

ENVIRONMENTAL IMPACT ASSESSMENT

CONSTRUCTION OF ASPHALT PLANT AT D. BLOUCH CAMP, KAHUTA BYPASS, NEAR NATHOOT, DISTRICT RAWALPINDI.

CONSULTANTS

GRAND SQUARE CONSULTANCY | Pakistan Office: Suite No. 12, 1st Floor, Glamour One Plaza, Shoukat Ali Road, Township, Lahore; UAE Office: Khalidiya Tower, Office No. 5, M-22, Al Khalidiya St., Abu Dhabi, UAE
Web: www.gscons.com; Email: info@gscons.com; Tel: +92 42 35213231



GRAND SQUARE CONSULTANCY

Suite # 12, 1st Floor, Glamour-I Plaza, Shoukat
Ali Road, Township, Lahore
UAE Office: Khalidiya Tower, Office No. 5, M-
22, Al Khalidiya St., Abu Dhabi, UAE

T: +92-42-35213231

E: info@gicons.com

W: www.gicons.com

Document Title: Environmental Impact Assessment of Asphalt Plant				
Prepared For: Asphalt Plant				
Prepared By: Grand Square Consultancy (GSCON)				
Document No: GSCON/EIA/AP/80/09-22		Distribution: ☒ Official ☐ Public ☒ Confidential		Date: 2022.
Report Summary: This document presents findings of Environmental Impact Assessment (EIA) regarding Construction of Asphalt Plant at D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi.				
0	Report	GSCON	RR	SMM
Revisions	Description	Originator	Reviewed	Approved

The preparation of this document by Grand Square Consultants (GSCON), Lahore Pakistan, has been undertaken within terms of the brief using all reasonable skills and care. Grand Square Consultants (GSCON) accepts no responsibility for data provided by other bodies and no legal liability arising from the use of data by other persons or opinions contained in this report. The views expressed in this document are those of the authors and do not necessarily reflect the views and policies of the governments. By making any designation of or reference to a particular territory or geographic area, or by using the term “state” in this document, Company does not intend to make any judgments as to the legal or other status of any territory or area.

Please contact info@gicons.com if you have questions or comments with respect to content, or if you wish to obtain copyright permission for your intended use that does not fall within these terms, or for permission to use the GSCON logo.

TABLE OF CONTENTS

GLOSSARY	I
LIST OF ABBREVIATIONS	III
EXECUTIVE SUMMARY	VI
INTRODUCTION	1
1.1 OVERVIEW	1
1.2 PURPOSE OF THE REPORT	2
1.3 IDENTIFICATION OF THE PROJECT AND THE PROPONENT	2
1.4 NATURE AND SIZE OF THE PROJECT	3
1.5 LOCATION OF THE PROJECT	6
1.6 SCOPE OF STUDY	7
1.6.1 REVIEW OF PROJECT DOCUMENTS	7
1.6.2 RECONNAISSANCE SURVEY	7
1.6.3 DATA COLLECTION	7
1.6.4 STAKEHOLDERS/ PUBLIC CONSULTATIONS	9
1.6.5 DATA PROCESSING AND ANALYSIS	9
1.7 PERSONS PERFORMING EIA STUDY	9
1.8 ROLES AND RESPONSIBILITIES	9
1.9 ROLE OF ENVIRONMENTAL PROTECTION AGENCY, PUNJAB	9
1.10 ORGANIZATION OF EIA REPORT	10
POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK	14
2.1 GENERAL	14
2.2 EXISTING REGULATIONS AND LEGAL FRAMEWORK	14
2.3 RELEVANT LEGAL / INSTITUTIONAL FRAMEWORK	14
2.3.1. NATIONAL CONSERVATION STRATEGY, 1992	14
2.3.2. PEPO, 1983 AND PEPA, 2012	15
2.3.3. NATIONAL ENVIRONMENTAL POLICY 2005	15
2.3.4. NATIONAL FOREST POLICY 2001	15
2.3.5. REVIEW OF IEE AND EIA REGULATIONS, 2000	16
2.3.6. GUIDELINES FOR THE PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS, 1997	16
2.3.7. PUNJAB ENVIRONMENTAL QUALITY STANDARDS (PEQS)	17
2.3.8. GUIDELINES FOR SENSITIVE AND CRITICAL AREAS	17
2.3.9. POLICY & PROCEDURES FOR THE FILING, REVIEW & APPROVAL OF ENVIRONMENTAL ASSESSMENTS, NOVEMBER-1997	17



2.3.10. GUIDELINES FOR PUBLIC CONSULTATION, PAKISTAN ENVIRONMENTAL PROTECTION AGENCY OCTOBER, 1997	17
2.3.11. PUNJAB WILDLIFE PROTECTION ACT, 1974	17
2.3.12. FOREST ACT, 1927	18
2.3.13. PUNJAB LOCAL GOVERNMENT ORDINANCE, 2001	18
2.3.14. PAKISTAN PENAL CODE, 1860	18
2.3.15. OCCUPATIONAL HEALTH	18
2.3.16. TOXIC OR HAZARDOUS WASTE	18
2.3.17. HAZARDOUS SUBSTANCE RULES, 2003	18
PROJECT DESCRIPTION	22
3.1 TYPE AND CATEGORY OF PROJECT	22
3.2 OBJECTIVES OF THE PROJECT	22
3.3 ALTERNATIVES CONSIDERED & THEIR REASON OF REJECTION	22
3.5 PROJECT LOCATION/ SITE LAYOUT	24
3.6 LAND USE AT THE PROJECT SITE	23
3.7 ROAD ACCESS	23
3.8 VEGETATION FEATURES OF SITE	23
3.9 ENERGY/ POWER SOURCE	23
3.10 WATER REQUIREMENT	23
3.11 SOLID WASTE	24
3.12 PROJECT COST & MAGNITUDE OF OPERATION	24
3.13 SCHEDULE OF IMPLEMENTATION	24
3.14 DESCRIPTION OF THE PROJECT	25
3.15 DESCRIPTION OF THE PROCESS	25
3.16 DETAILS OF RESTORATION & REHABILITATION PLANS	25
3.17 GOVT. APPROVALS AND LEASES REQUIRED BY THE PROJECT	25
DESCRIPTION OF ENVIRONMENT	ERROR! BOOKMARK NOT DEFINED.
4.1 GENERAL	ERROR! BOOKMARK NOT DEFINED.
4.2 PHYSICAL RESOURCES	ERROR! BOOKMARK NOT DEFINED.
4.2.1 TOPOGRAPHY, GEOLOGY & SOIL	ERROR! BOOKMARK NOT DEFINED.
4.2.2 HYDROLOGY	ERROR! BOOKMARK NOT DEFINED.
4.2.4 CLIMATE	ERROR! BOOKMARK NOT DEFINED.
ECOLOGICAL RESOURCES	ERROR! BOOKMARK NOT DEFINED.
4.2.5 BIODIVERSITY	ERROR! BOOKMARK NOT DEFINED.
4.2.6 FORESTRY (FLORA)	ERROR! BOOKMARK NOT DEFINED.



4.2.7 WILDLIFE (FAUNA)	ERROR! BOOKMARK NOT DEFINED.
4.2.8 FISHERIES AND AQUATIC BIOLOGY	ERROR! BOOKMARK NOT DEFINED.
4.3 SOCIOECONOMIC ENVIRONMENT	ERROR! BOOKMARK NOT DEFINED.
4.3.1 POPULATION & COMMUNITIES:	ERROR! BOOKMARK NOT DEFINED.
4.3.2 INDUSTRIES	ERROR! BOOKMARK NOT DEFINED.
4.4 BASELINE ENVIRONMENTAL QUALITY	ERROR! BOOKMARK NOT DEFINED.
4.4.1 AMBIENT AIR QUALITY	ERROR! BOOKMARK NOT DEFINED.
4.4.2 AMBIENT NOISE LEVELS	ERROR! BOOKMARK NOT DEFINED.
4.4.3 WATER QUALITY	ERROR! BOOKMARK NOT DEFINED.
PUBLIC CONSULTATION	28
5.1 GENERAL	28
5.2 PROPONENTS' ENVIRONMENT MANAGEMENT TEAM	28
5.3 THE RESPONSIBLE AUTHORITY	29
5.4 OTHER DEPARTMENT & AGENCIES	29
5.5 ENVIRONMENTAL PRACTITIONERS & EXPERTS	29
5.6 AFFECTED & WIDER COMMUNITY	29
SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES	34
6.1 GENERAL	34
6.2 IMPACT ANALYSIS	34
6.3 METHODOLOGY FOR IMPACT IDENTIFICATION	34
6.3.1 CHECKLIST	35
6.3.2 LEOPOLD MATRIX	35
6.4 IMPACT CHARACTERIZATION	35
6.5 IMPACT SIGNIFICANCE	45
6.6 MITIGATION & IMPACT ASSESSMENT	45
6.7 IMPACTS DUE TO PROJECT LOCATION	52
6.7.1 LAND ACQUISITION & CHANGE IN LAND USE PATTERN	52
6.7.2 ENVIRONMENTAL SENSITIVE AREAS	52
6.7.3 HISTORICAL, ARCHEOLOGICAL OR CULTURAL SITES	52
6.7.4 EXISTING INFRASTRUCTURE	52
6.8 DESIGN RELATED IMPACTS	52
6.8.1 DRAINAGE PATTERN	53
6.8.2 SEISMIC HAZARD	53
6.8.3 WATER RESOURCES	53
6.8.4 TRAFFIC PATTERNS	54



6.8.5	EMERGENCY RESPONSE	54
6.9	IMPACTS DURING CONSTRUCTION STAGE	54
6.9.1	IMPACTS ON TOPOGRAPHY	54
6.9.2	IMPACTS ON SOILS	54
6.9.3	IMPACTS ON GROUNDWATER	55
6.9.4	IMPACTS ON SURFACE WATER	55
6.9.5	IMPACTS ON AIR QUALITY	55
6.9.6	NOISE	56
6.9.7	WATER CONSUMPTION	56
6.9.8	WASTE GENERATION	57
6.9.9	CONSTRUCTION DEBRIS	57
6.9.10	HEALTH AND SAFETY OF WORKERS	57
6.9.11	IMPACTS ON FLORA & FAUNA	58
6.9.12	TRANSPORTATION OF CONSTRUCTION MATERIALS	58
6.9.13	TRAFFIC CONGESTION	59
6.9.14	EMPLOYMENT GENERATION	59
6.10	IMPACTS DURING OPERATIONAL PHASE	59
6.10.1	IMPACTS ON CLIMATE	59
6.10.2	CHANGE IN LAND USE	59
6.10.3	IMPACTS ON SOILS	59
6.10.4	EFFLUENT GENERATION	60
6.10.5	AIR QUALITY DETERIORATION	60
6.10.6	NOISE AND VIBRATION	60
6.10.7	WATER CONSUMPTION	60
6.10.8	SOLID WASTE GENERATION	61
6.10.9	HEALTH AND SAFETY OF WORKERS	61
6.10.10	EMPLOYMENT GENERATION	61
6.10.11	FIRE RISK	61
6.11	POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES	62
ENVIRONMENTAL MANAGEMENT & MONITORING PLAN		64
7.1	ENVIRONMENTAL MANAGEMENT	64
7.2	INSTITUTIONAL CAPACITY	64
7.2.1	ENVIRONMENTAL COMMITTEE AND ITS RESPONSIBILITIES	64
7.3	TRAINING SCHEDULES	65
7.4	IMPACTS & MITIGATION MEASURES	67



7.4.1	SUMMARY OF IMPACT & MITIGATION MEASURES	67
7.5	ENVIRONMENTAL MONITORING PROGRAM	67
7.6	ENVIRONMENTAL BUDGET	67
RECOMMENDATIONS & CONCLUSIONS		88
8.1	RECOMMENDATIONS	88
8.2	CONCLUSION	88
LIST OF REFERENCES		90
PHOTOLOG		102

A handwritten signature in black ink, located in the bottom right corner of the page. The signature is stylized and appears to be a name, possibly "John Doe" or similar, written in a cursive script.

LIST OF TABLES

Table 3. 1: Details of project area	Error! Bookmark not defined.
Table 4.1 Demographic profile of Rawalpindi	Error! Bookmark not defined.
Table 4.2: Diesel and Electric Tube wells	Error! Bookmark not defined.
Table 4.3: Month-wise Mean Min. & Max. Temperature (°C).....	Error! Bookmark not defined.
Table 4.4: Month-wise Relative Humidity	Error! Bookmark not defined.
Table 4.5: Month-wise Total Rainfall (mm)	Error! Bookmark not defined.
Table 4.6: Average Family Size & Gender Composition.....	Error! Bookmark not defined.
Table 4.7: Major Occupations of the Sample Population.....	Error! Bookmark not defined.
Table 4.8: Average Literacy Rate of the Sample Households.....	Error! Bookmark not defined.
Table 4.9: Educational Institutes nearby Project Area.....	Error! Bookmark not defined.
Table 4.10: Monitoring results of Ambient Air at project site.....	Error! Bookmark not defined.
Table 4.11: Monitoring results of Noise at project site	Error! Bookmark not defined.
Table 4.12: Monitoring results of Groundwater at project site.....	Error! Bookmark not defined.
Table 5.1: List of participants during stakeholder consultations & concerns	30
Table 6.1: Checklist for Environmental Consequences	36
Table 6.2: Leopold Matrix – Impacts for Construction Asphalt Plant	42
Table 6.3: Impact Characterization.....	43
Table 6.4: Mitigation and Impact Assessment.....	46
Table 7.1: Staff Training Plan.....	66
Table 7.2: Summary of Mitigation & Impact Assessment	69
Table 7.3: Environmental Management Plan for Asphalt Plant	80
Table 7.4: Environmental Monitoring Plan for Asphalt Plant.....	86

LIST OF FIGURES

Figure 3.1: Location Map of Project Site	22
--	----



Figure 4.1: Geological map of Northern Areas of Pakistan **Error! Bookmark not defined.**

Figure 4.2: Water supply system in Rawalpindi **Error! Bookmark not defined.**

Figure 4.3: Seismic Zoning Map of Pakistan..... **Error! Bookmark not defined.**

Figure 4.4: WHO Seismic hazard map of Pakistan **Error! Bookmark not defined.**

Figure 4.5: Month-wise Relative Humidity **Error! Bookmark not defined.**

Figure 4.6: Average and Maximum Wind Speed **Error! Bookmark not defined.**

Figure 4.7: Gender Composition..... **Error! Bookmark not defined.**

Figure 4.8: Major Occupations of Sample Population.... **Error! Bookmark not defined.**

Figure 4.9: Map of Transport Network & Irrigation Channels, Rawalpindi **Error! Bookmark not defined.**

LIST OF ANNEXURES

ANNEXURE-I.....	93
<i>Land Lease Documents</i>	93
ANNEXURE-II.....	94
<i>Layout Plan</i>	94
ANNEXURE-III	95
<i>Site Location Map</i>	95
ANNEXURE-IV	Error! Bookmark not defined.
<i>Other Documents</i>	Error! Bookmark not defined.
ANNEXURE-V	Error! Bookmark not defined.
<i>List of Team Members Performing EIA Study</i>	97
ANNEXURE-VI	98
<i>Air Quality Monitoring</i>	98
ANNEXURE-VII.....	99
<i>Background Noise Monitoring</i>	99
ANNEXURE-VIII	100
<i>Water Quality Monitoring</i>	100
ANNEXURE-IX	101
<i>Filled Performas of Stakeholder Consultations</i>	101



GLOSSARY

- a. **Act:** means Punjab Environmental Protection Act, 1997 [Amendment 2012].
- b. **Dust:** are fine powdery material such as dry earth/ pollen that can be blown in the air.
- c. **Discharge:** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping
- d. **Environment:** means air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned.
- e. **Environmental Impact Assessment:** means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed.
- f. **Effluent:** means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour.
- g. **Hazardous Substance:** a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics causes, or is likely to cause, directly or in combination with other matters, an adverse environmental effect; and any substance which may be prescribed as a hazardous substance.
- h. **Hazardous Waste:** means waste which is or which contains a hazardous substance or which may be prescribed as hazardous substance or which may be prescribed as hazardous waste, and includes hospital waste and nuclear waste.
- i. **Industrial Activity:** means any operation or process for manufacturing, making, formulating, synthesizing, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal or for mining, for oil and gas exploration and development, or for pumping

water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose.

- j. **Industrial Waste:** means waste resulting from industrial activity.
- k. **Incineration:** The thermal destruction of waste for the primary purpose of disposal, with or without recovery of energy.
- l. *Note: the term incineration generally means 'the act of burning to ashes'.*
- m. **Initial Environmental Examination:** means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment.
- n. **Leachate:** A liquid that has percolated through and/or been generated by decomposition of waste material. It includes water that come in contact with waste and is potentially contaminated by nutrients, metals, salts and other soluble or suspended components and products of decomposition of waste.
- o. **Landfill:** A waste disposal site used for the controlled deposit of solid waste onto or into land.
- p. **Mitigation Measure:** means measure for control, reduce or elimination of an adverse impact of a development on environment, including a restorative measures.
- q. **Punjab Environmental Quality Standards:** means the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste.
- r. **Regulations:** means the Pakistan Environmental Protection Agency, Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.
- s. **Recycling:** Set of processes (including biological) for converting recovered materials that would otherwise be disposed of as waste into useful material and/or products
- t. **Reuse:** using a waste product again for the same or different purpose without further manufacture.
- u. **Suspended Solids:** are solid particles suspended in water or air that can be removed by filtration or settlement.
- v. **Sustainability:** means such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs.
- w. **Waste:** means any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process.

LIST OF ABBREVIATIONS

AP	Asphalt Plant
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
EA	Environmental Approval
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMtP	Environmental Monitoring Plan
EPD	Environmental Protection Department
EPO	Environmental Protection Order
GOP	Government of Pakistan
HW	Hazardous Waste
IEE	Initial Environmental Examination
IMC	Independent Monitoring Consultant
IPPs	Independent Power Projects
IUCN	International Union for Conservation of Nature
LAA	Land Acquisition Act
MoE	Ministry of Environment
MSW	Municipal Solid Waste
NA	Not Applicable
NCS	National Conservation Strategy
ND	Not Detected
NO	Not Objectionable
PEQS	Punjab Environment Quality Standard
NGO	Non-Government organization
NOC	No-Objection Certificate
NOx	Oxides of Nitrogen
PC	Public Consultation
PEPA	Punjab Environmental Protection Act, 1997 [Amendment, 2012]
PEPC	Punjab Environmental Protection Council
PM	Particulate Matter
PP	Project Proponent
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan

RAP	Resettlement Action Plan
RFP	Request for Reports
SO _x	Oxides of Sulphur
SP	Seismic Provisions
TES	Threatened, Endangered and Special Status Species
TOC	Total Organic Carbon
UBC	Uniform Building Code
VOC	Volatile organic compound
WHO	World Health Organization
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. TITLE & LOCATION OF PROJECT:

Proposed project is about construction of **Asphalt Plant** by **M/S SMADB-SHAHRUKH (JV)** at **D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi**. The construction site is located near Kahuta Bypass, Near Nathoot, District Rawalpindi.

2. PROJECT PROPONENT

M/S SMADB-SHAHRUKH (JV) is the proponent of proposed project. Mr. Sabir Ali S/o Abdul Ghani Sabri is the authorized representative of proposed project regarding construction of **Asphalt Plant** by **M/S SMADB-SHAHRUKH (JV)** at **D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi**. Detail of the authorized representative is given hereunder.

Name:	Mr. Sabir Ali S/o Abdul Ghani Sabri
Address:	House # 351, Street # 70 Nazim-ud-din Road, Sector F-11/1, Islamabad
Post:	Authorized Representative Asphalt Plant
Contact Details:	Cell: +92346-8504880

3. CONSULTANTS:

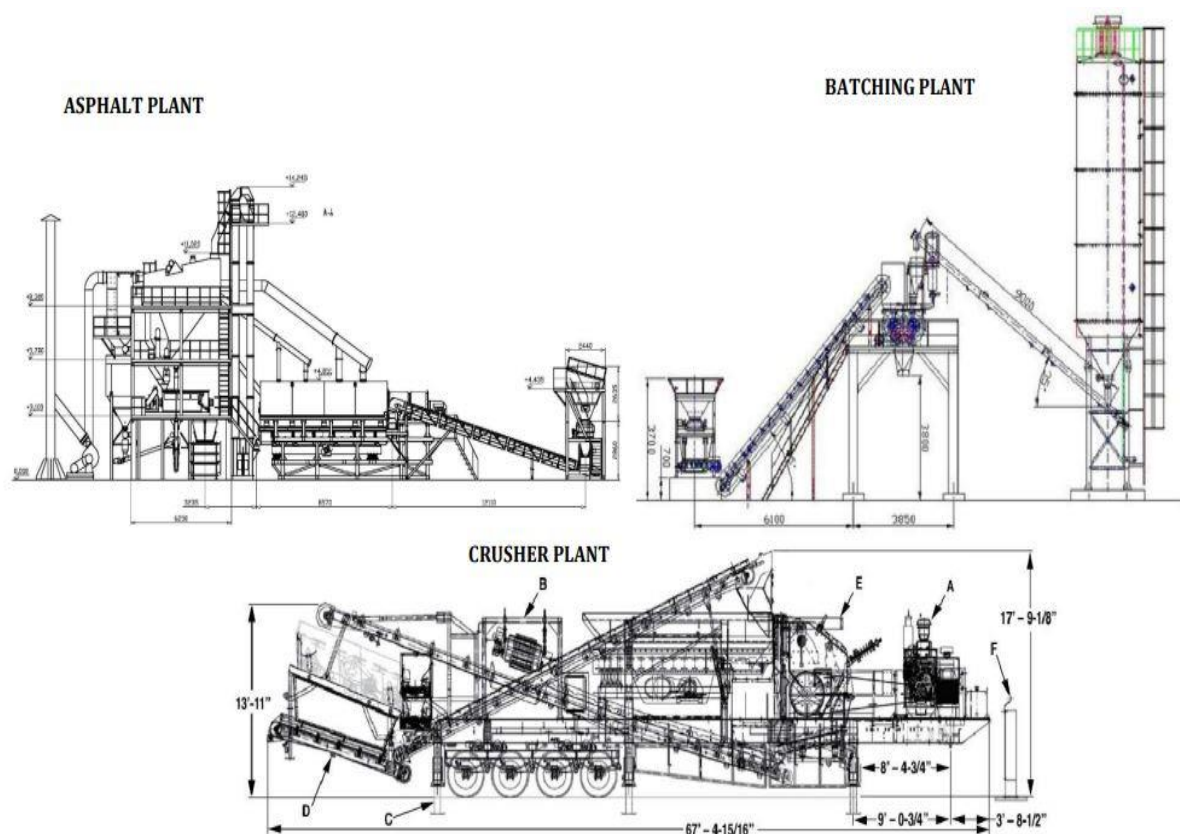
In order to satisfy EPA's requirement to carry out Environmental Impact Assessment (EIA), **M/S Grand Square Consultancy** is engaged by **M/S SMADB-SHAHRUKH (JV)** as their Environmental Consultant for this project.

