given to Local labor. • Proper landscaping plan has been done
Agriculture Department				

5	Umar Shehzad Ajmal	Deputy Director 03007607433	• Social welfare should also one of the priorities • Plantation should be ensured in project premises • Arrange plantation activities in city premises with the collaboration of city government.	• The site has a diverse flora and fauna which is being sustained in an effective manner. • As the Interchange will be constructed in already existing facility, no natural resource will be disturbed.
NGO				
6	Sana Khan	Project Assistant 0333-6871950	• Labor rights and empowerment should be ensured • Regular monitoring of air and water should be done • Solid waste should be managed properly to ensure the cleanliness • Safety of the workers should be ensured.	• Labor Rights policy will be implemented properly. • Safety of workers will be kept on top priority. • Solid waste will be managed properly.
Environmental Expert				
7	Mr. Faqeer Hussain	Environmental precautionary	• EMMP should be strictly followed. • Hazardous solid waste should be handled properly	• EMMP is strictly followed • Hazardous waste is disposed of through EPA certified contractor

Stakeholders Concerns and Priorities

For implementation of SEP, identified stakeholders were consulted and their concerns were documented with pictures and minutes of meetings held with project interested parties including project staff, government officials, and local communities to predict the nature and scale of risks, challenges and impacts of project perceived by them. Following describes the details of general / public meetings and series of focused group discussions held with different categories of the stakeholders at various locations along with their concerns & priorities raised about proposed project.

Table 5.4 Schedule Of Meetings With Stakeholders, Their Concerns/Comments & Suggestions

Time & Date	Venue	Stakeholder Category	No of Participants	Concerns & Comments Raised	Response to Comments
10:00 PM 17/08/23	More Khunda to Habo by Bala District Nankana Sahib	Farmers, Shopkeepers,	21	• It is a good project and it would decrease traffic congestion and facilitate the poor. • Agri business activities will be enhanced by provision of Road. • Road should be connected to all small populated areas to connect each other. • Preference should be given to locals for skilled & non-skilled people for job. • Much beneficial for the farmers for commodities supply. • Time and money consumption will be reduced due to easy approach to other cities via this road for education, health, business and other daily routine work	• Economics opportunities for the people of area. Contractor will be advised to hired local force on prefer during construction • Road rout has been finalized already in which all the nearest areas are connected to road
4:05 PM 16/08/23	More Khunda to Habo by Bala District Nankana Sahib	Students	07	• Much beneficial for the students whose are studying in Nankana Sahib District Headquarter especially relying on public transport. • Provision of U-Turns and bridges for water channels where necessary should be provided • Safety measures to avoid dust & noise and accidents.	• Bridges for water channels and U-turn are already in project design. • Accidents will be reported immediately and sign boards will be displayed to avoid accidents. PPEs will be provided to workers for safety. Maintenance of working machineries will be done on priority basis to reduce noise level. water sprinkling will be

					done on daily basis to suppress the dust • Contractor will prepare safety plan and also responsible for its implementation.
5:07 PM 16/08/23	More Khunda to Habo by Bala District Nankana Sahib	Labors (Daily Wages)	09	• Provision of U-Turns and bridges for water channels should be provided. • Preference should be given to locals for skilled & non-skilled people for job. • After construction of road, approach will be easy to other cities of Punjab. • Business activities will be increased in Said project area • Try to avoid unnecessary tree cutting to save the environment.	• Bridges for water channels and U-turn are already in project design • Economics opportunities for the people of area. Contractor will be advised to hired local force on prefer during construction • Unnecessary tree cutting activities will be avoided to save the environment
6:12 PM 16/08/23	More Khunda to Habo by Bala District Nankana Sahib	Other Residents	07	• Adopt necessary Measures to avoid accidents • It is Beneficial project for locals. Time and money consumption will be decreased after construction of Road	• sign boards will be displayed to avoid accidents. PPEs will be provided to workers for safety • Contractor will prepare safety plan and also responsible for its implementation.

5.2 Stakeholder Concerns And Recommendations

The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below

Participants have been categorized into students, shopkeepers, farmers, labors and other residents. Out of total respondents of, 86% knew about the project whereas 14% were not aware of the project planning and implementation. All people were then briefed about the project.

98% commented their views about the project and 02% didn't respond.

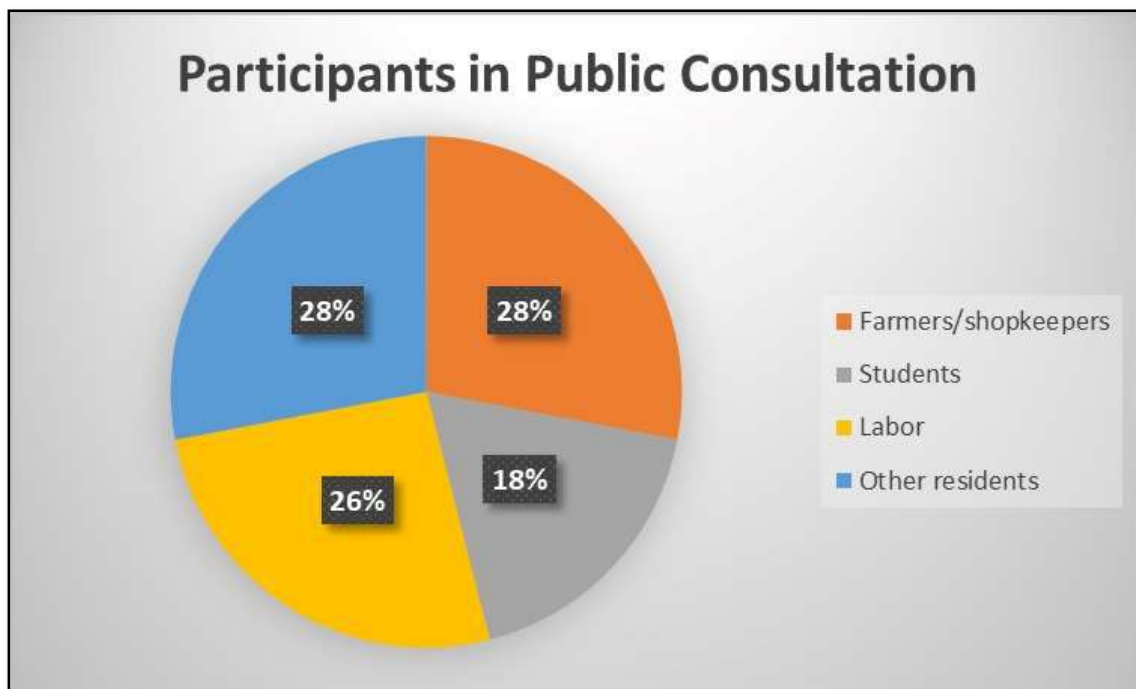


Figure 5.1: Participants of affected area

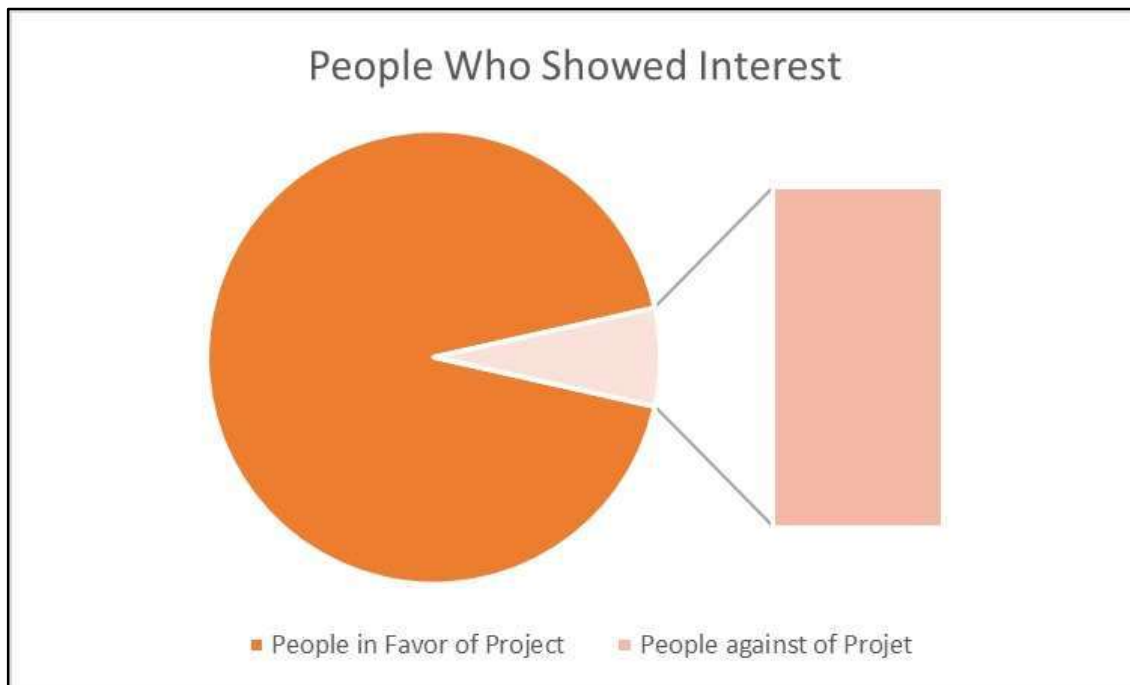


Figure 5.2: Percentage of People who showed Interest

Out of 98%, majority of the people (about 92%) favoured the construction of the project keeping in view its importance and 8% people showed pessimistic views in general but mitigation measures and solutions to their concerns were provided.

Majority of people were in Favor of project. They said that project will result not only in direct jobs opportunities for locals but also will enhance subsidiary business, trade, education, and agriculture and community development. The people were of the view that project might also elevate education standards, struggle for career enhancement besides improvement in standard and quality of living in area. People were also of the view that project may also be instrumental in connecting the local people with major cities and will result in increase in GDP. Very few near to 8 % only shows concerns over traffic issues, noise and health impacts. Majority of the concerns were changed in the Favor of installation after communicating the participants proper solutions and mitigation measures.

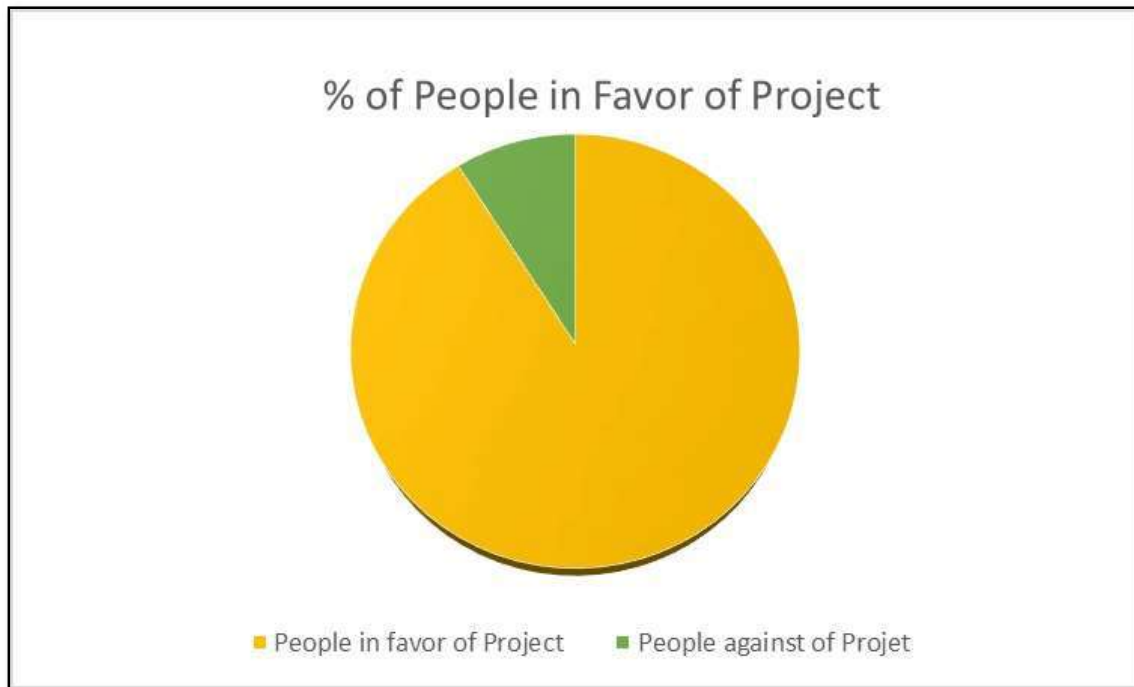


Figure 5.3: Percentage of People in Favor of Project

Stakeholder Consulted

Names of consulted stakeholders are given in table below:

Sr. No.	Stakeholder Name	Category
1.	Ali Ditta	Farmer
2.	Shahid Khan	Farmer
3.	Ali Muqadass	Farmer
4.	M. Abbas	Farmer
5.	Sabir Ali	Farmer
6.	M Saddique	Farmer
7.	Javed Iqbal	Farmer
8.	Inzamam	Farmer
9.	M Iqbal	Farmer
10.	Zafar Ali	Farmer
11.	M Fazii khan	Farmer
12.	M Afzal	Farmer
13.	Arsalan Naeem	Farmer
14.	Khurram Boota	Farmer
15.	Ilahi Bukhsh	Farmer
16.	Zubair Qasim	Farmer
17.	Amjad Nawaz	Farmer
18.	Muhammad Yousaf	Farmer
19.	Shoaib Khan	Farmer
20.	Niaz Zahid	Farmer
21.	Athar Yousaf	Farmer

22.	Akhtar Ali	Labour
23.	Muhammad Ahsan	Labour
24.	Babar Kamboh	Labour
25.	Shahbaz Jutt	Labour
26.	Akram Bashir	Labour
27.	Abid Bukhsh	Local Labour
28.	Aleem Ullah	Local Labour
29.	Muhammad Tajamul	Local Labour
30.	Adeel Akhtar	Local Labour
31.	Waseem Ashraf	Resident
32.	Qazi Ishtiaq	Resident
33.	Ashfaq Peer Muhammad	Resident
34.	Naeem ul Haq	Resident
35.	Khubaib Habib	Resident
36.	Fakhar Hayat	Resident
37.	Salman Hamid	Resident
38.	Ali Hassan	Self-Employee
39.	Azmat Baig	Shop Keeper
40.	Mushtaq Rasool	Shop Keeper
41.	Peer Muhammad	Shop keeper
42.	Asghar Arif	Shop keeper
43.	Aftab Sohail	Shop Keeper
44.	Muhammad Younis	Shop Keeper
45.	Gulshir	Shopkeeper
46.	Nijabat khan	Shopkeeper
47.	Mazhar Iqbal	Student
48.	Muhammad Junaid	Student
49.	Muhammad Atif	Student
50.	Assad Ullah	Student

Figure 5.4: pictorial evidence of Govt officials



5.3 Concerns / Apprehensions of the Stakeholders

Respondents were consulted during interview survey and their comments about project recorded on prescribed questionnaire. Following are the outcomes of consultation;

Sr. No	Concerns Shown by Stakeholders	How they will be addressed
01.	Disturbance to Ambient Air	
	Air, noise & soil pollution will increase not only during construction activities.	Regular water sprinkling will be done by the contractor Monitoring of ambient air, ambient noise and ground water analysis will be conducted as per SMART rules, 2000. Site specific EMP will be formulated to address this concern.
02.	Clearance of land	
	Tree cutting will be involved during road construction	No significant trees cutting is involved during project construction
03.	Protection of local population and business	
	Any business or land if is in the selected area should be paid compensation.	NHA will take the responsibility to compensate and address the graveness of affectees if arises at any point of construction or implementation stage.
04.	Timely Construction of Road	
	Road should be completed within the planning and as per implementation plan.	The contractor will complete the construction as per schedule of implementation given in chapter 3 of EIA report
05.	Transportation and Storage of Raw Materials	
	The raw materials including construction material will create problem for local residents	Raw material will be stored at designated areas. The material will be transported during night times. Safety signage will be placed at construction sites.
06.	Adverse Impacts on Local community	
	The representative from AC Office stated that a commitment should be made to provide locals with as many jobs related to the Project as possible. These include technical jobs for which training should be started as soon as possible	NHA will take responsibility of addressing these concerns as per finalized GRM

Sr. No	Concerns Shown by Stakeholders	How they will be addressed
	The presence of a colony and camps for workers and laborers will present challenges.	The contractor will provide all basic facilities to the labours.
	The maximum benefit of the Project should be to the locals. The resettled people, in particular, should be wealthier with an improved quality of life.	The contract will prefer local labours for in direct operation.
	Under social assessments, the EIA should include analysis on human rights, community benefit sharing, conflicts and security, etc.	The EIA will cover these aspects
07.	Concerns about Resettlement	
	All displaced households should be rehabilitated	NHA will make sure the payment for the acquisition of properties if require; Compensation rates will be finalized after the consultation with PAPs;
	Public infrastructure such as Basic Health Units (BHU) should be relocated.	This concern will be addressed in finalized GRM.
	Graves should be managed with the consent of the communities	There are no graves/ grave yard at the selected location for construction of interchange.
08.	Impacts on Terrestrial Ecology & Species of Conservation Importance	
	Construction phase disturbances area concern for terrestrial wildlife more so than operational phase disturbances. Air and noise pollution, in particular are important to address.	Landscaping plan will be presented along with EIA report to handle this concern
09	Safe alternate route for travelling	
	Alternate routes and traffic will be disturbed during construction times.	All necessary measures will be taken to ensure the safety of traffic during construction, including barricades (including signs, pavement markings). All such barricades will be set up to facilitate the local traffic.

Generally, people were found to be aware & convinced of the Construction of Road from More Khunda to Habo by Bala District Nankana Sahib, and indicated remarkably their support for the implementation of project. Local communities demanded that they should be the part of meaningful consultation activities along with other stakeholders at different stage of the Project including the design, construction, and operational periods. The pictorial presentation of public involvement (PI) process is given below.

Information Disclosure

Extensive information disclosure and public consultation / participation would be undertaken throughout the project cycle. During the preparation of EIA report and consultation meetings, not only the project related information has not been disseminated to PAPs but also will be disclosed once again at the stage of Draft EIA report and accessible to interested parties and general public on request. The version of final report will be available with project proponent and its summary will be provided in stakeholders' relevant local language at stage of Public Hearing (after submission of final EIA report to the EPA) of proposed project.

Figure 5.5: Pictorial Evidences of Different Site of project





Engagement During Project Implementation

Project affected parties (PAPs) will also be consulted during implementation stage of project for getting their feedback about their concerns addressed properly and what measures adopted for its resolution to enhance project effectiveness and sustainability. In case, if any residual impacts & risks or significant change occurs at project implementation stage, the project affected parties would be informed and as well consulted once again about its potential impacts & risks and how these will be mitigated or compensated.

5.4 Grievances Redressal Mechanism (GRM)

Grievance redress mechanism (GRM) is important for development projects where ongoing risks or adverse impacts are anticipated. These mechanisms serve as a way to meet requirements, prevent and address community concerns, reduce risks, and assist larger processes that create positive social change. The major objective of GRM is to implement and maintain a procedure for handling environmental and social concerns of the project stakeholders. This procedure will include a redress mechanism scaled to the project's identified risks and adverse impacts, focusing on stakeholders. Project proponent (NHA) will establish, maintain and implement a Grievance Redress Committee (GRC) to facilitate resolution of affected persons (APs) concerns and complaints about the project's performance at site, in line with the requirement of Environmental Protection Agency (EPA). The GRC will be coordinated by Director- Environment. The GRC will address affected people concerns and complaints promptly, using an open, effective, understandable and transparent process..

5.5 Composition of Grievances Redress Committee (GRC)

The GRC will directly work under the supervision of Director Environment (EALS). The following members are recommended to form a GRC to resolve the grievances;

- Deputy Director Environment (EALS)
- Representative of Affected persons (APs)
- Environmental Engineer of Supervision Consultant
- Environmental Engineer of Construction Contractor

NHA Director (Environment) will nominate one Deputy Director as member of GRC and

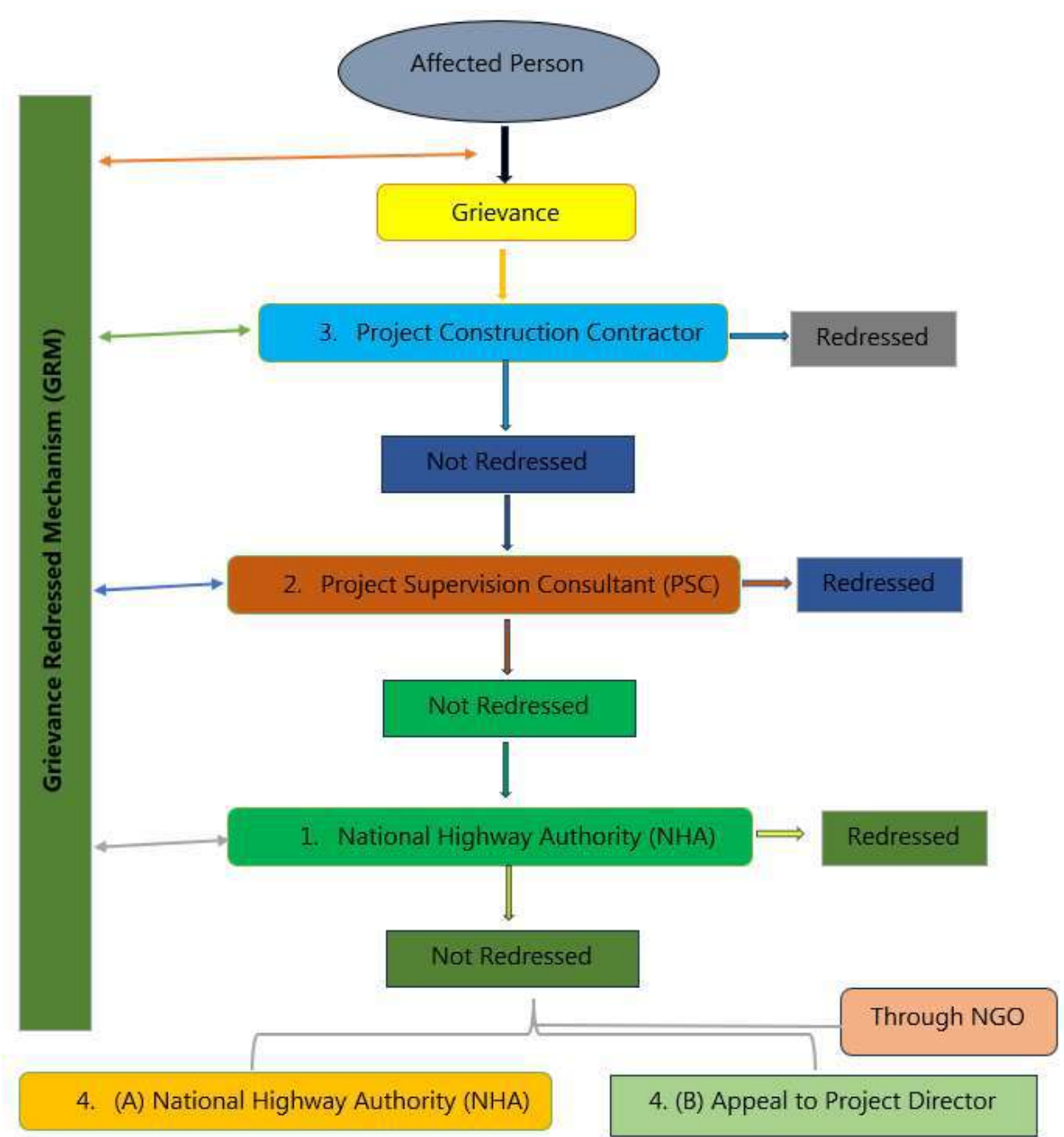
shall act as Project Environmental Grievance Officer (PEGO). The complaint would be lodged to GRC. GRC will review the case on merit and address the problem in accordance with prevailing rules/ procedures applicable to such grievances as per Environmental Management Plan (EMP). If the complaint is genuine, GRC would ask the contractor to address the grievance within seven days (07) depending upon nature of grievance. Representative of supervision consultant will monitor the contractor.

If the affected person does not receive a response from GRC or his complaint is not settled within thirty (30) days of the registry of the complaint, then it can be elevated to Director (Environment) NHA for its resolution, who should act on the complaint/grievance within two weeks of day of its filing. If the affected person is not satisfied with the decision of Director (Environment), then it can be referred to higher authorities/ relevant govt departments for its resolution.

As a last resort, He/ She may submit the complaint to Punjab EPA or contact the appropriate Court / local judiciary. At each stage the Grievance Redress Committee will act as third party to ensure a fair and just resolution, and assist in grievance mediation. Appeals to the GRC will be free of charge, and all reasonable expenses incurred will be paid from project funds. Once the operation phase commences and the PIU no longer exists, the PIU portion of the GRC will be eliminated

The flow chart of the proposed redress mechanism is shown in **Figure 5.6** on the next page:

Figure 5.6: Flow Diagram of Proposed Redress Mechanism



Responsibilities of GRC

The responsibilities of GRC will include the following;

- The GRC shall review, consider and resolve grievances related to environmental issues during implementation received by the PD office - NHA.
- Environmental Specialist of SC is responsible for conducting investigations on these grievances.

- Any grievances presented to the GRC should ideally be resolved on the first day of hearing or within a period of one week, in case of complicated issues requiring additional investigations.
- GRC is empowered to take decision which is binding on NHA and considered final.
- GRC meeting will be held in the PD office, NHA or other locations agreed by the committee. If needed GRC members may undertake field visits to verify and review the issues at dispute.

5.6 Procedure for Filing the Complaint

- 1) Any affected person can register his complaint through application to GRC office located in project area. The complaint would be lodged in complaint register.
- 2) There are several ways one can report a grievance:
 - a) Contact the PEGO of GRC over the phone call. The contact details will be provided in the GRC office.
 - b) Send an email, text message, or in-writing to the address provided in the PD office.
- 3) The PEGO will direct the Environmental Engineer of Supervision Consultant (EE-SC) for resolution of complaints from contractor at the same day and report back to PEGO. The EE-SC will have maximum one week to resolve the complaint. If complaint is not addressed within a week time, then a meeting of GRC would be convened by PEGO to discuss the issue.
- 4) The grievance will be reviewed and will be decided by the GRC. In case the grievance is not connected to the project related activity or in case the project authority finds that they are working within the applicable PAK EPA standards, the grievance will not be further processed. In these cases, this will be explained in writing to the grievant.
- 5) In all the other cases the GRC will investigate whether they have failed to work to the intended standard and if they have identified measures which might be taken to protect against the incident occurring again.
- 6) The grievance mechanism will be made public through the public consultations and information leaflets during implementation.

Type of Grievance

The following are some of the environmental issues could be subject for grievance from the affected people, concerned public and NGOs.

- Dust, noise and air pollution from construction activities
- Nuisance
- Intensive schedule of construction activities
- Inappropriate timing of construction vehicle flow
- Traffic Movement
- Water Pollution
- Waste disposal
- Disturbances to flora and fauna
- Health and safety
- Criminal activities
- Failure to comply with standards or legal obligations

SECTION 6

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.0 General

This section discusses the environmental impacts of the project activities at design, construction and operational stages and suggests mitigation measures to eliminate the project's adverse environmental impacts or to minimize to acceptable levels within the related legislative and regulatory framework.