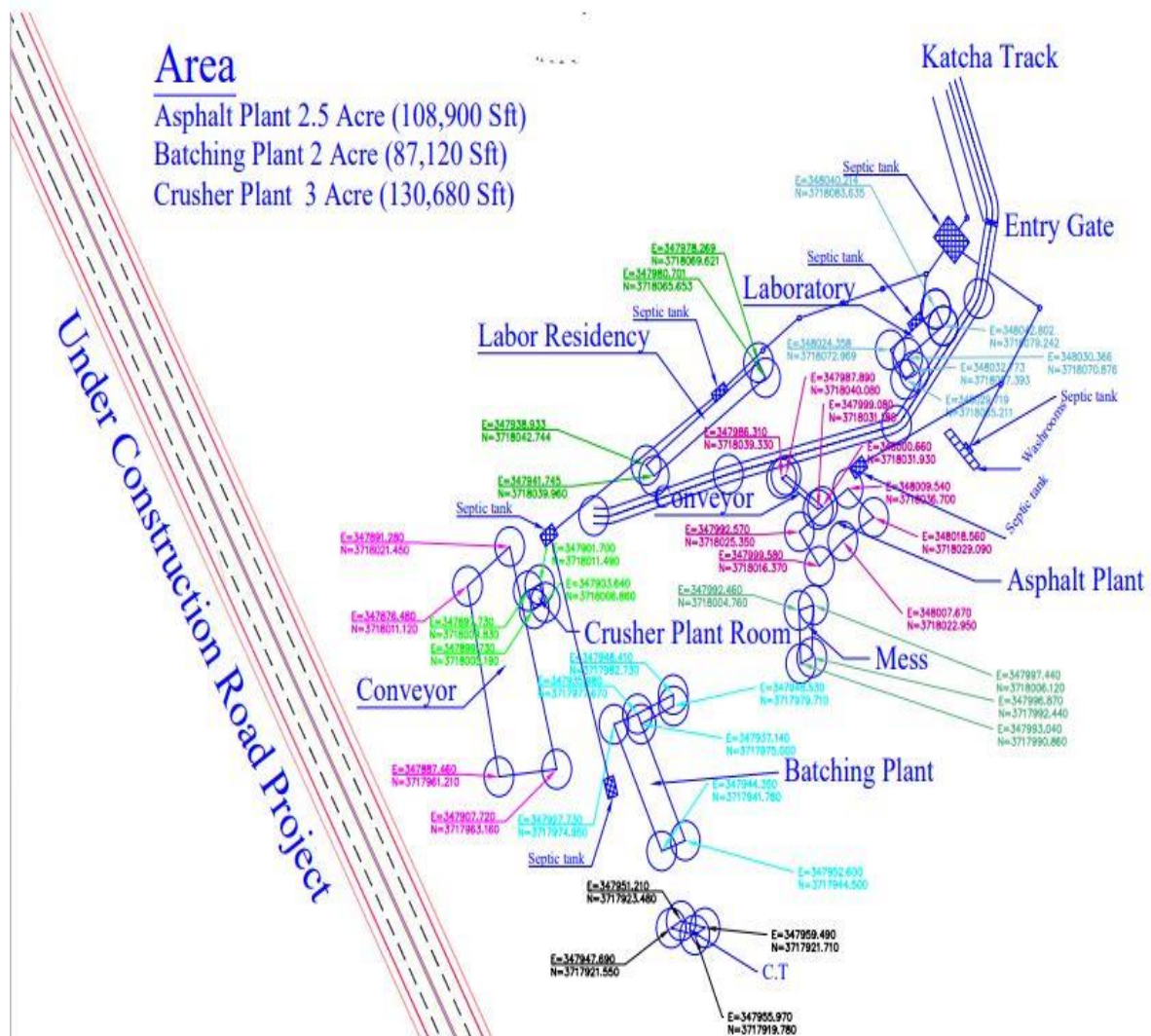
4. PROJECT PARTICULARS:

Proposed project is about the construction of Asphalt plant in combination with a batching plant, crushing unit and labor residence at **D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi** for the Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass by **M/S SMADB-SHAHRUKH (JV)**. The proposed project is intended to be developed on a land area of **12 Acres** (96 Kanals). The installation of this project on the proposed site is of temporary nature and is associated with the completion of project (Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass) allotted to **M/S SMADB-SHAHRUKH (JV)**. This project is likely to be completed in a period of two years. However, if **M/S SMADB-SHAHRUKH (JV)** gets the contract for the next section of the

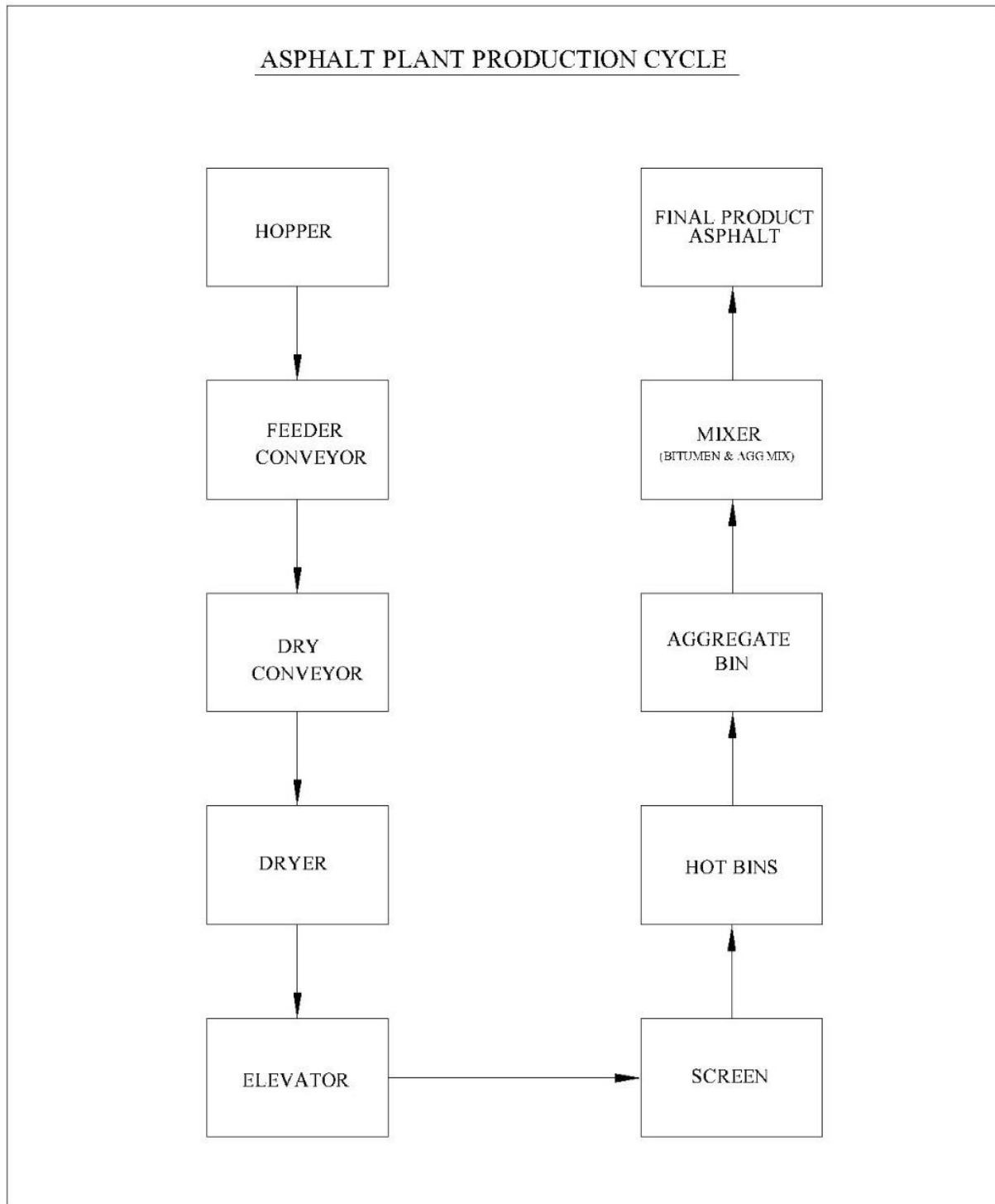
project as well, then project life will be extended accordingly by regular maintenance. The primary components of the asphalt plant include hoppers, feeders, conveyors, dryers, elevators, screens, hot bins, aggregate bins, and mixers and that of batching plant are mixer unit, conveyors, aggregate and cement batchers, cement silos etc. The source of all the raw material is Margalla hills near Turnol except bitumen, which will be obtained from Attok Refinery Rawalpindi. Water requirement will be fulfilled by two water bore of approximately 350 ft each with necessary equipment like water boozers, sprinklers etc on site. Total capacity of the asphalt plant is 1000 Kg (1 ton) daily. Capacity of batching plant is up to 1.5 m³ of fresh concrete/hour. Total cost of the proposed project is **Rs. 3,650,000,000/-** (Rupees Three Billion Six Hundred Fifty Million only).

The objectives of the project are to provide low cost and high quality asphalt, cement slurry, crushed stones and residence to labor for the Dualization of Rawalpindi-Kahuta road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass and to provide a quality service under the supervision of well-organized management. Figures given below provide an outlook of the project,





Process flow diagram of manufacturing of asphalt is given hereunder;



1.1 LOCATION OF THE PROJECT

Proposed project is located at **D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi**. The current project will provide employment opportunities, directly and indirectly to the local people of different categories, both skilled and unskilled, during its construction and regular occupancy.

The impacts of the project activities on environment during construction and operation phases have been considered in this EIA report. Constructional phase impacts will be short term and negligible. Operational Phase impacts will not be adverse as the project does not involve any activity which will produce high pollutants.

The mitigation measures have been proposed to minimize / eliminate the adverse/negative impacts of the project on the environment. A complete Environmental Monitoring and Environment Management Plan are recommended to regulate the requirements of Punjab Environmental Protection Act, 1997 (Amendment, 2012) and Schedule-II of Review of IEE/ EIA Regulations, 2000. As per Notification No. 304/56-G/LS/EPA and **Schedule II (Clause-I)** of Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulation 2000, the proposed project falls under category of projects requiring Environmental Impact Assessment (EIA)

Regular environmental monitoring, by a third party will also ensure environmentally sound construction of the project. The proponent / contractor will hire trained staff to ensure the enforcement of Environmental Management Plan. No trees will be cut down for this project. The equipment will be kept in proper condition to save the environment from any damage. During construction phase; air quality, ground water quality and surface water quality will be monitored and in operational phase; air quality and wastewater quality will be monitored.

5. ENVIRONMENTAL ASSESSMENT:

The impacts of the project activities on environment during construction & operational phases of proposed project have been considered. The mitigation measures have been proposed to minimize / eliminate the negative impacts of the project on the environment. A complete Environmental Monitoring and Environment Management Plan has been recommended to regulate the requirements of Punjab Environmental Protection Act, 1997 [Amendment, 2012]. Annual overall environmental monitoring by a third party will also ensure environmentally sound operation of the project.

The impacts on environment which are likely to be generated during execution of construction phase are summarized in table below:

ACTIVITY	ENVIRONMENTAL IMPACTS	MITIGATION MEASURES
----------	-----------------------	---------------------

- Planning and designing	- Cutting of trees - Involvement of forest and shamlati land - Stability issues of building	- Trees will not be cut down. - No forest and shamlati land will be included and to ascertain this NEC Farad is available with the proponent. - The buildings are designed by certified engineers / architects based on the reliable data and ground acceleration of area.
- Construction of road; - Excavation; - Construction of Sewerage system - Construction of building and Machinery - Waste Generate by workers	- Improper storage or handling of hazardous/ flammable materials including paints, fuels, solvents, oil, cement etc.; - Dust due to construction activities like excavation, clearing, leveling, compaction etc.; - Noise due to use of heavy machinery; - Violation of applicable air pollutant emissions or ambient concentration standards; - Safety issues for workers; and, - Solid waste including food waste - Collision of machinery while working/ improper parking	- Hiring of reputable construction contractor with sound knowledge of environment and HSE. - Substantial training of Workers before commencement of work. - Implementation of formal emergency procedures as per code of work by contractor. - Provision of all resources and PPEs consider essential to HSE. - Monitor the performance of contractor/ workers. - Necessary measures like sprinkling of water especially during dry climatic conditions should be taken to limit pollution from dust and other windblown materials. - Covering or use of wind sheets around the stockpiles to avoid air pollution through dispersion - Contractor will prepare waste management plan related to construction activities; get its approval from proponent and ensure its full implementation. - Control noise through control of working hours and selection of less noisy equipment. - All heavy machinery should be parked at designated area. - PPEs will be provided to the workers and its usage will be made mandatory. - Implementation of measures suggested in EMP of subject study. - Adequate care shall be taken during this phase to avoid any kind of damage to environment as well as worker's safety.

The impacts on environment which are likely to be generated during execution of operations are summarized in table below:

ACTIVITY	ENVIRONMENTAL IMPACTS	MITIGATION MEASURES
– Solid Waste – Liquid waste discharge	– Open dumping of house waste in street or in plots; – Discharge of liquid waste in open area; and, – Epidemic diseases.	– Solid waste should be temporally dumped on designated area and picked-up by contractor on regular basis. – Proper drainage system should be ensured for liquid waste. – Perform regular inspection of facility. – Implementation of measures suggested in EMP of subject study. – Avoid storage of hazardous waste more than a day. – Adequate care shall be taken during this phase to avoid any kind of damage to environment as well as worker's safety. – Ensure proper housekeeping; and, – Check and review regularly all elements of control measures for their continuing effectiveness.

Proposed project is designed to appropriate standards and is fitted with adequate safety and monitoring methods and will be operated by competent person. Proposed project will be equipped with engineering controls and intended to evaluate the environmental impact of proposed operational activity to avoid damage to the environment and risks to safety. All the building by laws of Tehsil Municipal Corporation are kept into consideration in the design of buildings.

Comprehensive Environmental Monitoring and Environment Management Plans are prepared to satisfy the requirements of Punjab Environment Protection Act, 1997 [Amendment, 2012] and rules and regulations made thereunder. Regular overall environmental monitoring by a third party will also ensure environmentally sound Construction and operation of the project. The proponent / contractor will hire trained staff to ensure the enforcement of Environmental Management Plan. The equipment will be kept in proper condition to save the environment from any damage.

During construction phase; air quality, ground water quality and surface water quality will be monitored and in operational phase; solid waste and wastewater drainage will be monitored. Environmental Committee will be formed to attend and address the issues relating to environment, cleanliness, up keeping, aesthetic beauty of the project site, general environmental enhancement, tree plantation, vegetation promotion, planting of flowers and ornamental plants on site.

The mitigation measures have been recommended in the EIA Report based on the best available techniques which will facilitate the project to operate in environmental friendly manner. Based on the findings of this EIA, it can be concluded that the project has negligible adverse impacts on the existing environment and the proposed project is suitable from environmental point of view.

CHAPTER-1

INTRODUCTION

1.2 OVERVIEW

Proposed project is about the construction of Asphalt plant in combination with a batching plant, crushing unit and labor residence at D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi for the Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass by M/S SMADB-SHAHRUKH (JV). The proposed project is intended to be developed on a land area of 12 Acres (96 Kanals). The installation of this project on the proposed site is of temporary nature and is associated with the completion of project (Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass) allotted to M/S SMADB-SHAHRUKH (JV). This project is likely to be completed in a period of two years. However, if M/S SMADB-SHAHRUKH (JV) gets the contract for the next section of the project as well, then project life will be extended accordingly by regular maintenance. The primary components of the asphalt plant include hoppers, feeders, conveyors, dryers, elevators, screens, hot bins, aggregate bins, and mixers and that of batching plant are mixer unit, conveyors, aggregate and cement batchers, cement silos etc. The source of all the raw material is Margalla hills near Turnol except bitumen, which will be obtained from Attok Refinery Rawalpindi. Water requirement will be fulfilled by two water bore of approximately 350 ft each with necessary equipment like water boozers, sprinklers etc on site. Total capacity of the asphalt plant is 1000 Kg (1 ton) daily. Capacity of batching plant is up to 1.5 m³ of fresh concrete/hour. Total cost of the proposed project is Rs. 3,650,000,000/- (Rupees Three Billion Six Hundred Fifty Million only).

The objectives of the project are to provide low cost and high quality asphalt, cement slurry, crushed stones and residence to labor for the Dualization of Rawalpindi-Kahuta road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass and to provide a quality service under the supervision of well-organized management. Figures given below provide an outlook of the project,

Proposed construction is planned to be developed in phases. The area under consideration is rented by the proponent. Land lease documents of the project have been attached as **Annexure-I** of this EIA report. The proposed project site is devoid of any tree or plants.

The proposed project is one among the construction which are unique in many aspects providing various facilities to its residents. A spacious area for roads with footpaths and parking lots, ornamental plants and fancy lights is an integral part of this construction. Beautiful building design will add glamour to the natural scenic beauty. It will play an important role in boosting the living standard of people in and around the vicinity of proposed project site. The current project will provide employment directly and indirectly opportunities to a large number of workers of all categories, both skilled and unskilled, during its development, construction and regular occupancy.

1.3 PURPOSE OF THE REPORT

Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore in compliance with the legal requirement of Section, 12 of Punjab Environmental Protection Act, 1997 [Amendment, 2012]; “Preparation and submission of IEE / EIA” for obtaining the Environmental Approval (EA) before starting project activity and **Schedule-II (Clause-I)** of Review of IEE/ EIA Regulations, 2000 stating projects requiring Environmental Impact Assessment (EIA). The other relevant regulations and guidelines considered while preparing this EIA report include:

- » Policy and procedures for filing, review, and approval of environmental assessments.
- » Guidelines for the preparation and review of environmental reports.
- » Guidelines for public participation.
- » Guidelines for sensitive and critical areas.
- » Detailed sectoral guidelines.
- » Hazardous Substance Rules, 2003.

Different environmental aspects like social, physical biological etc. and other related features of the project both during construction & operational phases are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval.

1.4 IDENTIFICATION OF THE PROJECT AND THE PROPONENT

a. Contact Person

Mr. Sabir Ali S/o Abdul Ghani Sabri is the authorized representative of proposed project regarding construction of **Asphalt Plant** by **M/S SMADB-SHAHRUKH (JV)** at D. Blouch

Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi. Detail of the authorized representative is given hereunder.

Name:	Mr. Sabir Ali S/o Abdul Ghani Sabri
Address:	House # 351, Street # 70 Nazim-ud-din Road, Sector F-11/1, Islamabad
Post:	Authorized Representative Asphalt Plant
Contact Details:	Cell: +92346-8504880

b. Consultant

Grand Square Consultancy (GSCON)

Address: Suite # 12, 1st Floor, Glamour-1 Plaza, Shoukat Ali Road, Township, Lahore

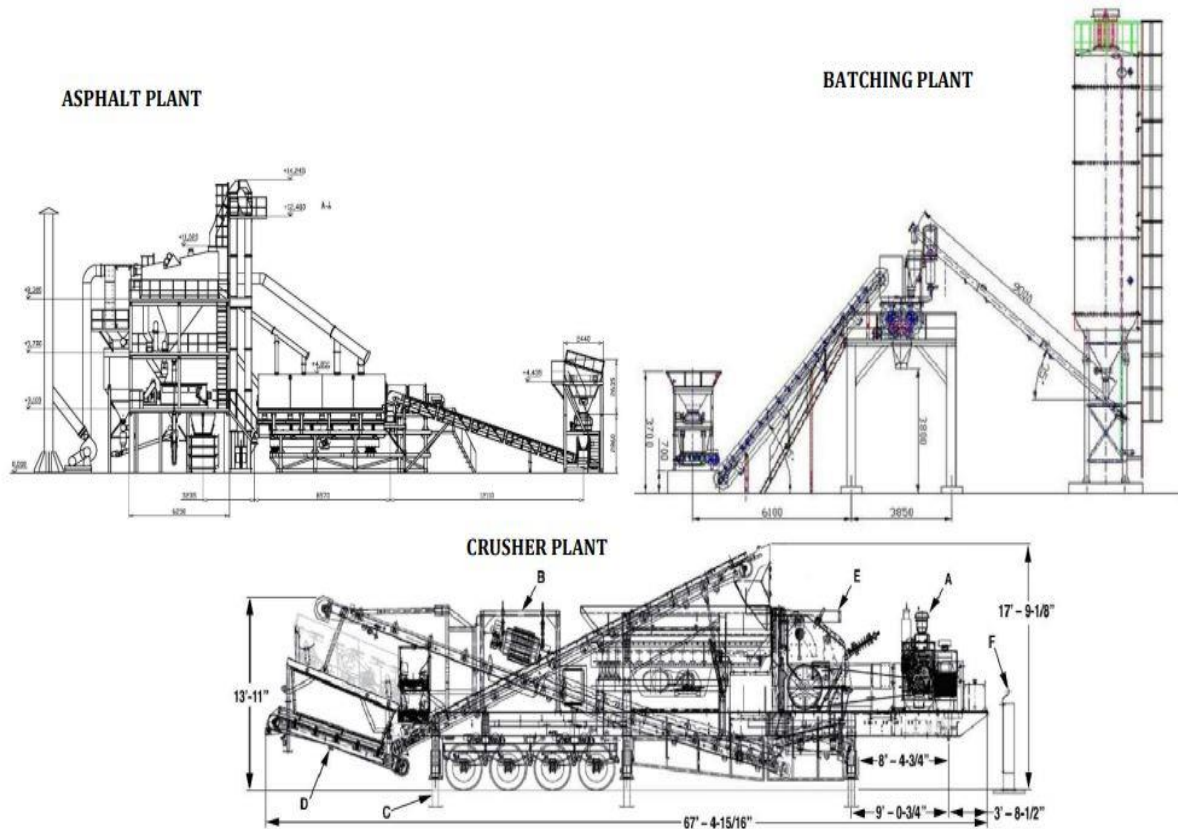
UAE Office: Khalidiya Tower, Office No. 5, M-22, Al Khalidiya St., Abu Dhabi, UAE

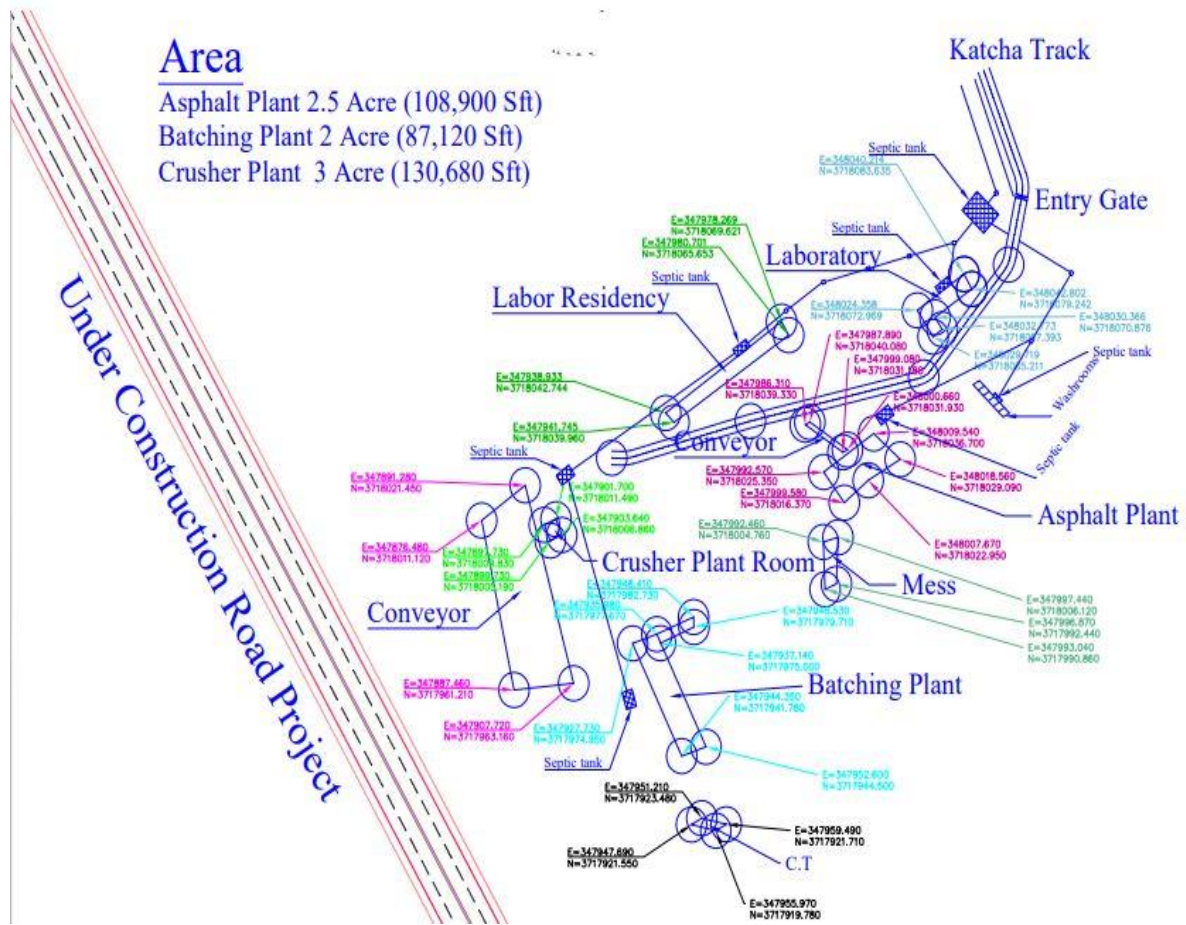
Tel: +92-42-35213231; **Email:** info@gscons.com; **Web:** www.gscons.com

1.5 NATURE AND SIZE OF THE PROJECT

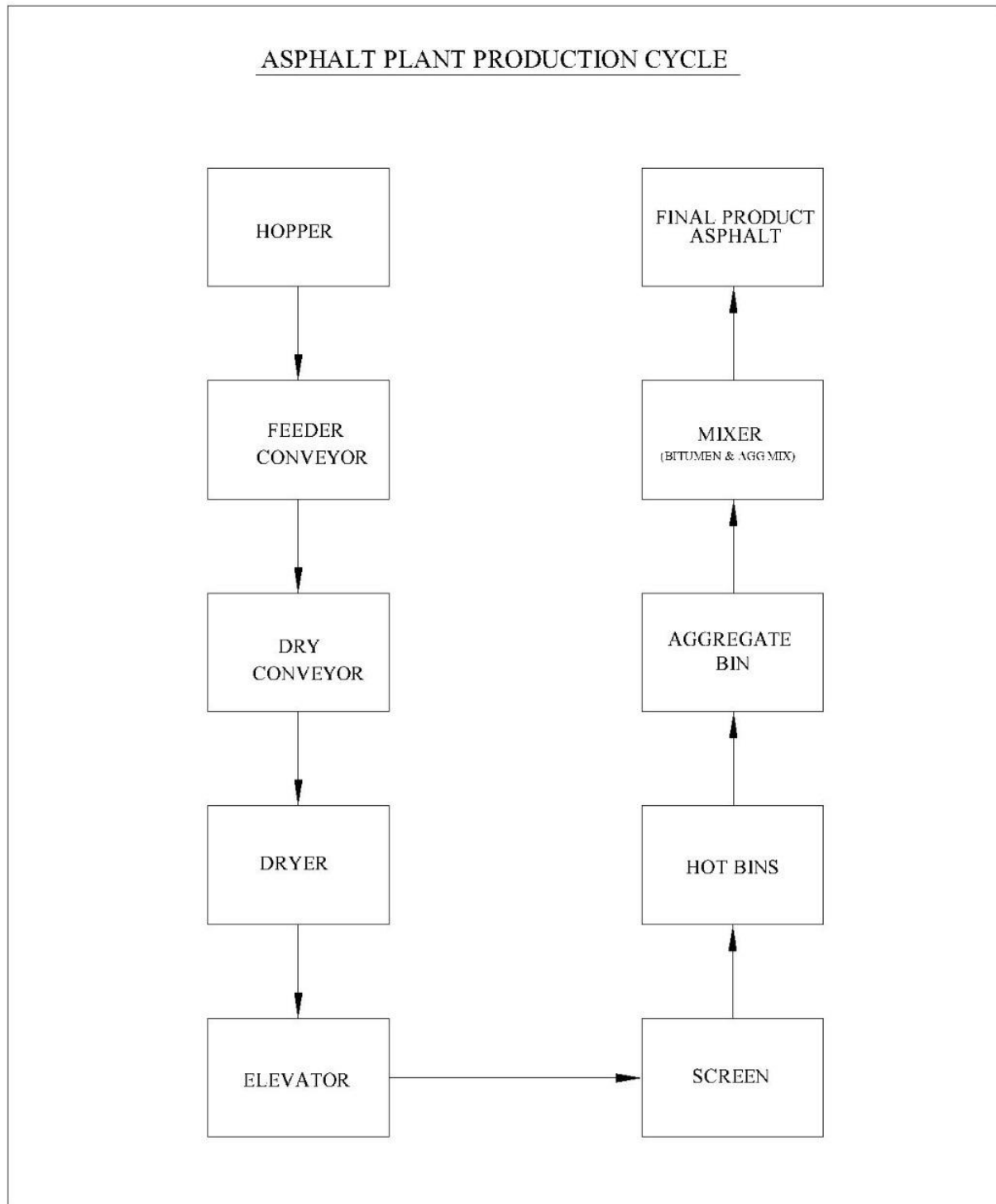
Proposed project is about the construction of Asphalt plant in combination with a batching plant, crushing unit and labor residence at **D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi** for the Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass **by M/S SMADB-SHAHRUKH (JV)**. The proposed project is intended to be developed on a land area of **12 Acres** (96 Kanals). The installation of this project on the proposed site is of temporary nature and is associated with the completion of project (Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass) allotted to **M/S SMADB-SHAHRUKH (JV)**. This project is likely to be completed in a period of two years. However, if **M/S SMADB-SHAHRUKH (JV)** gets the contract for the next section of the project as well, then project life will be extended accordingly by regular maintenance. The primary components of the asphalt plant include hoppers, feeders, conveyors, dryers, elevators, screens, hot bins, aggregate bins, and mixers and that of batching plant are mixer unit, conveyors, aggregate and cement batchers, cement silos etc. The source of all the raw material is Margalla hills near Turnol except bitumen, which will be obtained from Attok Refinery Rawalpindi. Water requirement will be fulfilled by two water bore of approximately 350 ft each with necessary equipment like water boozers, sprinklers etc on site. Total capacity of the asphalt plant is 1000 Kg (1 ton) daily. Capacity of batching plant is up to 1.5 m³ of fresh concrete/hour. Total cost of the proposed project is **Rs. 3,650,000,000/-** (Rupees Three Billion Six Hundred Fifty Million only).

The objectives of the project are to provide low cost and high quality asphalt, cement slurry, crushed stones and residence to labor for the Dualization of Rawalpindi-Kahuta road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass and to provide a quality service under the supervision of well-organized management. Figures given below provide an outlook of the project,





Process flow diagram of manufacturing of asphalt is given hereunder;



1.6 LOCATION OF THE PROJECT

The proposed project is located at D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi. The construction site is located away from nearby villages. Ling river is the nearest waterbody to the project. Villages Nathoot, Sarot and Dhani Awan are located at a distance of about 1.5 km from the project.

1.7 SCOPE OF STUDY

For achieving the objectives of EIA, the study is mainly divided into the following sub-tasks:

- Identification of various legal / statutory requirements as set forth by the Punjab Environmental Protection Act, 1997 [Amendment, 2012] and the guidelines for preparation of EIA Reports and review of existing regulatory framework in the country with reference to the development projects;
- Collection of data related to physical, ecological, and socio-economic resources of the project area;
- Identification and evaluation of salient environmental impacts;
- Identification of necessary mitigation measures to minimize the adverse impacts; and
- Preparation of an Environmental Management Plan (EMP).

The key steps followed while conducting EIA are briefly described below.

1.7.1 Review of Project Documents

Previous relevant reports have been reviewed for getting insight into the project area and related issues. Some offices and organizations were also visited for acquisition of published reports and data.

1.7.2 Reconnaissance Survey

The reconnaissance survey under this study was conducted on 23rd of November, 2022 by an interdisciplinary team consisting of Environmentalist, Health & Safety Specialist to conceptualize the project and understand the potential environmental and social impacts associated with the proposed project and also to familiarize the environmental setting and local conditions.

1.7.3 Data Collection

Both primary and secondary data were collected to accomplish the objectives of the study. The primary data was collected by conducting field survey on 23rd and 24th of November, 2022 through environmental monitoring, individual interviews of local population, focus group discussions and consultations with local community, while secondary data was collected from the published government documents, i.e. Economic Survey of Pakistan, District Population Census, Multiple Indicators Clusters Survey, Weather data, Government Acts, Laws and Regulations. Based on the environmental checklist, socioeconomic questionnaires and area profile as well format for consultations, field surveys were carried out to collect data on the physical, biological and social environment aspect of the project site.

i) Physical Environment

The physical aspects of the project site covered the following:

- » Soils - type of soils, erosion, stability
- » Land use pattern of the area including agriculture crops, barren lands, industrial and residential use
- » Affected buildings - residential, industrial, commercial, and structures of buildings
- » Drainage pattern
- » Available energy source(s)
- » Other private/ public infrastructure/ utilities like pipelines, electric poles
- » Water resources available both surface and groundwater
- » Air quality and noise level in the project impact corridor

ii) Biological Environment

In consideration of ecological environment, the following main aspects were studied:

- » Existing vegetation along the project impact corridor
- » Trees likely to be affected due to the project implementation (if any)
- » Endangered species both flora and fauna
- » Wildlife in the project impact corridor
- » Forests and game reserves existing along project impact corridor
- » Beneficial plants and animals in the project impact corridor
- » Aquatic life including fish resources
- » Wetlands within the vicinity of the project impact corridor

iii) Social Environment

Social assessment has attempted to determine the social implications in terms of assumed positive and negative impacts as a result of the implementation of the proposed project. The socioeconomic baseline data covered the following major aspects:

- » Demographic profile
- » Population
- » Number of households
- » Literacy status
- » Nature of business/ occupations
- » Livelihood/ income
- » Living standard of the population
- » Access to credit
- » Social infrastructure available
- » Women issues
- » Community perceptions about the Project

1.7.4 Stakeholders/ Public Consultations

During the detailed field survey dated 23rd of November, 2022; consultations were made with local community/ general public as well as intent officials. The basic purpose of these consultative meetings/ focus group discussions were to i) share information with stakeholders about the expected impacts of proposed development works on the physical, biological, and socioeconomic environment; ii) understand stakeholders' concerns regarding various aspects of the project, including the existing conditions and the potential impacts of the proposed project.

1.7.5 Data Processing and Analysis

After collecting all above data from different sources including interviews from communities, consultations, physical observations, and data compiled from other documents was analyzed. Accordingly, the results were presented through tables (means, percentage, number), graphical/ pictorial illustrations.

1.8 PERSONS PERFORMING EIA STUDY

EIA study of the project has been conducted by GSCON Consultant-Pakistan, according to the Review of IEE/EIA Regulations 2000, Pakistan Environmental Protection Agency (Pak EPA), Punjab Environmental Protection Act, 1997 [Amendment, 2012], and other relevant Regulations and completed this EIA Report. List of names, qualifications and roles of team members carrying out the EIA study is provided as **Annexure-V** of this document.

1.9 ROLES AND RESPONSIBILITIES

The executing firm/company of the proposed project is **M/S SMADB-SHAHRUKH (JV)**. Role and responsibilities have been proposed in the EIA report. Proposed mitigation measures, as defined in the EMP will be primarily implemented by the management of **Asphalt Plant** with responsibilities assigned to various departments. Project Proponent will strictly adhere to implementation of all mitigation measures contained in this report in order to minimize any negative impact on any component of environment during and after execution of project. Institutional arrangements have been suggested in Chapter-7 of this document, so that proposed mechanism of environmental protection shall work in time.

1.10 ROLE OF ENVIRONMENTAL PROTECTION AGENCY, PUNJAB

The main responsibility of Environmental Protection Agency, Punjab will be to monitor the mitigation measures, which will be taken up or implemented by **M/S SMADB-SHAHRUKH (JV)**. EPA is endorsed to inspect compliance of sections 13, 14, 17, & 18 of IEE/ EIA Regulations, 2000, which enunciate the conditions for approval, confirmation of compliance, entry, inspection and monitoring of proposed project. Hence, EPA Punjab is the sole entity

which is responsible to issue the necessary approval by exercising powers under section 12 of Punjab Environmental Protection Act 1997 [Amendment, 2012] after proper review of this EIA document.

1.11 ORGANIZATION OF EIA REPORT

The EIA report is divided into following chapter:

Executive Summary

Chapter 1: Introduction

Chapter 2: Legal Framework

Chapter 3: Project Description

Chapter 4: Description of Environment

Chapter 5: Stakeholder Consultation

Chapter 6: Impact Identification & Mitigation Measures

Chapter 7: Environmental Management Plan

Chapter 8: Findings and Recommendations

Annexure

CHAPTER-2

POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK

2.1 GENERAL

This section deals with the current policy as well as legal and administrative framework related to carrying out of Environmental Impact Assessment of various projects.

Like other Projects, the proposed Project, before its execution, is required to go through an Environmental Assessment, in accordance with the provisions of the Punjab Environmental Protection Act, 1997 [Amendment, 2012].

2.2 EXISTING REGULATIONS AND LEGAL FRAMEWORK

According to environmental laws of the country development projects have to undergo the process of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) in order to predict and mitigate the impacts of the development at an early stage. Based on nature, size, cost and associated impacts, the proposed project has been categorized for EIA Study according to the Regulation “4” of Statutory Notification issued on June 13, 2000 (S.R.O.339 (1) /2001). As per **Schedule-II (Clause-I)** of the IEE / EIA Regulations 2000 made under section 12 of Punjab Environmental Protection Act, 1997 [Amendment, 2012] under which the Environmental Impact Assessment (EIA) is mandatory for getting Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

This EIA Study has been carried out in the light of the policy guidelines of the Government of Pakistan, under the procedures and practices formulated by the Provincial Environmental Protection Agency (EPA-Punjab).

2.3 RELEVANT LEGAL / INSTITUTIONAL FRAMEWORK

The applicable laws for the environmental study of the proposed project are briefly given below. The proponent of the proposed project will abide by the applicable laws and regulations.

2.3.1. NATIONAL CONSERVATION STRATEGY, 1992

On March 1st, 1992, the Cabinet of Pakistan approved the National Conservation Strategy. It describes the stark reality of the country's deteriorating resource base and its implications for what is still largely a natural resource-based economy. It sets forth the beginnings of a plan to integrate environmental concerns into virtually every aspect of Pakistani economic life.

The strategy has three overriding objectives: conservation of natural resources, sustainable development, and improved efficiency in the use and management of

resources.

2.3.2. PEPO, 1983 AND PEPA, 2012

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which was replaced by the Pakistan Environmental Protection Act (PEPA) 1997, through an Act of Parliament. Now the PEPA 1997 has been replaced by Punjab Environmental Protection Act, 1997 [Amendment, 2012] on 18th April, 2012.

Under Sec. 8 of Environment Protection Ordinance (EPO) 1983, it was necessary to carry out IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

Under section 12 of the Punjab Environmental Protection Act, 1997 [Amendment, 2012] it is mandatory to take an Environmental Approval Environmental Protection Agency for commencement of any construction of project. This study has also been carried out under section 14 “**Handling of Hazardous Waste**” of the Punjab Environmental Protection Act, 1997 [Amendment, 2012] stated “no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except (a) under a license issued by the Provincial Agency and in such manner as may be prescribed; or (b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party”.

2.3.3. NATIONAL ENVIRONMENTAL POLICY 2005

The national environmental policy 2005 aims to protect, conserve and restore the environment in order to improve quality of the life of citizens through sustainable development and resource conservation. The main objectives of the policy are;

- Conservation, restoration and efficient management of the natural resources.
- Integration of the environmental considerations in policy making and planning process.
- Capacity building of government agencies and other stakeholders at all levels for the better environmental management.
- Meeting international obligations effectively in line with the national aspirations.
- Creation of a demand for environment through mass awareness and community mobilization.

2.3.4. NATIONAL FOREST POLICY 2001

This policy covers the Renewable Natural Resources (RNR) of Pakistan i.e. Forests, Watersheds, Rangelands, Wildlife, Biodiversity and their habitats. The policy seeks to

launch a process for eliminating the fundamental causes of the depletion of RNR through the active participation of all the concerned agencies and stakeholders, to realize the sustainable development of the resources. It is an umbrella policy providing guidelines to the Federal Government, Provincial Governments and territories for the management of their RNR. In consonance with it, the Provincial and District Governments may devise their own policies in accordance with their circumstances.

The goal of this policy is to foster the sustainable development of RNR of Pakistan, for the maintenance and rehabilitation of its environment and the enhancement of the sustainable livelihoods of its rural masses especially women, children and other deprived groups. The elements of the policy are as follow:

1. Population planning in critical eco-systems.
2. Providing substitutes to firewood in the wooded mountains.
3. Reducing the impact of socio-economic causes.
4. Reducing poverty, poverty of opportunity, and powerlessness.
5. Reducing political interference in the Forestry and Wildlife Departments.
6. Renovating and invigorating the institutions of RNR.
7. Supporting Local Governments in the sustainable development of their RNR.
8. Policies for fragile natural Eco-systems.
9. Riverain forests.
10. Irrigated Plantations.
11. Preservation of relict and unique forests.
12. Wildlife.
13. Rangelands and desert eco-systems.
14. Planting of trees and fodders on farmlands.

2.3.5. REVIEW OF IEE AND EIA REGULATIONS, 2000

The GOP has issued Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, to review the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Reports.

2.3.6. GUIDELINES FOR THE PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS, 1997

The GOP has also framed guidelines for the preparation and review of IEE/EIA of projects in various developmental sectors.

2.3.7. PUNJAB ENVIRONMENTAL QUALITY STANDARDS (PEQS)

Powers conferred under clause (c) of sub-section (1) of section 4 of Punjab Environmental Protection Act, 1997 [Amendment, 2012] has been approved the Punjab Environmental Quality Standards (PEQS), 2016 for municipal and industrial effluents, noise, drinking water, motor vehicle exhaust, air emissions, industrial gaseous emissions and treatment of liquid & disposal of biomedical waste.

2.3.8. GUIDELINES FOR SENSITIVE AND CRITICAL AREAS

GOP has issued Guidelines for Sensitive and Critical Areas in October, 1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the proposed projects are planned and sited in way that protects the values of sensitive and critical areas.

2.3.9. POLICY & PROCEDURES FOR THE FILING, REVIEW & APPROVAL OF ENVIRONMENTAL ASSESSMENTS, NOVEMBER-1997

Environmental Assessment is the Primary means of managing the approval of new development proposals in Punjab. Environmental Assessment allows for the systematic examination of proposals, clear procedures which provide for the interests of relevant Government Departments and other stakeholders to carefully consider the environmental impacts of new developmental projects.