6.1 Evaluation of Identified Impacts

Methodology adopted for the identification, evaluation and analysis of environmental impacts by the proposed project is "Matrix Method and Significance Rating of Impacts".

6.1.1 Environmental Impact Matrices

The environmental impact matrices have been developed to evaluate magnitude of the impacts of various project activities on different environmental settings for construction and operational phases. These matrices are given in **Table 6.1** and **6.2**. The following scale has been used for the evaluation of impacts:

LA	=	Low Adverse (low/short-term damage to the environment)
MA	=	Medium Adverse (moderate damage to the environment)
HA	=	High Adverse (severe damage to the environment)
LB	=	Low Beneficial (less beneficial to the environment)
MB	=	Medium Beneficial (moderate beneficial to the environment)
HB	=	High Beneficial (highly beneficial to the environment)
N/A	=	Not Applicable
O	=	Insignificant / No Impact

Table 6.1
Environmental Impacts Matrix for the Construction Phase

Sr. No.		Physical Environment						Biological Environment			Socioeconomic Environment							
		Topography	Soil Erosion/Contamination	Landscape	Air Quality	Hydrology and Drainage	Groundwater Quality	Habitat Change	Vegetation	Animal Movement	Health & Safety for Public and Worker	Disruption of Public Utilities	Employment	Population Disturbance	Cultural/Religious Values	Noise & Vibration	Local Economy/Benefits to Community	Traffic Management
	Environmental Components Project Activities																	
1	Construction camps, workshops etc.	O	LA	O	LA	O	LA	O	O	LA	LA	O	LB	LA	O	LA	LB	O
2	Excavation operations	LA	LA	LA	MA	LA	O	LA	LA	LA	LA	LA	MB	LA	O	MA	LB	LA
3	Transportation of construction materials	O	LA	O	LA	LA	O	O	O	LA	LA	O	LB	LA	O	MA	LB	LA
4	Use of construction materials etc.	O	LA	O	LA	O	LA	O	O	O	LA	O	O	O	O	LA	LB	LA
5	Earthwork/concrete work operations	LA	LA	LA	LA	O	LA	LA	O	LA	LA	LA	MB	LA	LA	MA	MB	LA
6	Operation of concrete batching plants	O	LA	LA	HA	O	O	O	O	O	LA	O	MB	O	O	MA	MB	O
7	Disposal of Waste Water	O	MA	LA	MA	LA	LA	O	O	O	LA	O	MB	LA	O	MA	LB	O
8	Solid Waste Management (Disposal of Excavated Material)	O	LA	LA	LA	LA	LA	O	O	O	LA	O	LB	O	O	O	O	O
9	Storage of oils/diesel	O	LA	O	LA	O	LA	O	O	O	LA	LA	LB	LA	O	O	O	O

Legend

O - Insignificant / no impact
NA - Not Applicable

LA - Low Adverse
LB - Low Beneficial

MA - Medium Adverse
MB - Medium Beneficial

HA - High Adverse
HB - High Beneficial

Table 6.2
Environmental Impacts Matrix for the Operational Phase

Sr. No.	Project Activities	Physical Environment					Biological Environment			Socioeconomic Environment			
		Soil Erosion/Quality	Surface Runoff	Air Quality	Groundwater Quality		Flora	Fauna		Public Transport	Employment	Community Development	HSE & Road Safety Issues
1	Movement of Traffic	O	LA	LA	O		O	LA		MB	MB	MB	LA
2	Road Maintenance Works	O	O	LA	O		O	O		O	LB	O	LA
4	Maintenance Contractor Camps	LA	O	LA	LA		LA	LA		O	O	O	LA

Legend

O - Insignificant / no impact
 NA - Not Applicable

LA - Low Adverse
 LB - Low Beneficial

MA - Medium Adverse
 MB - Medium Beneficial

HA - High Adverse
 HB - High Beneficial

6.1.2 Significance Rating of Impacts

The overall significance of the impacts was defined based on the result of a combination of the consequence rating and the probability rating. Each identified impact was analyzed individually according to a number of criteria including descriptions of their magnitude, extent, duration; and probability of occurrence; the value of the affected environment and likely degree of recovery of the affected area. The results of the assessment of the significance of the residual impacts were then linked to decision making in the following manner (as shown in **Table 6.3**)

Table 6.3 Description of Impacts significance ratings

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

6.2 Delineation of Project Corridor of Impact (COI)

Before proceeding to the environmental analysis of the proposed project, it is imperative to delineate the COI. The identified dumping site, camping site, borrow areas, asphalt and batching plant sites with their tentative location are marked on Figure 6.1. There are two (02) types of Project corridors which have been used for the environmental baseline information, impacts assessment and mitigation purposes and is described briefly as under:

a) Corridor of Impact (COI)

COI is a limit which identifies the area where direct and indirect impacts of the project activities are envisaged like existence of forests, game reserves, wetlands, archaeological sites etc. COI also includes the ROW. The limit for COI for the proposed project was taken as 100 m on either side of the existing road for collection of baseline information, impacts assessment and mitigation measures of physical, ecological as well as social resources.

b) Project Right of Way (ROW)

ROW is the corridor where direct impacts due to the construction of the proposed project are envisaged. In the ROW there will be direct impact on the environment like relocation of the physical infrastructure, clearing of vegetation, cutting of trees and some indirect impacts on shrubs, ornamental trees etc. are also envisaged. ROW is taken as 17 to 22 m wide strip of the existing road.

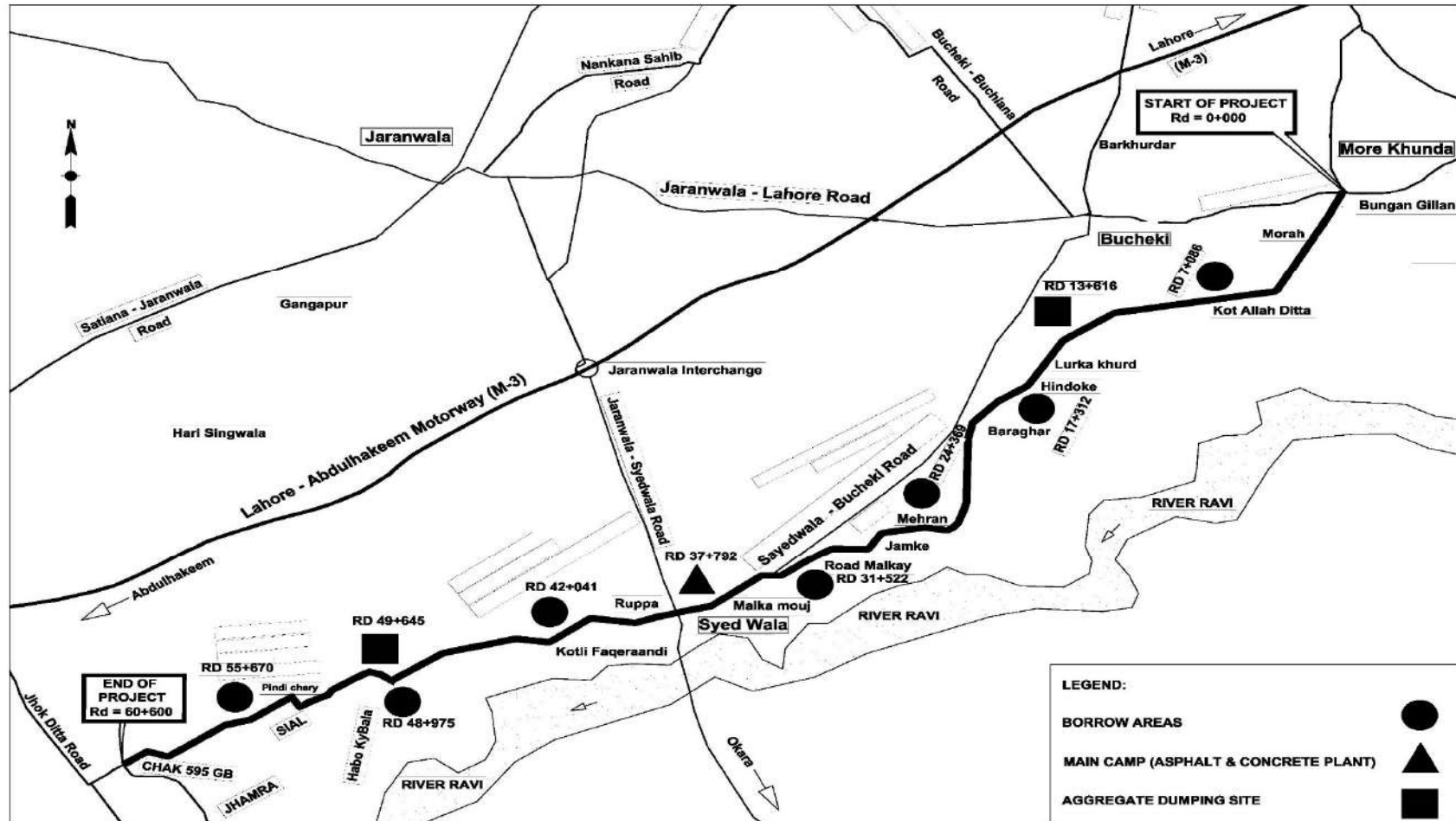


Figure 6.1 Marked locations of sites

6.3 Pre-Construction/Design Phase

Impacts envisaged during Pre-construction/Design Phase and the recommended mitigation measures have been described as follows;

6.3.1 Topography

The topography in the project area will change due to the construction of the proposed project. Visual changes to the topography will be of permanent and moderate adverse in nature and have no mitigation measures except that the project design should consider aesthetic concerns.

6.3.2 Formation width in Built-up Areas

The formation width in built-up areas may result in creating hindrance of market opportunities, loading and vending activities for the local residents/business owners/workers. However, this impact will be temporary and moderate adverse in nature.

Mitigation

- Incorporate technical design features that allow flexible shoulder width(s) near built-up areas; and
- Explore the incorporation of additional pedestrian overheads.

6.3.3 Land Acquisition

One of the major project related impact will be the land acquisition. The land required for the proposed project is mostly agricultural land. This impact will be permanent and high adverse in nature.

Mitigation

- Careful alignment selection by the designer to minimize the impact;
- Also, adequate budget should be allocated in the Project's budget for the compensation to the affectees as per Land Acquisition Act, 1894 and framing of a judicious and fair compensation package for provision of compensation on prevailing market rates.

6.3.4 Changes in Land Value

The proposed project is expected to increase the land values, especially in nearby villages/societies. Land owners will have an opportunity to sell their land on increased prices and start new businesses. This impact will be moderate beneficial in nature.

6.3.5 Flora

Due to the proposed project, about 600 numbers of trees of various species will be affected. This may have an adverse effect on the ecological habitat of the project area. This impact will be permanent and moderate adverse in nature.

Mitigation

- Incorporate technical design measures to minimize removal of trees, if possible, such as change in alignment;
- Plan for compensatory planting for four (4) trees against each fallen tree of similar floral function; and
- Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.).

6.3.6 Social Disturbance

Due to the proposed project, entry/exit problems for shop owners or industrialists and bifurcation of settlements, agricultural land/fields may occur for the residents. This will result in causing inconvenience and affecting daily activities and business. This impact is permanent and moderate adverse in nature.

Mitigation

- Provision of pedestrian overhead bridges (after every 2 to 3 kilometers) in the design to minimize the impact.

6.3.7 Public Utilities

Due to the proposed project, public utilities affected may create disruption of public services and economics. This impact is however temporary and moderate adverse in nature.

Mitigation

- Incorporate technical design features to minimize effect on public utilities; and
- All public utilities (e.g. sewage, drainage/water pipes, power transmission lines, underground telephone lines, etc.) likely to be affected by the proposed project, need to be relocated well before the commencement of construction work.

6.3.8 Loss of Business

Agricultural lands will be affected by the execution of the proposed project. This impact is temporary and moderate adverse in nature.

Mitigation

- Incorporate technical design features to minimize the project construction activities to avoid the loss of private property if possible; and
- In case of unavoidable interference prior notification and consultation needs to be made to reach consensus on procedures and options or any other form of agreed judicious compensation with the concerned stakeholders/affectees.

6.3.9 Surface/ Wastewater Resources

Only (1) surface water body (nala daik) is present at the end of project road. The wastewater may generate from canteens and toilets which needs to be disposed of properly. If disposed of improperly this wastewater will contaminate the surface water body and increase the contamination of the Nala Daik. The impact is moderate adverse and permanent in nature.

Mitigation

- Provision of septic tanks in the design to treat the wastewater;
- Provision of adequate drainage network to reduce infiltration; and
- Provision of storm water drainage system with adequate capacity.

6.3.10 Traffic Management

During the construction phase of the project, improper traffic management may result in traffic jams and cause inconvenience to the people passing through the

project area. The main reasons are the movement of vehicles carrying construction materials, different construction activities and the presence of terminals of freight services along the proposed route. This impact is temporary and minor adverse in nature.

Mitigation

- Proper traffic management plan should be formulated and announced before the construction to avoid traffic jams/public inconvenience.

6.3.11 Solid Waste

Solid waste will be generated from construction camps and different construction activities. Moreover, construction waste will also be generated during construction phase. The waste if not collected and disposed of properly will affect the aesthetics of area. It will lead to generation of odour, attracting disease vectors and clogging of canal and drain. The impact is considered to be temporary and minor adverse in nature.

Mitigation

- Waste management plan shall be devised including provision of waste bins, defining collection frequencies, allocating personnel and defining safe disposal options.

6.3.12 Resource Conservation

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

Almost all the materials to be used in the construction of proposed project are non-renewable or derived from non-renewable sources and therefore their sustainable use is necessary for the future use. The impact is considered to be permanent and high adverse in nature.

Mitigation

- Proper planning for reduction of wastage of water should be done;
- Provision of adequate insulation to reduce heat loss through batching plants; and

- Planning for regular monitoring of CO and CO₂ content of the flue gases to verify that combustion systems are using practical excess air volumes.

6.4 Construction Phase

Following is the brief description of impacts and their mitigation envisaged during the construction phase.

6.4.1 Topography

The main impact during the construction will be the clearing of ROW, cutting and filling of borrow pits including erosion of topsoil cover. This impact is temporary and Moderate adverse in nature.

Mitigation

- Where the use of agricultural land is unavoidable, the top 30 cm of the plough layer will be stripped of and stockpiled for redressing the land after the required borrow material has been removed;
- Where deep ditching is to be carried out, the top 1m layer of the ditching area will be stripped and stockpiled. The ditch will initially be filled up with scrap material from construction and then leveled with the stockpiled topsoil;
- Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize erosion and to avoid creating hazards for people; and
- Landowners will be compensated according to the terms of lease agreements negotiated with them and the restoration actions agreed upon by the Contractor will be duly carried out.

6.4.2 Soil

Due to the proposed construction activities, soil erosion and contamination may occur. Soil erosion may occur on roadside, at contractors' camps and at embankment works as a result of uncontrolled run-off from equipment washing yards, excavation of earth cutting operations and clearing of vegetation whereas contamination of soil may be caused by oil and chemical spills at asphalt plant sites, workshop areas and equipment washing yards. Also due to unauthorized

use of borrow areas and quarries, soil erosion may occur including degradation of landscape. This may limit the future use of land for agricultural purposes. This impact is, however, of temporary and moderate adverse in nature.

Mitigation

- Low embankments will be protected by planting Vetiver grass that can flourish in relatively dry conditions;
- Soil contamination by asphalt will be minimized by placing all containers in caissons;
- All spoils will be disposed off as desired and the site will be restored back to its original conditions before handing over;
- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered;
- Productive land or land adjacent to agricultural land may not be preferred for excavation; and
- Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference for borrowing materials.

6.4.3 Land Acquisition

One of the major impact during construction of the proposed project will be the land acquisition. About approximately 28 kanals of land would be acquired for construction of the proposed project. Similarly, few structures including residential and community structures within the proposed ROW will be affected by the proposed project.

This will result in loss of infrastructure, livelihood, commercial activities and disturbance to people. The impact will be permanent and high adverse.

Mitigation

- Provide judicious compensation to the affectees by providing sufficient budget in the project cost. The process of land acquisition and compensation should be followed in a transparent manner to minimize the impacts.

According to Land Acquisition Act 1894, the following points are to be considered while determining compensation to the project affectees:

- While determining the amount of compensation to be awarded for land acquisition under this Act, the court (the land acquisition collector) shall take into consideration the following:
 - *The market value of land at the date of publication of notification under section 4 sub section (1);*
 - *The damage sustained by the person interested, by reason of the taking of any standing crops, or trees which may be on the land at the time of the collector's taking possession thereof;*
 - *The damage if any sustained by the person interested at the time of the collector's taking possession of the land by reason of acquisition injuriously affecting his other property, moveable, or immoveable, in any other manner, or his earning;*
 - *As a consequence of the acquisition of the land by the collector, the person affected is compelled to change his residence or place of business, the reasonable expenses incidental to such change.*

6.4.4 Religious/Cultural Resources

Since no physical cultural resources are falling within the ROW of the proposed project area, so there is no need for relocation of such resources. Hence, no mitigation is required for this impact.

6.4.5 Construction Camps/Camp Sites

Due to the proposed camp sites, loss of vegetation and dissatisfaction of rehabilitation measures during and after completion of construction phase may occur. However, the impact will be temporary and moderate adverse in nature. For these impacts, mitigation measures have been developed to minimize the likelihood, extent or duration of their occurrence and any associated adverse effects. **Table 6.3** summarizes potential impacts and proposed mitigation measures associated with construction camps.

Table 6.3 Summary of Worker Camp Impacts & Mitigation Measures

Potential Impact	Proposed Avoidance and Mitigation Measures
Environmental - Temporary habitat loss or disturbance - Temporary visual intrusion - Noise emissions at a single location - Waste generation - Discharge of sanitary effluents and rainwater run-off to nearby water bodies	Environmental - Reinstate any temporary facilities to pre-existing conditions in ecologically sensitive areas. - Implement landscaping plan for all facilities in areas where high landscape value and visual vulnerability to the proposed activities warrants site-specific landscape restoration measures. - Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary. - Provide adequate warnings of impending works to all potential receptors within a 1 km corridor surrounding the ROW via public notices and local news
Social Worker camp site: consultation surrounding potential construction camp sites revealed concerns regarding the location of proposed sites for Worker Camps.	Social State land will be a second preference for worker camp locations, followed by land where there is a willing lessee. Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. This will include, in appropriate languages: - A briefing on camp rules - A community relations orientation to increase awareness about the local area, cultural sensitivities and the project Code of Conduct - Awareness-raising on health considerations, including sexually transmitted diseases (STDs). The construction contractor is required to develop a Construction Camp Management Plan to address: - Discipline; - Community liaison; - Ethnic tensions and; - Communicable diseases;

Potential Impact	Proposed Avoidance and Mitigation Measures
	A Code of Conduct and Camp Rules will be required within the Construction Camp Management Plan, which provides policies and a disciplinary framework with respect to worker behavior
<i>Camp Location</i> The final location will be determined by the construction contractors and agreed with the NHA.	<i>Camp Location</i> The construction contractor will be required to assess the environmental/social sensitivity of any additional or alternative sites prior to their approval for adoption.

Some additional mitigation measures will include:

- The contractor(s) should provide plan for removal & rehabilitation of site upon completion;
- Photographical and botanical inventory of vegetation before clearing the site; and
- Compensatory plantation to be scheduled when construction works near end.

6.4.6 Health and Safety

a) Occupational Health and Safety

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material. Workers should be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in the project area. This is a temporary and moderate adverse in nature.

Mitigation

- Obligatory insurance against accidents for labourers/workers;
- Provide basic medical training to specified work staff and basic medical service and supplies to workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;

- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers;
- Protection devices (ear muffs) should be provided to the workers doing job in the high noise areas;
- Provision of adequate sanitation, washing, cooking and dormitory facilities;
- Proper maintenance of facilities for workers will be monitored;
- Provision of protective clothing i.e. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. for labourers handling hazardous materials;
- Ensure strict use of wearing these protective clothing during work activities;
- Instruct foremen to strictly enforce the keeping out of non-working persons particularly children, off work sites; and Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic from More Khunda to Habo Ky Bala and other access roads.

b) Community Health and Safety

Quality of ground water and surface water resources available in the nearby local communities may get contaminated due to the construction activities, oil spillage and leakage. The labourers work with different transmittable diseases may spread out those diseases in the local residents. The impact is permanent and high adverse in nature.

Mitigation

- There should be proper control on construction activities and oil spillage/ leakage from construction vehicles/ machinery.
- The labour works with different transmittable diseases should be restricted within the construction site;
- Timely public notification on planned construction works;
- Close consultation with local communities to identify optimal solutions to maintain community integrity & social links;

- Fencing around the camps should be strong enough so that it cannot be broken easily by local people for making passages; and
- Use of water should not disturb public water availability and source of water should be selected carefully.

6.4.7 Borrow/ Open Pits

Borrow/ open pits and its excavation activities may result in land disputes, soil erosion, and loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments.

Borrow/ Open pits may also result in potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade hygienic condition of the project area. This impact is permanent and moderate adverse in nature.

Mitigation

- Borrow pits will be restored with the consent of owners and one possible option provided will be conversion of pits to fish farms;
- Necessary permits to be obtained for borrow pits
- Care must be taken in selection of borrow area so that it is not posing any threat /danger to road construction, stability and safety;
- In borrow pits the depth of the pit will be regulated so that the sides of the excavation will have a slope not steeper than 1:4;
- Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands; and
- In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites.

6.4.8 Air Quality

Air quality will be affected by fugitive dust emissions from construction machinery, asphalt plants and vehicular traffic. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability.

The critical sources of air pollution during the construction phase will be:

- Asphalt plants that generate toxic emissions which contain unburnt carbon particles, sulphur compounds and dust from batch preparation;
- Quarry areas that generate fugitive dust during crushing;
- Traffic diversion routes marked along dirt tracks that generate fugitive dust when in use by vehicular traffic; and
- Transportation of materials and other construction activities that create dust emissions.

During construction, the continuous operation of machinery and movement of heavy trucks and vehicles may generate gaseous emissions and have a temporary and moderate adverse impact on the surrounding environment.

The overall impact on the quality of air during the construction phase will, however, be limited to the project's implementation phase only.

Mitigation

- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize exhaust emissions;-
- Open burning of solid waste from the Contractor's camps should be strictly banned;
- Preventive measures against dust should be adopted for on-site mixing and unloading operations. Regular sprinkling of the site by water should be carried out to suppress excessive dust emission(s);
- Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions;
- Quarry areas and asphalt plants should be located at least 500m downwind from populated areas, wildlife habitats and contractor's camps to minimize the impact of dust emissions;
- Asphalt, hot mix and batching plants should be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce level of dust emissions;
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during

construction works;

- Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants should be taken up; e.g. providing them as applicable, with protection canvasses and dust extraction units. Mixing equipment should be well sealed and equipped as per existing standards;
- Regular sprinkling to avoid dust; and
- Regular monitoring of air quality in accordance with NEQS.

6.4.9 Noise

Noise is most pervasive environmental problems in the urban areas especially on the road side. Main sources are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers asphalt plants and other equipment's. Noise generated by construction machinery is likely to affect workers working on the site. This impact is temporary and minor adverse in nature.

The likely impacts due to noise are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels;
- Noisy settings and higher background levels can cause temporary threshold shift and consequent habit of speaking loud, which may cause damage to vocal cords in the persons exposed; and
- Noise produced from moving construction vehicles and blowing of pressure horns, at times, could be intolerable particularly during quite hours of night.

Mitigation

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices;
- Confine excessively noisy work to normal working hours in the day, as far as possible;

- Provide the construction workers with suitable hearing protection like ear cap or earmuffs and train them in their use;
- Preferably, restrict construction vehicles movement during nighttime;
- Heavy machinery like percussion hammers and pneumatic drills should not be used during the night;
- Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained;
- Use of low noise machinery, or machinery with noise shielding and absorption;
- Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures; Noise barriers in sensitive areas in the form of high boundary walls (concrete or wood), earth berms, etc. in front of schools, hospitals/ clinics and mosques; and
- Public hearings to discuss appropriate solutions and materials to control noise (e.g. mud or brick walls, bushes, etc.)

6.4.10 Surface and Groundwater

Surface water might get contaminated due to the disposal of construction waste generated during the project activities and earth and stone work activities. This contamination will not only endanger the aquatic life but may also result in jeopardizing the health of natives that use this water for meeting domestic requirement.

In addition to that, construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating it. Also, the water for construction and consumption may come in conflict with local water demand.

There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly. During the construction phase, the sanitary wastewater will be generated at the workers' camp(s). If this

wastewater is allowed to stagnate in water ponds on the site, it can percolate into the soil, thereby, contaminating groundwater. This impact is temporary and moderate adverse in nature.

Mitigation

- Protection of surface and groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality;
- The solid waste should be disposed of in designated landfill sites to sustain the water quality for domestic requirements;
- Water required for construction should be obtained in such a way that the water availability and supply to nearby communities remain unaffected;
- Conduct regular water quality monitoring according to Drinking Water Quality Standards (DWQS) and determined sampling schedule;
- The contractor should ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged;
- Work on canal areas should be kept to a minimum or protective walls should be constructed;
- Prohibit washing of machinery and vehicles in surface water, provide sealed washing basins and collect wastewater in sedimentation/retention pond; Construction work close to the water bodies should be avoided, especially during monsoon period; and
- Wastes must be collected, stored and taken to approved disposal site.

Spill control

- No refueling, storage, servicing or maintenance of equipment should take place within 150 feet of drainages or other sensitive environmental resources; and
- Any fluids drained from the machinery during servicing will be collected in leak proof container and taken to an appropriate disposal or recycling facility.

6.4.11 Flora

Trees are vital ecosystem, which perform variety of functions for the improvement of environment such as reduction in air pollution, noise

abatement, cooling effect on earth, supply of oxygen etc. Due to the proposed project, about 600 numbers of trees of different species will need to be cut due to the execution of the proposed project.

The trees coming in the ROW are mostly of Kikar (*Acacia Nilotica*), Sufaida (*Eucalyptus*) Borh (*Ficus bengalensis*), Sheesham (*Dalbergia sisso*), Willow (*Salix babylonica*), Simbal (*Salmalica malabarica*) and Jand (*Prosopis spicigera*).

Following impacts are expected on the flora of the project area:

- Trees act as a binding force as their roots are spread in the soil, which helps to keep the soil intact. With the removal of trees, however less, this binding force will be vanished and the soil will be liable to increased erosion;
- During the entire construction period dust laden polluted air will form a dust film on leaves thus blocking the stomata consequently hindering photosynthesis processes causing detrimental effect on the plant health;
- Exhaust of noxious gases from movement of heavy machinery will further pollute air which will adversely affect health of plants;
- Establishment of Contractors camps and warehouses for storage of equipment, material etc. will involve clearing of vegetation from the area, causing an adverse impact; and
- During construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

This impact will be permanent and high moderate negative in nature.