2.3.10. GUIDELINES FOR PUBLIC CONSULTATION, PAKISTAN ENVIRONMENTAL PROTECTION AGENCY OCTOBER, 1997

This guideline is part of a package of regulations and guidelines which include:

- » Punjab Environmental Protection Act, 1997 [Amendment, 2012]
- » Policy and Procedures for filing, review and approval of environmental assessments
- » Guidelines for the preparation and review of Environmental Reports
- » Guidelines for sensitive and critical areas
- » Punjab Environmental Quality Standards (PEQS)
- » Detailed sectoral guidelines

2.3.11. PUNJAB WILDLIFE PROTECTION ACT, 1974

This act was framed in 1974 by the Province Punjab and is about of protection and conservation of Wildlife.

2.3.12. FOREST ACT, 1927

This act was framed in 1927. The Forest Act, 1927 is still the basic charter for the forest departments in Pakistan. This law empowers provincial governments to manage forest areas.

2.3.13. PUNJAB LOCAL GOVERNMENT ORDINANCE, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. Under the Ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

2.3.14. PAKISTAN PENAL CODE, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268, which defines and recognizes noise as a public nuisance. "A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right."

2.3.15. OCCUPATIONAL HEALTH

Construction and operational activities could affect 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 Pakistan Factories Rules, 1962 (based on the Factories Act, 1934) and the Labor Laws (Amended) Ordinance, 1972.

2.3.16. 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.

2.3.17. HAZARDOUS SUBSTANCE RULES, 2003

Rule 5 stated that project/ industrial activity must be accompanied by Environmental Impact Assessment (EIA) involving generation, collection, consignment, transport, treatment, disposal, storage, handling/ import of hazardous substance in respect of which the license is sought.

CHAPTER-3

PROJECT DESCRIPTION

3.1 TYPE AND CATEGORY OF PROJECT

Proposed project is about construction of **Asphalt Plant** by **M/S SMADB-SHAHRUKH (JV)** at D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi. As per Notification No. 304/56-G/LS/EPA and **Schedule II (Clause-I)** of Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulation 2000, the proposed project falls under category of projects requiring Environmental Impact Assessment (EIA).

3.2 OBJECTIVES OF THE PROJECT

Due to growing population and urge for better living standards of life, demand for modern facilities has been raised during recent years. The objectives of the project are to provide low cost and high quality asphalt, cement slurry, crushed stones and residence to labor for the Dualization of Rawalpindi-Kahuta road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass and to provide a quality service under the supervision of well-organized management. The project aims to offer better living standards, achieve design/ construction features of roads matching with applicable standards. For more details, please refer to “1-Introduction-Nature and size of the project” above.

3.3 ALTERNATIVES CONSIDERED & THEIR REASON OF REJECTION

Proposed project is is being developed for the Dualization of Rawalpindi-Kahuta Road including 4-lane bridge over Sihala Railway pass, Sihala bypass and Kahuta bypass by **M/S SMADB-SHAHRUKH (JV)**. Construction of **Asphalt Plant** is need of nearby construction of road and bridges. Site has been selected based on easy travelling and suitable distance from the residential community and road construction site. It should also meet the legal requirements of the Town Municipal Administration (TMA) in the matters relating to the land use conditions of the project area.

An analysis of available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of appropriate option that was required to ensure optional results within defined set of economic

environmental, health and safety constraints. In particular, it outlines the following project options:

1. The “No-Development Option”

2. Alternative Site Option

1. No Development Option: No project means there would be no project at all. The no project option, if taken, would stop the community from an important and necessary project which is the need for today as per limited resources/ facilities being provided to general public. Other impacts of the ‘No project’ option would be loss in employment and social welfare in the project area, as the project is bound to create jobs and improve the lifestyle of the community of the area through different community development and social welfare projects. From the environmental point of view, this option would result in the loss of opportunity in further improvement of the environmental management of the area, environmental baseline data, and the mitigation and compensatory programs.

2. Alternative Site Option- Site Selection Criteria: In reference to the project alternatives, 2 sites were visited but due to lack of land documents and land use issues those sites were rejected. The final selection of site is based on following criterion:

- **Accessibility:** The site should be accessible from a permanent road to allow ready transport.
- **Water Supply:** Availability of adequate water supply, which should also meet drinking water standards.
- **Soil Condition for civil structures:** Suitability and stability of soil conditions required for civil structures
- **Sufficient land availability:** Availability of sufficient land to design and layout plan in an appropriate manner, with consideration of future expansions.
- **Electricity:** Availability of electricity from the National Grid for an uninterrupted supply of power, required for the project.

In view of all above criteria regarding site selection, it is to be sited at a place where there are bright prospects and need of the same. It should also meet the legal requirements of the Town Municipal Administration (TMA) in the matters relating to the land use conditions of the project area. The infrastructure and cable network is already present at the proposed project site. Availability of access road, communication facilities, electricity, basic infrastructure, sewerage etc. is another

necessary requirement for the proposed project which are already available at the proposed site.

Obviously, environmentally sound, neat and clean environment are the other considerations for site selection. The project will consist of construction of **Asphalt Plant** by **M/S SMADB-SHAHRUKH (JV)** in the area.

All the above stated qualities for an ideal site for proposed project are present in the selected project site. All the other basic infrastructural requirements are also available at the selected site. Accordingly, the selected site is best suited for construction of the project.

Such projects are dire need of time by keeping in mind the growing rate of tourism in Pakistan. With due attention to environmental protection and implementation of mitigation measures suggested in this EIA report; the construction of the project is a blend of elegant location, most efficient and cost effective design, elaborated by quality construction, is simply the best. Therefore, the present site is ideally suitable for this project.

3.5 PROJECT LOCATION/ SITE LAYOUT

Project location map has shown in figure 3.1 below. Project layout plan is attached as Annexure-II, however the detailed location map is attached as **Annexure-III**.

3.1: Location Map of Project Site



3.6 LAND USE AT THE PROJECT SITE

The project site is open land. Proposed construction is planned to be developed in phases. The area under consideration is rented by the proponent. Land lease documents of the project have been attached as **Annexure-I** of this EIA report.

3.7 ROAD ACCESS

In order to facilitate developments and growing tourism, basic infrastructure facilities like roads network, natural gas, water and power supply, means of transportation and communications etc. are being improved/ developed speedily. Kahuta road is nearest to the project site.

3.8 VEGETATION FEATURES OF SITE

Project site is situated within the low population area. The project site is open land. of This is worth mentioned that this project is based on the idea of **NO TREE CUTTING**.

3.9 ENERGY/ POWER SOURCE

As mentioned above in this EIA report, the project under reference of this EIA is construction of **Asphalt Plant** by **M/S SMADB-SHAHRUKH (JV)**. A Separate Line of 150 KV along with transformer is going to be installed by the IESCO. Copies of the documents reflecting the detail of the allotted connection is attached at **Annexure-IV**.

However, in addition to that a diesel generator with an estimated capacity of 450 KVA has been installed near to the plant location which is sound proof with canopy, in a very good condition and is environment friendly.

3.10 WATER REQUIREMENT

Adequate quantity of underground water will be required to meet all the project requirements. Around 13000 gallons of water will be used in the process of making concrete in batching plant. This water will become part of concrete mixture and will not be discharged. However, Water used for sanitation will be treated via septic tanks and will be discharged into nearby drain. To meet water requirement of project, two water bores of 350 feet each approximately are required along with necessary equipment like water boozers, water sprinklers etc. on site. The quality of water is also satisfactory. This factor also supports the decision regarding sitting of the project at the existing site.

3.11 SOLID WASTE

This project will not have any kind of solid waste that is hazardous in nature or needs to be disposed off. Any solid waste related to concrete manufacturing consisting of stones, pebbles etc. will be reused in the process

3.12 PROJECT COST & MAGNITUDE OF OPERATIONS

The estimated capital cost of the proposed project is about **Rs. 3,650,000,000/-** (Rupees Three Billion Six Hundred Fifty Million only) including land and development cost. The quantities have been worked out from the design drawings. The rates for cost estimates are based on land lease cost, construction work, contractor cost and cost of the equipment/ machinery with 10% escalation. At operation stage, the project proponent will be involved for operation and maintenance of the proposed facility. The development under reference of this EIA will be spread on an area of 12 acres.

3.13 SCHEDULE OF IMPLEMENTATION

Proposed project is settled for Environmental Approval to start its implementation. It is planned that the following schedule of project implementation will be adhered to. This is subject to the conditions that everything goes according to planning and no serious bottlenecks are encountered.

The implementation stages of the project activity include¹:

Stage I

Boundary markings and plotting of the said land.

Stage II

- i- Work on pavements, roads
- ii- Sewerage system along-with provision of other basic facilities like electricity, telephone and parking etc.
- iii- Laying of foundations excavation and commencement of erection work.

Stage III

Simultaneously grey structure of proposed blocks will be started.

Stage IV

Completion of Grey Structure and installation of machinery.

¹All dates/ periods for project start are tentative and likely to change depending upon the circumstances.

It is estimated that construction of the structures of the building will take almost 1.8 years.

3.14 DESCRIPTION OF THE PROJECT

The project has been duly described at: “1-Introduction- Nature and size of the Project-Purpose of the report, identification of the project and the project proponent.”

3.15 DESCRIPTION OF THE PROCESS

The project has been duly described at: “1-Introduction- Nature and size of the Project-Purpose of the report, identification of the project and the project proponent.”

3.16 DETAILS OF RESTORATION & REHABILITATION PLANS

M/S SMADB-SHAHRUKH (JV) will continue to maintain its highly organized way of work including restoration and rehabilitation in environmental friendly way even at the end of the first life of the project.

During entire construction period, necessary precautions will be taken to ensure that no damage will be done to the basic infrastructures like power transmission lines telephone lines, roads, private or public property and daily human life as well.

Safety measures as desired under the code of demolition will be adopted to avoid any harm to humans, property around or the environment in the project area. Dust to be generated will be minimized by constant sprinkling of water. After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spillover of these materials will be cleared adequately. The land, if and where pitted will be adequately leveled. On the whole, the project site and the area in its near vicinity will be made neat and clean to maintain the scenic beauty of the area.

3.17 GOVT. APPROVALS AND LEASES REQUIRED BY THE PROJECT

Project Proponent has accorded approvals/ certifications for their project from all relevant regulatory bodies successively. The land is rented. All of these documents have been provided under **Annexure-IV** of this document. So far the Environmental Approval from the EPA, Punjab, Lahore is the major requirement for which this EIA report has been prepared and submitted.

SECTION-4

DESCRIPTION OF ENVIRONMENT

4.1 GENERAL

This Section of the report covers a comprehensive description of the baseline conditions of the project and its related influence area with respect to the physical, biological, and social aspects. In addition to the secondary data, the field survey was carried out on 23rd of November, 2022 and the environmental baseline conditions were established based on socioeconomic interviews²; impact location profiles; environmental profile questionnaires and public consultations.

4.2 PHYSICAL RESOURCES

Following is a brief description of various physical resources of the Project Site.

4.2.1 Topography, Geology & Soil

Rawalpindi commonly known as Pindi is a city in the Punjab province of Pakistan. Rawalpindi is adjacent to Pakistan's capital of Islamabad, and the two are jointly known as the "twin cities" on account of strong social and economic links between the cities. Rawalpindi is the fourth-largest city in Pakistan by population, while the larger Islamabad Rawalpindi metropolitan area is the country's third-largest metropolitan area. It was the capital of Pakistan from 1959 to 1969.

The district was given the name from the hub municipality Rawalpindi which means the residence of Rawals. The famous emperor Jahangir in his world renowned book tuzk e Jahangiri has reported that name Rawalpindi is composed of two words, Rawals, a racial cluster that laid down the foundation of a non-urban society at the place where today we see Rawal Dam and Pindi, which was coined by Jhanda Khan, a leader of Ghakhar tribe who set a new city at the place of an ancient town Kaawa and gave the name Rawalpindi.

Rawalpindi was destroyed during the invasion of Mahmud of Ghazni before being taken over by Gakhars in 1493. In 1765, the ruling Gakhars were defeated as the city came under Sikh rule, and eventually became a major city within the Sikh Empire based in Lahore. The city fell to the British Raj in 1849, and in 1851 became the largest garrison town for the British Indian Army. Following the partition of British India in 1947, the

²Households resided in the vicinity of the project area, selected randomly and interviewed.

city became home to the headquarters of Pakistan Army hence retaining its status as a major military city.

Rawalpindi is situated on the southern slopes of the north-western extremities of the Himalayas, including large mountain tracts with rich valleys traversed by Mountain Rivers, at an elevation of 508 m (1,667 ft). The proposed project area is situated at Adyala road, Post office Dahgal, Rawalpindi.

Administrative subdivisions of Rawalpindi district is divided into seven tehsils: Gujar Khan, Kahuta, Kallar Syedan, Kotli Sattian, Rawalpindi Tehsil, Taxila, Kallar Syedan became the seventh Tehsil of Rawalpindi district on 1 July 2007; prior to this date it was part of Kahuta Tehsil. Brief demographical profile of city is mentioned in Table 4.1 below.

Table 4.1 Demographic profile of Rawalpindi

Item	Unit	Value
Total area of the District	Sq.km	5,286
Tehsils	Number	7
Density	Sq.km	1,322
Union Councils	Number	46
Total population of the District (census 2017)	Number	5,405,633
Population (male)	Number	2,663,075
Population (female)	Number	185,647
Transgender	Number	686
Literacy rate of the District	%	70.5
Average household size	Number	6.1

Source: Rawalpindi District: district in Punjab Province, Pakistan

Soils form major relation with environment. They influence environment by their special qualities and more so through fertility. Types of soils besides providing food, clothes or housing population serve with special food and lumber products, medicinal plants etc.

Soil should not be taken as a lifeless residual layer but it is a very dynamic element of environment in which very complicated physical, chemical and biological activities are constantly proceeding. In this way it is a dynamically changing and developing body. Soil scientists restrict the word soil or solum merely to the surface material, which has come to have distinct layers or horizon over the extended period of time.

Soils have different meanings for different people. To a soil scientist it means the upper a few layers created through weather effect in which plants are grown. The solid portion of soil is both organic and inorganic. The organic part consists of both living and decayed plant and animal materials. Texture of the soil plays a very important role in its water holding capacity of the soil. The same is true for various faunal species, which are important for adding the nutrients in the soil by the breakdown of organic matter and making it suitable for the agriculture.

The Project Area does not have any valuable minerals. The soil of Rawalpindi is different in character and generally inclined to be dry. However, it is rich in potential plant nutrients.

The terrain in the metropolitan area of Islamabad-Rawalpindi consists of plains and mountains whose total relief exceeds 1,175 m. Along with Rawalpindi, the region can where these two cities are located lie within three physiographic zones which trend generally in the east-northeast direction. Margalla Hills, together with Hazara and Kala Chitta Range, which are part of lower and outer Himalayas, form the northern part of the metropolitan area. The urban concentration of Rawalpindi and Islamabad lie in the piedmont bench. The northern part, which has a minor dissection, is where Islamabad is located while Rawalpindi lies in the relatively further dissected south near the Soan River which flows along the axis of Soan syncline. The clay in the region has five distinct strata. Coarse pebbles together with sand and clay make up the lowest layer which is of alluvium nature deposited by older system of Soan Basin over the pebble bed. The alluvium deposits same river system comprise the subsequent layers. The air borne top layer of silt or clay is called loess and the top most one is gravelly conglomerate.

4.2.2 Hydrology

The sub soils and sub strata encountered in the area have been formed by alluvial deposits transported by ancient streams of the River System. The unconsolidated sediments are to a depth of about 900 – 1000 feet. The groundwater recharge is mainly derived from the seepage of unlined canals, watercourses and from irrigation practices. Recharge directly from

rainfall is moderate. Also, some recharge takes place from ponds, water supply and sewerage systems.

Underground Water

The ground water table in district is 10-15 m deep. A supplemental network of municipal and private wells as deep as 200 meters (m) produces ground water primarily from quaternary alluvial gravels. The altitude of the water table decreases from about 600 m at the foot of the Margala Hills to less than 450 m near the Soan River, so that the saturated zone generally lies 2–20 m below the natural ground surface. The strata of the subproject area are water bearing and alluvial deposits, giving groundwater potential throughout the district. The water table is not seasonal and dug wells do not generally run dry. Groundwater sources exist in the area. The local population is generally reliant on supply from the hand pumps. The chemical quality of ground water in the district varies in different areas and at different depths. Potable water is available in the district. Irrigation supplies are perennial and tube wells have been installed to make up the deficiencies. Table 4.2 shows the number of diesel and electric Tube wells installed in district.

Table 4.2: Diesel and Electric Tube wells

Total Number of Wells	Government	Private
18,823.0	58.0	18,765.0

The chemical quality of groundwater is:

- Generally fresh in the area along the rivers: and
- Brackish/ saline in the central parts of the Doabs

During the last century, a weir controlled irrigation system was superimposed on these areas. Seepage from the canal system and irrigated fields has formed shallow fresh groundwater lenses/layers on top of the saline groundwater zone.

Thick clay lenses at varying depth in the area, divide the aquifer in different parts and these impervious clay lenses act as barrier between the shallow poor groundwater quality and deep fresh groundwater quality in the area. One of the reasons of poor groundwater quality at shallow depth in the area is water logging in the past. Whereas, different impervious thick

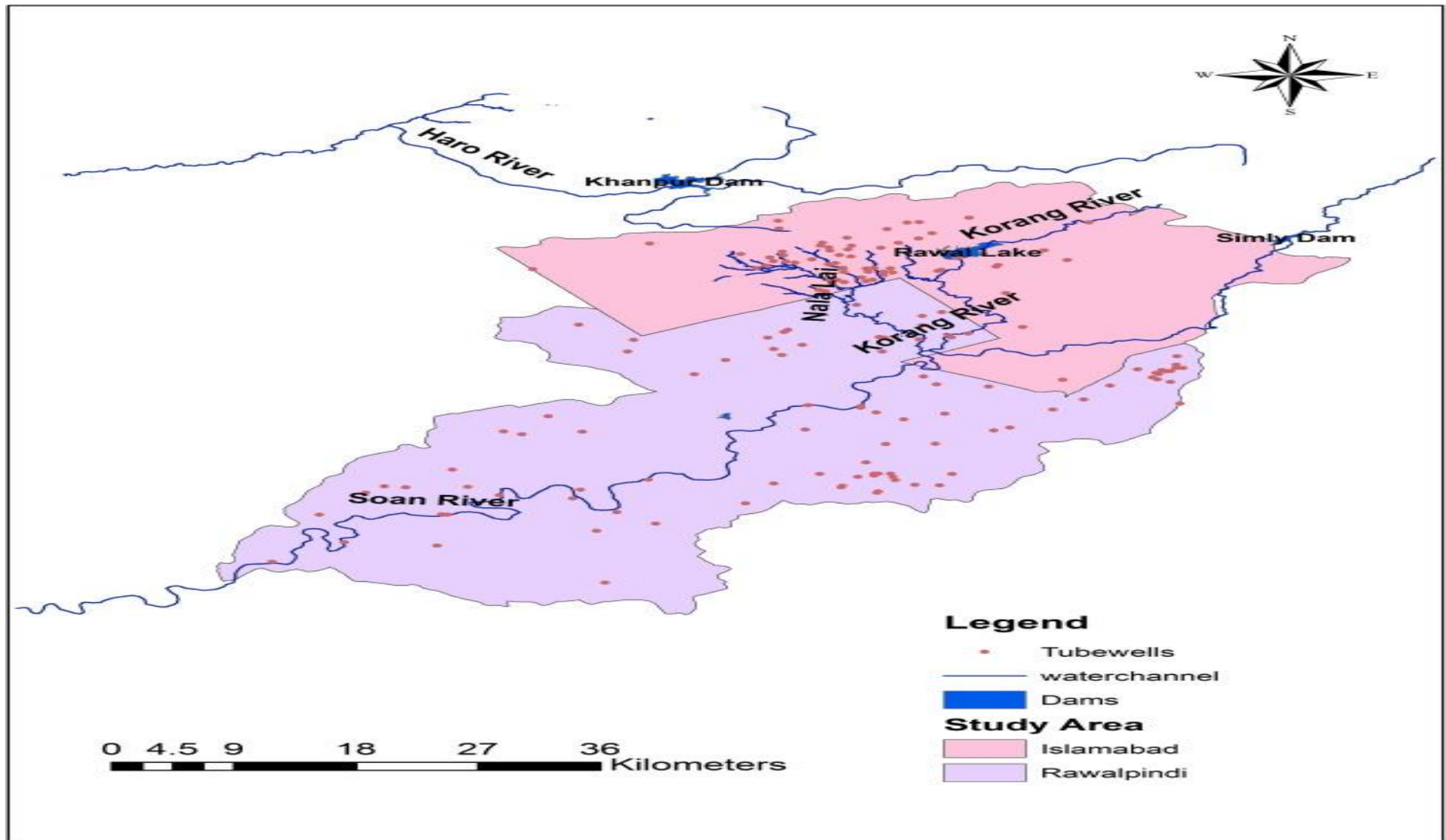
clay layers at depth up to 450 ft. separate the shallow aquifer from the fresh groundwater aquifer at depth. Therefore, the groundwater quality in the project area improves with depth.

Surface Water/Wet Lands

Rawalpindi District consists of Jhelum River and its tributaries, Haro and its tributaries, the Swan River and its tributaries, Leh and its tributaries, Kurang and its tributaries, Ling situated in Rawalpindi, the Kurang River from the Rawal water fall down to the tail of the Gangal Pool. The Swan River from the Grand Trunk Road Bridge to the tail of the Jalalia pool below Shahpur village, Kanshi Nullah and its tributaries, Sirin Nullah with its tributaries and Sang Jami Nullah with its tributaries

The Soan and Haro Rivers along with their tributaries are the main sources of ground water recharge and surface water supplies in the area. Rawal Lake near Rawalpindi, Simly Dam in the Islamabad hills, Khanpur Dam near Khanpur behind the Margalla hill have been constructed for providing raw water sources for the water supply system³. Lai Nullah is the permanent physical feature of the district, which enters from the southwest into densely populated areas. It meanders through developed areas of the city and finally joins Soan River in the south. Their primary tributaries are the Ling River, draining northwestward into the Soan; Gumreh Kas, draining westward into the Kurang from the area between the Kurang and Soan; and Lei Nala, draining southward into the Soan from the mountain front and urban areas. The Kurang and Soan Rivers are dammed at Rawal and Sambli Lakes, respectively, to supply water for the urban area. Extensive forest reserves in the headwaters of the Kurang and Soan Rivers benefit the quality and quantity of supply. Furthermore, map of water supply system in Rawalpindi is presented as Figure 4.1 below:

³ World Bank and Government of Punjab, 2006.