Mitigation

- The indigenous trees most suited to the tract should be re-planted;
- Flowering and fruiting shrubs should be planted along the road to beautify the landscape. Planting would however be done keeping in view the principles of landscape designing;
- An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees;

- The contractor's staff and labour should be strictly directed not to damage any vegetation such as trees or bushes. They should use the paths and tracks for movement and should not be allowed to trespass through farmlands;
- Construction vehicles, equipment's and machinery should remain confined within their designated areas of movement;
- Contractor should supply gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel should not be allowed; and
- Camp sites and asphalt plants should be established on waste/barren land rather than on forested or agriculturally productive land. However if such type of land is not available, it should be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to trees.

6.4.12 Fauna

The usual fauna found in the project area have already been mentioned earlier in Section-4. Due to the implementation of the proposed project, the free movement of fauna would be disturbed. Another impact on the fauna of the project area will be the probable dislocation of the birds/animals (rodents) from their nests and burrows. Birds who have nests on the trees located in the ROW or who frequently visit the project area in search of food may receive an adverse impact and shall have to move to adjoining areas.

Also, due to the leakages/spills from the construction equipment/machinery the local ponds/water storages and canal water from where the animals/birds drink water may get contaminated; thus, endangering the fauna of the project area. The impact may be considered permanent & moderate adverse in nature

Mitigation

- Plantation of large number of trees along the proposed project to regain the ecological habitat;
- New and good condition machinery with minimum noise should be used in construction;
- Noisy work should not be carried out in night time so that there should be no disturbance to local birds and animals;

- Contractor should ensure that the no hunting, trapping of animals should be carried out during construction;
- Borrow pits should be fenced so that no animal can fall into these;
- The camps should be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly waste of the camps should be properly disposed off to prevent the chances of eating by wild animals, which may prove hazardous to them; and
- Special measures should be adopted to minimize impacts on birds such as avoiding noise generating activities during the critical period of breeding.

6.4.13 Disposal of Mucking Material

Inevitable cut and fill earthwork operations will open up scars on the land around the project area. This impact is temporary and minor adverse in nature.

Mitigation

- The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites.

6.4.14 Disruption of Existing Public Utilities/ Infrastructure

There may be some disruption to the already existing utilities like electricity poles, underground telephone lines, power transmission lines etc. in the project area during the construction phase. This impact is, however, temporary and moderate adverse in nature.

Mitigation

- Rehabilitation of existing utilities before construction to avoid any inconvenience to the residents of the project area or provide them with alternate arrangement during the construction period.

6.4.15 Traffic Management

Due to the proposed construction activities, traffic management may pose a challenge in the project area. Movement of vehicles carrying construction materials may result in traffic jams and time delays and cause inconvenience to the people passing through the Project Area. It will also increase the traffic load on the existing road network, thus deteriorating the existing condition of the

road. Also, the movement of vehicles along the haulage routes may cause soil compaction, vegetation pattern and damage to properties and utilities. This impact is temporary and moderate adverse in nature.

Mitigation

- Proper traffic management plan should be implemented to avoid traffic jams/public inconvenience;
- Movement of vehicles carrying construction materials should be restricted during the daytime to reduce traffic load and inconvenience to the local residents/ business owners;
- Coordinate planning of traffic diversions with the traffic police and the Transport Department in accordance with the construction program with advance warnings to the affected residents and road users;
- Availability of continuous services of the traffic police in the diversion and control of traffic; and
- The executing agency is required to maintain liaison between the Highway/ Traffic Police, local residents/ travelers and the contractor to facilitate traffic movement during construction stage.

6.4.16 Impact of Heavy Vehicles on Existing Road Network

The plying of heavy vehicles on existing road network may result in air pollution (if unpaved roads), noise pollution especially near sensitive receptors (residential areas, school, health facilities etc.), and damage to roads and traffic congestion. However, the impacts would be temporary and moderate adverse in nature for which the following mitigation measures are proposed.

Mitigation

- Vehicle with the open load carrying area used for transportation of materials should have properly fitted side and tail boards;
- Materials having potential to produce dust should not be loaded to a level higher than the side and tail boards and should be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and extended to at least 300 mm over the edges of the side and tail board; and
- The contractor should not use any vehicle either on or off road with excessive noise pollution. Noise mufflers should be installed and

maintained in good condition on all motorized equipment's.

6.4.17 Solid & Liquid Waste (Municipal, Construction and Hazardous Waste)

Different types of waste are likely to be generated during the construction phase of the proposed project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, wood, metal pieces and electrical wires. Whereas hazardous waste can be comprise paints and construction chemicals. Due to construction activities waste will also be generated at construction and contractors camp site which may include wastewater, oil spillage from machinery and solid waste etc. Handling and storage of oil, asphalt/bitumen may be a source of environmental pollution as a hazardous waste. This will result in unhygienic conditions, health risk to work force at the camp site.

All these, if left unintended, can become a source of nuisance and environmental pollution in the project area. The impact is considered to be temporary and moderate adverse in nature.

Mitigation

- Wastewater effluent from contractor's workshop and equipment washing yards should be passed through gravel/ sand beds to remove oil/ grease contaminants before discharge;
- Training of work force should be conducted in the storage and handling of materials and chemicals that can potentially cause soil contamination;
- Solid waste generated during construction and camp sites should be safely disposed in demarcated waste disposal sites and the contractor should provide a proper waste management plan;
- Reusable/recyclable (iron bars, aluminum) waste should be sold to waste vendors and those which cannot be sold out may be used as a filling material for leveling the depressions, subject to technical feasibility;
- Debris generated by dismantling of existing pavement structures should be re-used subject to the suitability of the material;
- Ensure proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.;

- Conduct training of employees involved in the transportation of hazardous material regarding emergency procedures;
- Provide the necessary means for emergency response on call 24 hours/day;
- The sewage system for camps should be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters;
- Lined wash areas should be constructed within the camp site or at site, for the receipt of wash waters from construction machinery; and
- Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of waste.

6.4.18 Disturbance to People

Approach/ hindrance problems for the residents/ business owners and movement of the people to the mosque/ shrines will be disturbed during construction activities. This impact is temporary and minor adverse in nature.

Mitigation

- Timely completion of the construction works and provides alternate routes for the areas where the construction is being carried out.

6.4.19 Economic Activity

Due to the construction of the proposed project, economic activity will be generated in the project area as the labourers and semi-skilled staff will have an opportunity to work for the construction of the proposed project. This will help in developing their skills and capacities. This is a moderate beneficial impact.

6.4.20 Maintenance of Construction Equipment

Improper maintenance of construction equipment may lead to safety and environmental hazards like groundwater and soil contamination or injury to workers. This impact is temporary and moderate negative in nature.

Mitigations:

- Place substantial blocking under any chain-hoist-suspended or jack supported equipment under which people must work. (The operator of

trenching equipment should never leave the controls while shovels are suspended without blocking);

- No work should occur in areas where passing automobiles or moving machinery result in a hazardous condition;
- All work areas should be provided with proper ventilation. Employees shall not work in areas where they are exposed to excessive carbon monoxide gas from exhausts of running engines;
- Gasoline should not be kept in open containers or pits;
- Use a reasonably nontoxic solvent with a high flash point for cleaning parts and never use gasoline;
- Keep wrenches or tools clean and in safe working condition;
- Secure unbolted heavy parts or engines if necessary to leave the work;
- Always keep a suitable fire extinguisher ready. Inspect fire extinguishers regularly, and keep them in good operating order;
- Ground electric appliances, keep them in good working condition, and ensure that sparking will not ignite gases or vapors. Do not permit live cords to touch workers;
- Put oily rags in closed metal containers for disposal after use; and
- The maintenance workshop must be equipped with washing yards for cleaning of heavy equipment and septic tanks/soakage pits for the treatment of waste water.

6.5 Anticipated Impacts during Operational Phase

The anticipated impacts related to the proposed project have been studied for the operational phase and discussed hereunder.

6.5.1 Flora

No negative impacts are envisaged on the flora of the area during the operational phase. However, improper maintenance of the saplings planted against the trees cut for the proposed project may adversely affect the growth of those saplings which were planted to improve the environmental aesthetics of the project area. Raising of new trees in four rows on either side of the proposed project, will render a positive impact on the flora of the area and will also cause a beneficial impact on the landscape of the area, which will be of permanent in

nature.

Presence of adequate flora will absorb noxious hydro-carbon gases, through photosynthesis, emitted from an expected large number of cars, vehicles and public transport, thus purifying air of hazardous particles.

Mitigation

- The saplings planted in the project area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients;
- An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees; and
- Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides.

6.5.2 Fauna

The project activities will bring some adverse impacts on the fauna of the project area such as the uneasiness of movement and increased probability of accidents, if the animals/livestock approach the proposed project. This impact is permanent and high adverse in nature. Noise and air pollution caused due to heavy and fast traffic will be the source of disturbance to the fauna of the project area and especially to the avifauna of the area, which is an another high adverse impact.

Raising of dense plantation of shady trees on both sides of the proposed project will provide resting, nestling and roosting habitat to the avifauna which is a high beneficial impact

Mitigation

- Provision of animal/ livestock crossings after some distances to facilitate their movement; and
- Installation of sign boards indicating the sensitive areas for the road users to avoid accidents.

6.5.3 Surface and Groundwater

No major adverse impact on surface and groundwater is anticipated during the

operational phase with the exception of some occasional oil spills, which may be restricted up to the road surface.

6.5.4 Air Quality

The existing dust pollution will be reduced drastically by operation of the project due to improvement in road condition but it will be short termed. However, in the longer run, increased traffic levels and congestion will lead to PM10 pollution levels above the national standards, which may result in causing public health risks, nuisance and other impacts on bio-physical environment. These conditions will result in the rise of vehicular emissions (CO, NO_x, SO_x, PM10) associated with the adverse effects on the environment and humans. This impact is permanent and moderate beneficial during operational phase of the proposed project.

6.5.5 Noise

During the operational phase, the noise levels are anticipated to increase due to traffic related noise pollution; vibrations from movement of heavy vehicles and mainly use of pressure horns. This impact is permanent and minor adverse in nature.

Mitigation

- Noise measurements should be carried out at locations and schedule specified in the Environmental Management Plan (EMP) to ensure the effectiveness of mitigation measures;
- Signs for sensitive zones (health centers/ educational institutions etc.) to disallow the use of pressure horns; and
- Enforcement and penalties against traffic rules violators.

6.5.6 Road Safety

Enhanced vehicular movement and speed in the long run may result in road safety issues like traffic accidents. This impact is permanent but moderately adverse in nature, since the frequency of accidents may be lowered, but their intensity may be quite severe due to enhanced speeds at which vehicles will move. The impact may be considered permanent and high adverse in nature.

Mitigation

- Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic) and enforcement of penalties for the violators.

6.5.7 Landscape

At present, the landscape of the project area is dominated by agricultural area with small cluster of trees. However, after the construction of the proposed project, the landscape of the project area will be changed in terms of road infrastructure and planned plantation of trees along the road. This will permanently change the landscape of the project area and at the same time will have a beneficial impact in terms of socio-economic development of the project area.

6.5.8 Drainage

During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public due to flooding of the drainage. In case of chocking of road drainage, the increased surface runoff due to heavy rains will accumulate on the project road and can cause traffic jams. The impact may consider to be moderate adverse in nature.

Mitigation

- The impact can be controlled/ reduced by timely and continuous maintenance/ cleaning of the drainage system; and
- Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain.

SECTION – 7

ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

7.0 General

This Section provides an overall approach for managing and monitoring the potential environmental and social impacts and describes the institutional framework and resource allocations to implement these measures. The main objectives of the Environmental Monitoring and Management Plan (EMMP) are:

- Provide the details of the Project impacts along with the proposed mitigation measures and the corresponding implementation activities;
- Define the role and responsibilities of the Project Proponent, Contractor, Supervisory Consultants and other role players and effectively communicate environmental issues among them;
- Define a monitoring mechanism, reporting frequency and identify monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented; and
- Identify the resources required to implement the EMMP and outline the corresponding financing arrangements.

For effective environmental management, the Client should assign the necessary responsibilities to an Environmental Committee (EC) through Project Director NHA, who will be responsible for implementation of the EMMP. The Project Director will be assisted by an Environmental Expert and a Social Expert in implementing the mitigation measures proposed in EMP.

7.1 Environmental Committee and its Responsibilities

NHA will form up an Environmental Committee (EC), which will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed project. EC will consist of Environmental Expert by the Contractor, Supervision Consultant (SC) and NHA. The responsibilities of the Environmental Committee (EC) are as follows:

- To ensure implementation of all the proposed mitigation measures proposed in EMMP during the construction of the Project;
- To organize routine monitoring of air quality, traffic, noise and vibration; etc. In case, the noise and emission levels exceed the acceptable levels; a penalty or ban must be enforced;
- To develop operational guidelines and implementation schedule;
- Receiving complaints from residents and institutions and assisting the local environmental authority including liaison with EPA Punjab; and
- To ensure that the proposed project is implemented in an environment friendly manner, causing least harm to the existing environment.

7.2 Environmental Management and Monitoring Plan (EMMP)

The EMMP provides the framework for the implementation of the mitigating measures and environmental management and monitoring during the construction and operational phases of the proposed project. **Table 7.1** portrays impacts, targets, mitigations and the responsible organizations for the implementation of the mitigation measures during the construction and the operational phases.

Table 7.1 Environmental Management Plan

Sr. No.	Project Component or Impact	Target	Mitigation	Responsibility	
				Design Consultant	Concerned Department
A. PRE-CONSTRUCTION/ DESIGN PHASE					
1	Topography	To ensure minimum changes in the topography of the project area	Project design should consider aesthetic concerns.	Prepare topographic survey plans with tentative alignment	District administration shall ensure the preservation of the original topographical configuration without alteration.
2	Formation width in built-up areas	To minimize the hindrance for the local people; and To lessen the density of traffic.	- Incorporate technical design features that allow flexible shoulder width in villages; and - Explore the incorporations of additional underpasses	Prepare Geometric Design with plan and profile drawings	District administration is mandated to ensure strict adherence to the

					design parameters as sanctioned by the design consultant.
3	Land Acquisition	To minimize land acquisition	- Careful alignment selection by the designer to minimize the impact; and - Also adequate budget will be provided in the Project cost for the compensation to the affected people as per Land Acquisition Act, 1894	List of Land Acquisition areas and utilities prepared has been attached in Annex-VI of EIA report	Land Acquisition Controller / NHA shall acquire land as per SOP of Government of Pakistan
4	Flora	To avoid/minimize tree cutting	- Incorporate technical design measures to minimize removal of trees, if possible, such as change in alignment; - Plan for compensatory planting for four (4) trees against each fallen tree of similar floral function; and - Disallow introduction of exotic species with known environmental setbacks (Eucalyptus)	An estimated number of removal of trees has been included in BOQ and the same has been mentioned in Executive summary of EIA	Forest Department shall replant trees as per SOP of Govt of Pakistan

				Report	
5	Social Disturbance	To minimize the entry/exit problems of the locals in the Project Area	Mitigation measures will include provision of pedestrian overhead bridges (after every 2 to 3 kilometers) in the design to minimize the impact.	In current design considerations, there is no immediate requirement for the implementation of overhead bridges. However, such structures would be provided in future, if need arise	District administration / Punjab Police shall oversee any site-related social disturbances in accordance with the (SOP) established by the Govt of Pakistan
6	Public Utilities	To avoid disturbance to the public	- Incorporate technical design features to minimize effect on public utilities; and - All public utilities (e.g., sewage, drainage/water pipes, power transmission lines, underground telephone lines, etc.) likely to be affected by the proposed project, need to be relocated well before the	List of public utilities prepared has been attached in Annex-VI of EIA report	NHA along with respective departments shall relocate utilities as per SOP of Govt of Pakistan

			commencement of construction work.		
7	Loss of business	To avoid the loss of private property and economic loss.	• Incorporate technical design features to minimize the project construction activities to avoid the loss of private property if possible; and • In case of unavoidable interference prior notification and consultation needs to be made to reach consensus on procedures and options or any other form of agreed judicious compensation with the concerned stakeholders/affectees.	Our design considerations prioritize the minimization of private property encroachment on the project site to the greatest extent possible.	NHA / District administration shall be responsible for the supervision and mitigation of any instances involving the loss of private property and economic losses on-site, adhering to the (SOP) as stipulated by the Govt of Pakistan.
8	Surface/ Water Resources	To avoid/ minimize the contamination of surface water body and drain.	• Provision of septic tanks in the design to treat the wastewater; • Provision of adequate drainage network to reduce infiltration; and • Provision of storm water drainage system with adequate capacity.	Total water requirement and wastewater generation	WASA Department shall ensure the proper disposal and

				calculations has been mentioned on page 3-17 and 3-18 of EIA report	avoidance of contamination.
10	Traffic Management	To minimize traffic problems in the Project Area.	• Proper traffic management plan should be formulated and announced before the construction to avoid traffic jams/public inconvenience.	Proper Traffic management plan prepared has been attached in Annex-IX of EIA report	To be implemented by Construction Contractor and supervised by NHA
11	Solid waste	To minimize odour, spreading of diseases and clogging of canal and drain.	• Waste management plan shall be devised including provision of waste bins, defining collection frequencies, allocating personnel and defining safe disposal options.	Proper Waste management plan prepared has been attached in Annex-IX of EIA report	To be implemented by Construction Contractor and supervised by NHA
12	Resource Conservation	To reduce the use of non-renewable resources.	• Proper planning for reduction of wastage of water should be done; • Provision of adequate insulation to reduce heat loss through batching	Total water requirement and wastewater	NHA to ensure that proper disposal should be

			plants; and using practical excess air volumes • Planning for regular monitoring of CO and CO2 content of the flue gases to verify that combustion systems are using practical excess air volumes	generation calculations has been mentioned on page 3-17 and 3-18 of EIA report	made
B. CONSTRUCTION STAGE					
Sr. No	Project Component or Impact	Target	Mitigation	Responsibility	
1	Topography	To minimize adverse impact to topography of the Project Area	• Where the use of agricultural land is unavoidable, the top 30 cm of the plough layer will be stripped of and stockpiled for redressing the land after the required borrow material has been removed; • Where deep ditching is to be carried out, the top 1m layer of the ditching area will be stripped and stockpiled. The ditch will initially be filled up with scrap material from construction and then leveled with the stockpiled topsoil; • Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize erosion and to avoid creating hazards for people; and • Landowners will be compensated	CC, SC EC	

			according to the terms of lease agreements negotiated with them and the restoration actions agreed upon by the Contractor will be duly carried out.	
2	Soil	To minimize soil erosion and contamination	• Low embankments will be protected by planting Vetiver grass that can flourish in relatively dry conditions; • Soil contamination by asphalt will be minimized by placing all containers in caissons; • All spoils will be disposed off as desired and the site will be restored back to its original conditions before handing over; • Non- bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for the dumpsites, and covered; • Productive land or land adjacent to agricultural land may not be preferred for excavation; and • Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference for borrowing materials.	CC, SC EC, NHA
3	Land Acquisition	To provide compensation to the affectees.	• Provide judicious compensation to the affectees by providing sufficient budget	LAC

			in the project cost. The process of land acquisition and compensation should be followed in a transparent manner to minimize the impacts.	
4	Construction Camps/ Camp Sites	To minimize loss of assets and vegetation/ trees due to construction of construction camps.	• The contractor(s) should provide plan for removal & rehabilitation of site upon completion; • Photographical and botanical inventory of vegetation before clearing the site; and • Compensatory plantation to be scheduled when construction works near end.	CC, SC, EC, NHA
5	Health and safety of workers and communities	To minimize health risks	<i>Health & Safety of workers:</i> • Obligatory insurance against accidents for labourers/workers; • Provide basic medical training to specified work staff and basic medical service and supplies to workers; • Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents; • Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers; • Protection devices (ear muffs) should be provided to the workers doing job in	CC, SC, EC

			the high noise areas; • Provision of adequate sanitation, washing, cooking and dormitory facilities; • Proper maintenance of facilities for workers will be monitored; • Provision of protective clothing i.e. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. for labourers handling hazardous materials; • Ensure strict use of wearing these protective clothing during work activities; • Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites; and • Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic in Lundianwala Area and other access roads. <i>Community Health & Safety:</i> • There should be proper control on construction activities and oil spillage/ leakage from construction vehicles/ machinery. • The labour works with different transmittable diseases should be restricted within the construction site;	

			• Timely public notification on planned construction works; • Close consultation with local communities to identify optimal solutions to maintain community integrity & social links; • Fencing around the camps should be strong enough so that it cannot be broken easily by local people for making passages; and • Use of water should not disturb public water availability and source of water should be selected carefully.	
6	Borrow/Open Pits	To avoid land disputes and to minimize soil erosion	• Borrow pits will be restored with the consent of owners and one possible option provided will be conversion of pits to fish farms; • Necessary permits must be obtain for any borrow pits from the competent authorities; • Care must be taken in selection of borrow area so that it is not posing any threat /danger to road construction, stability and safety; • In borrow pits the depth of the pit will be regulated so that the sides of the excavation will have a slope not steeper than 1:4; • Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands; and	CC, SC, EC

			• In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites	
7	Air Quality	To minimize air pollution	• All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions; • Open burning of solid waste from the Contractor's camps should be strictly banned; • Preventive measures against dust should be adopted for on-site mixing and unloading operations. Regular sprinkling of the site by water should be carried out to suppress excessive dust emission(s); • Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions; • Quarry areas and asphalt plants should be located at least 500m downwind from populated areas, wildlife habitats and contractor's camps to minimize the impact of dust emissions; • Asphalt, hot mix and batching plants should be equipped with dust control	CC, SC EC

			equipment such as fabric filters or wet scrubbers to reduce level of dust emissions; • NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works; • Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants should be taken up; e.g. providing them as applicable, with protection canvasses and dust extraction units. Mixing equipment should be well sealed and equipped as per existing standards; • Regular sprinkling to avoid dust; and • Regular monitoring of air quality in accordance with NEQS	
8	Noise	To minimize noise pollution	• Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices; • Confine excessively noisy work to normal working hours in the day, as far as possible; • Provide the construction workers with suitable hearing protection like ear cap or earmuffs and train them in their use; • Preferably, restrict construction vehicles movement during nighttime;	CC, SC and EC

			• Heavy machinery like percussion hammers and pneumatic drills should not be used during the night; • Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained; • Use of low noise machinery, or machinery with noise shielding and absorption; • Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures; • Noise barriers in sensitive areas in the form of high boundary walls (concrete or wood), earth berms, etc. in front of schools, hospitals/ clinics and mosques; and • Public hearings to discuss appropriate solutions and materials to control noise (e.g., mud or brick walls, bushes, etc.); and	
9	Surface & Groundwater	To avoid contamination of surface and groundwater and to avoid use of canal water in construction work.	• Protection of surface and groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality; • The solid waste should be disposed of	SC and EC, CC

			in designated landfill sites to sustain the water quality for domestic requirements; • Water required for construction should be obtained in such a way that the water availability and supply to nearby communities remain unaffected; • Conduct regular water quality monitoring according to Drinking Water Quality Standards and determined sampling schedule; • The contractor should ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged; • Work on canal areas should be kept to a minimum or protective walls should be constructed; • Prohibit washing of machinery and vehicles in surface water provide sealed washing basins and collect wastewater in sedimentation/retention pond • Construction work close to the water bodies should be avoided, especially during monsoon period; and • Wastes must be collected, stored and taken to approved disposal site. <i>Spill Control</i> • No refueling, storage, servicing or maintenance of equipment's should	

			take place within 150 feet of drainages or other sensitive environmental resources; and Any fluids drained from the machinery during servicing will be collected in leak proof container and taken to an appropriate disposal or recycling facility.	
10	Flora	To minimize the impact on flora	- The indigenous trees most suited to the tract should be re-planted; - Flowering and fruiting shrubs should be planted along the road to beautify the landscape. Planting would however be done keeping in view the principles of landscape designing; - An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees; - The contractor's staff and labour should be strictly directed not to damage any vegetation such as trees or bushes. They should use the paths and tracks for movement and should not be allowed to trespass through farmlands; - Construction vehicles, equipment's and machinery should remain confined within their designated areas of movement; - Contractor should supply gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel should	CC, SC, NHA

			not be allowed; and • Camp sites and asphalt plants should be established on waste/barren land rather than on forested or agriculturally productive land. However, if such type of land is not available, it should be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to the trees	
11	Fauna	To minimize the impact on fauna and avi- fauna and their dislocation	• Plantation of large number of trees along the proposed project to regain the ecological habitat; • New and good condition machinery with minimum noise should be used in construction; • Noisy work should not be carried out in night time so that there should be no disturbance to local birds and animals; • Contractor should ensure that the no hunting, trapping of animals should be carried out during construction; Borrow pits should be fenced so that no animal can fall into these; • The camps should be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly waste of the camps should be properly disposed off to prevent the chances of eating by wild animals, which may prove hazardous to them; and	CC, SC, EC

			• Special measures should be adopted to minimize impacts on birds such as avoiding noise generating activities during the critical period of breeding.	
12	Disposal of mucking material	To minimize the scars on the land in the project area	• The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites.	CC, SC, EC
13	Disruption of existing public utilities and infrastructure	To minimize the disturbance to public utilities and infrastructure	• Rehabilitation of existing utilities before construction to avoid any inconvenience to the residents of the project area or provide them with alternate arrangement during the construction period.	CC, SC, EC
14	Traffic Management	To minimize traffic problems in the project area	• Proper traffic management plan should be implemented to avoid traffic jams/public inconvenience • Movement of vehicles carrying construction materials should be restricted during the daytime to reduce traffic load and inconvenience to the local residents/ business owners; • Coordinate planning of traffic diversions with the traffic police and the Transport Department in accordance with the construction program with advance warnings to the affected residents and road users; • Availability of continuous services of the traffic police in the diversion and control of traffic; and • The executing agency is required to	CC, SC, EC, Traffic Police

			maintain liaison between the Highway/ Traffic Police, local residents/ travelers and the contractor to facilitate traffic movement during construction stage.	
15	Maintenance of Construction Equipment	Improper maintenance of construction equipment may lead to safety and environmental hazards like groundwater and soil contamination or injury to workers	• Place substantial blocking under any chain-hoist-suspended or jack supported equipment under which people must work. • All work areas should be provided with proper ventilation. • Always keep a suitable fire extinguisher ready. • Put oily rags in closed metal containers for disposal after use • Secure unbolted heavy parts or engines if necessary to leave the work	CC, SC, EC
16	Impact of heavy vehicles on existing roads network	To minimize air and noise pollution, traffic congestion and damage to roads	• Vehicle with the open load carrying area used for transportation of materials should have properly fitted side and tail boards; • Materials having potential to produce dust should not be loaded to a level higher than the side and tail boards and should be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and extended to at least 300 mm over the edges of the side and tail board; and • The contractor should not use any vehicle either on or off road with excessive noise pollution. Noise	CC, SC, EC

			mufflers should be installed and maintained in good condition on all motorized equipment's.	
17	Solid & liquid waste (municipal, construction and hazardous waste)	To minimize the impact on soil and water resources	• Wastewater effluent from contractor's workshop and equipment washing yards should be passed through gravel/ sand beds to remove oil/ grease contaminants before discharge; • Training of work force should be conducted in the and handling of materials and chemicals that can potentially cause soil contamination; • Solid waste generated during construction and camp sites should be safely disposed in demarcated waste disposal sites and the contractor should provide a proper waste management plan; • Reusable/recyclable (iron bars, aluminum) waste should be sold to waste vendors and those which cannot be sold out may be used as a filling material for leveling the depressions, subject to technical feasibility; • Debris generated by dismantling of existing pavement structures should be re-used subject to the suitability of the material; • Ensure proper labelling of containers, including the identification and quantity of the contents, hazard contact	CC, SC, EC

			information etc.; • Conduct training of employees involved in the transportation of hazardous material regarding emergency procedures; • Provide the necessary means for emergency response on call 24 hours/day; • The sewage system for camps should be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters; • Lined wash areas should be constructed within the camp site or at site, for the receipt of wash waters from construction machinery; and • Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of waste.	
18	Disturbance to people	To minimize the disturbance (hindrance in free movement) to people in the project area	• Timely completion of the construction work and provide alternate routes for the areas where the construction is being carried out.	CC, SC, EC
C. OPERATIONAL STAGE				
1	Flora	Proper maintenance of saplings planted	• The saplings planted in the project area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients;	NHA

			• An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees; and • Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides.	
2	Fauna	To provide alternate crossings for animals and livestock	• Provision of animals/livestock crossings after every some distances to facilitate their movements; and • Installation of sign boards indicating the sensitive areas for the road users to avoid accidents	NHA, Traffic Police
3	Noise	To minimize noise pollution	• Noise measurements should be carried out at locations and schedule specified in the Environmental Management Plan (EMP) to ensure the effectiveness of mitigation measures; • Signs for sensitive zones (health centers/educational institutions etc.) to disallow the use of pressure horns and • Enforcement band penalties against traffic rules violators	NHA, EPA Punjab
4	Road safety	To control speed violation	• Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic) and enforcement of penalties for the violators.	Traffic Police

5	Drainage	To avoid chocking, flooding and nuisance to public.	• The impact can be controlled/ reduced by timely and continuous maintenance/ cleaning of the drainage system; and • Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain.	NHA

KEY

DC Design Consultant
 CD Concerned Department
 CC Construction Contractor
 SC Supervision Consultant

EC Environmental Committee
 NHA National Highway Authority
 EPA Environmental Protection Agency
 LAC Land Acquisition Collector

7.3 Environmental Monitoring

Environmental Monitoring is undertaken during both the construction and operational phases to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters are selected and quantitative analysis is carried out. The results of analysis are compared with the guidelines; standards and pre-project condition to investigate whether the EMP and its implementation are effective for the mitigation of impacts or not. Parameters to be analyzed during construction and operation of the proposed project and responsibilities for monitoring and reporting have been discussed below. A cost estimate for this measurement of parameters is given in **Table 7.2**.

7.3.1 Construction Phase

a) Air Quality

Air quality monitoring will be carried out on quarterly basis during the construction phase for the parameters CO, NOR, SO₂ and PM₁₀.

b) Ground Water Quality

Ground water quality monitoring will be done quarterly during the construction phase and will be in accordance to Drinking Water Quality Standards (DWQS).

c) Wastewater Quality

Wastewater quality will be monitored quarterly during the construction phase. The parameters will be monitored according to NEQS for wastewater.

d) Surface Water Quality

Surface water quality will also be monitored quarterly during the construction phase.

e) Noise Level

The noise level monitoring will be carried out quarterly during the whole construction period for the proposed project and will be in accordance to NEQS for noise

7.3.2 Operational Phase

a) Air Quality

Air quality monitoring will be done bi-annually during the operational phase of the proposed project. The parameters will be monitored are CO, NO_x, SO₂ and PM₁₀.

b) Ground Water Quality

Ground water quality monitoring will be done bi-annually during the operational phase and will be in accordance to Drinking Water Quality Standards (DWQS).

c) Wastewater Quality

Wastewater quality will be monitored bi-annually. The parameters will be monitored according to NEQS for wastewater.

d) Surface Water Quality

During the operational phase, surface water quality monitoring will be carried out biannually.

e) Noise Level

The noise level monitoring will be carried out bi-annually during the operational phase and the resulting values will be compared with NEQS for noise.

7.3.3 Responsibilities for Monitoring and Reporting

The EC will be responsible for environmental monitoring and reporting throughout the construction and operational phase. A monitoring report will be prepared on monthly basis and one comprehensive report will be prepared at the end of the project construction phase and a comprehensive quarterly report will also be prepared and submitted to the EPA-Punjab for the first year of the project. Contents of the final report will include results of environmental monitoring in comparison to the standards for the various parameters, location and sampling time along with recommendations for the future projects. One report will be submitted during the construction phase to each of the following authorities and institutions: (i) NHA and (ii) EPA-Punjab whereas, one report will be submitted to EPA-Punjab during the operational phase.

Table 7.2 Budget Estimate For Environmental Monitoring During The Construction & Operational Phase

Components	Parameters	Quantity (No. of samples x No. of locations x Frequency)	Frequency	Responsibility	Duration	Cost (Rs.)
Construction phase (1.5 year)						
Air quality	CO, NO _x , SO ₂ , PM ₁₀	1x1x4 = 4	Quarterly @ Rs. 25,000/ sample	Contractor & SC	24 hours	100,000
Ground water quality	According to Drinking Water Quality Standards	1x1x4 = 4	Quarterly @ Rs. 25,000/ sample	Contractor & SC		120,000
Noise level		1x1x4 = 4	Quarterly @ Rs. 4,000/ point	Contractor & SC	24 hours	16,000
TOTAL						236,000
Operational phase (1 year)						
Air quality	CO, NO _x , SO ₂ , PM ₁₀	1x1x2 = 2	Bi-annual @ Rs. 25,000/ sample	NHA & EPA Punjab	24 hours	50,000
Ground water quality	According to Drinking Water Quality Standards	1x1x2 = 2	Bi-annual @ Rs. 30,000/ sample	NHA & EPA Punjab		60,000
Noise level		1x1x2 = 2	Bi-annual @ Rs. 4,000/ point	NHA & EPA Punjab	24 hours	8,000
TOTAL						118,000

Components	Parameters	Quantity (No. of samples x No. of locations x Frequency)	Frequency	Responsibility	Duration	Cost (Rs.)
GRAND TOTAL						354,000

KEY

SC – Supervision Consultant

NHA – National Highway Authority

EPA – Environmental Protection Agency

7.4 Tree Plantation Plan

Tree plantation plan has been prepared for the proposed project keeping in view the design and length of the project. This plan is based on best possible estimations and can be modified accordingly at the execution stage. A total number of 1200 trees are to be planted in linear pattern, keeping the distance from plant to plant as 50 meters for 60 km length of the proposed project.

Plantation Cost

The cost of raising 500 plants has been estimated as Rs. 857,500/- including price of plants, earthwork, procurement of manures, continued supply of water to young plants throughout the year and its maintenance for five (5) years. Break-up of expenditure of 500 plants@ Rs.500/- per diem is as follows:

Table 7.3: Estimated Cost of Plantation of 500 Plants for First Year

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	Layout	1 km	2 MD/Av.km	1000
2	Digging of Pits 2.5 ft. each 2.5x500 =1500 cft.	1500 cft.	10 MD/Av.km	5000
3	Cost of plants including	500 No.	Rs.750/- plant	375000
4	Cost of planting of plants	500 No.	Rs. 10/- plant	5000
5	Carriage of plants from private nursery to site including loading/unloading	500 No.	Rs. 5/- plant	2500
6	Cost of Manure and Bhall (silt) including carriage	600	Lump Sum	5000
7	H/watering 50 times 500x50 with water bowser, one driver and one coolie	25,000 no's.	5 MD/per 1000	62500
8	Weeding twice 500x2	1200 no.	5 MD	2500

9	Reopening of Pits twice (500x2)/cft/pit	1200 cft.	5 MD	2500
10	Unforeseen	---	---	1000
Total				462,000

Table 7.4: Estimated Cost of Plantation of 20% of First year (100) plants and their Maintenance for Second Year

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	Cost of Plants 20% Restocking	100 No.	Rs.750/- plant	75,000
2	Cost of planting	100 No.	Rs. 10/- plant	1000
3	Carriage of plants	100 No.	Rs. 5/- plant	500
4	H/watering 30 times with water bowser, one driver and one coolie	25,000 no.	5 MD/per 1000	75000
5	Reopening of Pits twice (500x2)	1200 cft.	5 MD	2,500.00
6	Weeding twice 500x2	1200 no.	5 MD	2,500.00
7	Unforeseen	---	---	1000
Total				157,500.00

Table 7.5: Estimated Cost of Plantation of 10% (100) plants and Maintenance for Third Year

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	Cost of Plants 10% Restocking 100 No.	100 No.	Rs.750- plant	75,000.00
2	Cost of planting	100 No.	Rs. 10/- plant	1000
3	Carriage of plants	100 No.	Rs. 5/- plant	500
4	H/watering 40 times	20000	5 MD/1000	50,000
5	Reopening of Pits twice (500x2)	1000 cft.	5 MD	2,500.00
6	Unforeseen	---	---	1000
Total				130,000.00

Table 7.6: Estimated Cost for maintaining 500 plants for Fourth Year

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	H/watering 40 times	20000	5 MD/1000	50,000
2	Pruning and cleaning of plants	1200 cft.	5 MD	2,500.00
3	Unforeseen	---	---	1500
Total				54000

Table 7.7: Estimated Cost for maintaining 500 plants for Fifth Year

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	H/watering 40 times	20000	5 MD/1000	50,000
2	Pruning and cleaning of plants	1200 cft.	5 MD	2,500.00
3	Unforeseen	---	---	1500
Total				54000

Total cost for raising 500 plants & Maintenance for 5 years = Rs. 857500/-

Cost for raising 1 plant & its maintenance for 5 years = Rs. 1715/-

Total cost for raising 1200 plants including Maintenance for 5 years = Rs. 2,058,000/-

7.5 Environmental Technical Assistance and Training Plan

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. The EC should play a key role in this respect and arrange the trainings.

An environmental and social training and Technical Assistance (TA) program is to be carried out before the implementation of the project. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. A suitable training program is proposed to train the

Contractor(s) staff who will be involved in the construction phase and the professional staff from the client involved at the operational stage of the project.

The NHA will direct its Environment Cell to manage the environmental training program. The objective of this will be, to help in establishment of appropriate systems, and to train senior NHA staff and EC responsible for managing environment, operations, and planning, who can then impart training at a broader level within and outside the NHA (i.e., the training of trainers). The Environment Professionals engaged from the Environment Cell will organize training courses for NHA and contractor staff to train them in specialized areas such as air and noise pollution monitoring; develop environment operation manuals in consultation with the EPA, Punjab. The details of this training program are presented in **Table 7.8**.

Table 7.8 Personnel Training Program/ TA Services

Provided by	Contents	Trainees/Events	Duration
Environment Cell/ organizations specializing in environmental management and monitoring	Short seminar and a course on: Environmental laws and regulations, daily monitoring and supervision	One seminar for NHA and contractor project staff	2 days
Environment Cell / organizations Specializing in social management and monitoring	Short seminar and course on: Social awareness	One seminar for project staff dealing in Social/lands matters	2 days
Environment Cell/ organizations specializing in Occupational, health and safety issues	Short lecture relating to Occupational Safety and Health	One seminar for contractor's staff	2 days

7.6 Environmental Monitoring, Mitigation and Training Cost

The cost required to effectively implement the mitigation measures is important for the sustainability of the Project both in the construction and operational phases of the Project.

These costs are summarized in **Table 7.9** and the break-up for Health Safety & Environment cost is given in **Table 7.10**.

Table 7.9 Environmental Mitigation and Monitoring Cost

Sr. No.	Activity	Basis	Cost (Rs.)
1	Medical screening for workers	Rs. 1200 for 80 employees	96,000
2	Drinking water analysis	Rs. 20,000 for microbiological and chemical analysis for one sample collected quarterly for 18 months from one (01) camp site	120,000
3	Material Storage, handling and use	Five (05) No. of tarpaulins of Rs. 20,000 each	100,000
4	Handling/ transportation of hazardous material	Rs. 12,000/month for a period of 18 months will be required for transportation of material	216,000
5	Handling of solid waste	Rs.10,000 per month (two trips per month) for a period of 18 months, which includes the cost of collection, transportation and disposal to the designated site	180,000
6	Excavation, cutting and filling	Rs. 5000 for 50 hay bales are estimated	250,000
7	Health & Safety of Workers	For 80 employees for the provision of dust masks, safety shoes, gloves, first aid box, ear plugs, safety helmets and safety jackets (Hi Vis) And Provision of dust bins, warning tap, safety cones, safety sign boards and water sprinkling	7,558,000
8	Environmental Monitoring Cost	Air water, noise (From Table 7.2)	354,000
9	Tree plantation and maintenance for five (05) years	----	2,058,000
Grand Total			10,980,000

Table 7.10 Break-up for Health Safety & Environment cost (Serial No. 7 of Table 7.9)

Items	Quantity	Cost / Item (Rs.)	Total Cost (Rs.)
(A) Personal Protective Equipment			
Dust Masks	5760	20	115,200
Safety Shoes	240	1200	288,000
Gloves	2900	200	576,000
First Aid Box	2	2000	4,000
Ear Plugs	1440	30	43,200
Safety Helmets	80	800	64,000
Safety Jackets (Hi Vis)	160	400	64,000
Sub Total (A)			1,154,000
(B) Others			
Provision of Dust Bins	120	1000	120,000
Warning Tape	50	500	25,000
Safety Cones	40	1000	40,000
Safety Sign Boards	20	1200	24,000
Water Sprinkling	2 times/day	15000	5,475,000
Rain Coat	240	2000	480,000
Gum Boots	240	1000	240,000
Sub Total (B)			6,404,000
Total (A) + (B)			7,558,000

Time required for Construction = 18 months

No. of labour required during construction = 80

(A) Personal Protective Equipment's PPEs

Dust Mask	1 dust mask to be used in a week by each labourer
Safety Shoes	1 safety shoe for six months for each labourer
Gloves	2 pair of gloves for each labourer for a month
First Aid Box	1 first aid box for every 50 labourers
Ear Plug	1 set of ear plug to be used for 1 month for each labourer
Safety Helmet	1 safety helmet for each labourer for 18 months
Safety Jackets (Hi Vis)	2 safety jackets (Hi Vis) for each labourer for 18 months

(B) Others

Dust Bin	1 after every 500 m
Water sprinkling	for the whole construction period (18 months)
Rain Coat	1 rain coat for each labourer for six months
Gum Boots	1 gum boot for each labourer for six months

The Environmental Mitigation and Monitoring cost will be **Rs. 10,980,000** or **Rs. 10.98 Million**

SECTION 8

CONCLUSION AND RECOMMENDATIONS

8.0 General

This section presents conclusions of the EIA Report. Overall Project has been conceived to provide easement to traffic from More Khunda to Habo Ky Bala.

The conclusions mentioned below are based on the findings of detailed environmental assessment, which has been carried out as per requirement of Provincial EPA-Punjab.

8.1 Identification of the Main Issues and Concerns

During the field surveys, significant efforts were made to identify the main social, cultural and environmental issues related to the widening/rehabilitation of the existing road. Social surveys and public consultations were also conducted with area resident/stakeholders. Following is the list of main issues and concerns:

- Land acquisition for construction of cutting of trees falling within the proposed corridor;
- Disturbance to the public movement during construction;
- Reduction in the daily routine activities of local residents during construction;
- Noise and air pollution due to the operating of construction machinery during construction phase of the Project;
- Provision of proper diversion arrangements during construction stage;
- Solid waste generation during construction;
- Oil spillages from construction machinery, resulting in soil and groundwater contamination; and
- Loss of fertile agricultural land due to the proposed Project.

8.2 Conclusions

After the execution of the proposed project, people living in the project area and the road user/ travelers will get the following benefits:

- Overall safety of passengers will be increased.
- Less time will be required for travelling and reaching the destination.
- During the construction phase, local labor will be accommodated in the construction activities.
- Less fuel consumption will be another positive impact of the project.

Overall, the proposed Project will have a positive and healthy improvement on socio-economic environment of the project area.

8.3 Recommendations

Finally on the basis of EIA study conclusion, following recommendations must be taken care prior to any of the decision about execution of the project:

- A proper judicious compensation to the land and structure affectees must be given to the respective owners;
- A proper traffic diversion plan must be formulated and conveyed to the road users;
- Tree plantation plan must be followed during operational phase;
- Operation and maintenance of the drainage structures and road wear and tear must be done periodically;
- Health and safety plan for the workers must be followed during construction phase; and
- Environmental compliance during the construction phase of the project must be done for which EMP must be a part of the construction contract document.

Annexure I

Ambient Air Monitoring Reports

SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

Ambient Air Quality Monitoring

Client Name: Feasibility Study and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib.

Monitoring Date: 17-08-2023 to 18-08-2023

Monitoring Point: Kot Hidayat Nankana Sahib

Monitoring Location: 31°10'35.25"N
73°36'47.14"E

Report Issue Date: 24-08-2023

Reference Number: EHS-LHR-327/23/AA3

Results are as under

Sr.#	Parameters	Unit	Results
1	Air Temperature	°C	38
2	Air Humidity	% rH	44

Average Ambient Air Quality Monitoring Results

Sr.#	Parameters	Unit	PEQS*	Results
1.	Ozone (O ₃)	µg/m ³	130	8
2.	Carbon Monoxide (CO)	mg/m ³	5	1.89
3.	Nitrogen Oxide (NO)	µg/m ³	40	25.10
4.	Nitrogen Dioxide (NO ₂)	µg/m ³	80	61.66
5.	Sulfur Dioxide (SO ₂)	µg/m ³	120	30.57
6.	Particulate Matter (PM _{2.5})	µg/m ³	35	32.33
7.	Particulate Matter (PM ₁₀)	µg/m ³	150	123.59



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Hourly Ambient Air Quality Monitoring Results

Sr. No	Time (H)	O ₃	CO	NO	NO ₂	SO ₂	PM ₁₀	PM _{2.5}
	Unit	µg/m ³	mg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
1	14:00	8.0	2.1	17.9	65.4	29.7	116.3	30
2	15:00	---	2.3	19.6	63.2	28.9	112.6	28.6
3	16:00	---	2.2	20.86	63.4	27.4	118.6	32.1
4	17:00	---	2.4	22.9	61.5	32.1	123.4	34.3
5	18:00	---	1.59	24.6	59.8	34.2	116.7	31.4
6	19:00	---	1.6	23.8	62.3	33.1	123.6	33.6
7	20:00	---	1.8	25.8	61.6	32.1	132.9	35.46
8	21:00	---	1.2	28.7	63.5	35.2	129.7	28.6
9	22:00	---	---	29.6	64.2	30.6	134.6	30.2
10	23:00	---	---	27.4	59.53	31.3	129.8	26.52
11	0:00	---	---	28.56	58.3	29.6	128.7	28.47
12	1:00	---	---	30.2	64.25	26.5	130	26.3
13	2:00	---	---	26.7	64.2	27.8	130.8	28.9
14	3:00	---	---	30.2	69.7	29.3	122.6	29.8
15	4:00	---	---	29.4	60.3	29.6	127.3	31.4
16	5:00	---	---	23.4	58.9	33.6	134.6	39.2
17	6:00	---	---	28.6	67.4	31.4	137.8	40.6
18	7:00	---	---	27.8	58.2	32.4	143.2	36.7
19	8:00	---	---	30.1	65.9	32.6	141.4	42.4
20	9:00	---	---	28.7	65.4	30.6	146.2	34.7
21	10:00	---	---	19.6	69.8	29.6	129.1	35.6
22	11:00	---	---	18.17	56.3	31.1	126.3	29.4
23	12:00	---	---	21.3	48.6	29.3	118.2	32.1
24	13:00	---	---	18.7	48.2	25.7	11.8	29.7
Average Values		8.0	1.89	25.10	61.66	30.57	123.5	32.33

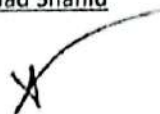
PEQS: Punjab Environmental Quality Standards

- The values were representative of process conditions when monitoring was carried out.
- The client is responsible for lawful usage of reported data in the future.
- The report is not valid for any court / negotiations / EPA Submission.
- Report has been issued for client's self-reference only.

Monitoring Supervisor: Numan Anwar

Signature: 

Name of Chief Chemist: Saad Shahid

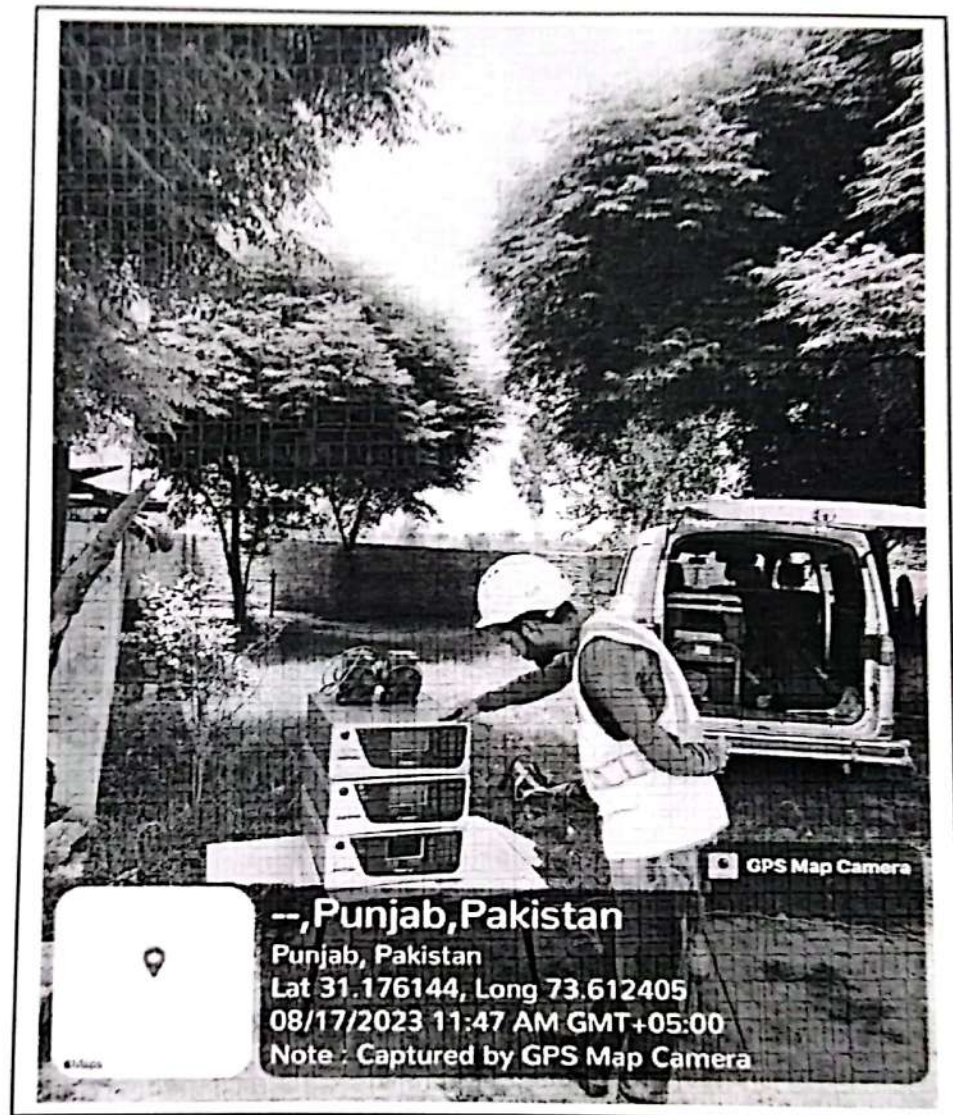
Signature: 

Date: 24-08-2023



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Pictorial Log:



Annexure II

Noise Level Monitoring Reports

SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

NOISE LEVEL MONITORING REPORT

Project Name: Feasibility Study and Detailed Design for Construction of Road from More Khunda to Habo by Bala District Nankana Sahib.

Monitoring Date: 17-08-2023 to 18-08-2023

Reporting Date: 24-08-2023

Monitoring by: SES&L

Results:

GPS Location: 31°10'35.25"N
73°36'47.14"E

Instrument Used: Digital Sound Level Meter UT 353

Reference No: EHS-LHR-327/23/NL/03

Sr. #	Time	Unit	Average Value	PEQS Standard for Commercial Area
1	11:00 AM	dB(A)	53.5	65
2	12:00 PM	dB(A)	53.25	65
3	1:00 PM	dB(A)	56	65
4	2:00 PM	dB(A)	59.5	65
5	3:00 PM	dB(A)	55.7	65
6	4:00 PM	dB(A)	56.6	65
7	5:00 PM	dB(A)	56.9	65
8	6:00 PM	dB(A)	63.9	65
9	7:00 PM	dB(A)	60.1	65
10	8:00 PM	dB(A)	61	65
11	9:00 PM	dB(A)	56.6	65
12	10:00 PM	dB(A)	58.5	55
13	11:00 PM	dB(A)	56	55
14	12:00 AM	dB(A)	54	55
15	1:00 AM	dB(A)	52.2	55
16	2:00 AM	dB(A)	51	55
17	3:00 AM	dB(A)	50.1	55
18	4:00 AM	dB(A)	49.5	55
19	5:00 AM	dB(A)	51	55
20	6:00 AM	dB(A)	54.3	65
21	7:00 AM	dB(A)	55.8	65
22	8:00 AM	dB(A)	57.8	65
23	9:00 AM	dB(A)	60	65
24	10:00 AM	dB(A)	59	65
Average Day Time			57.49	65
Average Night Time			56.91	55



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SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

PEQS: Punjab Environmental Quality Standard

Note:

- The average Noise levels describe the overall Noise intensity of the site.
- Selected measurement units were dB (A) otherwise stated.
- Quality was assured through self-calibration of the instrument.
- The measurements were carried out on client request.
- The client is responsible Unlawful usage of reported data in future.
- The report is not valid for any Court / negotiations / EPA Submission.
- Report has been issued for client self-reference only.