Figure 4.1: Existing water supply system in Rawalpindi

Source: Adapted from Urban Unit's Rawalpindi base map

4.2.3 Seismicity

Seismic Zoning Map of Pakistan showing Proposed Project site area is presented as Figure – 4.2, indicating zones according to the Building Code of Pakistan - 2007. The project site is located at District Rawalpindi, the project site falls in Seismic Zone 2A according to the Seismic Zoning Map of Pakistan. Zone 2A (moderate limit of high damage) represents peak ground acceleration (PGA) from 0.8 to 1.6g.

Figure – 4.3 presents the WHO Seismic hazard map of Pakistan prepared for Peak Ground Acceleration (PGA) for 500 years return period, with intensity level at “medium category”.

Figure 4.2: Seismic Zoning Map of Pakistan

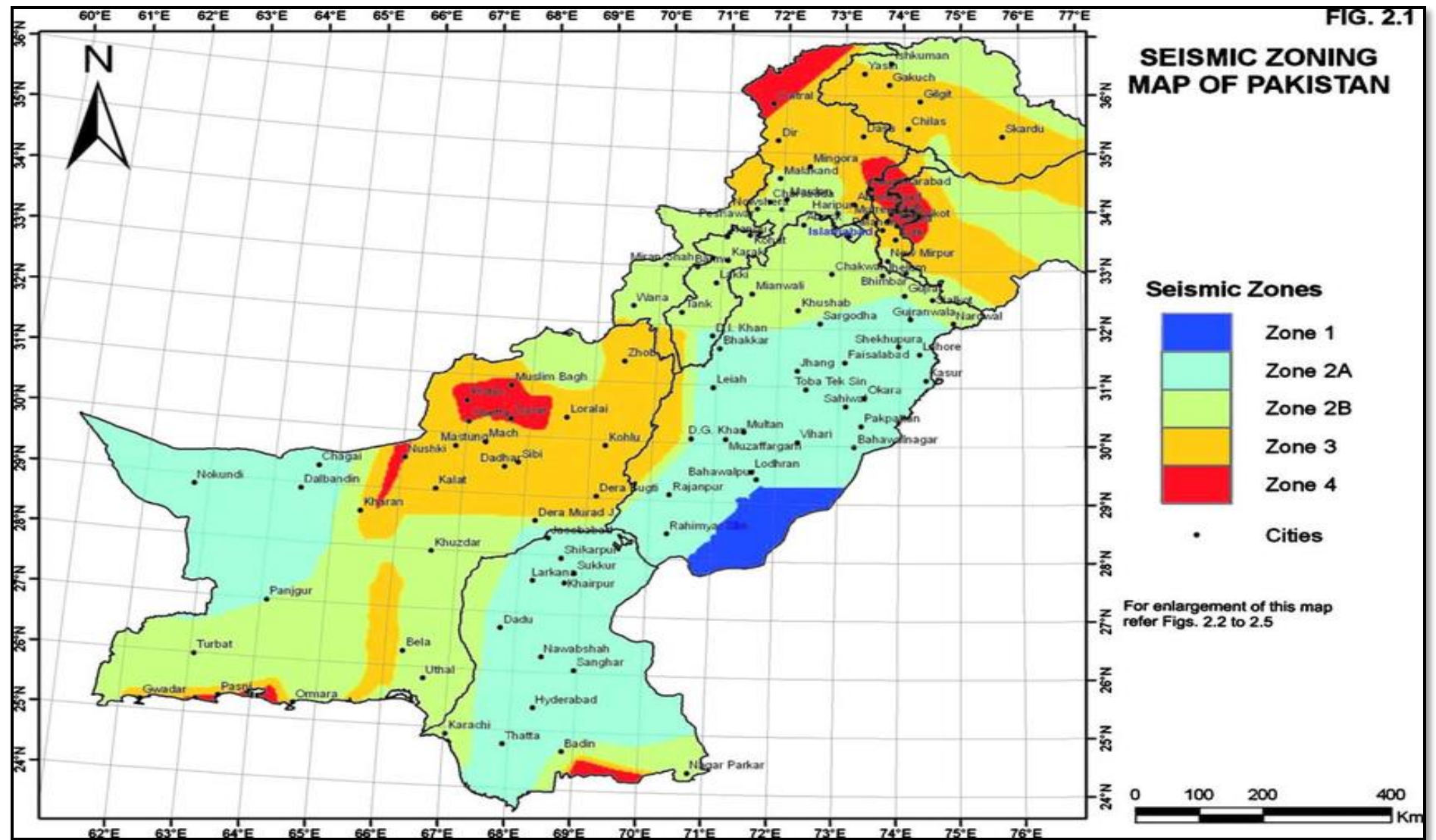
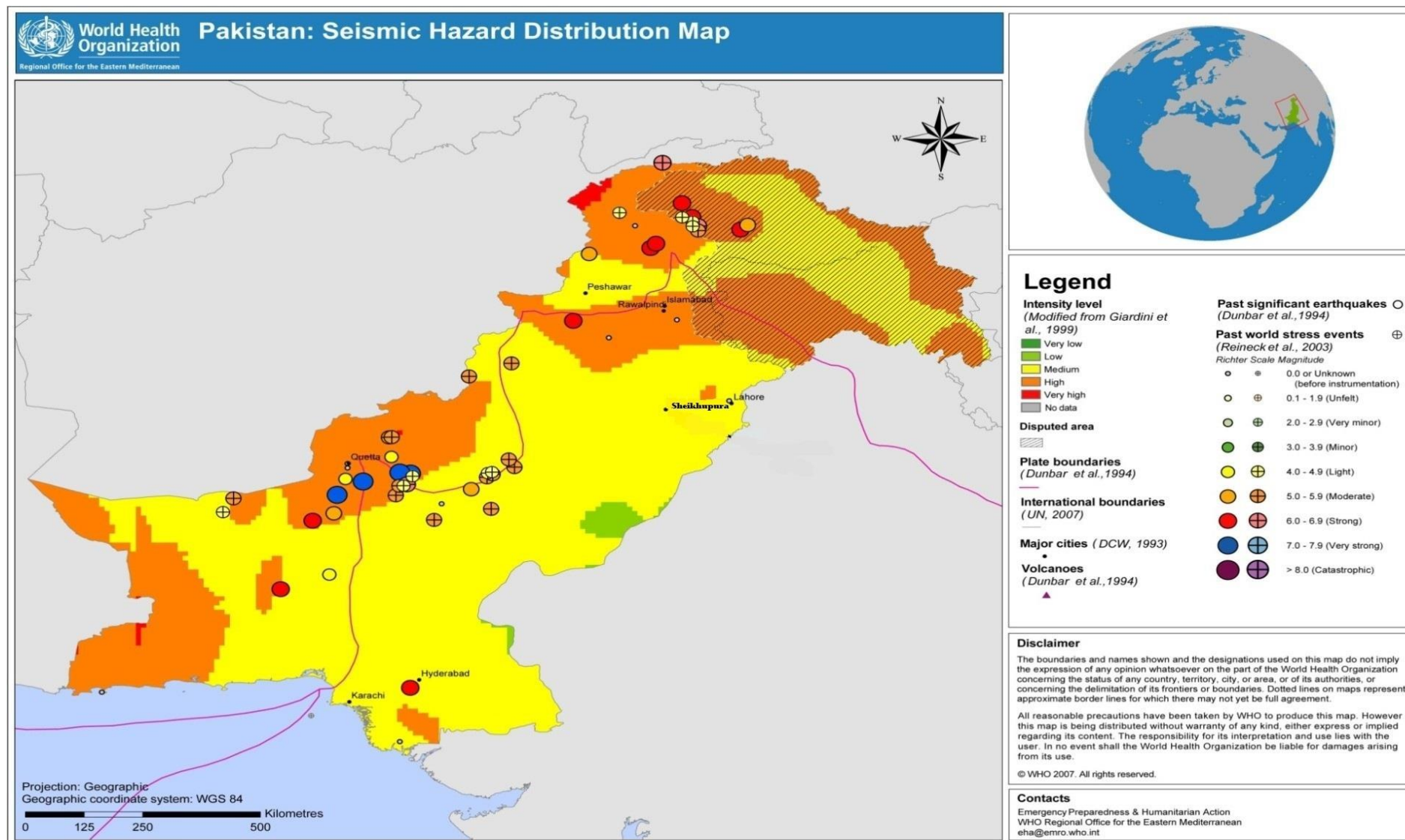


Figure 4.3: WHO Seismic hazard map of Pakistan



4.2.4 Climate

Pakistan is situated on the western margin of one of the main regions of the world—the monsoon region. Due to this, the climate of the country is more Continental than that of the other parts of Subcontinent. The range of seasons of project area:

- Summer Season—April to October.
- Winter Season—November to March.
- Monsoon Season—July to September

The climate of the region is typically subtropical in nature. This type of climate is characterized by hot summers with monsoon and cold winters. The hottest months are May and June while the temperature drops slightly in subsequent months from July to September due to heavy monsoon rains. However, the humidity is at a high in these months. Western depressions are another source of rainfall for the region. Seasonal climatic conditions must be considered for the design and execution of Project. The climate including air, temperature, precipitation, humidity and evaporation is an influencing factor, affecting the construction factors and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered.

Temperature

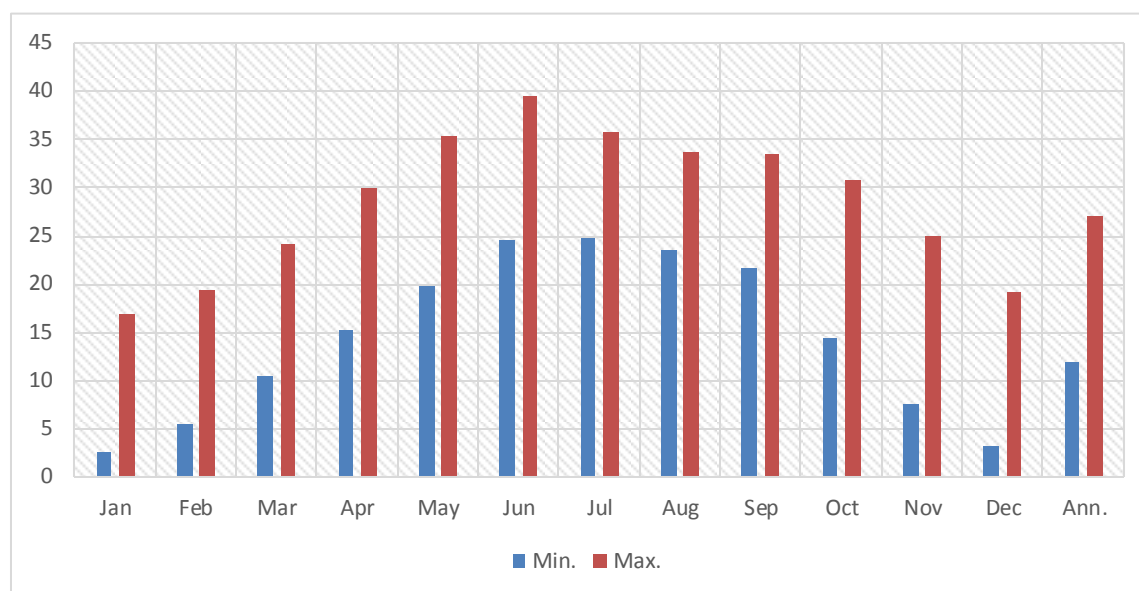
The temperature of the district is hot and dry during summer and cold in winter. The summer season starts in April and continues till October. The month with the highest average low temperature is July (24.8°C). The coldest month (with the lowest average low temperature) is January (2.7°C). The warmest month (with the highest average high temperature) is June (39.5°C). The month with the lowest average high temperature is January (17°C). More of mean high and low temperature detail for the year of 2019 is presented in table 4.3 and figure 4.4 below.

Table 4.3:Month-wise Mean Min. & Max. Temperature (°C), Rawalpindi

Mean Temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Min.	2.7	5.5	10.4	15.3	19.9	24.5	24.8	23.6	21.6	14.5	7.5	3.3	2.7
Max.	17	19.5	24.2	29.9	35.4	39.5	35.8	33.7	33.6	30.9	25	19.3	17

Source: www.Meowweather.com

Figure 4.4: Month-wise Average Min. & Max, Temp., Rawalpindi



Note: Temperature figures are based on 2019.

Source: www.Meowweather.com

Humidity

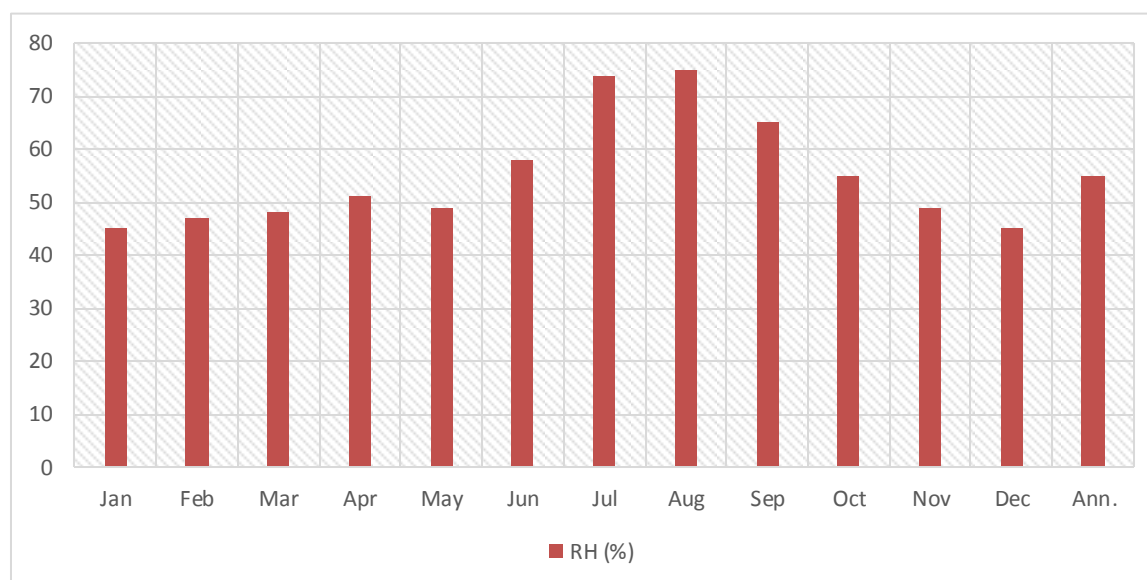
The humidity variation in the year 2019 from January to August in District Rawalpindi ranges from 45% to 75%. Month-wise relative humidity values are shown in Table 4.4.

Table 4.4: Month-wise Relative Humidity (%), Rawalpindi

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
RH (%)	45	47	48	51	49	58	74	75	65	55	49	45	55

Source: Myweather2, 2019 (Website).

Figure 4.5: Month-wise Relative Humidity



Rainfall

The average rainfall in District varies markedly. The climate in Rawalpindi is warm and temperate. When compared with winter, the summers have much more rainfall. According to Köppen and Geiger, this climate is classified as Cwa. The rainfalls mainly occurred during the months of July, which is commonly known as monsoon month. The wettest month (with the highest rainfall) is July (237mm). The driest month (with the lowest rainfall) is November (16mm). Month-wise total rainfall in Rawalpindi is presented in table 4.5 and figure 4.6 presents the rainfall regimes of Pakistan.

Table 4.5: Month-wise Total Rain (mm), Rawalpindi

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Rainfall (mm)	58	56	68	44	38	37	237	236	92	23	16	36	941

Wind Direction

The predominant wind direction is from South-West (SW) to North-East (NE) directions. The average and maximum wind speed for District Rawalpindi is indicated in Figure 4.7.

Figure 4.7: Average and Maximum Wind Speed, Rawalpindi

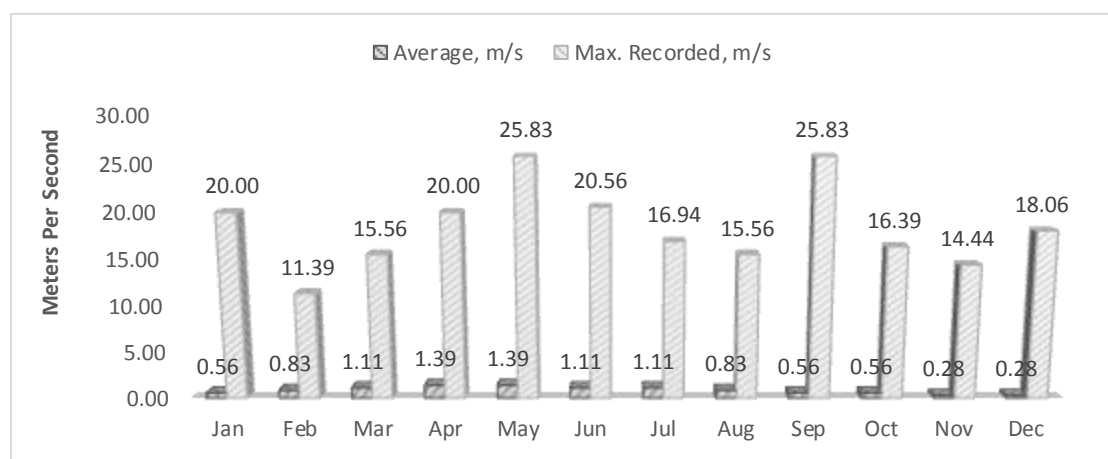


Figure 4.6: Precipitation Regime of Pakistan

 This image cannot currently be displayed.

Source: UNEP Environment Assessment Program for Asian and the Pacific

4.3 ECOLOGICAL RESOURCES

4.3.1 Biodiversity

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the "Biological Diversity". The contribution of the "Natural capital" is recognized at three distinct levels including genera, species, and community-habitat and ecosystem. Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the Biodiversity. It is in this background that the biodiversity of the area is discussed below:

4.3.2 Forestry (Flora)

Since the project site is situated in the semi-urban region of District Rawalpindi therefore, there is no likelihood of any forest or any type of flora worth mentioning around the project.

Plantation, grasses and shrubs along road, rail, and canal and river side exist. Tree species found in the project area include Shisham (*DalbergiaSisoo*), Alustonia, Neem (*AzaddrachtaIndica*), Keekar (*Acacia Nilotica*), Bottle Palm and Rubber Plant (*FicusElastica*). Additionally, the Bar jungle has almost disappeared owing to colonization and extension of canal irrigation. Karil (*Capparis aphylla*) is commonly met with but is nowhere bigger than shrub. Jand a much prized tree for its firewood and charcoal is becoming a Variety. Van which has also become rare is kept for its shade. Shisham Kikar along canal banks has developed into fine big trees. There is no locality without a rich growth of trees mainly Piple, Bohar, Eucalyptus, Popular and Sharin. However, the execution of the project does not involve cutting of the trees.

Main Fruits

The commonly occurring main fruits of the area are Mango, Apple, Plums, Apricot, Grapes, Banana, Citrus, Guava and Peach.

Crops

Rice; Maize and Sugarcane are the major crops being grown during the kharif (summer) and Wheat; Gram; Barley and Rabi Fodder are the major crops being grown during the rabi (winter) seasons.

Vegetables

The commonly available vegetables of the area are: Carrots, radish, ladyfinger, cauliflower, cabbage, turnip, red and green chilli, spinach, peas, pumpkins, bitter gold, and tomatoes.

4.3.3 Wildlife (Fauna)

The project is to be sited within the semi-urban area of Rawalpindi District; therefore, there is no likelihood of any wildlife, game reserves or else around the project site. On very limited scale the following native birds like sparrows, pigeons, crows, doves, rats, lizards, snakes, etc., are found here and there, like in all Punjab.

There are man-made wildlife habitats in district Rawalpindi. Some of them are as follows:

- Ayub National Park
- Safari Zoo
- Lohi Behr Wildlife Park

4.3.4 Fisheries and Aquatic Biology

The project site is in the semi-urban setting which is far away from rivers. Swan River, Haro River and Jehlum River are some of the major rivers that flow in the district. The fish production has been increasing day by day in the district which is playing a vital role in the economy of the country. Table 4.6 shows the fish production & income generation in the District Rawalpindi. However, there are no worth mentioning sources of fishery in the form of fresh water fishery or fishing ponds or else in the area of influence of the project.

Table 4.6: Fish Production & Income in District Rawalpindi

Quantity (000) Quintals				
2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
16	87	92	92	93
Value Million (Rupees)				
1064	1305	1472	1472	1488

4.4 HUMAN & ECONOMIC DEVELOPMENT

4.4.1 Population & Communities

District Rawalpindi is located on following coordinates 33.5651° N latitude and 73.0169° E longitude. According to 2017 Census Report of Rawalpindi the total population of the district was about 5.2 million with a growth rate of 2.4 percent. The population of district is predominantly Muslims i.e. 95.5 per cent. The next higher percentage is of Christian with 4.1 points, followed by Ahmadi 3 per cent. While other minorities like Hindu (jati), scheduled castes etc. are very small in number. The proportion of Muslims is higher in rural areas (98.8 per cent), as compared to their counterparts in urban (93.8 per cent). Christians are mostly living in urban areas representing 5.7 per cent as compared to just 0.9 per cent in rural areas. Similarly Ahmadi are more in urban area as compared to their proportion in rural areas. For the study of ethnography Rawalpindi can be divided into two parts i.e. urban and rural. In Rawalpindi people belonging to almost all possible races and tribes of Pakistan are living. Regarding people living in rural area, they are mostly Rajput. The important sub-division are Bhatti, Rawal, Janjua and Chohan. Besides, Gujjar, Awan, Mughal, Qureshi, Syed and Satti are also living there. Some of the other minor tribes are the Jat, Malyar and Pathan and some Khattar

Punjabi is the predominantly language being spoken in Rawalpindi, representing 71.6 per cent of population followed by Urdu spoken by 10.1 per cent, Pushto 9.5 per cent and Siraiki 1.1 per cent while others speak Sindhi Balochi, Bravi, Dari etc. The proportions of people speaking Urdu, Sindhi, Pushto, Siraiki and other languages except Punjabi are more in urban area than in rural areas.