Monitoring Supervisor: Numan Anwar

Signature of Supervisor: 

Name of Chief Chemist: Saad Shahid

Signature of Chief Chemist: 

Date: 24-08-2023



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Annexure III

Water Analysis Reports



TEST REPORT

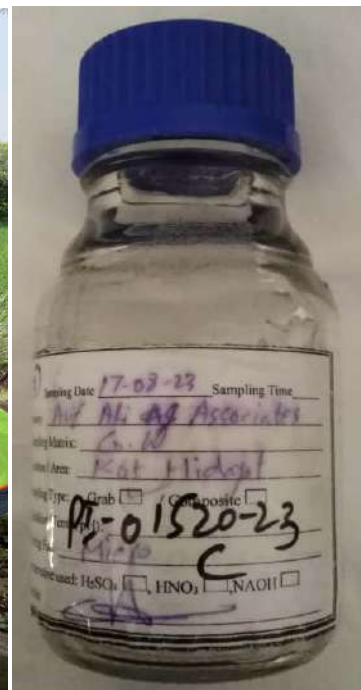
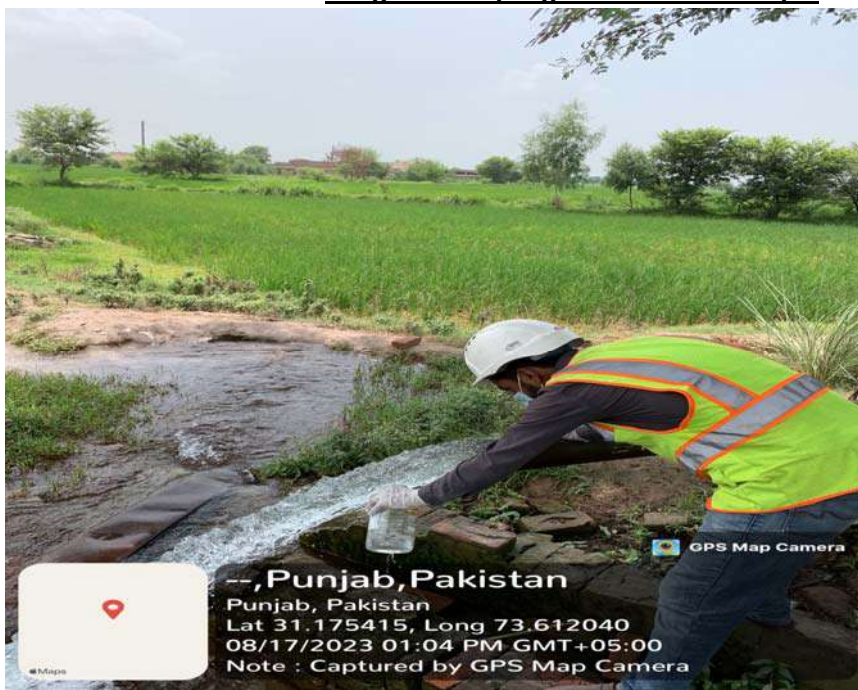
Report Number: PI-01520-23 C
Sampling Date: 17 August, 2023
Receiving Date: 18 August, 2023
Issue Date: 22 August, 2023

Customer : Feasibility Study and Detailed Design for Construction of Road from More
Khunda to Habo by Bala District Nankana Sahib.
Address : 31°10'35.25"N
73°36',47.14"E
Contact person : /
Contact details : /
Email : /

Sample Information

Sample Description: : Ground Water
Vendor Reference: : Kot Hidayat district Nankana Sahib

Image of Sampling & Submitted sample



For and on behalf of
Tti Testing Laboratories

Hamad Ahmad
Head Food and Water Lab

Page 1 of 4

This test report is governed by the terms and conditions available overleaf or accessible at <http://ttilabs.net/terms&conditions.html>. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The report is issued strictly based on the testing of the samples submitted by the customer. This test report may not be reproduced, except in full, without written approval of Tti Testing Laboratories.



Test Results:

Drinking Water Analysis: Kot Hidayat district Nankana Sahib

Sr.#	Parameter	Method	Unit	MDL	PEQS Limit	Results
1.	Taste	Sensory Evaluation	-	-	Not objectionable	Acceptable
2.	Odor	Sensory Evaluation	-	-	Not objectionable	Acceptable
3.	Color	APHA 2120 C	TCU	≤ 5	≤ 15	< 5
4.	Turbidity	APHA 2130 B	NTU	≤ 5	< 5	< 5
5.	pH Value @ 25 °C	APHA 4500 H*B	pH Unit	0.01	6.5-8.5	7.53
6.	Conductivity	APHA 2510 B	$\mu\text{S}/\text{cm}$	-	N.S	484
7.	Total Dissolved Solids (TDS)	APHA 2540 C	mg/L	5.0	< 1000	260
8.	Fluoride	APHA 4500 D	mg/L	0.02	≤ 1.5	0.10
9.	Nitrates NO_3	APHA 4500 NO_3^- E	mg/L	0.04	≤ 50	0.29
10.	Nitrite, NO_2	APHA 4500 NO_2^- B	mg/L	0.001	≤ 3	0.005
11.	Residual Chlorine	APHA 4500 Cl G	mg/L	0.01	N.S	N.D
12.	Cyanide	APHA 4500 CN^- E	mg/L	0.002	≤ 0.05	N.D
13.	Total Hardness (as CaCO_3)	APHA 2340 C	mg/L	4.0	< 500	229
14.	Chloride	APHA 4500 Cl B	mg/L	1.0	< 250	07
15.	Phenolic Compounds	APHA 5330 D	mg/L	0.05	N.S	N.D
16.	Aluminium (Al)	APHA 3111 / 3120 B	mg/L	0.1	≤ 0.2	N.D
17.	Antimony (Sb)	APHA 3111 / 3120 B	mg/L	0.005	≤ 0.005	N.D
18.	Arsenic (As)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
19.	Barium (Ba)	APHA 3111 / 3120 B	mg/L	0.1	0.7	N.D
20.	Boron (B)	APHA 3111 / 3120 B	mg/L	0.1	0.3	N.D
21.	Cadmium (Cd)	APHA 3111 / 3120 B	mg/L	0.003	0.01	N.D

**TEST REPORT****REPORT NUMBER:** PI-01520-23 C

Sr.#	Parameter	Method	Unit	MDL	PEQS Limit	Results
22.	Chromium (Cr)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
23.	Copper (Cu)	APHA 3111 / 3120 B	mg/L	0.5	2.0	N.D
24.	Iron (Fe)	APHA 3111 / 3120 B	mg/L	0.1	8.0	N.D
25.	Lead (Pb)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
26.	Manganese (Mn)	APHA 3111 / 3120 B	mg/L	0.1	≤ 0.5	N.D
27.	Mercury (Hg)	APHA 3112 / 3120 B	mg/L	0.001	≤ 0.001	N.D
28.	Nickel (Ni)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.02	N.D
29.	Zinc (Zn)	APHA 3111 / 3120 B	mg/L	0.5	5.0	N.D
30.	Selenium (Se)	APHA 3111 / 3120 B	mg/L	0.005	0.01	N.D
31.	Sodium (Na)	APHA 3111 / 3120 B	mg/L	1.0	N.S	36.5
32.	Potassium (K)	APHA 3111 / 3120 B	mg/L	1.0	N.S	2.1
33.	Total Coliform	APHA 9222 B	cfu/100mL	-	Absent	Absent
34.	Fecal E. coli	APHA 9222 D	cfu/100mL	-	Absent	Absent
35.	Fecal Streptococci / Enterococci	APHA 9230 C	cfu/100mL	-	Absent	Absent
36.	Chemical Oxygen Demand (COD)	APHA 5220 D	mg/L	5.0	N.S	16
37.	Biochemical Oxygen Demand (BOD ₅)	APHA 5210 B	mg/L	10.0	N.S	07

Note:

PEQS = Punjab Environmental Quality Standards

MDL = Method Detection Limit

mg/L = milligram per liter

APHA = American Public Health Association

N.D = Not Detected

N.S = Not Specified

- Report has been issued for client's self-reference only.
- Report is not Valid for any Court / Negotiations
- Uncertainty of the parameters and laboratory conditions at the time of analysis can be provided as per client's requirement.
- The lab environmental conditions are maintained at 25±5C° and humidity at 50±20%.
- Other Terms and Conditions are mentioned overleaf.

Annexure IV

Punjab Environmental Quality Standards

EXTRA ORDINARY ISSUE

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LAHORE MONDAY AUGUST 15, 2016

**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(122 of 2016)**

12th August 2016.

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Ambient Air is published for general information:

DR SYED ABUL HASSAN NAJMEE

Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013. - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Ambient Air:

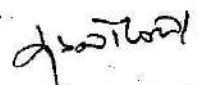
Punjab Environmental Quality Standards for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
Sulfur Dioxide (SO ₂)	Annual Average*	80 µg/m ³	Ultraviolet Fluorescence method
	24 hours**	120 µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	40 µg/m ³	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	80 µg/m ³	
Ozone (O ₃)	1 hour	130 µg/m ³	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m ³	High Volume Sampling, (Average flow rate not less than 1.1 m ³ /min).
	24 hours**	500 µg/m ³	
Respirable Particulate Matter PM ₁₀	Annual Average*	120 µg/m ³	Preferably β-Ray absorption method
	24 hours**	150 µg/m ³	
Respirable Particulate Matter PM _{2.5}	Annual Average*	15 µg/m ³	Preferably β-Ray absorption method
	24 hours**	35 µg/m ³	

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
	1 hour	15µg/m ³	
Lead (Pb)	Annual Average*	1 µg/m ³	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5µg/m ³	
Carbon Monoxide (CO)	8 hours**	5 mg/m ³	Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m ³	

* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly / 8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.


(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

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LAHORE MONDAY AUGUST 15, 2016.

**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(121 of 2016)**

12th August 2016.

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Noise is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/ 7-26 /2013. In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Noise:

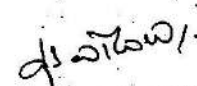
Punjab Environment Quality Standards for Noise

Punjab Environmental Protection Act, 2002					
No.	Category of Area/Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2013	
		Limits in dB(A) Leq*			
		Day Time	Night Time	Day Time	Night Time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Day time hours; 6:00am to 10:00pm.
2. Night Time hours; 10:00 pm to 6:00 am.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospital, educational institutions and courts
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority

* dB(A) Leq: Time weighted average of the level of sound in decibel on scale A which is relatable to human hearing.


 (IQBAL MOHAMMED CHAUHAN)
 Secretary, Government of the Punjab
 Environment Protection Department

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**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(124 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Drinking Water is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013 - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Drinking Water:

Punjab Environmental Quality Standards for Drinking Water

Properties/Parameters	Standard Values	WHO Standards	Remarks
Microbiology			
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Most Asian countries also follow WHO standards
Physical and Chemical			
Colour	≤15 TCU	≤15 TCU	
Taste	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Odour	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Turbidity	<5 NTU	<5 NTU	

Properties/Parameters	Standard Values	WHO Standards	Remarks
Total hardness as CaCO ₃	< 500 mg/l	---	
TDS	<1000	<1000	
pH	6.5 – 8.5	6.5 – 8.5	
Essential Inorganic			
	mg/Litre	mg/Litre	
Aluminum (Al) mg/l	≤0.2	0.2	
Antimony (Sb)	≤0.005 (P)	0.02	
Arsenic (As)	≤0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl ⁻)	<250	250	
Chromium (Cr)	≤0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	mg/l	mg/l	
Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤1.5	1.5	
Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤0.5	0.5	
Mercury (Hg)	≤0.001	0.001	
Nickel (Ni)	≤0.02	0.02	
Nitrate (NO ₃)*	≤50	50	
Nitrite (NO ₂)*	≤3 (P)	3	
Selenium (Se)	0.01(P)	0.01	

Properties/Parameters	Standard Values	WHO Standards	Remarks
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source		
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries
Organic			
Pesticides mg/l			PSQCA No. 4639- 2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.**
Phenolic compounds (as Phenols) mg/l		0.002	
Poly-nuclear aromatic hydrocarbons (as PAHs) g/l		0.01 (By GC/MS method)	
Radioactivity			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

* Indicates priority health related inorganic constituents, which need regular monitoring.

** PSQCA: Pakistan Standards Quality Control Authority.

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

Annexure V

Tti-SES&L Certifications



ENVIRONMENT PROTECTION DEPARTMENT

Government of the Punjab
National Hockey Stadium, Lahore.



CERTIFICATION AS AN ENVIRONMENTAL LABORATORY

In exercise of power conferred by clause (k) of sub section (1) of section 6 of the Punjab Environmental Protection Act 1997 (XXXIV of 1997), the Provincial Agency is pleased to certify the laboratory mentioned below as an Environmental Laboratory, for conducting tests and analysis.

Name: - TTI Testing Laboratories

Address: - 347/S. Quaid-e-Azam Industrial Estate, Lahore.

Certificate No. 21/DD (Lab)/EPA/2021

1. This certification is valid as described below subject to fulfillment to the conditions of certification placed at **Annex-C**:
 - (a) Municipal & Liquid Industrial Effluents as per **Annexure-A**.
 - (b) Drinking Water Quality as per **Annexure-B**.
2. This certification is subject to the conditions laid down in regulation 9 of the Certification of Environmental Laboratories Regulations, 2000 and QA/QC conditions contained in **Annex-C**.
3. This certificate is valid until 03 / 02 / 2025 unless earlier suspended or revoked.

Dated 04 / 02 / 2022

3.1 April
Director General

Fm
Fala

Amu



Pakistan National Accreditation Council

Ministry of Science & Technology
Government of Pakistan
Islamabad



Certificate of Accreditation

is awarded to

Tti Testing Laboratories
(Textile Testing International)
347-S, Quid-e-Azam Industrial Estate, Kot Lakhpat
Lahore-54770-Pakistan

in accordance with the requirements of **ISO/IEC 17025:2017**
The accreditation is subject to regular surveillance and compliance
to the requirements of PNAC
For scope of accreditation, see Appendix

Accreditation Certificate Number: LAB 022

Date of Issue:
09-08-2021


Director General

Valid until
08-08-2024



Pakistan National Accreditation Council

Ministry of Science & Technology

Government of Pakistan

Islamabad



Certificate of Accreditation

is awarded to

Tti - Inspection (Pvt.) Limited,

347-S, Quaid-e-Azam Industrial Estate, Kot lakhpat

Lahore-54770-Pakistan

in accordance with the requirements of **ISO/IEC 17020:2012**

The accreditation is subject to regular surveillance and compliance

to the requirements of PNAC

For scope of accreditation, see Appendix

Accreditation Certificate Number: IB 006



Date of Issue:

13-09-2021

Valid until

12-09-2024


Director General



ENVIRONMENT PROTECTION DEPARTMENT

Government of the Punjab
National Hockey Stadium, Lahore.



CERTIFICATION AS AN ENVIRONMENTAL LABORATORY

In exercise of power conferred by clause (K) of sub section (1) of section 6 of the Punjab environmental protection Act 1997 (XXXIV of 1997). The provincial agency is pleased to certify the laboratory mentioned below as an environmental laboratory.

Name: Sustainable Environmental Services & Laboratory
Address: Office No. 4, 3rd Floor, Amana Tower, 1-C-P-III, PECO Road, Lahore

Certificate No. 177 /DD(Lab)/EPA/ 06/2019

- This certification is valid for:
 - Liquid effluents/wastes as per Annexure - A
 - Drinking water quality as per Annexure - B
 - Industrial gaseous Emissions as per Annexure - C
 - Ambient air quality as per Annexure -D
 - Motor vehicle exhaust and noise (in use vehicle) as per Annexure - E
 - Subject to fulfillment of conditions of certificate as per Annexure - F
- This certification is subject to the conditions laid down in regulation 9 of the National environmental quality Standards (Certification of Environmental Laboratories) Regulations, 1999.
- This certificate is valid until 17.06.2022 unless earlier suspended or revoked.

Dated: 17.06.2019

Received
Eng. Omar Munir
18/06/2019
0201-444326

[Signature]
Director General

Annexure VI

List of Land Acquisition Areas & Utilities

LIST OF LAND ACQUISITION			
Sr. No.	RD	Description	Area (Sq-m)
1	0+070	Wall R/S	0.714
2	1+170	Houses R/S	357.702
3	1+780	Houses R/S	144.556
4	6+865	Houses R/S	45.244
5	6+970	Shop R/S	10.621
6	6+975	Hut R/S	22.779
7	8+680	Mosque R/S	12.715
8	15+312	Houses R/S	168.199
9	19+010	Shop R/S	2.624
10	19+018	Foundation R/S	18.306
11	19+250	School R/S	33.812
12	19+295	Houses R/S	114.284
13	19+320	Houses R/S	111.046
14	21+060	Houses R/S	348.042
15	21+395	School R/S	163.075
16	21+550	Houses R/S	660.789
17	22+155	Houses R/S	78.369
18	24+226--24+327	Houses & shops	796.54
19	24+355	Houses R/S	359.262
20	26+105	Houses R/S	168.572
21	29+755	Houses R/S	266.232
22	29+800	Houses R/S	275.858
23	29+815	Grave Yard R/S	59.697
24	29+910	Houses R/S	455.983
25	30+010	Houses R/S	481.05
26	31+915--32+120	Houses R/S	1488.712
27	32+165	Houses R/S	84.505
28	32+390	Houses & Shops	234.387
29	32+425	Houses & Shops	158.857
30	32+595	Service Station	2.537
31	34+220	Houses R/S	76.975
32	34+297	Houses R/S	57.445
33	35+805	Houses R/S	8.262
34	36+200	Houses R/S	72.594
35	36+340	Shed R/S	38.29
36	36+600	Service Station R/S	11.13
37	36+600	Boundary wall R/S	35.232
38	36+680	Shops R/S	24.371
39	36+690	Shops R/S	3.211
40	36+700	Shops R/S	1.856
41	36+720	Shops R/S	23.04
42	36+780	Houses R/S	56.021
43	36+820	Houses R/S	165.81
44	36+870	Shop R/S	237.083
45	36+950	Houses & Shops	376.254
46	37+005	Poultry Farm	42.164
47	37+130	Houses R/S	354.044
48	37+190	Houses R/S	118.691
49	37+210--37+360	Houses & shops	366.938
50	37+450	Houses R/S	9.144
51	37+484	Shop R/S	12.422

52	37+900	Houses R/S	350.137
53	38+030	Houses R/S	64.825
54	38+050	Shop R/S	16.974
55	38+110	Houses R/S	210.615
56	38+140	Shop R/S	7.229
57	38+170	Houses R/S	96.387
58	38+138	Shop R/S	7.229
59	38+220--38+340	Houses R/S	381.546
60	38+370	Houses R/S	51.937
61	38+400	Shop R/S	18.463
62	38+420	Mosque R/S	73.592
63	38+450	Houses R/S	168.776
64	39+505	Mosque R/S	31.834
65	39+512	Shop R/S	13.861
66	39+830	Shop R/S	13.058
67	40+260	Houses R/S	223.323
68	40+305	Houses R/S	50.528
69	40+330	Houses R/S	18.506
70	40+390	Shop R/S	75.184
71	40+445	Houses R/S	37.863
72	41+632	Shop R/S	20.693
73	41+390	Houses R/S	95.555
74	42+070	Houses R/S	179.884
75	42+543	Mosque R/S	10.887
76	43+230	Houses R/S	197.362
77	43+465	mosque R/S	145.972
78	43+735	Houses R/S	60.713
79	44+592	Shop R/S	9.898
80	44+680	Shop R/S	0.346
81	44+705	GB R/S	14.927
82	44+850	Houses R/S	697.469
83	44+960	Houses R/S	355.757
84	45+190	Green belt of Petrol Pump	147.116
85	45+975	Shop R/S	7.11
86	46+680	Houses R/S	12.609
87	46+735	Mosque R/S	32.0241
88	46+760	Houses R/S	389.293
89	56+265	Room R/S	29.167
90	56+380	Shop R/S	26.58
91	56+642	House L/S	10.51
92	56+665	Houses R/S	17.396
93	56+685	Houses R/S	28.146
94	56+885	Houses R/S	78.918
95	56+915	Houses R/S	182.844
96	60+120	Mosque R/S	13.311
97	60+150	Houses R/S	129.747
Total (Square Meters)			14022.15
Total (Marlas)			554.39
Total (Acres)			3.46
Total (Kanal)			27.71

LIST OF UTILITIES			
Sr. No.	Chainage	Utilities	Location
1	1+300	Electric pole	R/S
2	1+360	Electric pole	R/S
3	1+698	Electric pole	R/S
4	1+700	Electric pole	R/S
5	6+965	Hand pump	L/S
6	9+918	Water hoze	R/S
7	9+920	Tube Well	R/S
8	15+600	Electric pole	R/S
9	16+160	Electric pole	R/S
10	17+160	Electric pole	R/S
11	19+395	Electric pole	R/S
12	20+055	Tree	L/S
13	20+075	Tree	L/S
14	20+110	Tree	L/S
15	20+130	Tree	L/S
16	20+150	Tree	L/S
17	20+170	Tree	L/S
18	20+185	Tree	L/S
19	20+200	Tree	L/S
20	20+215	Tree	L/S
21	20+230	Tree	L/S
22	20+245	Tree	L/S
23	20+270	Tree	L/S
24	22+630	Electric pole	R/S
25	23+133	Tube Well	R/S
26	23+660	Tube Well	R/S
27	23+667	Water hoze	R/S
28	24+383	Electric pole	R/S
29	24+385	Electric pole	R/S
30	24+411	Water hoze	R/S
31	24+415	Tube Well	R/S
32	24+434	Electric pole	R/S
33	24+475	Electric pole	R/S
34	24+860	Electric pole	R/S
35	24+956	Electric pole	R/S
36	25+060	Electric pole	R/S
37	25+177	Electric pole	R/S
38	25+293	Electric pole	R/S
39	25+326	Electric pole	R/S
40	25+419	Electric pole	R/S
41	25+535	Electric pole	R/S
42	25+635	Electric pole	R/S
43	25+821	Electric pole	R/S
44	25+924	Electric pole	R/S
45	26+030	Electric pole	L/S
46	26+121	Electric pole	L/S
47	26+211	Electric pole	L/S
48	26+212	Electric pole	L/S
49	26+300	Electric pole	L/S
50	26+415	Electric pole	R/S
51	26+416	Electric pole	R/S
52	26+527	Electric pole	R/S
53	26+528	Electric pole	R/S
54	26+650	Electric pole	R/S
55	26+651	Electric pole	R/S
56	26+760	Electric pole	R/S
57	26+881	Electric pole	R/S
58	26+997	Electric pole	R/S
59	27+115	Electric pole	R/S
60	27+214	Electric pole	R/S
61	27+314	Electric pole	R/S
62	27+374	Electric pole	R/S
63	27+461	Electric pole	R/S
64	27+559	Electric pole	R/S
65	27+652	Electric pole	R/S
66	27+741	Electric pole	R/S
67	27+845	Electric pole	R/S
68	27+952	Electric pole	R/S

69	28+134	Electric pole	R/S
70	28+246	Electric pole	R/S
71	29+405	Tube Well	R/S
72	29+495	Electric pole	L/S
73	29+842	Electric pole	R/S
74	29+942	Electric pole	R/S
75	29+956	Hand pump	L/S
76	30+052	Electric pole	R/S
77	30+146	Electric pole	R/S
78	30+212	Electric pole	R/S
79	30+292	Electric pole	R/S
80	30+358	Electric pole	R/S
81	30+432	Electric pole	R/S
82	30+492	Electric pole	R/S
83	30+573	Electric pole	R/S
84	30+575	Electric pole	R/S
85	30+718	Electric pole	R/S
86	30+853	Water hoze	R/S
87	30+860	Tube Well	R/S
88	31+349	Electric pole	R/S
89	31+448	Electric pole	R/S
90	31+636	Electric pole	R/S
91	31+734	Electric pole	R/S
92	31+797	Tube Well	R/S
93	31+830	Electric pole	R/S
94	31+926	Electric pole	L/S
95	32+042	Electric pole	L/S
96	32+080	Electric pole	L/S
97	32+154	Electric pole	R/S
98	32+329	Electric pole	L/S
99	32+402	Electric pole	R/S
100	32+471	Electric pole	R/S
101	32+506	Hand pump	L/S
102	32+537	OFC	R/S
103	33+219	Tree	R/S
104	33+220	Tree	L/S
105	33+509	OFC	R/S
106	34+258	Hand pump	L/S
107	35+192	Electric pole	R/S
108	36+352	Electric pole	R/S
109	36+640	Electric pole	R/S
110	36+666	Electric pole	L/S
111	36+676	Hand pump	L/S
112	36+897	Electric pole	R/S
113	36+898	Electric pole	R/S
114	37+126	Electric pole	L/S
115	37+172	Electric pole	L/S
116	37+174	Electric pole	L/S
117	37+210	Electric pole	L/S
118	37+238	Electric pole	L/S
119	37+277	Electric pole	R/S
120	37+278	Electric pole	R/S
121	37+308	Electric pole	L/S
122	37+310	Electric pole	L/S
123	37+339	Electric pole	L/S
124	37+349	Electric pole	R/S
125	37+367	Electric pole	L/S
126	37+398	Electric pole	L/S
127	37+430	Electric pole	R/S
128	37+550	Electric pole	R/S
129	37+652	Electric pole	R/S
130	37+775	Electric pole	R/S
131	37+863	Electric pole	R/S
132	38+045	Electric pole	R/S
133	38+082	Electric pole	R/S
134	38+132	Electric pole	R/S
135	38+190	Electric pole	R/S
136	38+236	Electric pole	R/S
137	38+270	Electric pole	R/S
138	38+304	Electric pole	R/S
139	38+350	Electric pole	L/S

140	38+352	Electric pole	L/S
141	38+360	Electric pole	R/S
142	38+445	Electric pole	R/S
143	38+478	Electric pole	R/S
144	38+512	Electric pole	R/S
145	38+754	Electric pole	R/S
146	39+373	Electric pole	R/S
147	39+507	Hand pump	L/S
148	40+059	Electric pole	R/S
149	40+067	Electric pole	R/S
150	40+256	Electric pole	L/S
151	40+298	Electric pole	L/S
152	40+300	Electric pole	L/S
153	41+480	Electric pole	R/S
154	41+608	Hand pump	R/S
155	41+610	Hand pump	R/S
156	41+820	Electric pole	L/S
157	42+110	Electric pole	L/S
158	42+111	Electric pole	L/S
159	42+145	Electric pole	L/S
160	42+177	Electric pole	L/S
161	42+215	Electric pole	L/S
162	42+457	Hand pump	L/S
163	43+210	Hand pump	L/S
164	43+480	Electric pole	R/S
165	44+212	Electric pole	R/S
166	44+690	W P	R/S
167	44+725	W P	R/S
168	44+725	Electric pole	R/S
169	44+790	Electric pole	R/S
170	44+791	Electric pole	R/S
171	44+862	Electric pole	R/S
172	44+863	Electric pole	R/S
173	44+864	Electric pole	R/S
174	44+864	Electric pole	R/S
175	44+915	Electric pole	R/S
176	44+916	Electric pole	R/S
177	44+977	Electric pole	R/S
178	44+978	Electric pole	R/S
179	45+054	Electric pole	R/S
180	45+165	Electric pole	R/S
181	45+278	Electric pole	R/S
182	45+390	Electric pole	R/S
183	46+710	Electric pole	R/S
184	47+658	Electric pole	R/S
185	49+905	Hand pump	R/S
186	49+909	Hand pump	R/S
187	52+894	Electric pole	L/S
188	56+645	Hand pump	L/S
189	56+650	Hand pump	R/S
190	59+520	Hand pump	L/S
191	60+333	Electric pole	R/S

Annexure VII

Raw Material Quantities Wastage

Quantities for Work Plan

Item Description	Course Aggregate	Bitumen	O.P Cement	Sand
Subbase	287,519	0	0	0
Aggregate Base	201,034	0	0	0
Asphalt Base Course	0	0	0	0
Triple Surface Treatment	0	3,681	0	0
Concrete	9461	0	2365	4,731
Units	m^3			

Subbase		
As		
Quantity of Aggregate	287,519	m^3
Construction period for Sub base	13	months
material used for 1 day	737.2282	m^3 /day
% of material wasted in 1 day	5	%
material wasted for 1 day	37	m^3/day

Aggregate Base Course		
As		
Quantity of Aggregate	201,034	m^3
Construction period for Aggregate Base	13	months
material usd for 1 day	515.4718	m^3 /day
% of material wasted in 1 day	5	%
material wasted for 1 day	26	m^3/day

Triple Surface Treatment		
As		
Quantity of Bitumen	3,681	m^3
Construction period for TST	13	months
material usd for 1 day	9.4391	m^3 /day
% of material wasted in 1 day	5	%
material wasted for 1 day	0.47	m^3/day

Concrete		
As		
Quantity of Aggregate in Concrete	9,461	m^3
Construction period for Concrete	15	months
material usd for 1 day	21.0244	m^3 /day
% of material wasted in 1 day	5	%
material wasted for 1 day	1	m^3/day

Concrete		
As		
Quantity of Cement in Concrete	2,365	m^3
Construction period for Concrete	15	months
material used for 1 day	5.2562	m^3 /day
% of material wasted in 1 day	5	%
material wasted for 1 day	0.26	m^3/day

Concrete		
As		
Quantity of Sand in Concrete	4,731	m^3
Construction period for Concrete	15	months
material used for 1 day	10.5124	m^3 /day
% of material wasted in 1 day	5	%
material wasted for 1 day	1	m^3/day

Annexure VIII

Social Survey Form

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Illahi Bakhsh
2. Address Chak #1366, G13, Jhal Jyann District Faisalabad
3. Age 30
4. Education Secondary
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- Farmer
10. Is there any family member suffering from some disease? No

Receptors Information

11. How many hospitals/ dispensaries are available in the area? 2 Govt Hospitals
12. How many schools and colleges are present in the area? 1 Govt Boys Primary school, 2 Govt Girls Primary

Project Information

13. Do you know about this project? How were you informed? Yes, I know
14. What do you think about the Project? Do you think it should be applied? Why, why not? Yes, a good project should be implemented
15. What do you think would be the positive/ negative effects of the Project? Better transportation
16. What will be the Health and Safety Issue due to this project in your point of view? Smoke emission is a health hazard
17. Would you like to add anything else? No

Faheed Ahmad

Signature of Person (Name)

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Peer Muhammad Contact #/ CNIC 03214188139
2. Address char # 366, GB Johk Jigan, District Faisalabad.
3. Age 35
4. Education Matric
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 35,000/- / shopkeeper
9. Total income/ occupation 02
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 (Govt Hospital)
12. How many schools and colleges are present in the area?
2 schools, 1 Govt school for girls & for boys

Project Information

13. Do you know about this project? How were you informed?
Yes
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project, should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Job opportunity will be a positive effect.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise, and dust pollution during construction phase.
17. Would you like to add anything else?
NO

Interviewed By: Habib

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Waseem Ashay Contact #/ CNIC 032 77 31973
2. Address Chak # 367 G.P. 3, Thok Bhukri District-Faisalabad
3. Age _____
4. Education _____
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 02
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 35,000/- hort employer
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Private Hospital
12. How many schools and colleges are present in the area?
2 schools, 1 for girls, 1 for boys

Project Information

13. Do you know about this project? How were you informed?
yes
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project should be applied, beneficial for annuity
15. What do you think would be the positive/ negative effects of the Project?
Better transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution during construction phase
17. Would you like to add anything else?
NO

Interviewed By: Ahsan et al.

Sign of Person (Interviewed) Waseem Ashay

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Qazi Asliq. Contact #/ CNIC 0337731979.
2. Address Maz Sial Colony District Faisalabad.
3. Age 28
4. Education Matric
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children Nil.
7. Religion Islam.
8. No. of earning members in family 02.
9. Total income/ occupation 40,000/- / Shopkeeper.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Private Hospital.
12. How many schools and colleges are present in the area?
2 schools (1 for boys 1 for girls).

Project Information

13. Do you know about this project? How were you informed?
Yes.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project, should be implemented.
15. What do you think would be the positive/ negative effects of the Project?
Better transportation.
16. What will be the Health and Safety Issue due to this project in your point of view?
Dust emission during construction phase.
17. Would you like to add anything else?
NO.

Interviewed By:

Zubari

Sign of Person (Interviewed)

ghina jelo

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Aslyaq Peer Muhammad Contact #/ CNIC 03224358339.
2. Address Pindi cherry District Namlana Sahib.
3. Age 27.
4. Education Matric.
5. Marital Status
☒ Married 5. ☐ Single
6. If married, No. of children 5.
7. Religion Islam.
8. No. of earning members in family 1
9. Total income/ occupation 40,000/- self employed.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital.
12. How many schools and colleges are present in the area?
2 (1 boy and 1 girl Govt Primary school for boys?)

Project Information

13. Do you know about this project? How were you informed?
Yes, I know through a local resident.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project must be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better transportation.
16. What will be the Health and Safety Issue due to this project in your point of view?
Dust emission
17. Would you like to add anything else?
NO.

Interviewed By: Qurat-ul-Amin

Sign of Person (Interviewed): [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Naem-ul-Haq Contact #/ CNIC 03000457680
2. Address Chak Lachman District Nankana Sahib
3. Age 35
4. Education Secondary
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 4
9. Total income/ occupation 35,000/- /shopkeeper
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital
12. How many schools and colleges are present in the area?
2 (1 for boys & Govt school for girls)

Project Information

13. Do you know about this project? How were you informed?
Yes, through a friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Yes, good Project I am in favour
15. What do you think would be the positive/ negative effects of the Project?
Job opportunities
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution
17. Would you like to add anything else?
NO

Interviewed By: Hamid Sultani

Sign of Person (Interviewed) Hamid Sultani

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Asghar Arif Contact #/ CNIC 0300 0457661
2. Address Maina Noorice District Wamkam Sahit.
3. Age 34
4. Education Matric
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation Shopkeeper / 35000/-
10. Is there any family member suffering from some disease?
No.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital.
12. How many schools and colleges are present in the area?
2, 1 for girls 1 for boys 1 Govt School / Primary.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know by myself.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project.
15. What do you think would be the positive/ negative effects of the Project?
Job opportunities for locals.
16. What will be the Health and Safety Issue due to this project in your point of view?
Smoke emissions.
17. Would you like to add anything else?
No.

Interviewed By: H. Arif Sahit.

Sign of Person (Interviewed) Asghar Arif

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Tajammul Contact #/ CNIC 03000457688
2. Address M/032a Rajah District Nankana Sahib.
3. Age 35
4. Education Primary
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 3
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 30,000/- / Labour
10. Is there any family member suffering from some disease?
No.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
0 / Govt Hospital
12. How many schools and colleges are present in the area?
0 (1 Govt school for girls)

Project Information

13. Do you know about this project? How were you informed?
Yes, through a friend.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project, should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Job opportunities.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution.
17. Would you like to add anything else?
No.

Interviewed By: Hannix Sahail

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

Name Abghar Arif Contact #/ CNIC 03038484395
Address Dharm District Namkeana Sahib

Age 35

Education Matru

Marital Status

☒ Married

☐ Single

If married, No. of children 2

Religion Islam

No. of earning members in family 1

Total income/ occupation 30,000/- Street Vendor

Is there any family member suffering from some disease?

No

Receptors Information

How many hospitals/ dispensaries are available in the area?

0 Govt Hospital

How many schools and colleges are present in the area?

2 Primary Govt school for boys

Project Information

Do you know about this project? How were you informed?

Yes

What do you think about the Project? Do you think it should be applied? Why, why not?

It is a good project

What do you think would be the positive/ negative effects of the Project?

Better transportation

What will be the Health and Safety Issue due to this project in your point of view?

Noise pollution

Would you like to add anything else?

No

Interviewed By:

Nasir Ahmad

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Adeel Alkhar. Contact #/ CNIC 03038484391.
2. Address Chak # 66/14 District Nankana salib.
3. Age 30.
4. Education Matric.
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2.
7. Religion Islam.
8. No. of earning members in family 1 / Local Labour.
9. Total income/ occupation 30,000 / Local Labour.
10. Is there any family member suffering from some disease? No.

Receptors Information

11. How many hospitals/ dispensaries are available in the area? 0 / Private Hospital.
12. How many schools and colleges are present in the area? 2 Govt boys and girls school (Primary)

Project Information

13. Do you know about this project? How were you informed? No.
14. What do you think about the Project? Do you think it should be applied? Why, why not? No idea.
15. What do you think would be the positive/ negative effects of the Project? It will be.
16. What will be the Health and Safety Issue due to this project in your point of view? Transportation will be good
17. Would you like to add anything else? No

Interviewed By: Nayman Alkhar.

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Jemard. Contact #/ CNIC 03038484398.
2. Address Jamke District Namkama Sahib.
3. Age 20.
4. Education Fsc.
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children NO.
7. Religion Islam
8. No. of earning members in family 1.
9. Total income/ occupation 40,000/-
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital
12. How many schools and colleges are present in the area?
1 Govt boys Primary School.

Project Information

13. Do you know about this project? How were you informed?
Yes, a friend told me.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is good Project should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better transportation.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution during construction.
17. Would you like to add anything else?
NO.

Interviewed By: Schvish Saleem.

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Aliy Contact #/ CNIC 03038483295
2. Address Qila Baram Singh District Namkama Sahib
3. Age 18
4. Education F.A
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children No
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 40,000/- / shop keep
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
0
12. How many schools and colleges are present in the area?
1

Project Information

13. Do you know about this project? How were you informed?
Yes, a friend told me
14. What do you think about the Project? Do you think it should be applied? Why, why not?
a good Project I am in favour
15. What do you think would be the positive/ negative effects of the Project?
Better transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Dust emission
17. Would you like to add anything else?
No

Interviewed By: M. Janard

Sign of Person (Interviewed) sub 6/15

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Abbas - uddin Contact #/ CNIC 03004275048
2. Address Chak # 10/63 District Namkoma Sahib
3. Age 21
4. Education FA
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children No
7. Religion Islam
8. No. of earning members in family 02
9. Total income/ occupation 40,000/-
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
02 Hospitals, 1 Dispensary
12. How many schools and colleges are present in the area?
1 Primary Govt (Boys School)

Project Information

13. Do you know about this project? How were you informed?
Yes, through a friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good procedure should be applied
15. What do you think would be the positive/ negative effects of the Project?
Better Job opportunities
16. What will be the Health and Safety Issue due to this project in your point of view?
Not, really
17. Would you like to add anything else?
No

Interviewed By: Sabir Ali Khan

Sign of Person (Interviewed) Signature

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Salman Hamid . Contact #/ CNIC 0300 4275043 .
2. Address Hindolce District Nankana Sahib .
3. Age 35 .
4. Education Matric
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 1
7. Religion Islam .
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- .
10. Is there any family member suffering from some disease?
No .

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital / 1 dispensary .
12. How many schools and colleges are present in the area?
1 girls and 1 boys Govt primary school .

Project Information

13. Do you know about this project? How were you informed?
Yes .
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project .
15. What do you think would be the positive/ negative effects of the Project?
Better Job opportunities
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution
17. Would you like to add anything else?
No .

Interviewed By: Nauman Anwar .

Sign of Person (Interviewed) Salman

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Falchor Hayat Contact #/ CNIC 03344019803
2. Address Haram District Namkema salab
3. Age 35
4. Education _____
5. Marital Status
☒ Married 03 ☐ Single
6. If married, No. of children 03
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / self employed
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospitals
12. How many schools and colleges are present in the area?
1, HTS Primary school

Project Information

13. Do you know about this project? How were you informed?
Yes
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project, should be applied
15. What do you think would be the positive/ negative effects of the Project?
Everything is positive
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution in construction phase
17. Would you like to add anything else?
NO

Interviewed By: _____

Falchor Hayat

Sign of Person (Interviewed) _____

Falchor Hayat

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name AKram Bashir Contact #/ CNIC 3344019808
2. Address Hindole District Nankana Sahib
3. Age 33
4. Education Primary
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- Labourer
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospitals
12. How many schools and colleges are present in the area?
2 Govt schools are available in the area

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this project through a friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project, it should be applied
15. What do you think would be the positive/ negative effects of the Project?
Better transportation facilities for locals would be a positive effect
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution will be a health and safety concern
17. Would you like to add anything else?
NO

Interviewed By: Mr. Jumaid

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Shahbaz Jinn Contact #/ CNIC 8301149706
2. Address 20. Harbham District Namikama Taluk
3. Age 33
4. Education Primary
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 3
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 25,000/- Labour
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
0.1 Govt Hospital, 1 dispensary
12. How many schools and colleges are present in the area?
1 Govt Primary school for girls

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this project
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better transport opportunities.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution will be a health and safety concern.
17. Would you like to add anything else?
No.

Interviewed By: Farkhad Ahmad

Sign of Person (Interviewed) Jinn

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Aman Yousaf Contact #/ CNIC 03011149705
2. Address Moro Ichumda District Nankana Sahib
3. Age 33
4. Education Illiterate
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 4
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 25,000/- / Farmer
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
03, including private and Govt Hospitals
12. How many schools and colleges are present in the area?
Total, four Govt girls and boys primary schools are present.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project, Yes
15. What do you think would be the positive/ negative effects of the Project?
Negative impact will be the transportation difficulties during construction
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution during construction
17. Would you like to add anything else?
NO

Interviewed By: Farhad Ahmed

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Niaz Zahid Contact #/ CNIC 03431626933
2. Address Banaghar District Nankana Sahib
3. Age 34
4. Education Primary
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 25,000/- / Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
2 Hospital including Govt and Private Hospitals
12. How many schools and colleges are present in the area?
4 Schools and colleges including Govt and Private schools

Project Information

13. Do you know about this project? How were you informed?
Yes, a friend told me
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project, should be applied
15. What do you think would be the positive/ negative effects of the Project?
Positive effect will be better transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution
17. Would you like to add anything else?
No

Interviewed By: Humaira Maqsood

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M Younis Contact #/ CNIC 03431626932
2. Address B.B. Baraghar District
3. Age 33
4. Education Middle
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 30,000/- Shopkeeper
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
2 Govt Private Hospitals
12. How many schools and colleges are present in the area?
4 Schools and Colleges (Govt and Private)

Project Information

13. Do you know about this project? How were you informed?
yes, a relative told me
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project, should be applied
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution
17. Would you like to add anything else?
NO

Interviewed By: Humaira Maqsood

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ajfa Sohail Contact #/ CNIC 03431626991
2. Address Syed wala District Namikan Sahib
3. Age 33
4. Education Primary
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 30,000/- / Shopkeeper
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1 - Hospital, 1 dispensary
12. How many schools and colleges are present in the area?
Total 5 schools and colleges (Govt and Primary)

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this project
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project, should be applied
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution
17. Would you like to add anything else?
No

Interviewed By:

Hussain
Magsood

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Babar Kamboh Contact #/ CNIC 03431626934
2. Address Syed wala District Nankana Sahib
3. Age 39
4. Education Matric
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 4
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- Labour
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 - Hospital, 1, dispensary
12. How many schools and colleges are present in the area?
5, including Private and Govt Hospitals

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about the Project
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project should be applied
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution due to construction
17. Would you like to add anything else?
NO

Interviewed By:

Hussain Magsood

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Zubair Qasim. Contact #/ CNIC 03431626935.
2. Address Bungla kalam District Namkani Salim.
3. Age 30
4. Education Middle.
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 02.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 25,000/- Farming.
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital
12. How many schools and colleges are present in the area?
02 Govt and Primary schools.

Project Information

13. Do you know about this project? How were you informed?
Yes,
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project.
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise Pollution.
17. Would you like to add anything else?
No.

Interviewed By: Qurat-ul-ain

Sign of Person (Interviewed) زبیر

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ichutait Habib Contact #/ CNIC 03431626938
2. Address Lukka Ichud District Namkeema Salub
3. Age 33
4. Education Middle
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 02
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 25,000/- / Resident
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital, 1 Private
12. How many schools and colleges are present in the area?
1 Govt Boys Primary School

Project Information

13. Do you know about this project? How were you informed?
yes
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project, It should be applied
15. What do you think would be the positive/ negative effects of the Project?
Better transportation
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution
17. Would you like to add anything else?
NO

Interviewed By: Humair Maqsood

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Arsalan Naveem Farmer. Contact #/ CNIC 03234133161.
2. Address Chak # 268 GB, Jhok Rehman District Faisalabad.
3. Age 33.
4. Education Matric.
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 4.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / Farmer.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospitals.
12. How many schools and colleges are present in the area?
1 - Govt Boys Primary . 2 - Govt girls Primary school.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know through a relative.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project should be implemented.
15. What do you think would be the positive/ negative effects of the Project?
Job opportunity will be a positive effect.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise Pollution during construction phase.
17. Would you like to add anything else?
NO.

Interviewed By:

Fahad Ahmad.

Sign of Person (Interviewed)

Arsalan.

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Khuram Boota. Contact #/ CNIC 0321466139.
2. Address Chak # 268, C/B Thok Rehman, District Faisalabad.
3. Age 33.
4. Education Master.
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 03.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 90,000/- / Farmer.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospitals.
12. How many schools and colleges are present in the area?
2 Schools.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know through a local.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better transport facility.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution will be a negative effect.
17. Would you like to add anything else?
NO.

Interviewed By: Azra Anwar.

Sign of Person (Interviewed) خرم بوتا

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Aleem ullaah. Contact #/ CNIC 0321433169.
2. Address Chak # 598, Phok Dawat Wala District Faisalabad.
3. Age 30.
4. Education _____
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 03.
7. Religion Islam.
8. No. of earning members in family 1
9. Total income/ occupation 30,000/- / Local labour.
10. Is there any family member suffering from some disease?
No.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital.
12. How many schools and colleges are present in the area?
1, Govt Boys Primary School. 2, Govt Girls Primary School.

Project Information

13. Do you know about this project? How were you informed?
yes, I know about this project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project it should be implemented.
15. What do you think would be the positive/ negative effects of the Project?
Job opportunity and ease in transportation will be a positive effect.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution due to construction will be a health and safety issue.
17. Would you like to add anything else?
No.

Interviewed By:

Farhad Ahmad.

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Azmat Baig Contact #/ CNIC 03214133163
2. Address Chak #1 435 GB, Lashari District Faisalabad.
3. Age 32.
4. Education Matric.
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / Shopkeeper.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1 Govt. Hospital.
12. How many schools and colleges are present in the area?
1 Govt Elementary school, 2- Govt girls high school, two Private schools.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this project through a neighbour.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Yes, I am in favour of this project, it will enhance the living and travelling condition.
15. What do you think would be the positive/ negative effects of the Project?
Local people will get some job during construction phase, Dust pollution will be a negative effect.
16. What will be the Health and Safety Issue due to this project in your point of view?
During construction phase dust will be an health issue, as well as machinery will cause noise pollution which may lead to hearing issues.
17. Would you like to add anything else?
NO.

Interviewed By: Humaira Maqsood.

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Mushtaq Rasool. Contact #/ CNIC 0323435822.
2. Address Chak # 435 GB, Lahore District Faisalabad.
3. Age 28.
4. Education _____
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children Nil.
7. Religion Islam.
8. No. of earning members in family 02.
9. Total income/ occupation 40,000/- / Shopkeeper.
10. Is there any family member suffering from some disease?

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital.
12. How many schools and colleges are present in the area?
1. Govt Elementary school, 2. Govt Girls High School, Two Private School.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project, it should be applied for the betterment of community.
15. What do you think would be the positive/ negative effects of the Project?
Transport will be improved.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise and dust pollution will be an issue during construction phase.
17. Would you like to add anything else?
Yes, it is a good project should be implemented.

Interviewed By: Farhad Khudad.

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ahmad Bulegh Contact #/ CNIC 0323435833
2. Address Chak # 595, Jhot Dawat Wala District Faisalabad.
3. Age 30.
4. Education _____
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 3.
7. Religion Islam.
8. No. of earning members in family 2.
9. Total income/ occupation 35000/- / Local Labour.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
0 of Govt Hospitals.
12. How many schools and colleges are present in the area?
1. Govt Boys Primary school. 2. Govt Girls Primary school.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project it should be applied, it will be beneficial for community.
15. What do you think would be the positive/ negative effects of the Project?
positive effect will be job opportunity, negative impact will be dust emission from construction.
16. What will be the Health and Safety Issue due to this project in your point of view?
Health issue will be during construction phase like dust and noise pollution.
17. Would you like to add anything else?
NO

Interviewed By: Farrhad Ahmad

Sign of Person (Interviewed) ade

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Amjad Nawaz Contact #/ CNIC 83234358302
2. Address Chak 140/2, Tehsil / District Nankana Sahib
3. Age 33
4. Education Matric
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Muslim
8. No. of earning members in family 01
9. Total income/ occupation 25000/- / Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1 private clinic
12. How many schools and colleges are present in the area?
1, Govt Boys school

Project Information

13. Do you know about this project? How were you informed?
Yes, a friend told me about this project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project, I am in favour.
15. What do you think would be the positive/ negative effects of the Project?
Better transportation opportunities
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise and dust pollution
17. Would you like to add anything else?
No

Interviewed By: Azhar Anwar

Sign of Person (Interviewed) امجد نواز

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Akbar Ali Contact #/ CNIC 032343 58335
2. Address Wateka Ichud, Tehsil/District Nankana Sahib
3. Age 33
4. Education Primary
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children No.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- Labour.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1, Govt Hospitals.
12. How many schools and colleges are present in the area?
1, Govt Boys Primary school.

Project Information

13. Do you know about this project? How were you informed?
yes, I know about the Project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation will be an advantage.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise Pollution will be an health and safety issue during construction phase.
17. Would you like to add anything else?
NO.

Interviewed By: Hamid Sahail

Sign of Person (Interviewed) امید

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Muhammed Ahsan. Contact #/ CNIC 03234358337.
2. Address Lurica Ichord, Tehsil/District Nankana Sahib
3. Age 30.
4. Education FA.
5. Marital Status ☒ Married 2. ☐ Single
6. If married, No. of children 2.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / Farmer.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1, Govt Hospitals.
12. How many schools and colleges are present in the area?
1, Govt Boys Primary school.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Good Project, I am in favour of this
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation will be a positive effect.
16. What will be the Health and Safety Issue due to this project in your point of view?
Dust emission will be an issue.
17. Would you like to add anything else?
NO.

Interviewed By: Farhad Ahmad.

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Mazhar qabal. Contact #/ CNIC 03234358330.
2. Address Malika Roadway Tehsil/District Namkama Salib
3. Age 18.
4. Education F.A.
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children NO.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / student.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1, Govt Hospital.
12. How many schools and colleges are present in the area?
1, Govt girls primary school.

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about this Project, a friend told me about this Project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project for community it must be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation will be a positive effect of the Project.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise and Smoke Pollution during construction phase.
17. Would you like to add anything else?
NO.

Interviewed By: Qurat-ul-Amin

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Afzal Contact #/ CNIC 0300 8862219
2. Address Maora Kany Pp Bara Ghar, Tehsil district Nankana Sahib
3. Age 35 yr
4. Education F-A
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 35000 / Farmer
10. Is there any family member suffering from some disease?
Diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 baray ghar, nearest Hospitals
12. How many schools and colleges are present in the area?
02, govt primary school, Govt girls primary

Project Information

13. Do you know about this project? How were you informed?
yes / A team came for survey some days ago
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied. Beneficials for locals
15. What do you think would be the positive/ negative effects of the Project?
It will positive effects. Time saving, money saving easy approach to cities. Connected with other areas
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By:

Farhad

Sign of Person (Interviewed)



QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Shahid Khan Contact #/ CNIC 0306 4524841
2. Address Maoza Kang, P/O Bara Ghar
Jehsil district Nankana Sahib
3. Age 50 yr
4. Education No
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 02, 01 daughter
7. Religion Islam
8. No. of earning members in family _____
9. Total income/ occupation /Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Bang gar Nearest Hospital
12. How many schools and colleges are present in the area?
02, 01 primary girls, 01 Boys Govt Primary

Project Information

13. Do you know about this project? How were you informed?
yes / my Uncle
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied. Beneficial for Locals

15. What do you think would be the positive/ negative effects of the Project?
To positive impact like employment, easy approach
to cities, money saving, time saving.
16. What will be the Health and Safety Issue due to this project in your point of view?
No

17. Would you like to add anything else?
No

Interviewed By:

Farhad

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Farid Khan Contact #/ CNIC 0300 3166 336
2. Address Maaza Kang P/O Bara Ghar, Tehsil of district Mankana Sahib
3. Age 60 yr
4. Education Metric
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 02
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 40,000/ Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital, near Bara Ghar
12. How many schools and colleges are present in the area?
02, one govt girl and one boys primary school

Project Information

13. Do you know about this project? How were you informed?
Yes / A team came To Survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Beneficial project It should be applied
15. What do you think would be the positive/ negative effects of the Project?
Positive effect, easy approach To cities. Mostly boys Locals are attached with Agri business. it is easy for commodities sale
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By:

Farhad

Sign of Person (Interviewed)

M. Farid

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Nijabat Khan Contact #/ CNIC 03431626936
2. Address Maoza Kamy P/O Bara Gar, Tehsil of district Mankani
3. Age 55
4. Education Metric
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 04 son and 4 daughter
7. Religion Islam
8. No. of earning members in family _____
9. Total income/ occupation 1 shop/keeper and Farmer
10. Is there any family member suffering from some disease?
Sugar, diabetes, heart problem

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital in Bara gar
12. How many schools and colleges are present in the area?
01 Govt primary boys School and 01 Govt girls primary

Project Information

13. Do you know about this project? How were you informed?
yes / My cousin
14. What do you think about the Project? Do you think it should be applied? Why, why not?
yes It should be applied. Beneficial for locals
15. What do you think would be the positive/ negative effects of the Project?
No negative impacts. All are positive impacts. Easy approach to cities. Commodities sale and purchase.
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Farhad

Sign of Person (Interviewed) Nijabat Khan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Zafar Ali Contact #/ CNIC 0300 8167 535
2. Address Bara Ghar Tehsil and district Nankana
Sahib
3. Age 24
4. Education metric
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 1
9. Total income/ occupation 25,000/ Farmer
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1 of Govt Hospital and 1 of clinic and 1 of dispensary
12. How many schools and colleges are present in the area?
3 Govt schools, primary, middle and high and one Govt colleges

Project Information

13. Do you know about this project? How were you informed?
Yes / My Friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied. Good opportunities
15. What do you think would be the positive/ negative effects of the Project?
Beneficial for local population. easy Transportation
Agribusiness enhanced
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Iqbal Contact #/ CNIC 03008167535
2. Address Tal Khan Bhat, P/o Bara Ghar
Jehsil District Nankana Sahib
3. Age 40
4. Education Middle
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 01
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 20,000 / Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Bara Ghar Nearest Govt Hospital
12. How many schools and colleges are present in the area?
2 Schools High + Middle 01, 100 ft
Nearest in Bara Ghar

Project Information

13. Do you know about this project? How were you informed?
No
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Positive Impacts. Should be applied
15. What do you think would be the positive/ negative effects of the Project?
connects with other areas, easy approach to
Cities, Commodities Sale and Purchase, Agribusiness
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
NO

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Inzamam Contact #/ CNIC 0306 4524841
2. Address Maaza Kany P/O Bara Gar Tehsil
District Nankana Sahib
3. Age 18
4. Education F A
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 25000/Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Bara Gar nearest Govt Hospital
12. How many schools and colleges are present in the area?
02 01 Primary Boys, 01 Girls Govt Primary
School

Project Information

13. Do you know about this project? How were you informed?
yes / My Uncle informed me
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Project is beneficial for us. It should be applied
15. What do you think would be the positive/ negative effects of the Project?
For Education purpose easy approach To colleges and
schools
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Farhad