Detailed Population of District Rawalpindi 2017 is described in table 4.7 below:

Table 4.7: Population of District Rawalpindi

District Rawalpindi	Rural	Urban	Total
Population	2,530,117.0	2,875,516.0	5,405,633.0
Male	1,262,511.0	1,479,361.0	2,741,872.0
Female	1,267,536.0	1,395,539.0	2,663,075.0
Transgender	70.0	616.0	686.0
Housel hold	418,177.0	470,588.0	888,765.0

Source: Pakistan Bureau of Statistics

According to census 2017 total population of District Rawalpindi is 5,405,633.0. In Total population males are 2,741,872.0, female are 2,663,075.0 and Transgender are 686.0. Average annual growth rate is 2.52 from 1998 to 2017. Rawalpindi is the 4th most populated district of Pakistan.

Population growth rate of District Rawalpindi is described in table 4.8 below:

Table 4.8: Population growth rate Rawalpindi

District Rawalpindi	Population (Million)		Population in Urban/Rural Area (%)		Annual Growth Rate (%)
	1998	2017	1998	2017	
Urban	1.91	2.88	56.7	53.2	2.18
Rural	1.46	2.53	43.3	46.8	2.95

Source: 2017 Census of Pakistan.

The field survey have shown that the settlement pattern of the project area and its vicinity is mostly semi-urban with no residential settlements exist in the vicinity of the project site. A large number of people in the area belong to the lower middle class segment of the society. A segment of the people belongs to middle class, while there are a few number of the people who live below the poverty line. Awareness about importance of education is growing and the same is reflected by the large number of students in educational institutes within the city and in other cities of learning. Easy access to print and electronic media are also playing great role in modifying life style. With this background and large cross section of the urban population still stick to social customs of the old past. Old traditional life style is being followed in almost all walks of life. Elders belong to respected group and they play vital role in decision making. Most of the old generation is uneducated. Old customs are loved and practiced. Arranged marriages are liked and they are quite successful. Joint family system prevails. The people are very hospitable.

The field survey (including interviews, focus group discussions, census, and area profile) was carried out to collect the socioeconomic data from the project affected people as well as other general population to accomplish

the baseline information, which will provide the basis for subsequent monitoring and evaluation studies.

The demographic feature comprises the information on household's profile, gender composition, occupations, and literacy status of the population residing in the project area. The information relating to the demographic profile of the people in the project area are described below.

Family Size and Gender Composition

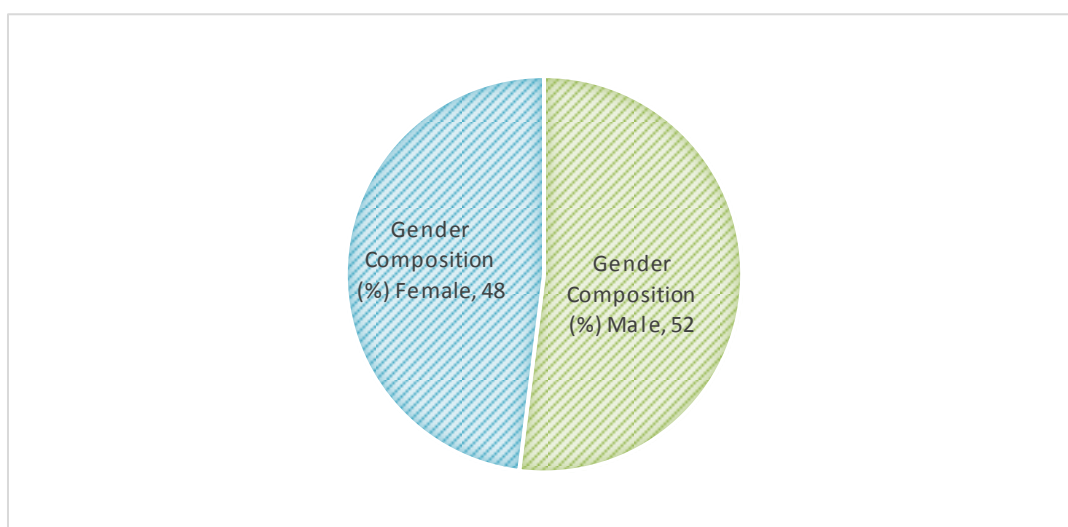
Based on the field survey of sample affected people/ local population, the average family size computed to be 6.2, out of which the proportion of male and female members is 52.0 percent and 48.0 percent respectively as shown in Table 4.9 and Figure 4.8.

Table 4.9: Average Family Size & Gender Composition

Average family Size (No.)		
Gender Composition (%)	Male	Female
6.2	52.0	41.0

Source: Pakistan Bureau of Statistic

Figure 4.8: Gender Composition



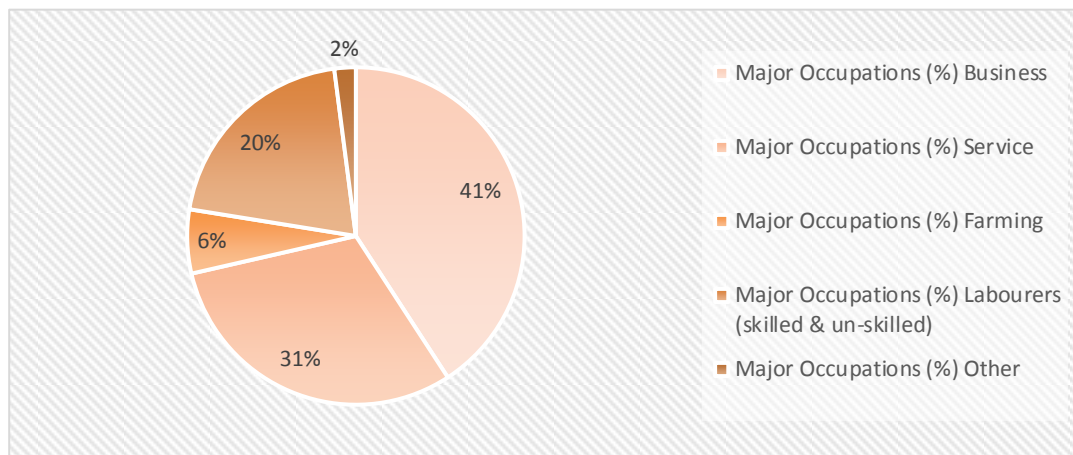
In the vicinity of the project area, the sample population are involved in different occupations in order to meet their living expenditure. Out of total sample population, 50.8 percent are involved in self business like shops/stores, while 29.6 percent are employed in various services. About 5.12 percent population is involved in farming activities. The percent of labor both skilled and un-skilled of the area is 10.41, while 5.05 percent are daily-wage laborers and others respectively. Table 4.10 and Figure 4.9

shows the major occupations of the sample population resided in vicinity of the project area.

Table 4.10: Major Occupations of the Sample Population

Major Occupations (%)				
Business	Service	Farming	Labourers (skilled & un-skilled)	Other
40.82	30.60	6.12	20.41	2.05

Figure 4.9: Major Occupations of Sample Population



Status

The general disparity in education exists in low-income communities. Rawalpindi district is blessed with higher educational facilities like Pir Mehr Ali Shah Arid Agricultural University, Government Post Graduate College for Women Satellite Town, Fatima Jinnah Women University, Virtual University Campus, National University of Medical Sciences, College of Physician & Surgeons, Rawalpindi Institute of Cardiology, Armed Forces Institute of Pathology, Institute of Engineering & Technology, Fauji Foundation College for Boys and other several government and private colleges for boys and girls and technical/ poly institute. The field survey has shown that on the whole, in the vicinity of the project site, the average literacy rate of the local population estimated as 61.98%. The percentage of literacy rate among males and females residing in the vicinity of the project area is computed to be 68.53% and 52.55% respectively. The literacy rate of male and female population in urban and rural area is shown in table 4.11.

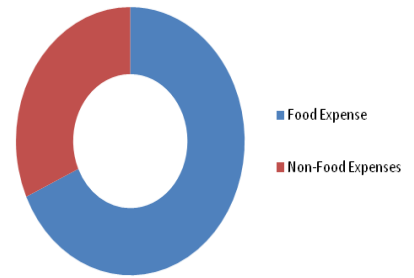
Table 4.11: Average Literacy Rate of the Sample Households

Literacy rate	Male	Female
Project vicinity	68.53%	52.55%
Urban	60.41%	39.59%
Rural	80.67%	19.33%
Overall District	65.8%	34.2%

Note: This is the average literacy rate of population resided in the vicinity of project site.

Average Household Expenditure

The annual expenditure and pattern of expenditure provides an indication for assessing standard of living of a household. The expenditure on food items include cereals, pulses, flour, sugar, cooking oil/ ghee, milk etc., while the non-food items including the expenditure on education, medical treatment, clothes, shoes, cosmetics.



The proportion of expenditure incurred on food and non-food items is 70% and 30% respectively.

4.4.2 Industries

The economy of Rawalpindi and the surrounding district has a diverse industrial base. With a population exceeding 5.4 million, Rawalpindi is the third largest city of the Punjab province of Pakistan, and the fourth largest city in the country. It is located in the northernmost part of Punjab, strategically connecting the region with Kashmir to the east and the province of Khyber Pakhtunkhwa to the north. It also borders Islamabad, the capital of Pakistan, of which it is considered a sister city. It has historically been an important industrial and commercial center of the Punjab region. The main industries of the city include oil refineries, gas processing, steel manufacturing, iron mills, railroad yards, a brewery, sawmills, tent factories, textiles, hosiery, pottery, leather goods production, transport and tourism. Following are the major industrial units in Rawalpindi:

- ✚ Al Muqarram Insulation Industry Ltd.
- ✚ Bonanza Garments Industries (Pvt) Ltd.
- ✚ Cambridge Garment Industries - The Cambridge Shop.
- ✚ Cool Industries (Pvt) Ltd. - WAVES Home Appliances.
- ✚ Diamond Paints Industries (Pvt) Ltd.

- ✚ Dolphin Industries.
- ✚ Heavy Industries Taxila - HIT.
- ✚ Ittehad Textiles Industries (Pvt) Limited

4.4.3 Infrastructure

During the field survey, the availability/ or access to basic infrastructure/ services to the local population was recorded. In this context, it was observed that on the whole, all basic infrastructure/ facilities, i.e. education & health facilities, electricity, telephone/ cell, roads, fuel/ filling station etc. were available to almost all the 75% population resided in the vicinity of the project area. Rawalpindi district is considered as one of the most developed district of Pakistan. It is covered with metalled roads, highways and motorways. The roads of Rawalpindi are 3687.02 Km, National highways are 97.38 and Motorways are 38.00 Km long. Variety of private road transport in the form of buses, trucks and wagons are available to reasonable extent. Rawalpindi is a secured area as it has 67 police stations and 56 police posts. The area is supplied electricity from the National Grid of Water and Power Development Authority. There are telephone exchanges operating in the district. Cellular phone services are available in the district. Underground water is used for drinking and other domestic purposes.

4.4.4 Institutions

Rawalpindi has thousands of registered schools, colleges and universities including government, semi-govt, charity and private. Details of government education units present in Rawalpindi are presented in table 4.12 and 4.13.

Table 4.12: Education Units (Government)

SCHOOLS					
Type	Primary	Middle	High	Higher Secondary	Total
Boys	612	131	192	22	957
Girls	634	193	164	15	1006
Mixed	6	3	-	-	09
Total 2013	1252	327	356	37	1972
Total 2012	1378	317	351	34	2080

Source: District Report Card Education- Rawalpindi (2013)

Children in the 3-5 age groups: 57% are enrolled (43% girls and 57% boys). Of this percentage, 40% children are enrolled in government schools and 60% in private educational facilities.

Children in the 6-16 age groups: 93% are enrolled (44% girls and 56% boys). Of this percentage, 59% children are enrolled in government schools and 41% in private educational facilities.

More than 0.3 million children are enrolled in government schools. Of the 362,158 Children enrolled in government schools, 52% are girls and 48% are boys. There are 9 Mosque Schools in District Rawalpindi.

Table 4.13: Colleges and Universities in District Rawalpindi

No.	Enrollment	Teaching Staff
<i>Intermediate Colleges</i>		
48	10714	1296
<i>Degree Colleges</i>		
134	78294	2732
<i>Universities</i>		
15	23113	2816

Other than these there are a lot of Govt. and private educational institutes in Rawalpindi. List of universities in the district of Rawalpindi, Pakistan is described as follow:

- ✚ Army Public College of Management and Science
- ✚ Fatima Jinnah Women University
- ✚ Islamic International Medical College, part of Riphah International University
- ✚ Constituent colleges of the NUST
- ✚ Army Medical College
- ✚ College of Electrical and Mechanical Engineering
- ✚ Military College of Signals
- ✚ National College of Arts, Rawalpindi campus
- ✚ Rawalpindi Medical College
- ✚ University of Arid Agriculture
- ✚ Barani Institute of Information Technology
- ✚ Mohammad Ali Jinnah University
- ✚ Virtual University Campus, Rawalpindi

4.4.5 Transportation: Roads, Rails, Airports, Navigable Rivers

Rawalpindi District is strategically located between the Punjab and Azad Kashmir. Rawalpindi is connected to other cities of Punjab such as Lahore, Peshawar and Taxila to the north via network of roads and railways. However, majority of the commodities from other parts of the country to Rawalpindi approach via M-2. Many express and passenger trains run from Rawalpindi daily. Subak Kharam Express, Subak Raftar Express, Awam Express, Khyber Mail, Jaffer Express, Rawalpindi Express, Tezgam, Margalla Express and Pakistan Express are famous trains from Rawalpindi District.

There are 21 Railway stations in Rawalpindi District. The major Railway stations are Rawalpindi Railway Station, Budho Railway Station, Chaklala Railway station and Harnal Railway Station. Nearest Railway station from project site is Rawalpindi Railway Station located at distance of about 30 km. Rawalpindi has many airports some of the major airports are Chaklala Airport, Islamabad International Airport & Mangala Airport. New Islamabad International Airport is located at distance of about 11.5 km from project site. Rawalpindi is surrounded by Indus River, Korang River and Soan River. A water tributary namely Sill River is passing through the proposed project site, for which connecting bridge of 450 ft long has already been constructed.

Mini-dam will be constructed within project intended for recreational and rainwater harvesting purposes. Optimum utilization of water-ways and surplus water during raining season will be managed by the consultants of the Society in using such resources into horticulturist.

The average annual growth rate of vehicles by type in Rawalpindi is presented in table 4.14 and map highlighting transport network and irrigation channels of District Rawalpindi is presented as Figure 4.10.

Table 4.14: Number of Motor Vehicles Registered by “Types” of Rawalpindi

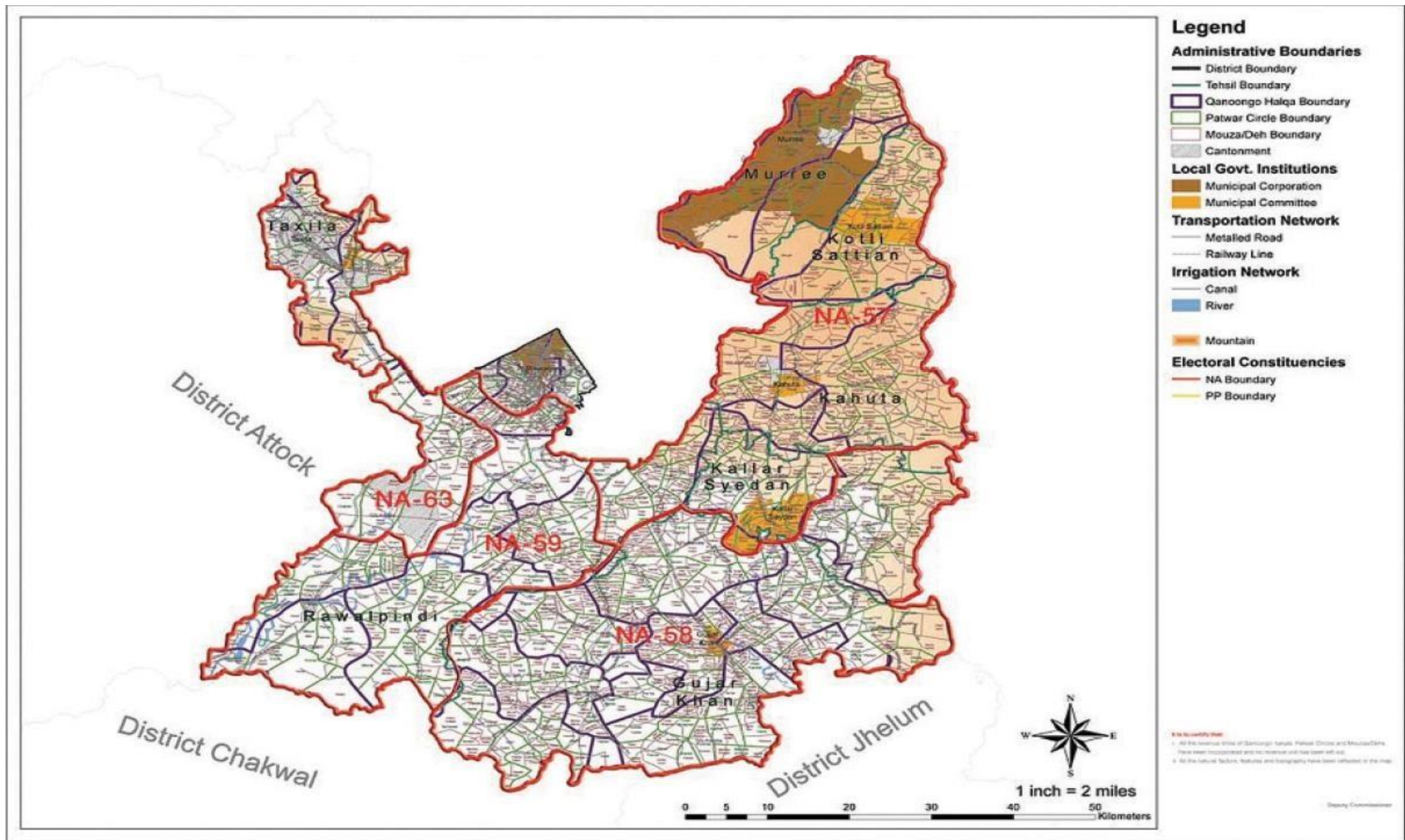
Total	Cars, Jeeps & Station Wagons	Motor Cycles/ Scooters	Trucks
1,225,378.0	156,515.0	879,580.0	19,192.0

Source: Punjab Development Statistic

4.4.6 Land Use Planning

The entire land use planning is carried out according to provincial laws. The project site is open land. Proposed construction is planned to be developed in phases. The area under consideration is rented by the proponent. No trees will be cut down for this project. The equipment will be kept in proper condition to save the environment from any damage.

Figure 4.10: Map of Transport Network & Irrigation Channels, Rawalpindi



4.4.7 Power Sources & Transmission

Electricity requirement of proposed project when fully developed is projected to be around 100 MW. IESCO is the source of all power in the project area.

4.4.8 Agriculture & Mineral Development

The project area lies in the semi-urban zone. Extensive area is under the use of vegetation & vacant plots. Shallow and scattered water reservoirs, canal system by using tube-wells and motor is used for agriculture but due to cost factor this is unaffordable by many people. Agriculture alone cannot sustain life of the people.

Punjab is also a mineral rich province with extensive mineral deposits of Coal, Iron, Gas, Petrol, Rock salt (with the second largest salt mine in the world), Dolomite, Gypsum, and Silica-sand. The Punjab Mineral Development Corporation is running over a hundred economically viable projects. Manufacturing includes machine products, cement, plastics, and various other goods.

4.5 QUALITY OF LIFE VALUES

4.5.1 Socioeconomic values

Majority of the residents of the city Rawalpindi belong to middle class. Small proportion of people is among the affluent class. Some people earn their livelihood while performing private jobs, carrying out business on small and large scale and even running very small shops etc.

Importance of educational values is highly found. Consequently, the people send their children to educational institutions and try to get them educated to the extent their financial means permit them. The people share with each other the social, cultural and economic values of life. To a greater extent there is harmony towards collective interests among the people.

Mostly, locals follow old traditions in almost every walk of their life. Elderly people command respect and play deciding role in decision making. A large cross section of the older generation is uneducated. But due to awareness about education younger generation of both sexes, is now trying to get education in almost every department including science and technology on preferential basis. There is a rising trend in the society to change their old traditional socioeconomic pattern of life. Print and electronic media are playing great role in bringing tangible change in the old pattern of life.

On overall basis, about 40% of the sample population is women. Women are participating to alleviate poverty, enhance economic growth and human well-being of the families by involving in farming and other income generation activities.

It can be concluded that in the vicinity of the project area, women are involved in several households and income generation activities. In general, there is no issue with the women of the study area associated with the implementation of the project. However, during the consultative meetings, local women pointed out that some suitable jobs to their male members should be provided. In this way, in addition to their jobs, they can also look after their household activities.

During the field survey of the project area, no indigenous people and affected women headed households were observed in the project area as well as in the vicinity of the project area. Thus, there would not have any impact on the indigenous people and women headed households' due to the implementation of this project.

Environmentally speaking, the carrying capacity of the environment is not utilized. The project activity, under the proposed strict operational environmental controls, is not going to leave adverse impacts on all out environment. The operational Environmental Management Plan and Environmental Monitoring Plan further provide protection to the environment around. Legal compliance of environmental monitoring with PEQS standards is to doubly ensure environmental protection of all the segments of the environment.