Sign of Person (Interviewed) Inzamam

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Javed Gabal Contact #/ CNIC 0306 4524841
2. Address Maza Lal Khan Bhatti P/o Bara Ahar
Tehsil and district Nankana Sahib
3. Age ~~17~~ 28
4. Education Middle
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 20,000/ Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital Near Bara Ahar
12. How many schools and colleges are present in the area?
04, Govt Boys High School, Primary and middle
School and one college near Bara Ahar

Project Information

13. Do you know about this project? How were you informed?
No
14. What do you think about the Project? Do you think it should be applied? Why, why not?
yes. It should be applied. Beneficial for us
15. What do you think would be the positive/ negative effects of the Project?
positive effects. Beneficial for us
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By:

Farhad

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Sabir Ali Contact #/ CNIC 0300-4919182
2. Address Kot Hidayat P/O Bara Gar, Tehsil 0
district Nankana Sahib
3. Age 32
4. Education middle
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 03
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
03 Govt Hospitals, 01 dispensary and 2 Govt
12. How many schools and colleges are present in the area?
05, 01 Girls, 04 Boys, All are Govt
Schools

Project Information

13. Do you know about this project? How were you informed?
Yes / some days ago a team came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied It is beneficial for locals
15. What do you think would be the positive/ negative effects of the Project?
Positive impacts, Time save, money save, Agri
Commodities sale, Easy Approach to city
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Farhaad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Abbas Contact #/ CNIC 03015336201
2. Address Kot Hidayat P/o Bara Ghar, Tehsil 0
District Nankana Sahib
3. Age 60
4. Education NO
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 06
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 20000 / Farmer
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
03 Govt hospitals including 01 dispensary
12. How many schools and colleges are present in the area?
05 Govt schools. All are primary schools including
01 Girls primary

Project Information

13. Do you know about this project? How were you informed?
yes / Some day before a team came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied because it is beneficial
15. What do you think would be the positive/ negative effects of the Project?
Time saving, employment, Economy strong, money
saving, easy approach to city. Completely positive impacts
16. What will be the Health and Safety Issue due to this project in your point of view?
NO
17. Would you like to add anything else?
NO

Interviewed By:

Farhaed

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ali Hassan Contact #/ CNIC 03018156554
2. Address Kot Hidayat, P/O Bohar Ghar, Tehsil District Nankana Sahib
3. Age 23
4. Education B-A
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children 01
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 20,000 / self employ
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
02, Bary Ghar, Sayyed wala, Govt Hospitals
12. How many schools and colleges are present in the area?
05, primary, 01 Girls, 04 Boys, All Govt Schools

Project Information

13. Do you know about this project? How were you informed?
yes, My Uncle
14. What do you think about the Project? Do you think it should be applied? Why, why not?
Great project It should be applied
15. What do you think would be the positive/ negative effects of the Project?
positive: Infrastructure development enhance facilities and economy of Population, Time saving, money saving, employment
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Farhad

Sign of Person (Interviewed) Ali Hassan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ali Mugaddas Contact #/ CNIC 0309-7007347
2. Address Kot Hidayat, P/O Bara Ghar, Tehsil o
district Nankana sb
3. Age 24
4. Education F.A
5. Marital Status
☐ Married ☒ Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 2500 / Farmer
10. Is there any family member suffering from some disease?
sugar, diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
03, Govt Hospitals Near distance
12. How many schools and colleges are present in the area?
05, primary schools, 02 girls, 04 Boys, Govt

Project Information

13. Do you know about this project? How were you informed?
yes / My Uncle
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be Applied. It is a great project for locals
15. What do you think would be the positive/ negative effects of the Project?
Employment, Agriculture benefits, Transportation
easy. all are positive effects of Project
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By:

Farhad

Sign of Person (Interviewed)

Amir

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Allah Ditta Contact #/ CNIC 0304-6644614
2. Address Kot Hidayat P/O Bara Ghar, Tehsil & District Nankana Sahib
3. Age 26
4. Education Middle
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 25000 / Farmer
10. Is there any family member suffering from some disease?
B.P

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
03 Govt Hospitals including one dispensary
12. How many schools and colleges are present in the area?
05 Primary schools. All are Govt schools including one girls primary school

Project Information

13. Do you know about this project? How were you informed?
Yes. Engineering Team came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied. Easy approach to city
15. What do you think would be the positive/ negative effects of the Project?
Employment, save time, save money, Economy strong, Easy approach to cities. Totally Positive effects
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Fahad

Sign of Person (Interviewed) _____

Fahad

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Gulsher Contact #/ CNIC 03431626938.
2. Address Bara Ghar, Tehsil and district Nankana Sahib
3. Age 72
4. Education No
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 07
7. Religion Islam
8. No. of earning members in family 03
9. Total income/ occupation 55,000 / Farmers, shopkeeper
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital, one private and one dispensary
12. How many schools and colleges are present in the area?
03 schools, primary middle and High college only one

Project Information

13. Do you know about this project? How were you informed?
yes / friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied, positive effect
15. What do you think would be the positive/ negative effects of the Project?
Agri business, Easy approach to cities
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By:

Farhad

Sign of Person (Interviewed)



QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Siddique Contact #/ CNIC 03431626937
2. Address Bara Gar, Tehsil and District Nankana Sahib
3. Age 65
4. Education No
5. Marital Status
☒ Married ☐ Single
6. If married, No. of children 05
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 20000/- Farmer
10. Is there any family member suffering from some disease?
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
01 Govt Hospital, 01 dispensary, 01 clinic
12. How many schools and colleges are present in the area?
one primary, one middle and one high school and one college

Project Information

13. Do you know about this project? How were you informed?
Yes, my friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It should be applied, Beneficial for locals
15. What do you think would be the positive/ negative effects of the Project?
Positive effects: Employment, Agribusiness enhanced easy approach to cities
16. What will be the Health and Safety Issue due to this project in your point of view?
No
17. Would you like to add anything else?
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Shoaib Khan. Contact #/ CNIC 03234358331
2. Address Malka Roadway Tehsil/District Nankana Sahib.
3. Age 33.
4. Education Matric.
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 03.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / Farmer.
10. Is there any family member suffering from some disease?
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1 Govt Girls Primary School, Hospitals.
12. How many schools and colleges are present in the area?
1, Govt Girls Primary School.

Project Information

13. Do you know about this project? How were you informed?
Yes I know, through a relative.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good Project, Should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better transportation opportunity.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise pollution during construction phase.
17. Would you like to add anything else?
NO.

Interviewed By:

Hussain
Piragood.

Sign of Person (Interviewed)

Shoaib Khan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Muhammad Yousaf Contact #/ CNIC 03234358339
2. Address Lwika Khurd Tehsil / District Nankana Sahib
3. Age 30
4. Education Matric
5. Marital Status ☒ Married ☐ Single
6. If married, No. of children 2
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 30,000/- / Farmer
10. Is there any family member suffering from some disease?
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?
1, Govt Hospitals
12. How many schools and colleges are present in the area?
1, Govt Boys Primary School

Project Information

13. Do you know about this project? How were you informed?
Yes, I know about the project, a relative told me about the project.
14. What do you think about the Project? Do you think it should be applied? Why, why not?
It is a good project, it should be applied.
15. What do you think would be the positive/ negative effects of the Project?
Better Transportation.
16. What will be the Health and Safety Issue due to this project in your point of view?
Noise Pollution will be an issue.
17. Would you like to add anything else?
NO

Interviewed By: Mo. Ahsan

Sign of Person (Interviewed) [Signature]

Annexure IX

Management Plans

MANAGEMENT PLANS

SOLID WASTE **MANAGEMENT PLAN**

LIST OF ABBREVIATIONS

NHA National Highway Authority

EPA Environmental Protection Agency

HSE Health, Safety & Environment

Ltd. Limited

No. Number

NOC No Objection Certificate

PPEs Personal Protective Equipment's

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1 INTRODUCTION

1.1 General

This report covers Solid waste Management Strategies and three key pillars of Solid Waste Management such as Micro Planning, Decentralized management and Stakeholder engagement. The Decentralized Solid Waste Management (DSWM) is a system to provide a clean environment and hygienic living condition by reducing the quantity of waste at source.

Hazardous Waste

Waste material that may cause damage to human health or the environment that requires precautions when storing, handling, transporting or disposing due to its toxicity corrosiveness, ignitability or reactivity.

Non-Hazardous Waste

Non-hazardous waste includes any rubbish or recycling that causes no harm to human or environmental health. This can be from business or household producers. This can include general household waste like food or bathroom rubbish and recycling, and business wastes including any that come from industrial or agricultural sources. Waste can be offensive but not hazardous. This can include healthcare waste that is soiled but poses no threat to human or environmental health.

1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from More Khunda to Habo by Bala District Nankana Sahib on deposit work basis as the subject road is a provincial road. The project will facilitate construction material, agricultural product, industrial products, commercial freight traffic movement of surrounding areas.

1.3 Introduction of Firm

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies,

Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

1.4 Location of Project:

The project road starts from Adda Mangtanwala and ends at Habo Kybala (near River Ravi) traversing through More Khunda, Bungan Gillan, Morah, Kot Allah Ditta, Lurka Khurd, Hindoke, Bara Ghar, Mehran, Kamke, Roaday Malkay, Malka Mouj, Syed wala, Ruppia, Kotli Faqerandi and Pindi Chery. The total length of the project is 56 Km approx

1.5 Procedure

All waste arising from the project site operations and activities will be managed to minimize the risk and impact on the environment and human health. Waste management activities will be performed in accordance with the following waste hierarchy principles.

Reduce:

The quantity of waste through improved supply chain management and improved process and design initiatives.

Reuse:

Material where possible in engineering structures or alternative use, and/or through take back schemes to suppliers were surplus to requirements.

Recycle:

Material streams where possible to reduce the quantity of waste (e.g., metals, wood, POL, paper, plastics, other) that has to be disposed of.

After following the 3Rs above, for whatever waste remaining, the responsible authorities for project site will conduct responsible disposal either through internal or contractor managed incineration, alternative treatments or landfill in order to reduce hazards, risks and long-term impact on the environment.

Waste minimization and the application of the above principle shall also be addressed in contracts and procurement strategies, in accordance with existing rules and regulations, and taken into consideration as much as possible in the supply chain, e.g., when reviewing shipping, storage and disposal options throughout the project lifecycle.

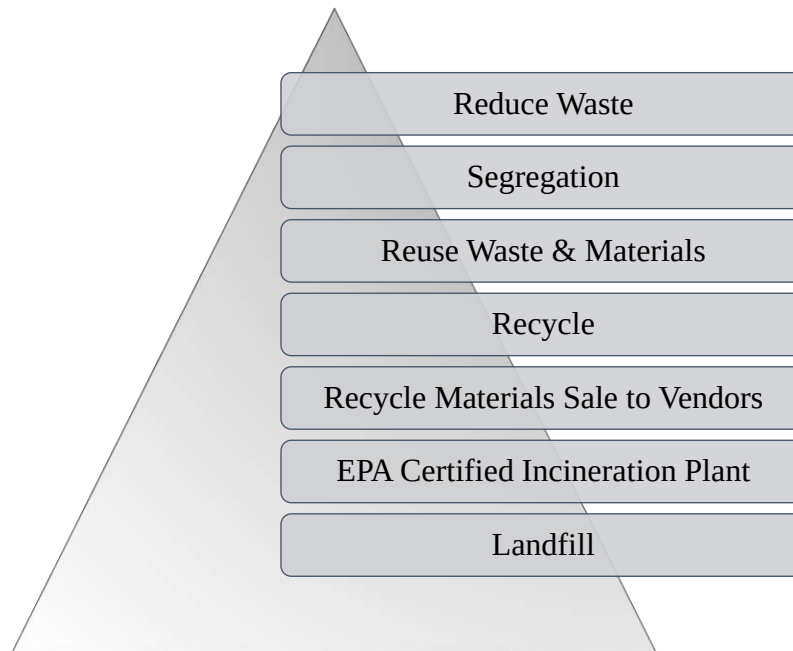


Figure 1: Hierarchy of Solid Waste Management

1.6 Waste Reduction & Supply Chain Management

The overall reduction of waste is a primary objective across project site and therefore is of paramount importance to provide clear actions on how waste reduction will be achieved.

- Procurement of material for the mission as much as possible based on strict ‘rate of use formula’ to reduce oversupply and accumulation of stockpiles as a result of product expiration.
- Preference is given to vendors who operate ‘take back schemes’
- Preference on less hazardous or non-hazardous alternatives materials to reduce to burden on earth due to environmental pollution.
- Preference in the implementation to reduce printing, water use to prevent waste plastic containers, others.

1.7 Waste Generation Assessment

Estimation of waste generated will be performed by the assessment of waste generation for specific source considering the following factors,

- i. Frequency of collection.
- ii. Maximum quantity of waste generated.
- iii. Peak waste generating hours.

iv. Collection trolley capacity.

After the assessment of waste generation, waste container/ bin will be placed with in the section or area. The location of waste bin layouts / list must be updated by area owner and will submit to Admin department. Area owner is responsible to keep the update list of waste generated from his area.

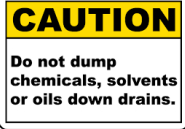
1.8 Segregation Color Coding & Labeling of Waste and waste Containers

Waste segregation is encouraged using color coding containment bins placed across Project premises or facilities.

Labels identifying the waste type are placed on three sides of the assigned colored bins.

Table 1: category, description, symbol, label, color code and Treatment Method

Category	Description	Symbol	Label	Packaging	Color Code	Treatment
Paper & cardboard waste	Office papers, production cardboards, paper, wood, coths, fiber etc.		Recyclable	Poly bad or rigid container	Blue	Recycle by EPA approved body
Glass, metals, sharps	Machine metal parts, scrap, nail, sheets, broken glasses, syringes etc.	 	Sharp – Handle with care	Puncture proof, rigid container	Yellow	Recycle by EPA approved body
Mercury containing material	Thermometer, mercury bulbs, others		Mercury – Do not open	Puncture proof, sealed, rigid container	Red	Recycle by EPA approved body
Lube lights, bulbs, etc.	Florecent lights, incandacent lights, other		Hazardous waste	Puncture proof, rigid container	Red	Recycle by EPA approved body
Asbestos containing material	Asbestos sheet, lining, sealing, others	 	Asbestos containing material – Authorized person only.	Puncture proof, Sealed	Red	Disposed by EPA approved body.
Organic (food material)	Kitchen waste,		Recyclable	Poly bad or rigid container	Black	Disposed or composted by EPA approved body.
Organic (Process waste)	Production food waste, QC rejected food waste, Autoclave waste, IRD trail waste, etc.		Recyclable	Poly bad or rigid container	Black	Disposed or composted by EPA approved body.
Organic (Process waste)	Production food waste such as red chilli waste (skin irritant, eyes irritant, respiratory)	 	Irritant	Puncture proof, Sealed with label of irritant.	Black	Disposed or composted by EPA approved body.
Plastic	Pet bottles, packing, shrink wrap, foam,		Recyclable	Poly bad or rigid container	Green	Recycle by EPA approved body

Chemicals for lab	Solvents, chemical bottles etc.	 	Handle with care	Heavy duty Puncture proof plastic bag or container	Red	Recycle by EPA approved body after rinsing of container
Chemicals (operation or workshop)	WD-40, Lube oil, kerosene, oil filters, rugs, air filters, Oil paints buckets, sealing, fumigation waste etc.	 	Handle with care	Heavy duty Puncture proof plastic bag or container	Red	Recycle or incinerate by EPA approved body
Fumigation waste solid	Tablets, waste powder, others	 	Flammable	Puncture proof, rigid metal container with soapy water in it.	Red	Disposed by EPA approved body
Cleaning equipment	Used mops, cleaning equipment, used spill kits, other		Hazardous waste	plastic bag or container sealed and labelled	Red	Disposed or incinerated by EPA approved body
Used PPE – Hazardous	Respiratory filters, gloves, apron, others.		Hazardous waste	plastic bag or container sealed and labelled	Red	Disposed or incinerated by EPA approved body
E-Waste	LEDs, Sensors, lights, electronic devices, holder, switches, socket etc.	 	E- Waste, Hazardous Waste	Put in boxes, sealed and labelled accordingly.	Yellow	Recycle by EPA approved body
Construction waste	Waste from Demolishment, debris, silica etc.			Puncture proof, rigid container	Yellow	Recycle by EPA approved body
Mixed Waste	Any above which can't be segregate.	Relevant sign as per hazard nature or SDS		Heavy duty Puncture proof plastic bag or container	Pink	Disposed by EPA approved body
Radioactive Waste		 	Radioactive waste	Heavy duty Puncture proof plastic bag or container	Purple	Disposed by EPA approved body

2 Handling of Waste

Handling of waste is to be carried out in such way as to minimize risk to human health and to the environment. In particular, all precautions should be taken in order to avoid accidents that affect:

- Soil or water pollution.
- Fire or explosion
- Toxic gas generation

The following are good practices should be adopted by the project authorities for internal transportation of waste:

- i. Containers containing liquids should always be closed.
- ii. Containers carrying solid or liquid waste should be secured to the means of transport being used in order to avoid any spills of material.
- iii. Any waste which has fallen out of the container should be collected immediately.
- iv. Provide Safety Data sheet for hazardous chemicals along with waste.

Table 2: Solid Waste Management Plan

Objective	Management Action	Responsibility	Time framework
Water pollution			
Proper disposal of wastewater /sewerage	✓ Proper disposal of construction debris. ✓ Proper handling, storage and disposal of oil and oil wastes. ✓ Proper disposal of wastewater /sewerage at Contractor's workmen's camps.	Contractor	Throughout Construction
Oil pollution			
Proper storage, handling and disposal of oil	✓ Proper storage, handling and disposal of oil and oil wastes ✓ Maintain plant and equipment ✓ Maintenance of construction vehicles should be carried out in the Contractor's camp Warning signs are placed on all the containers carrying hazardous waste	Contractor	Throughout Construction
Construction waste			
Disposal of Construction Wastes	✓ Proper disposal of construction wastes including oil, solid wastes and debris Dike wall and spill drain shall be provided. ✓ Hazardous materials containers are labelled according to their category i-e explosive, flammable etc.	Contractor	Throughout Construction
Demobilization			

Clean up site	✓ Clean up site ✓ Remove all debris ✓ Remove to original condition	Contractor	Throughout Construction
Public Health and Occupational Safety			
Proper disposal of solid and sanitary waste	✓ Proper disposal of solid and sanitary waste at site. ✓ Design and locate pit latrines prudently. ✓ Have communal ablution facilities.	Contractor	Throughout Construction

2.1 Waste Storage areas:

Waste storage area must be correctly planned. The following points should always be considered:

- i. Spills and leakages should be avoided wherever possible, or preferably kept to a minimum.
- ii. Skips for hazardous waste should be covered and the site should have suitable containment with appropriate drainage facilities.
- iii. Spills are to be contained and collected such that they do not contaminate soil or water.
- iv. Soil or water are not to be polluted by rainwater which is contaminated through contact with waste.
- v. Waste storage area should be separated and clearly identified/marked (in native language) and understood by all operators including those from transport companies and those collecting waste.
- vi. Any hazard risk (flammable, toxic etc.) should be clearly legible and immediately identifiable.
- vii. Chemically incompatible wastes are to be segregated.
- viii. Appropriate emergency equipment for first aid, fire and spills should be easily accessible.
- ix. In case of hazardous waste, a safety data sheet should be available with the waste.
- x. Waste generated within Project premises for any contractor must be disposed of, off site by a fully licensed carrier as soon as reasonably practicable so as not to accumulate on Project premises. The responsible person will ensure that the site is checked that it is properly clean and waste free before the work are terminated.

2.2 Training & Awareness

Individual must be provided with detail training on waste management system. The supervisor must provide the on-hand training to every individual on handling the waste along with safety measure taken for the prevention of environmental and health impact.

Training record must be kept by supervisor and area owner.

2.3 Record Keeping

- The admin is to maintain a waste records of all disposal of hazardous and non-hazardous waste.
- The Waste contractor should regularly provide a certificate of the collected waste together with all weight chits.

2.4 Disposal

The waste with the project authority logo or private details must be remove/shredded in supervision of admin prior handing over the waste contractor.

The admin will ensure that the waste is properly treated and dispose on EPA approved landfill site or location to comply regulatory requirement.

2.5 Responsibilities

2.5.1 General Manager Operation

The General Manager operation shall be responsible for ensuring that this procedure is implemented and staff with required competency is appointed.

2.5.2 Manager HSE

The HSE Manager will be responsible to ensure that:

- This procedure is effectively implemented at the site
- Provide oversight and monitor this procedure.
- Ensure that the selected risk controls are implemented.

2.5.3 HSE Representative

The relevant Site HSE representative shall

- a) Communicate the requirements laid down in this procedure to all employees.
- b) He/she will monitor and track the practical implementation.
- c) He/she will be responsible for delivering training on this procedure to all relevant employees.
- d) Extend necessary advice for effective conduct of assessment.
- e) Conduct inspection and audit to check the effectiveness of procedure.
- f) Maintain relevant/auditable record.

2.5.4 Supervisor

The supervisor shall

1. Communicate the requirements laid down in this procedure to all employees.
2. Ensure practical implementation on floor.
3. Conduct daily walkabout to check the effectiveness of implemented controls measures.

HAZARDOUS WASTE

MANAGEMENT PLAN

LIST OF ABBREVIATIONS

HWMP Hazardous waste Management Plan

Engr. Engineer

EPA Environmental Protection Agency

ETP Effluent Treatment Plant

HSE Health, Safety & Environment

Ltd. Limited

No. Number

NOC No Objection Certificate

PPEs Personal Protective Equipment's

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1 INTRODUCTION

1.1 General

The Hazardous Waste Management Plan (HWMP) is developed to supplement the overall EHS system with regards to protecting human health and safety, appropriately managing various site wastes, reducing negative impact to the environment, managing disposal costs, and ensuring regulatory compliance.

The HWMP provides information for the proper management and disposal of three types of waste found;

- Hazardous waste,
- Regulated non-hazardous waste
- Universal waste.

1.2 Definition

Any substance, agent, effluent, object, material or equipment to be discarded, destroyed or disposed of, which has been generated through any operation, activity or process, premises etc.

1.3 Hazardous Waste

Waste material that may cause damage to human health or the environment that requires precautions when storing, handling, transporting or disposing due to its toxicity corrosiveness, ignitability or reactivity.

1.4 Purpose of Report

The environmental issue has become a worldwide concern in the last decades being the focus of discussions in a variety of forums both at national and international levels. Because environmental problems are rooted in economic and social policies, they occur at all levels from local to global, and success requires action by many players over long periods of time.

The purpose of this report is therefore to highlight the Hazardous Materials Handling and Management at the time of construction of subject road. This is an important factor to be considered that during construction of roads there might involve usage of such substances which

can be declared hazardous/ dangerous as well as it is the responsibility of the contractor to scientifically disposed of such chemicals to avoid Environmental degradation. This HWMP underlines the framework to check the compliance of site initiatives and to take timely actions for correction in case any accident of significant criteria, requirements or goals are found.

1.5 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from More Khunda to Habo by Bala District Nankana Sahib on deposit work basis as the subject road is a provincial road. The project will facilitate construction material, agricultural product, industrial products, commercial freight traffic movement of surrounding areas.

1.6 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

1.7 Objectives of Hazardous Waste Management

Conducting hazardous substance audit is a sound precaution and proactive measure in environmental governance system. Specific objectives of proposing this management plan are as follows:

- Proposing a management plan for handling, storage, transportation and disposal of hazardous substance through detailed study of the process and identifying potential sources of hazardous pollution
- Suggest appropriate recommendations through hazardous substance management plan to mitigate or minimize the adverse impact of hazardous substances.
- Dispose-off every type of waste in responsible and environmentally friendly manner and to keep record.

1.8 Introduction of Firm

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban

roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

1.9 Location of Project:

The project road starts from Adda Mangtanwala and ends at Habo Kybala (near River Ravi) traversing through More Khunda, Bungan Gillan, Morah, Kot Allah Ditta, Lurka Khurd, Hindoke, Bara Ghar, Mehran, Kamke, Roaday Malkay, Malka Mouj, Syed wala, Ruppa, Kotli Faqerandi and Pindi Chery. The total length of the project is 56 Km **approx.**

2 HAZARDOUS MATERIALS MANAGEMENT PLAN

2.1 General

This section includes detailed and comprehensive Hazardous Materials Management Plan for safe handling, storage and disposal of hazardous chemicals, materials and/or substances associated.

2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

Authority: The project leading authority will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

2.3 Hazardous Materials Management Plan (EMP)

It lists all the mitigation measures associated with the environmental or social aspect in line during handling and management of hazardous materials with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by making it environmental friendly.

Table 1 shows hazardous materials management plan being implemented at project site and also highlights the points to be implemented.

Table 1: Hazardous Materials Management Plan

Objective	Management Action	Responsibility	Time framework
Hazardous Materials Supply/ Transportation			
Hazardous Materials Supply	After receiving of hazardous materials, strict supervision of following aspects should be made: ✓ The container etc. shall have label affixed with a specific code to the container by department ordering the hazardous material ✓ Hazardous items received on site must be inspected, handled, stored and controlled in accordance to Hazardous material rules 2014.	Contractor, EHS, Administration	Throughout Construction
Handling of Hazardous Materials			
Handling of Hazardous Materials	✓ Trained personnel should be allowed to handle hazardous materials. ✓ All hazardous substances should be used in accordance with material safety data sheets (MSDS). ✓ All personnel handling or using hazardous materials shall use PPEs as directed by EHS unit. ✓ Hazardous materials handling workers should be properly supervised by EHS team head.	Contractor, EHS, Administration	Throughout Construction

	✓ No worker aged below eighteen years or over sixty years shall be employed for any job involving physical handling of hazardous substances. ✓ A record of every worker shall be maintained containing amongst others details, his name and address, his medical checkup history and hazardous substances handled by him. ✓ The use of appropriate storage systems, such as drums, bottles, carboys, crates and boxes etc. for hazardous reactive materials. Hazardous materials should be stored in containers according to the color-coding system of hazardous waste storage. ✓ Containers should be filled leaving headspace for expansion of contents. Often the original container is perfectly acceptable. ✓ Warning signs are placed on all the containers carrying hazardous waste		
Storage of Hazardous Material			
Storage of Hazardous Materials	✓ All the personnel involved in handling, storage, transportation and disposal of hazardous substances should be trained on regular basis. A training program should be designed and implemented ✓ Only authorized personnel are allowed to handle hazardous materials ✓ Environmental conditions of storage area i-e temp, humidity etc. should be checked regularly	Contractor, EHS, Administration	Throughout Construction

	✓ Materials should be stored according to their MSDS ✓ Danger sign should be displayed on hazardous materials storage area ✓ Hazardous materials containers should be labelled according to their category i-e explosive, flammable etc. ✓ Gas tests should be conducted to ensure that gases are not exceeding tolerable limit		
Hazardous waste Spills and Leaks			
Hazardous waste spills and Leaks	✓ Keep out unnecessary and unprotected personnel from designated storage area. ✓ Use Personal Protective Equipment (PPE's) as required. ✓ Remove or isolate incompatible materials as well as other hazardous materials. ✓ Contain and soak up the spill with absorbent that does not react with spilled product. ✓ Flush the spill area where possible. ✓ Proper PPEs must be worn during spill control activity ✓ Neutralize the hazardous material according to MSDS ✓ Used materials of the spill kit must be discarded carefully in an enclosed container and dispose of with hazardous waste.	Contractor, EHS, Administration	Throughout Construction
Occupational Health and Safety			

Health and safety planning	✓ PPEs including health and safety shoes, caps, safety gloves and masks are provided to the workers ✓ Use of PPEs will be strictly enforced in order to save the workers from hazards. ✓ Incidents should be reported directly to the concerned authority ✓ HSE Manager should be deputed at site and should conduct regular inspections.	Contractor, EHS, Administration	Throughout Construction
Fire Hazard Management			
Fire Hazard	✓ Fire extinguishing arrangements should be ensured. ✓ Fire extinguisher should be easily accessible near storage area. ✓ Fire warning signs should be used to identify flammable materials and other fire hazards ✓ Fire alarms should be present in storage area.	Contractor, EHS, Administration	Throughout Construction
Hazardous Waste Management			
Disposal of Hazardous waste	✓ Hazardous waste disposal shall conform to federal and provincial legislation ✓ Ensure that hazardous waste should not be mixed with non-hazardous waste ✓ Quantity and characteristics of hazardous waste generated and discarded should be recorded properly	Contractor, EHS, Administration	Throughout Construction

	✓ All waste bags or containers should be labelled with basic information on their content. The information may be written directly on the bag or container or on preprinted labels, securely attached.		

2.4 Emergency Preparedness and Response Plan

Emergency preparedness and response plan can be considered as the tool for implementing management plan as handling, transportation and storage of hazardous substance can cause a serious harm if not taken seriously. The probable emergency situation can be:

- Serious fire or explosion
- Major spillage
- Any other incident involving all or large part of the premises and its workers.

To handle emergency situations HSE Training plans should be the part of construction activities. Emergency response training as an HSE training program will cover the following:

- General awareness
- Emergency alarms and evacuations
- Employees responsibilities during emergencies
- Firefighting
- First aid
- Spillage control
- Use of appropriate PPE
- Risk Management

2.5 Conclusion:

This management plan is formed to for handling, transportation, storage and disposal of hazardous chemicals at construction site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts due to hazardous substance has been incorporated and this Hazardous Chemicals Management Plan is sufficient if implemented in true spirit.

TRAFFIC MANAGEMENT

PLAN

LIST OF ABBREVIATIONS

TMP Traffic Management Plan

Engr. Engineer

EPA Environmental Protection Agency

HSE Health, Safety & Environment

Ltd. Limited

No. Number

NOC No Objection Certificate

PPEs Personal Protective Equipment's

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1 INTRODUCTION

1.1 General

The purpose of this Traffic Management Plan is to organize site activities so that vehicle traffic and pedestrian traffic can be segregated to minimize the risk from vehicles, and so that traffic routes can be used safely. The risks from construction site traffic can be controlled through the organization and management of traffic on site. The term vehicles include: cars, vans, lorries, delivery vehicles, low-loaders and mobile plant such as excavators, lift trucks and site dumpers etc. The term pedestrians include: operatives, workers, management, consultants, visitors and any other person accessing the site on foot. This construction site traffic management plan outlines the management of the movements of vehicles and pedestrians on site and interaction with adjacent land use. It does not cover the present permanent traffic situation and conditions surrounding the site.

Key issues in dealing with traffic management on site and that will be addressed within this traffic management plan are:

1. Pedestrian and vehicle separation
2. Minimizing vehicle movements
3. People on site
4. Loading and storage areas
5. Turning vehicles
6. Visibility
7. Signs and instructions
8. Public protection

1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from More Khunda to Habo by Bala District Nankana Sahib on deposit work basis as the subject road is a provincial road. The project will facilitate construction material, agricultural product, industrial products, commercial freight traffic movement of surrounding areas.

1.3 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

1.4 Aims and Objectives of Traffic Management Plan

The purpose and aims of this plan are:

1. To identify the traffic related hazards and risks present on site.
2. To effectively manage the risk from construction site traffic through implementing control measures.
3. To communicate the construction site traffic management procedures to all site operatives, visitors and other interested parties.
4. To raise awareness of the risks identified and controls in place.
5. To eliminate traffic related accidents on site. This document aims to provide a suitable site-specific plan for managing the risks of construction site traffic. The business has duty to ensure the safe management of pedestrian and vehicle movements on site.

1.5 The Site Manager

The site manager shall:

- Ensure measures such as the use of pedestrian barriers, stop blocks, one-way systems where possible, segregation of routes, signage, etc. are implemented as required within the construction site in accordance with this document.
- Ensure a suitable briefing on traffic management requirements is included in the site induction for new starters and communicated in the form of a toolbox talk to existing workers in accordance with the arrangements in this document.
- Ensure suitable steps are taken to co-ordinate traffic movements in the construction area by involving subcontractor supervisors in regular reviews of planned work activities, including deliveries, on a weekly basis in accordance with the arrangements in this document.
- Ensure suitable steps are taken to co-ordinate traffic movements of adjacent sites, client occupied areas or other access requirements, in regular reviews of planned activities, in accordance with the arrangements in this document.
- Investigate, take appropriate action and respond to reports from workers on deficiencies and faults in the implementation of the traffic management arrangements in accordance with this document.
- The Site Manager may delegate particular elements of the requirements of the traffic management plan to other competent members of the site management team as required to ensure the requirements are met in an effective and efficient manner.

1.6 Site / Highway Management Road Closures

It is not foreseen that any road closures will be required during the construction of the development. Although ultimately the decision on the need to close a road will fall to the contractors, it is recommended they do not do this due to the busy nature of the adjacent carriageway.

Traffic Management, as with road closures, the need for traffic management will fall to the contractors. Due to the size of the development, it is unlikely that traffic management measures will need to be put into place for any significant length of time. Footway Management as some deliveries will need to be made on the highway, there is the potential for disruption to the footway. There is a pedestrian crossing to the north of the application site, with traffic lights and associated tactile paving, that pedestrians can use to by-pass any development related activity on the footway.

As all deliveries will take place outside of network and school peak hours, and outside of the TRO operational hours, the impact of deliveries on the adjacent footway will be minimized. Maintaining Signage and barriers associated with the site will be the responsibility of the contractor, as the application site is relatively small, it is not anticipated that the regime of signage and barrier inspection and maintenance will have a severe impact on the highway.

There will be construction workers arriving at the application site first thing in the morning and departing in the evening, although the numbers involved are forecast to be relatively low on a day-to-day basis and will typically comprise private cars and light vans. Construction workers associated with the development will be required to park off-site, the nearest car park. Based on the provision of car parking in the vicinity of the site, it is not considered that employee traffic will disrupt the operation of the TRO on the adjacent highway. Employee parking will be subsidized by the contractor, to avoid employees seeking free parking at the site.

1.7 Introduction of Firm

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

1.8 Location of Project:

The project road starts from Adda Mangtanwala and ends at Habo Kybala (near River Ravi) traversing through More Khunda, Bungan Gillan, Morah, Kot Allah Ditta, Lurka Khurd, Hindoke,

Bara Ghar, Mehran, Kamke, Roaday Malkay, Malka Mouj, Syed wala, Ruppia, Kotli Faqerandi and Pindi Chery. The total length of the project is 56 Km approx.

2 MANAGEMENT PLAN

2.1 General

This section includes detailed and comprehensive Traffic Management Plan for safe handling, of traffic at the project site.

2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

Proponent: The project proponent will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

2.3 Traffic Management Plan (TMP)

It lists all the mitigation measures associated with the traffic aspect in line during management of traffic with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by making the traffic manageable.

Table 1 shows traffic management plan being implemented in the said location and also highlights the points to be implemented.

Table 1: Traffic Management Plan

Objective	Management Action	Responsibility	Time framework
Pedestrians and vehicles interface			
Pedestrian struck by vehicles	✓ Separate vehicle and pedestrian access routes to be established. ✓ Pedestrians to wear high visibility clothing (jacket or vest minimum) at all times on site. ✓ Audible and visual alarms to be in working order on vehicles. Signage to be displayed on site directing vehicles and pedestrians. ✓ Speed limit to be established and enforced. Provide anticipated delivery times.	Contractor	Throughout Construction
Deliveries			
Collision / conflict with other work activities or site operation	✓ Clear instructions to be given for delivery drivers when placing orders / arranging deliveries. ✓ Site Manager contact details to be displayed at the main site entrance for contact on arrival. ✓ All delivery vehicles to be directed to site office on arrival and banksman notified where access onto site required. Request that the suppliers provide their drivers with cyclist safety training and limit the size of their vehicles for deliveries. ✓ Containers should be filled leaving headspace for expansion of contents. Often the original container is perfectly acceptable. ✓ Warning signs are placed on all the containers carrying hazardous waste	Contractor	Throughout Construction
Access equipment			

Struck by vehicles/ overturning	✓ Access equipment positioned in areas at risk from being struck by vehicles, including other mobile access equipment, to be segregated from vehicle routes with barriers. Mobile access equipment to be accompanied by a banksman on site roads when moving around site. Danger sign is displayed on hazardous materials storage area.	Contractor	Throughout Construction
Excavations			
Vehicles entering / overturning	✓ Vehicles routes to be planned away from excavations as far as possible. ✓ Vehicles to be kept a safe distance from excavations. Excavations adjacent to and within 1m of vehicle routes where there is a risk of driving directly into the excavation to be provided with pedestrian barriers and stop blocks (minimum 200mm high) along entire length of excavation. ✓ Excavation parallel to and within 1m of vehicle routes where there is a risk of driving indirectly into the excavation to be provided with barriers along excavation.	Contractor	Throughout Construction
Excavations by walkways			
Falls from height	✓ Excavations to be provided with solid pedestrian barriers/fences a minimum of 300mm from edge of excavation. Barriers are to be distinctively marked with warning signs.	Contractor	Throughout Construction
Vehicles Reversing And/or Maneuvering			
Collision with pedestrian ns / structures	✓ All reversing and/or turning vehicles (delivery vehicles and construction site) to be accompanied by banksman.	Contractor	Throughout Construction

Poor maintenance of vehicles			
Failure of built-in controls	✓ All site to be maintained and examined in accordance with manufacturer's instructions. ✓ Where extra workers to be hired obtain copies of certificates from the hire company. ✓ All construction vehicles to be provided with suitable audible and visual indications of movement. Controls, lights and warning systems to be checked before first use each shift.	Contractor	Throughout Construction
Lack of competence			
Human error due to lack of awareness	✓ Confirm the competence of drivers for the particular vehicles to be used. Instruction given through inductions, on site safety briefings, signage and regular tool box talks. ✓ A banksman will be used if the driver's vision is restricted or when operating in a congested area. The carrying of passengers is prohibited.	Contractor	Throughout Construction
Congestion			
Collision of vehicles / excessive maneuvering	✓ Schedule of planned deliveries to be maintained and deliveries planned in advance to avoid conflict with other site operations or adjacent land uses.	Contractor	Throughout Construction
Unauthorized use			
Misuse of Vehicle	✓ The ignition key will be removed whenever machine is left unattended and if left on site overnight all site will be immobilized.	Contractor	Throughout Construction
Noise			

Hearing damage	✓ Figures for noise levels will be obtained from the hire company and where these are above 80dB(A) ear protectors will be worn.	Contractor	Throughout Construction
Vibration			
Whole body vibration syndrome	✓ Drivers should be provided with 'suspension' seats to reduce effects of whole-body vibration. Drivers do not drive for prolonged periods to minimize risk of whole-body vibration.	Contractor	Throughout Construction

2.4 Control of Construction Vehicles

Vehicular access routes will be established on site, and as far as reasonably practicable these will be away from pedestrian routes, uneven ground, excavations and structures. The site allows for a one-way system, this will be implemented where possible to avoid the need to turn or reverse on site. No vehicle will exceed 8 tones. No HGV is anticipated. All turning or reversing will be accompanied by a competent banksman. Records shall be kept on site for all construction vehicles accessing the site, and shall include the following:

1. Make, model and serial number.
2. Records of inspection of work equipment including a written weekly check of the operation of the equipment confirming adequacy of safety devices such as emergency stops, audible and visual alarms, controls, guards etc.
3. Records of thorough examination of lifting equipment including dates of last and next examination.
4. Operators' certification and training records.

A register of authorized users of each designated piece of construction site. Subcontractors shall also make the above information available on site and will be stored at the site office. Unused construction materials are stored away from work areas and designated traffic routes in agreement with the site manager and construction material will be promptly removed from site on completion of use.

All requirements for additional material will be discussed with the site manager in advance, prior to delivery to site. Parking is outside the site hoarding and there are 2 spaces which belong to the actual site in Invicta close for the project team. The site does not anticipate more than 5 people on site at its peak.

2.5 Communication of Information

The site will be hoarded with a minimum 2m hoarding and decorated to be aesthetically pleasing to the area, the planned works will be approximately 3 months and during this time there will be communication with the residents and Construction Traffic Management Plan.

The traffic management will form part of the site induction, and a tool box talk will be delivered within the early stages of the project as a further reminder of the hazard of construction site traffic and the site-specific controls in place to reduce the risks on site. Traffic management arrangements will be discussed during daily briefings to include planned deliveries and any restrictions or changes due to developing site conditions or short-term activities.

Consultation and an open-door policy will be implemented on site to gain worker involvement and understanding in traffic management arrangements.

2.6 Reporting

Everyone on site has a duty to contribute to site safety, and will be requested to report any near misses or dangerous situations, including that involving traffic management on site. The near miss reporting system will be used to assess any deficiencies in the traffic management arrangements, and remedial action will be taken as necessary.

Subcontractors

All subcontractors will be inducted and provided with information on the traffic management procedures in place. Sub-contractor deliveries must be arranged via the Site Manager and coordinated with other planned deliveries.

2.7 Monitoring

Traffic management will be assessed and monitored ongoing throughout the project with any changes made to the plan as necessary to ensure safe access, egress and movement around the site.

A record of all deliveries will be held at the site office. Delivery notes for all deliveries will be held on site (these will include the points of origin of the material). The above information will be used to produce a monthly report this will identify any improvements required to the plan in addition to any deviations from that proposed.

2.8 Conclusion

This environmental management plan is formed to for traffic related issues at construction site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts due to traffic discrepancy has been incorporated and this Traffic Management Plan is sufficient if implemented in true spirit.

BATCHING AND ASPHALT
PLANT MANAGEMENT
PLAN

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1 INTRODUCTION

1.1 General

The purpose of this Batching and Asphalt Plant Plan is to organize activities so that at batching plant no environmental, social and economic issues are raised during the construction process.

Asphalt Plant:

During road construction, it is necessary to temporarily arrange batching and asphalt plans to make the perfect material to be utilized for. Asphalt facility is an assembly of mechanical equipment where aggregates (i.e. inert mineral materials such as stone dust, crushed stone) are blended, heated, dried and mixed with bitumen (asphalt cement). Asphalt production involves the blending and drying of a mixture of aggregates before being heated to an appropriate temperature for coating with a bitumen binder. There are generally two component parts of an asphalt mixing plant with the first being the aggregate dryer which removes moisture from the aggregate, and the second part being the mixer where the aggregate is coated with bitumen and heated to the required mixing temperature as per the mixture specification. This report gives an over view for the management plan set by the contractor for asphalt plant.

1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from More Khunda to Habo by Bala District Nankana Sahibon deposit work basis as the subject road is a provincial road. The project will facilitate construction material, agricultural product, industrial products, commercial freight traffic movement of surrounding areas.

1.3 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

1.4 Objectives of Asphalt Plant/Area Management Plan

The purpose and aims of this plan are:

1. To identify the hazards and risks present on batching and asphalt site.
2. To effectively manage the risk from construction site through implementing control measures.
3. To communicate the construction site, batching and asphalt area management procedures to all site operatives, visitors and other interested parties.
4. To raise awareness of the risks identified and controls in place.
5. To propose enhancement measures after utilizing the resources

1.5 The Site Manager

The site manager shall:

- Ensure measures such as the use of pedestrian barriers, stop blocks, one-way systems where possible, segregation of routes, signage, etc. are implemented as required within the batching site in accordance with this document.
- Ensure a suitable briefing on asphalt plant area management requirements is included in the site induction for new starters
- Ensure suitable steps are taken to co-ordinate traffic movements in the construction area by involving subcontractor supervisors in regular reviews of planned work activities from asphalt area, including deliveries, on a weekly basis in accordance with the arrangements in this document.

1.6 Introduction of Firm

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

1.7 Location of Project:

The project road starts from Adda Mangtanwala and ends at Habo Kybala (near River Ravi) traversing through More Khunda, Bungan Gillan, Morah, Kot Allah Ditta, Lurka Khurd, Hindoke, Bara Ghar, Mehran, Kamke, Roaday Malkay, Malka Mouj, Syed wala, Ruppa, Kotli Faqerandi and Pindi Chery. The total length of the project is 56 Km approx.

2 MANAGEMENT PLAN

2.1 General

This section includes detailed and comprehensive Batching and Asphalt Plant Management Plan for proper utilization of resources for the project construction.

2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

Proponent: The project proponent will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

2.3 Batching and Asphalt Area Management Plan

It lists all the mitigation measures associated with the Batching and Asphalt area with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures.

Table 1 shows batching and asphalt area management plan being implemented in the said location and also highlights the points to be implemented.

Table 1: Batching and Asphalt Area Management Plan

Anticipated Impacts	Mitigation Measures	Responsibility	Frequency
Air Quality	✓ Dust collector will be installed to collect dust generating from drying process. ✓ Low sulphur fuel will be used in generators. ✓ Regular monitoring will be carried out by 3rd party to assess the nuisance of emissions from the project site. ✓ Monitoring data should be kept in record for further correspondence.	Contractor	Construction Phase
Wastewater	✓ Domestic wastewater should be disposed of in sewer line. ✓ Proper wastewater management should be carried out to avoid pollution of surface and groundwater.	Contractor	Construction Phase
Solid waste	• Solid waste should be disposed off through approved vendors. • Training will be provided to personnel for identification, segregation, and management of waste. • For the collection of such waste, receptacles will be provided. • Waste from such containers shall be collected separately on a daily basis. • All the collection bins shall be properly maintained on regular bases.	Contractor	Construction Phase
Noise	• Equipment should be regularly serviced.	Contractor	Construction Phase

	• Ensure that the workers are wearing PPE's (ear plugs, ear muffs etc.) where engineering control is not applicable to reduce the impact of noise • Schedule different noisy activities to occur at the same time as less frequent noise activities would be less annoying.		
Fire Hazard	• Availability of fire extinguishers at plants site. • Install fire-fighting equipments in the entire plant area. • Train employees to use fire-fighting equipments at the time of emergency.	Contractor	Construction Phase
Increased Risk of Occupational Health and Safety Incidences	• Ensure that workers are oriented to the specific hazards of individual work assignments. • Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards; • Conduct basic first aid, fire safety training, and Occupational Safety and Health training. • Provide adequate lighting in all operating rooms. • Passageways for pedestrians and vehicles within and outside building should be segregated and should provide for easy, safe, and appropriate access. • Provision of fire-fighting equipment in strategic and well labelled sites. • Train workers on safe work practices, and provide appropriate PPE.	Contractor	Construction Phase

	Enforcement of use of PPE such as gloves, lab coats, nose masks in all workrooms requiring use.		
Equipment Maintenance	- Prepare and keep the record of equipment maintenance log. - Prepare proper maintenance sheets for vehicles. - Use fully tuned vehicles and machinery.	Contractor	Construction Phase

2.4 Control of Transportation Vehicles

Vehicular access routes will be established on site from asphalt area, and as far as reasonably practicable these will be away from pedestrian routes, uneven ground, excavations and structures. Records shall be kept on site for all construction vehicles accessing the site, and shall include the following:

1. Make, model and serial number.
2. Records of inspection of work equipment including a written weekly check of the operation of the equipment confirming adequacy of safety devices such as emergency stops, audible and visual alarms, controls, guards etc.
3. Records of thorough examination of lifting equipment including dates of last and next examination.
4. Operators' certification and training records.

All requirements for additional material will be discussed with the site manager in advance, prior to delivery to site. Parking is outside the site hoarding and there are 2 spaces which belong to the actual site in Invicta close for the project team. The site does not anticipate more than 5 people on site at its peak.

2.5 Reporting

Everyone on site has a duty to contribute to site safety, and will be requested to report any near misses or dangerous situations, including that involving asphalt area management on site. The near miss reporting system will be used to assess any deficiencies in the asphalt area management arrangements, and remedial action will be taken as necessary.

2.6 Conclusion

This management plan is formed to for batching and asphalt plant site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts at asphalt plant are observed and this Management Plan is sufficient if implemented in true spirit.

BORROW AREA **MANAGEMENT PLAN**

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1 INTRODUCTION

1.1 General

The purpose of this Borrow Area Management Plan is to organize activities so that the area from which material is excavated to be used as fill material in another area can be reclaimed or rehabilitated. The abandoned borrow areas can result into various risk factors which can be:

1. Loss of ecosystem
2. Ground water contamination
3. Loss in vector population and associated illness
4. Loss of flora and fauna

During road construction or any other development project at large scale, the materials are excavated from borrow sites, it is necessary that borrow area sites should be properly maintained after the material is excavated as well as during excavation disturbance to nearby environment should be minimized by adopting mitigation measures. This report gives an over view for the management plan set by the contractor for borrow area.

1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from More Khunda to Habo by Bala District Nankana Sahib on deposit work basis as the subject road is a provincial road. The project will facilitate construction material, agricultural product, industrial products, commercial freight traffic movement of surrounding areas.

1.3 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

1.4 Objectives of Borrow Area Management Plan

The purpose and aims of this plan are:

1. To identify the Excavation related hazards and risks present on site.
2. To effectively manage the risk from construction site through implementing control measures.
3. To communicate the construction site, borrow area management procedures to all site operatives, visitors and other interested parties.
4. To raise awareness of the risks identified and controls in place.
5. To propose enhancement measures after utilizing the resources
6. To ensure safe route of raw material transportation

1.5 The Site Manager

The site manager shall:

- Ensure measures such as the use of pedestrian barriers, stop blocks, one-way systems where possible, segregation of routes, signage, etc. are implemented as required within the borrow site in accordance with this document.
- Ensure a suitable briefing on borrow area management requirements is included in the site induction for new starters
- Ensure suitable steps are taken to co-ordinate traffic movements in the construction area by involving subcontractor supervisors in regular reviews of planned work activities from borrow area, including deliveries, on a weekly basis in accordance with the arrangements in this document.

1.6 Introduction of Firm

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

1.7 Location of Project:

The project road starts from Adda Mangtanwala and ends at Habo Kybala (near River Ravi) traversing through More Khunda, Bungan Gillan, Morah, Kot Allah Ditta, Lurka Khurd, Hindoke, Bara Ghar, Mehran, Kamke, Roaday Malkay, Malka Mouj, Syed wala, Ruppia, Kotli Faqerandi and Pindi Chery. The total length of the project is 56 Km approx.

2 MANAGEMENT PLAN

2.1 General

This section includes detailed and comprehensive Borrow Area Management Plan for proper utilization of resources/ fill space for the project construction.

2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

Proponent: The project proponent will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

2.3 Borrow Area Management Plan

It lists all the mitigation measures associated with the borrow area with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures.

Table 1 shows borrow area management plan being implemented in the said location and also highlights the points to be implemented.

Table 1: Borrow Area Management Plan

Project Activities	Potential Impacts On Environment	Mitigation Measure	Responsibility	Time Frame
Mining activities and blasting	Soil Erosion, Emissions, Water Contamination, Noise & Vibration, Wildlife affected, Employment, Health & Safety of Workers	✓ Dust emission from aggregate storage stockpiles will be reduced by keeping the material moist by sprinkling of water at appropriate frequency ✓ Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emission. ✓ Noise control measures will be implemented ✓ In said case surface excavation will be done in which strips will be cut till ground surface only. So, no sinkhole will be there. Off-road driving will be minimized in order to avoid accidental killing of fauna. ✓ Workers will be provided with PPEs ✓ Training of workers ✓ Break of workers during blasting' ✓ Water sprinkling on the site will minimize the dust pollution. Transportation will be done in covered trucks.	Contractor	During Construction
Vehicles Usage	Soil & Water Contamination due to Fuel Leakages &	✓ Periodic maintenance and inspection of vehicles ✓ Vehicles with leaks will not be operated.	Contractor	During Construction

	Spillage, Emissions, Noise & Vibration	✓ All project vehicles should be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. ✓ PPEs should be provided to workers ✓ Machinery should be maintained properly to avoid gaseous emissions. ✓ Vehicles should not be washed or serviced in the field. ✓ All vehicles will be maintained in good working condition ✓ All vehicles will have properly functioning silencers (mufflers).		
Transportation of material	Dust and Particulate Emissions, Noise Generation, Safety and Health Effects	✓ Excessive use of horns will be avoided ✓ PPE's will be provided to workers ✓ Covering of transporting material trucks ✓ Nighttime driving of project vehicles will be limited where possible ✓ Low speed limit will be maintained on the section of the access road that is adjacent to the community and site.	Contractor	Proponent*
Use of local water resources	disturbance to local community	✓ Initiation of water conservation program ✓ Where possible, water should be recycled	Design engineer & Contractor	Proponent*
Heavy machinery	Particulate Matter, Emission of GHG, Noise, Vibration	✓ Spill prevention trays provision ✓ Noise control plans No machinery will be left unattended, particularly in running condition	contractor	Proponent*

and vehicles operation		✓ All vehicles, other equipment used will be tuned and maintained in good working condition in order to minimize emission of pollutants ✓ Reducing equipment noise at source by proper design, maintenance and repair of construction machinery and equipment, ✓ Minimizing noise from vehicles by use of proper silencers and mufflers ✓ Use noise-abating devices wherever needed and practicable. ✓ PPE's provision		
Hazardous material management	Safety hazard, spills	✓ Labeling will be placed on all storage vessels/containers as appropriate to national and international standards. The labeling will clearly identify the stored materials ✓ Explosives will be provided to only concerned person and proper record will be maintained.	Contractor	Proponent*

2.4 Control of Transportation Vehicles

Vehicular access routes will be established on site from borrow area, and as far as reasonably practicable these will be away from pedestrian routes, uneven ground, excavations and structures. Records shall be kept on site for all construction vehicles accessing the site, and shall include the following:

1. Make, model and serial number.
2. Records of inspection of work equipment including a written weekly check of the operation of the equipment confirming adequacy of safety devices such as emergency stops, audible and visual alarms, controls, guards etc.
3. Records of thorough examination of lifting equipment including dates of last and next examination.
4. Operators' certification and training records.

All requirements for additional material will be discussed with the site manager in advance, prior to delivery to site. Parking is outside the site hoarding and there are 2 spaces which belong to the actual site in Invicta close for the project team. The site does not anticipate more than 5 people on site at its peak.

2.5 Reporting

Everyone on site has a duty to contribute to site safety, and will be requested to report any near misses or dangerous situations, including that involving borrow area management on site. The near miss reporting system will be used to assess any deficiencies in the borrow area management arrangements, and remedial action will be taken as necessary.

2.6 Conclusion

This management plan is formed to for borrow area site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts at borrow area are observed and this Borrow Area Management Plan is sufficient if implemented in true spirit.