4.5.2 Public Health

The District of Rawalpindi abounds with medical health facilities such as hospitals, private clinics, dispensaries etc. In Rawalpindi, there are three teaching hospitals including DHQ hospital, Holy Family Hospital and Rawalpindi General Hospital. There are total 1050 beds in these hospitals. These hospitals cater health care services directly and referral from other health facilities, from district Rawalpindi and also from adjoining districts. Some of the Major health Units in Rawalpindi are as follows:

- Benazir Bhutto Hospital
- Rawalpindi Institute of Cardiology

▪ Holy Family Hospital

Total governmental health units present in District Rawalpindi is presented in Table 4.15 as below:

Table 4.15: Health units in District Rawalpindi

Hospitals		Dispensaries		Veterinary Hospitals	Veterinary Dispensaries	Veterinary Centers
No.	Beds	No.	Beds			
40	4618	76	62	49	168	183

4.5.3 Recreational Resources & Development

There are number of playgrounds & extensive parks in each sub sector of project have been proposed. For recreation of local residents, the project will feature an 18-hole golf course and a community club. This project is itself full of recreational activities. Thus, there would not have any impact on the recreational activities of the local population/ community due to the implementation of this project.. Moreover, there are many recreational places in Rawalpindi such as Jinnah Park, Ayub Park, Liaqat Park and Loher Behr Wildlife Park.

4.5.4 Cultural & Aesthetic Values

The Rawalpindi district has experienced continued growth in the residential, commercial and especially industrial sectors over the last decades. Religious harmony is also a major character of these communities. The semi-urban set up in the area may have a diversified impact on the socio-economic environment of the area. Rawalpindi District has number of historical places in attracting a sizable tourist population. These attractions include the Rawal Fort, Unity Towers, Army Museum, Masjid Gulshan Dadan Khan and Bedi Mahal.

4.6 BASELINE ENVIRONMENTAL QUALITY

4.6.1 Ambient Air Quality

The degradation of air quality in all the large cities is a major environmental concern these days. Air pollution levels in urban centers have either crossed safe limits given in the PEQS or have reached the threshold values. About 60 to 70 % of the deterioration in the air quality is due to the vehicular emissions. The parameters which have proved to be the major threat are particulate matter and concentration of oxides of nitrogen that are relatively higher in all the large cities of Punjab.

The proposed project area is mostly semi-urban area. Vehicular traffic is the major contributor for environmental pollution. The project sections pass through barely built-up area with residential, commercial and institutional establishments. The ambient air quality data with respect to Stack emissions from Generator, PM (PM₁₀), SO_x, NO_x and CO was measured at specified sites. The data was collected during the month of recon, 2020 by ESPAK (Pvt.) Limited, Lahore. The result of the tests concludes that the values obtained for all of tested parameters are within permissible limits. Air Quality test report has been attached **Annexure-VI** of this report.

Table 4.16: Monitoring results of Ambient Air and Particulate Matter (PM) at project site

Reference Point		CO (mg/m ³)	SO ₂ (µg/m ³)	O ₃ (µg/m ³)	NO (µg/m ³)	NO ₂ (µg/m ³)	PM2.5 (µg/m ³)	PM10 (µg/m ³)
Monitoring of Ambient Air and (PM) at the center of the Project Site	Average	0.5	15.0	21.1	18.6	30.5	33.0	143.6
	Max.	0.8	17.8	28.8	23.7	35.9	38.5	149.9
	Min.	0.3	12.9	15.6	15.5	28.2	27.2	132.1
Punjab Ambient Air Quality Standards (PAAQS)	24-hrs	5 (mg/m³) For 8-hrs	120 (µg/m³)	130 (µg/m³) For 1-hrs	40 (µg/m³)	80 (µg/m³)	35 (µg/m³)	150 (µg/m³)

4.6.2 Ambient Noise Levels

Noise is generally used as an unwanted sound, or sound which produces unpleasant effects and discomfort on the ears. Noise is considered as environmental pollution, even though it is thought to have less damage on humans than water, air or land pollution. Generally, problems caused by noise pollution include stress, hearing loss, sleep disruption etc. During the construction phase of this project, noise can be generated from machinery used.

Traffic movement in area is considered to be the major cause of noise pollution. The noise levels were monitored during day-time by ESPAK (Pvt.) Limited, Lahore during month of August, 2020. Noise levels were monitored with Digital Noise Meter, Model AR824. On comparison of noise quality data

with the limits specified for in ambient noise quality standards; it is evident that noise values at almost all sites are within permissible limits as presented

Reference Point		Noise (dB)
Monitoring of Noise at project Site	Average	64
	Max.	69
	Min.	59
National Air Quality Standards (NEQS) at day-time is 65dB		

in table below. Noise Quality test report has been attached as **Annexure-VII** of this report.

Table 4.17: Monitoring results of Noise at project site

4.6.3 Water Quality

Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose. It is commonly compared with a set of standards against which compliance can be assessed.

The water resource tested in the study area includes drinking water from filter plant and wastewater from main drain nearby. All of tested parameters for drinking water quality as well as wastewater are within permissible limits. The results of the water quality test reports have been attached as **Annexure-VIII** of this report.

CHAPTER-5

PUBLIC CONSULTATION

5.1 GENERAL

This section deals with the public concerns about the said project. As already given in the previous sections, the said project is about Development and Construction of **Asphalt Plant**. Consultation with stakeholders is a tool for managing two-way communication between the project sponsor and the public. Its goal is to improve decision making and build understanding by actively involving individuals, groups and organizations which have a stake in the project. This involvement increases project's long term viability and enhances its benefits to locally affected people and other stakeholders.

Consultation with the community and their active participation plays a vital role in successful implementation of the development projects. To identify the different types of stakeholders and ascertain their perception about the project, an impact assessment survey was conducted by keeping in view the requirement of '*Review of IEE/ EIA Regulations 2000*'. Stakeholders were consulted with the help of structured/ semi-structured tools. Informal group discussions were also held as an additional tool for obtaining feedback that are being discussed on the following pages.

Public consultations were carried out keeping in view the following main objectives:

- Sharing of information with stakeholders/ public on the proposed project activities and assess expected impacts.
- Understanding the stakeholder's concerns regarding the various aspects of the project, including the project technology, existing situation and the potential impacts of the project during construction and operational phase of the project.

The forums mentioned in subsequent sections were consulted. Written views and observations with particulars of people, environmental experts, and officials consulted is described comprehensively in table 5.1 and the performas filled during consultation by all stated forums is appended as **Annexure-XII** of this document.

5.2 PROPONENTS' ENVIRONMENT MANAGEMENT TEAM

As stated in earlier sections, project of **Asphalt Plant** is in its planning phase. Once the project comes in its construction phase, a team with representatives from key management functions will be developed to assess issues, aspects, opportunities and existing manufacturing process w.r.t environment. Therefore, it is too early to substantiate the stated inscription.

5.3 THE RESPONSIBLE AUTHORITY

Proponent is responsible for the environmental impacts of this project and has taken commitment to implement the mitigation measures proposed in the Environmental Management Plan with subsequent review and approval conditions. Proponent ensured to use all practicable means consistent with other essential considerations to protect and preserve environmental quality.

5.4 OTHER DEPARTMENT & AGENCIES

About 4 people from different governmental departments such as Civil defense, RDA, PHA and Agricultural consulted for proposed project. The environmental concerns and suggestions made by the officials were listed out, discussed and suggestions were accordingly mentioned in the table 5.1.

5.5 ENVIRONMENTAL PRACTITIONERS & EXPERTS

The Environmental Experts has been informed with briefing on project interventions including its benefits. All of consulted experts asked questions to get information about different components of project. About 3 experts were consulted and their recommendations have been mentioned in table 5.1.

1. Adeel Pervaiz Sr. Manager Landfill LWMC
2. Dr. Fariha Arooj. Assistant Professor UVAS
3. Dr. Mujtaba Baqir. Lecturer GCU

5.6 AFFECTED & WIDER COMMUNITY

The people of the project area are pro project installation. They are of the view that the project will enhance the economic benefits. About 15 persons were consulted during the public survey and majority of people consulted were of view that this project will provide employment opportunity to locals of the area. They focused on a point to encourage such projects in order to increase economic development as well as to improve living standards of area. At the same time, they foresee that project management will feel their social, moral and legal obligation and bring in Environment Management Order whereby environment will not be tempered as mentioned in table 5.1.

Table 5.1: List of participants during stakeholder consultations & concerns

Sr.#	Date	Location/ Venue/ Address	Particulars of Participants	Feedback/ Concerns
Official Consultations				
1.	23-11-2022	Rawalpindi Development Authority, R.W.P.	Mr. Sadoon Basra [AD Engineering, RDA]	- It's a good initiative for economy empowerment of the area. This project augments jobs opportunity and security of the area. - Be ensuring during the development of project no harm to flora, fauna and no tree cutting involved.
2.	23-11-2022	Director General Agricultural (Field), R.W.P.	Mr. Khalid Mahmood [Dy. Director Agriculture]	- Stated project shall not affect irrigation channels or stream. Agricultural land shall be protected to its intent rather using it for industrial purposes; as far as this could be considered.
3.	23-11-2022	Parks and Horticulture Authority, Islamabad	Mr. Faisal Ahmed [Assistant Director]	- Every new project must be planned with tasteful landscaping as living within aesthetically pleasing environment. New societies should promote tree planation as its enhanced scenery and protect from floods.
4.	23-11-2022	Punjab Fisheries Department Rawal Town near Rawal Chowk	Mr. M. Iftikhar [Dy. Director, Fisheries]	- Stated project shall not disrupt aquatic natural ecosystem (if any nearby). So we have no objection in the commencement of this project.
Environmental Experts				
5.	23-11-2022	Environmental Expert	Mr. Adeel Perviz	- No construction, preliminary or otherwise relating to the project shall be started until and unless the Environmental Approval has been issued by EPA.
6.	23-11-2022	UVAS, Data Ganj Bakhsh Town, Lahore	Dr. Fariha Arooj [Assis. Prof UVAS]	- The environmental reports must be available for better understanding to comment. - All mitigation measures must ensure by proponent while development of this project.
7.	23-11-2022	Govt. College University Lahore	Dr. Mujtaba Baqir [Lecturer, GCU]	- Development of project must be supervised by proponent and concerned department. - Solid Waste should be handled properly on daily basis

				and proper drainage system for waste water must be designed keeping in view heavy rainfall.
Public Consultation				
1.	23-11-2022	Sarot Dist. Rawalpindi	Hammad Ahmad [Shopkeeper]	- This project will facilitate many people.
2.	23-11-2022	Sarot Dist. Rawalpindi	Ahmed Abbasi [Property Dealer]	- It looks like a good project, and such a project should be encouraged to create more job opportunities.
3.	23-11-2022	Sarot Dist. Rawalpindi	M Haroon [shopkeeper]	- In terms of job creation, this is a good project.
4.	23-11-2022	Sarot Dist. Rawalpindi	M. Abdullah [Shopkeeper]	- It is requested to take care of cleanliness of area and have no issues regarding project.
5.	23-11-2022	Sarot Dist. Rawalpindi	M. Akhtar [Business man]	- It's a good initiative for betterment of area.
6.	23-11-2022	Nathot Village Dist. Rawalpindi	Atiq Ahmad [General store owner]	- I have no issues regarding this project.
7.	23-11-2022	Nathot Village Dist. Rawalpindi	M. Mohsin Quba [Restaurant Owner]	- The following project seems good, hope it will provide lots of benefits to locals including job facilities.
8.	23-11-2022	Nathot Village Dist. Rawalpindi	Abdul Rehman [Tyre Shop Owner]	- No issue, please maintain the cleanliness of town.
9.	23-11-2022	Nathot Village Dist. Rawalpindi	Rasheed Khan [Shopkeeper]	- I have no issue regarding this project.
10.	23-11-2022	Nathot Village Dist. Rawalpindi	Rashid Kiani [Ex. Vice Moderator]	- I have no objections to this project, but we will not compromise the health of the surrounding community, so please control noise and dust pollution as much as possible.
11.	24-11-2022	Channi Awan Dist. Rawalpindi	M Naved khan [Property dealer]	- Hope it will be an upright project for job opportunities and for workers.
12.	24-11-2022	Channi Awan Dist. Rawalpindi	Mustafa Abbasi [Student]	- I have no issue on this project.
13.	24-11-2022	Channi Awan Dist. Rawalpindi	Qaisr Azam [Shopkeeper]	- As population of the country increasing day by day so such projects will provide good life style.

14.	24-11-2022	Channi Awan Dist. Rawalpindi	Mehmood Alam [Worker]	- I have no objection on this project.
15.	24-11-2022	Channi Awan Dist. Rawalpindi	Pervaiz Ali [Peon]	- No issues regarding stated project.
16.	24-11-2022	Kandhar Awan Dist. Rawalpindi	Hamid khan [Local seller]	- As per description this seems to be good project & it is requested to provide maximum jobs to local community.
17.	24-11-2022	Kandhar Awan Dist. Rawalpindi	M Akber [Security Guard]	- I have no issue on this project. It will provide opportunities for local residence.
18.	24-11-2022	Kandhar Awan near Kahuta, Dist. Rawalpindi	Raza Niaz [Shopkeeper]	- Jobs must be provided to the general public in order to support the underprivileged locals.
19.	24-11-2022	Kandhar Awan Dist. Rawalpindi	Hamed Abbasi [Horse ride service provider]	- No issues regarding the project except request for cleanliness of the area.
20.	24-11-2022	Kandhar Awan Dist. Rawalpindi	Abubakr khan [Worker]	- Stated project is helpful to provide the employment opportunities and managing the life better.

CHAPTER-6

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

6.1 GENERAL

The potential environmental impacts have been studied related to design, location, construction and operational stages of the proposed project. Environmental protection measures are recommended to eliminate adverse environmental impacts or to reduce them to an acceptable level within the prevailing legislative and regulatory framework.

6.2 IMPACT ANALYSIS

Potential Environmental impacts associated with proposed study has been analyzed by a process wherein a group of experienced people with relevant experience were involved for identifying potential safety and operational problems associated with the design, maintenance or operation of a proposed project. They assessed different parts/components of proposed project in critical view to environmental protection. Proposed project has been evaluated laterally and collectively about what impacts might be expected to arise with the proposed project. Impacts are evaluated on the basis of magnitude, immediacy and sustainability. Evaluation criteria are as follows:

- Magnitude
 - Type of impact (direct, indirect, cumulative)
- Immediacy
 - Temporal extent (during construction, after construction)
 - Spatial extent (local, widespread)
- Sustainability and Reversibility
 - Mitigability (fully, partially)
 - Monitoring (fully, partially)

Furthermore, **consultative meetings** were held for impact analysis with EIA team members and proponent of the project. Risk rating factors were the main agenda of these meetings for each environmental inventory element. Final outputs are presented in following sections below.

6.3 METHODOLOGY FOR IMPACT IDENTIFICATION

Screening of the potential impacts associated with the proposed project activities was carried out with help of Checklist and Leopold Matrix methods specifically tailored for this project.

6.3.1 Checklist

This lists significant environmental effects known to have occurred in past relevant development projects. This is arranged to permit (i) ready screening out of non-pertinent items by checking the column ‘No significant effects’ and (ii) ready grading of significant environmental effects by degree of effect. The checklist presented as Table 6.1 shows checklist of environmental parameters & its consequences for Construction and development of **Asphalt Plant**.

6.3.2 Leopold Matrix

With the help of this matrix, interaction of various project activities with various components/aspects of the environment was identified. This interaction was then categorized with respect to its severity of impacts, as follows:

- | | | | |
|-----------|---|--------------------|---|
| • Low : | L | • Positive Impact: | P |
| • Medium: | M | • No Impact: | N |
| • High: | H | | |

With the help of the above ranking, less important/ severe impacts were screened out from the ones which were more important, needing further discussion as presented in table 6.2.

6.4 IMPACT CHARACTERIZATION

Subsequent to the impact screening, various characteristics of the potential impacts including spatial extent (local, regional, global), nature (direct/indirect), temporal extent (temporary, permanent), reversibility, severity, sensitivity of receptors and significance of impacts were determined.

Impacts characterization associated to project activities/ operational phase and their explanation is presented in table 6.3.

Table 6.1: Checklist for Environmental Consequences

Sr. No.	Activity / Parameter	Y*	M*	N*	B*	Impact**	Explanation of Environmental Consequences (Y, M, B)
1) Earth Resources							
1.1	Excavation and leveling	✓				Minor	Excavation of insignificant level will be carried out for the basement of proposed retail outlet.
Geological hazards							
1.2	Faults		✓				The building structure will be designed to withstand the seismic action (load) without local or general collapse.
	Landslides			✓			Proposed project area comprising on hard rock. There are no chances of land sliding as other societies' are also existing.
	Un-engineered fill			✓			
	Earthquake consideration	✓				Minor	The proposed structure will be designed to withstand seismic loads in accordance with the Uniform Building Code – 1997, Building Code of Pakistan Seismic Provision – 2007 to ensure the safety of the building during such an event. The significance of this impact is minor as the proposed building will be constructed as per the applicable building code for Rawalpindi and adjoining areas
1.3	Contaminated soils		✓				Possibility of soil contamination due to oil spills from generators, vehicle workshops, and accidental spills. The chances of soil contamination are close to negligible.
1.4	Contaminated surface or groundwater		✓				The chances of groundwater contamination are close to negligible as the proposed site is an area where no major activity generating excessive effluent exists.
1.5	Borrow pits		✓				Borrow pits (if any), will be restored after completion of the construction activities.
1.6	Loss of high-quality farmlands			✓			Proposed project area is open land.
1.7	Site drainage	✓				Minor	A surface drainage system will be designed to cater the needs of the project site.
2) Air Quality							
Substantial increase in onsite air pollutant emission-construction phase							
2.1	Dust emissions during construction activities	✓				Moderate	Dust emissions during construction will be mitigated by applying measures as per EMP.

Sr. No.	Activity / Parameter	Y*	M*	N*	B*	Impact**	Explanation of Environmental Consequences (Y, M, B)
	Emissions from vehicles and machinery		✓			Minor	Emissions from vehicles and machinery used during the construction phase will be mitigated by adoption of measures as presented in EMP.
	Substantial increase in odor during construction		✓				Paint, polishing, pesticide spray would produce odor. Safe Use Action Plan will be implemented and further impacts will be mitigated by using proper mitigation measures as per EMP.
Substantial increase in onsite air pollutant emission-operation phase							
	Emissions from generators		✓				Proposed project activity would involve use of generator of 125 kVA capacity during load-shedding hours. Therefore, proper mitigation measures for use of generator would be adopted as per EMP to avoid deterioration of air quality.
2.2	Increase in odor			✓			
	Violation of applicable air pollutant emissions or ambient concentration standards	✓					To limit air emissions from proposed facility, it must be properly operated and carefully maintained.
	Consideration of indoor air quality	✓					Project will be designed according to the RDA rules and regulation. There must be proper ventilation.
3) Water Resources and Quality							
3.1	River, stream or lake onsite or around the project site			✓			
3.2	Provision of safe drinking water during operational phase				✓		Water needs will be fulfilled by groundwater which is found safe for drinking after monitoring results appended as Annexure .
3.3	Presence of any wetland of national importance (like game reserve, wildlife sanctuary etc.) or international significance (like Ramsar site etc) located within or around the proposed project site			✓			
3.4	Discharges to surface or groundwater			✓			
3.5	Onsite bulk storage of liquid fuels or hazardous materials.		✓				Minor quantity of daily usage fuel, paints etc. may be stored on padded floor with impermeable lining or as per regulated SOPs.
3.6	Site Drainage.			✓			The sewerage from the proposed facility will be disposed off after due treatment in proposed septic tanks. Small diameter sewer line collecting the sewage flow from the proposed center will be combined with the

Sr. No.	Activity / Parameter	Y*	M*	N*	B*	Impact**	Explanation of Environmental Consequences (Y, M, B)
							external nearby sewer drain at an appropriate point keeping in view the diameter and invert level etc.
4) Cultural resources							
4.1	Pre-hisotric, historic or paleontological resources within or around the proposed construction site.			✓			
4.2	Any gazetted or notified archaeological site located within or around the project site			✓			
4.3	Any cultural, religious site located around the project site.			✓			
4.4	Site/ facility with unique cultural or ethnic values.			✓			
5) Biological resources							
5.1	Vegetation removal			✓			Proposed project does not involve any vegetation removal/ tree cutting.
5.2	Construction in wetlands or riparian areas			✓			
5.3	Use of pesticide/ rodenticide/ insecticide	✓				Minor	Anti-termite treatment will be used according to Regulation 22 CFR 216.3 (b) (a through l). Only registered pesticide from USEPA will be used. Proper safety measures including use of Personal Protective Equipment (PPE) will be ensured. Selection, storage and application of pesticide will be recommended as per 2011 Pakistan Programmatic Umbrella PERSUAP.
5.4	Protected areas (wildlife sanctuary, national park) or within game reserve declared by provincial wildlife Ordinances/ Laws			✓			
5.5	Any rare, threatened or vulnerable wildlife or vegetation specie observed/reported in or near project site			✓			
5.6	Presence of core habitat for any key wildlife species, within or in close			✓			

Sr. No.	Activity / Parameter	Y*	M*	N*	B*	Impact**	Explanation of Environmental Consequences (Y, M, B)
	vicinity of project site (e.g. path of migratory birds)						
6) Planning and Land Use							
6.1	Potential conflict with adjacent land uses			✓			
6.2	Non-compliance with existing codes, plans, permits or design criteria			✓			
6.3	Potential impact on adjacent buildings due to construction of existing structures			✓			
6.4	Construction in public park or designated recreational areas			✓			
6.5	Create substantially annoying source of light or glare			✓			
6.6	Relocation of > 10 individuals for +6 months			✓			
6.7	Interrupt necessary utility or municipal services for more than 10 individuals for +6 months			✓			
6.8	Substantial loss/ inefficient use of mineral or nonrenewable resources			✓			
6.9	Increase in existing noise levels	✓					Noise will be generated during construction/ operational activities. To minimize the noise impact proper mitigation measures will be adopted as per EMP.
6.10	Non-compliance with building codes (structure failure)			✓			
7) Traffic, Transportation and Circulation							
7.1	Increase vehicle load or congestion on existing roads		✓				During the construction of the project, movement of heavy trucks and machinery will have only a minor impact on the traffic of area as project is away from city where there is no heavy traffic.
7.2	Onsite congestion due to fuel transporting vehicles.			✓			No.
8) Hazards, Workers Safety							
8.1	Substantially increase risk of fire,		✓				Any potential increase in risk of fire, explosion, or hazardous chemical/

Sr. No.	Activity / Parameter	Y*	M*	N*	B*	Impact**	Explanation of Environmental Consequences (Y, M, B)
	explosion, or hazardous chemical/ fuel/ petrol spill or leakages						fuel/ petrol release will be minimized onsite for handling any emergency situations as mentioned in EMP.
8.2	Accidents or human health hazard		✓				Risks of accidents and human health hazards will be avoided by putting caution signs and use of PPE during work hours as mentioned in EMP.
8.3	Workers safety	✓				Minor	Safety procedures will be ensured during construction, electrical installations and operational activities.
9) Hazardous waste							
9.1	Increase quantity of heavy metals			✓			
9.2	Bulk quantities of hazardous materials or fuel storage			✓			
9.3	Increase in hazardous waste		✓			Minor	All hazardous waste needs to be disposed properly via suitable disposal option.
10) Non-Hazardous waste							
10.1	Construction waste/ Municipal waste	✓				Minor	Impacts from construction/ municipal waste will be mitigated according to measures mentioned in EMP.
10.2	solid waste management	✓				Minor	Solid waste will be managed as per EMP.
11) Electrical and Mechanical Installations and Fixtures							
11.1	Presence of Halons, HCFC's in HVAC systems, refrigeration equipment and fire suppression equipment.			✓			
11.2	Presence of PCBs in electrical equipment.		✓				Electrical equipment free from PCBs must be installed.
11.3	Safety issues for using low quality cables and appliances.			✓			
12) Paints							
12.1	Presence of Lead and arsenic or any other banned chemical in the paints.		✓				Some paints may contain toxic substances such as arsenic ⁴ . Such paints will not be allowed to use.
13) Spills/ Leakages							
13.1	Leakages from generators & boiler		✓				Regular monitoring is required to prevent any leakages.
13.2	Leakages from vehicles and fuel storage			✓			

⁴ TECHNICAL BULLETIN HEALTHEFFECTSINFORMATION; Oregon Department of Human Services, <http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Monitoring/Documents/health/arsenic.pdf>

Sr. No.	Activity / Parameter	Y*	M*	N*	B*	Impact**	Explanation of Environmental Consequences (Y, M, B)
	tanks						
13.3	Petrol spills/ leakages		✓				Project management will apply strict rules on his workers and labor to ensure that no spill or leakages are caused. If spills/ leakages occur, it should be managed as per measures suggested in EMP.
14) Result							
14.1	Substantial adverse impact			✓			
14.2	Adverse impact			✓			
14.3	Minimal impact	✓					Overall the project will have minimal impact.

Notes:

Y*: Yes, M*: May be, N*: No, B*: Beneficial

** Impacts: Minor, Moderate, Major

**Table 6.2: Leopold Matrix – Impacts for Construction Asphalt Plant**

Environmental component → Project Component ↓	PHYSICAL ENVIRONMENT										BIOLOGICAL ENVIRONMENT										SOICAL ENVIRONMENT							
	Climate	Geology	Seismicity	Soils contamination	Land use	Surface Water	Groundwater	Air Quality	Slope Failure	Noise	Aquatic Ecosystem	Wetland Ecosystem	Trees	Endangered Species (Plants & animals)	Migratory Species	Birds and Animals	Plants	Wildlife	Disease Vectors	Public/ Workers Health	Flow of Road Traffic	Employment	Structures and Infrastructure	Health & Safety hazards	Cultural & Religious Values	Tourism & Recreation	Disruption of Businesses	
	Location of proposed project	L	N	H	L	L	N	N	N	H	N	N	N	N	N	N	N	N	N	N	N	N	P	N	N	N	P	N
	Design phase of proposed project	L	N	H	N	L	N	N	N	H	N	N	N	N	N	N	N	N	N	N	N	N	P	P	N	N	P	N
	Construction Phase	M	L	H	M	L	N	N	M	H	M	N	N	N	N	N	N	N	N	M	M	L	P	P	M	N	P	N
Operational Phase of project	N	N	M	N	L	N	N	N	M	L	N	N	N	N	N	N	L	N	N	N	N	P	P	N	N	P	N	

*Key: P: Positive Impact; N: No Impact; L: Low Impact; M: Medium Impact; H: High Impa

Table 6.3: Impact Characterization

Environmental Impacts → Categories ↓	Health & Safety Hazard	Soil Contamination	Water Quality	Air Quality	Explanation
Nature	Direct	Direct	Direct	Direct	Direct: The environmental parameters are directly affected by the Project construction or operation. Indirect: The environmental parameter changes as a result of alteration in another parameter.
Duration of Impact	Long term	Short term	Short term	Short term	Short-term: The impacts that last only during the construction of the proposed Project e.g., noise from the construction activities. Medium-term: lasting for a period of few months to a year the project before naturally reverting to the original condition such as loss of vegetation due to clearing of campsite, contamination of soil or water by fuels or oil. Long term: lasting for period much greater than medium term impact before naturally reverting to the original condition such as loss of soil due to erosion.
Geographical Extent	Local	Local	Local	Local	The geographical extent may be local or regional (spatial dimension)
Project Phases	On going	On going	On going	On going	Pre-construction (designing), Construction and Operational. Impacts are ongoing only during construction phase
Reversibility of impacts	Temporary	Temporary	Temporary	Temporary	Temporary: The impacts that don't cross ecosystem threshold value of resilience. Permanent: The impacts that exceed ecosystem threshold value of resilience i.e., community that cannot come back to its original stage without external aid.
Likelihood of the Impact	Certain	Likely	Likely	Likely	Certain: Impact anticipated occurring under extreme circumstances. Likely: Impact will probably occur under less extreme circumstances. Possibly: Impact may possibly occur during different stages of the project. Unlikely: Impact could occur during many stages of the project. Rare: Impact may occur but only under exceptional circumstances.
Impact Consequence Severity	Major	Minor	Minor	Minor	Major: When an activity causes irreversible damage to a unique environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; has long-term effects (period of years) on socio-economic activities of significance or regional level. Moderate: When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or

					distribution over one generation of a population of flora or fauna; has short-term effects (period of months) on socio-economic activities of significance on regional level. Minor: When an activity causes short-term (period of few months) reversible damage to an environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period; has short term (period of months) effects on socio-economic activities of local significance. Negligible: When no measurable damage to physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative of statutory requirements.
Significance of Impact	Medium	Low	Low	Low	Impact may be categorized as high, medium, or low. Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern; and conformance with legislative of statutory requirements.

6.5 IMPACT SIGNIFICANCE

Subsequent to screening and characterization, impacts of significant importance are described below:

- Health hazard for staff, workers, and nearby communities caused by not following PPEs, as well as improper construction activities and use of construction equipment and machineries
- Safety hazards caused by various stages of construction activities as well as natural disasters (earthquake, slope failures, landslides etc.)
- Seismic Hazards by natural cause
- Air quality deterioration by use of construction machineries/ vehicle exhaust, dust emissions, odor due to paint, polishing and pesticide spray

These impacts and their mitigation measures are discussed in detail below at each stage of proposed project activities.

Based on the above screening and evaluation process the following determination (check all that apply) is recommended. It is assessed that proposed project has minimal adverse impacts after proper implementation of mitigation measures proposed for each associated activity.

	The activity contains . . .	(equivalent regulation)
☐	Very low risk sub-activities	categorical exclusion(s)
☐	After environmental review, sub-activities determined to have no significant adverse impacts	negative determination(s)
☒	After environmental review, sub-activities determined to have no significant adverse impacts, given appropriate mitigation and monitoring.	negative determination(s) with conditions
☐	After environmental review, sub-activities determined to have significant adverse impacts	positive determination(s)

6.6 Mitigation & Impact Assessment

Anticipated Environmental Impacts of proposed project of Construction and Development of **Asphalt Plant** by M/S SMADB-SHAHRUKH (JV) are determined. Upon consequent, relevant mitigatory measures have been suggested and presented in table 6.4 below.

Table 6.4: Mitigation and Impact Assessment

Sr. #	PROJECT ACTIVITY	DESCRIPTION*			MITIGATION MEASURES**
		When	Where	How	
1. Earth Resources					
1.1.	Excavation & Leveling	»Construction phase	»Proposed Project site	»Excavation will be carried out for the basement of proposed building.	»Excavated soil should be stockpiled at appropriate locations. Adequate enclosures to be provided for such storage, to avoid blowing away by wind and run off with storm water. »Use of security fences or hazard tapes to warn and control the access of unauthorized persons to the excavated site. »Weekly monitoring during excavation & reporting by HSE manager of construction contractor.
1.2.	Earthquake consideration	»Planning/ designing phase	»On site	»The building structure will be designed to withstand the seismic action (load) without local or general collapse. »Significance of Impact is minor	»The design specification will be followed to withstand seismic loads in accordance with the Uniform Building Code (UBC) - 1997 and Building Code of Pakistan (BCP), Seismic Provisions - 2007, as required by local codes and standards for high degree of structural competence, reliability and ease of construction ⁵ . »It will be executed and managed at planning & design phase by design contractor.
1.3.	Soil contamination	»Construction & Operational Phase	»On site	»Improper handling of construction material by construction workers; »Inadequate handling & disposal of contaminated soil.	»Impart proper training to their workforce in the storage and handling of obnoxious materials that can potentially cause soil contamination by construction contractor. It must be monitored and implemented by HSE manager of construction contractor. »Implement mitigation measures suggested under sub-section 6.9.2 & 6.10.3.
1.4.	Loss of trees/ vegetation	»Construction Phase	»Project site	»No tree cutting is involved in stated project.	»It will be executed by project proponent.
1.5.	Land Use	»Planning, Construction	»On site	»Potential impact on adjacent buildings due to	»The construction contractor must ensures that all structure, equipment, materials and facilities used or created on site

⁵ Structural design at present in Pakistan is designed as per UBC-97 and ACI 318-02M because of the local techniques, procedures, technologies and material available for concrete and other construction material. The building Codes BCP, SP-2007, Design of Concrete Structures by Arthur H. Nilson, Design of Reinforced Concrete by M. C. Cormac, Foundation Analysis and Design by J.E. Bowles will also be followed in due course of time upon availability of advanced materials and techniques in Pakistan

		& Operational Phase		construction of proposed facility; it is anticipated to be minor; »Aesthetic value of the area might get impaired.	for/ or during construction activities are removed. »Tree plantation must be encouraged in and around project site for enhanced aesthetics of the area.
2. Air Quality					
2.1.	Dust Emissions	»Construction phase	»On site	»Due to construction activities, dust will be generated.	»Sprinkling of water to suppress dust emissions. »Periodic Environmental monitoring in specific to air quality will be carried out by HSE manager of construction contractor.
2.2.	Emissions from vehicles/ generator stack/ chemical fumes from fuel storage tanks	»Designing, Construction & Operational Phase	»On & Off site	»Vehicles washing, servicing and repairing works onsite »Flue gas emissions from generator & fuel storage tanks if not maintained properly	»Use of properly maintained and tuned vehicles/ equipment/ generators onsite to avoid air and soil pollution. »Properly designed and maintained ventilation as it is one of the more effective ways of reducing exposure to harmful chemicals in the form of fumes. »Implement mitigation measures suggested under sub-section 6.9.5 & 6.10.5. »Periodic Environmental monitoring in specific to air quality will be carried out by HSE manager of construction contractor. »Besides, it will be taken care to operate processes and activities to minimize emission hazardous to health of proposed project by Design Contractor & Project Proponent.
2.3.	Increase in odor	»During operational phase	»On site	»Odor from petrol storage tanks/ fueling or defueling area.	»Proposed facility must be properly ventilated & designed. »It will be executed by construction contractor and ensure compliance to use of PPEs by workers while handling petrol. »HSE manager will monitor use of PPEs by workers on daily basis.
3. Water Quality					
3.1.	Surface/ Ground water Contamination	»Construction & Operational Phase	»On & off site	»Improper sanitation system for construction as well as operational workers.	»Proper sanitary system must be provide to construction workers on temporary bases during construction phase. »The chances of water contamination are close to negligible as no major activity generating excessive effluent exists. »It will be executed by construction contractor during construction phase & project management during operational

					phase. »Implement mitigation measures suggested under sub-sections 6.9.4 & 6.10.4.
4. Traffic, Transportation, Circulation					
4.1.	Congestion on existing road	»Construction Phase	»On site	»Traffic jams or congestion on road by the movement of construction/ raw material/ vehicles during the peak traffic hours.	»Traffic jams or congestion on road will be eliminated by avoiding the movement of vehicles during the peak traffic hours »Allocation of proper place for vehicles will be carried out to avoid congestion and haphazard movement of vehicles onsite. »Daily monitoring by HSE manager of construction contractor to ensure pedestrian/ operator's safety and their ability to complete the task without incident.
5. Solid Waste					
5.1.	Municipal waste	»Construction & Operational Phase	»On Site	»Garbage produced by workers; »Hideous littering by workers engaged for operational activities.	»Measures should be adopted for safe and environment friendly disposal of all generated solid and liquid wastes. It is recommended that workers must restrict their activities within the project premises. »Orientation trainings will be provided to the workers for identification, segregation & management of solid waste during construction & operational phase. »Weekly monitoring and inspection of waste management related facilities and activities in order to ensure compliance as per applicable rules & regulations by project management. »Maintain records of training.
5.2.	Hazardous waste	»Operational Phase	»On site	»Regular and thorough management of hazardous waste which is absolutely essential for efficient operation.	»Monthly monitoring & inspection of hazardous. Waste management activities directly resulting from executing the project process by project management during operational phase. »Implement mitigation measures suggested under sub-section 6.10.9.
6. Health & Safety					
6.1.	Accidents/ human health hazards	»Construction Phase	»On site	»Construction activities will pose certain negative impacts on workers.	»Ensure safe working practices are observed at all times while carrying out work activities by construction contractor. »All accidents, whether to themselves, others or property must

					immediately be reported to project management. »Site specific HSE Plan must be used as a guide to assist the Contractor working on this project. »HSE manager by Construction Contractor will be responsible for periodic site safety inspections. »Implement mitigation measures suggested under sub-section 6.9.10.
6.2.	Noise/ Vibrations	»Construction Phase	»On site & On duty	»Construction activities such excavation, use of heavy machinery etc. may generate noise; »Use of unnecessary horns by drivers of construction/ fuel transporting vehicles; »Noise will also arise from generators operational during load-shedding hours.	»Drivers must be aware of their code of conduct and avoid use of unnecessary horns. »Implement mitigation measures suggested under sub-sections 6.9.6. & 6.10.6. »Minimum number of vehicle must be used for construction material to mitigate noise and exhaust emissions. »Daily monitoring by HSE manager of construction contractor to check compliance as per PEQS during construction phase. »Noise from generators must be curtailed within limiting values set by PEQS via engineering control.
6.4.	Emergency Response	»Design, & Construction Phase	»On site & On duty	»There are always chances of fire risks/ another hazard of worth considering (explosion, petrol spills, earthquakes etc.)	»Operating procedures must be in place to minimize the fire danger at the site. » It must be executed and monitored by project proponent in close liaison with design contractor of stated facility.
7. Material Storage and others					
7.1.	Construction Material Storage	»Construction phase	»On site	»Poor housekeeping leads to injuring of workers.	» Stockpiles shall not be situated such that they obstruct natural pathways » Stockpiles shall not exceed 2m in height unless permitted by Concerned Engineer on site » If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either depending on the duration of the project. Stockpiles may further be protected by the construction of low brick walls around

					their bases » All substances required for vehicle/ machinery maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site » Hazardous substances / materials are to be transported in sealed containers or bags » Spraying of herbicides / pesticides shall not take place under windy conditions
7.2.	Spills/ leakages	»Construction Phase	»Project area	»Spills/ leakage may result due to improper handling of paints, fuels, solvents, cements, chemicals etc.	» Ensure proper handling and storage of chemicals/ paints/ fuels etc. and should be marked to highlight their content. » Workers must be aware of their code of work. » Compliance to above stated as well as to use of PPEs by workers must be monitored by HSE manager of Construction Contractor during construction phase and project management during operational phase.
7.3.	Use of pesticides/ insecticides	»Construction Phase	»Project area	»Use of mosquito repellent sprays/ fumigation to disinfect and control pest/ disease vectors.	» Mosquito repellent sprays/ fumigation should be carried out as per project safety plan. All safety measures including use of PPE must be ensured. » HSE manager will monitor compliance to use of PPEs during pesticide spray.
7.4	Biological Hazards	»Construction phase	»Project site	»Excavation for the foundation	» Proposed project site does not involve cutting of any trees » Plantation of maximum number of trees. » Staff and workers should be instructed not to damage nearby vegetation of the surrounding area. » Open fires should be prohibited in the area to avoid the hazard of fire and impact on nearby flora and fauna. » Contractor staff should be given clear instructions that

							they should not hunt any birds/ animal in the project area/ site » Barriers/ fencing/ or boundary wall should be installed at project site to protect movement of animals at the project site during constructions. » Proper disposal of organic waste (if any) generated during the construction stage to avoid rodents and other insects' generation.
--	--	--	--	--	--	--	---

* It contains when problem will occur and when, where & how it will be occur.

** It suggests whys of achieving mitigation measures [changing in planning and design/ improved monitoring and management practices/ compensation in money terms/ replacement, relocation & rehabilitation

Moreover, assessed impacts and their mitigation measures are discussed in detail at each stage of proposed project activities as described below.

6.7 IMPACTS DUE TO PROJECT LOCATION

The project envisages construction and development of **Asphalt Plant** at D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi. The possible environmental impacts due to project location are described below.

6.7.1 Land Acquisition & Change in Land Use Pattern

As mentioned above the proposed project site is situated in area where no worth mentioning activity with special reference to environment is involved hence no significant adverse impact will happen. The adjacent land value will be increased by this project.

Mitigation

No.

6.7.2 Environmental Sensitive Areas

There is not any environmentally sensitive or critical zone in or around the project site.

Mitigation

Not required.

6.7.3 Historical, Archeological or Cultural Sites

There are no cultural resources, historical place or archeological sites such as ancient monuments, forts, sculpture, etc. to be destructed.

Mitigation

Not required.

6.7.4 Existing Infrastructure

Infrastructure like roads, electricity, telephone, natural gas and drainage system is already present in the area. As existing planning and design standards are suited to local conditions, hence, there will not be any unnecessarily wasteful of land.

Mitigation

Not required.

6.8 DESIGN RELATED IMPACTS

The construction plan of the project is taking all the consideration of all engineering details, their soundness and else as desired under the rules and regulations “Uniform Building Code – 1997, Building Code of Pakistan Seismic Provision – 2007” for such

constructions. This will automatically take care of the soundness of the building and its design.

The present EIA Report testifies that there will not be any environmental problems at all, due to project design.

In view of these considerations no environmental problems are foreseen in the context of design. However the possible impacts of proposed project have been considered and their mitigation measures justified in Environmental Impact Assessment.

Mitigation

No.

6.8.1 Drainage Pattern

Drainage system is available around the project site for waste water disposal. All the waste water (constituting sewage only) from the proposed facility will be disposed into this drain after due treatment in septic tanks.

Mitigation

As there is no significant impact on drainage pattern, so, no mitigation is required.

6.8.2 Seismic Hazard

The proposed project is situated in Seismic Zone 3B. In this zone intermittent earthquakes with fundamental periods greater than 1.0 second may cause damage to structures.

Mitigation

The structure of the proposed project has been designed in accordance with Uniform Building Code – 1997, Building Code of Pakistan Seismic Provision – 2007, so that the building may withstand moderate to large earthquakes.

6.8.3 Water Resources

Ground water will be extracted via installation of electric pumps. Major use of this ground water other than the process itself is for allied activities such as washroom/ official activities by workers.

Mitigation

- » Ensure that projected use of ground water is within the capacity of natural system to replenish itself.
- » Use indigenous vegetation that requires less water, drip irrigation or shaded plantings.
- » Workers should strictly be advised not to misuse or waste ground water in any way.

6.8.4 Traffic Patterns

The existing road will be utilized for all the traffic movement involved in this project. During the construction of the project, movement of heavy trucks and machinery will have only a minor impact on the traffic of area as project is away from city where there is no heavy traffic.

Mitigation

Not required.

6.8.5 Emergency response

There are always chances of earthquakes and other manmade disasters such as fires due to electrical short-circuiting, overheating, forest fire etc. Besides, proposed building layout has been designed with inception of such considerations.

Mitigation

The following mitigation measures will be adopted to minimize or eliminate the emergency situations:

- » The design of proposed project will also include emergency exits and open space for gathering which can be used during emergency situation.
- » Adequate water distribution system will be designed, which could also supply adequate quantity of water for fire-fighting during emergency.
- » Fire hydrants and firefighting extinguishers will be provided at locations where necessary.

6.9 IMPACTS DURING CONSTRUCTION STAGE

The potential environmental impacts of the proposed project along with the mitigation measures during the construction stage have been described as following:

6.9.1 Impacts on Topography

Civil work will be done for the construction of proposed facility so there will not any major changes in the existing topography of the project site. The changes due to the civil work will be of localized nature. There will be no significant changes off-site the project area.

Mitigation

Not required.

6.9.2 Impacts on Soils

The overall geology and soil quality of the project site is not expected to be adversely impacted due to the execution of the proposed project during the construction period. Furthermore, the main finding of Soil Investigation Report of proposed project site

has been prepared by Pak Engineers & Geotech Lab Office no.02 First floor, Ali plaza, near Bank Al Habib G.T New Morgah road, Rawalpindi. Complete Soil investigation report will be shared on the demand of EPA.

Mitigation

Vigorous plantation needs to take place at the project site so that soil becomes stabilized.

6.9.3 Impacts on Groundwater

As mentioned above very small level civil work will be undertaken for establishment of the said project so the water quality will not be disturbed too much extent.

Mitigation

- » The workers will be provided with washrooms and toilets at site.
- » Proper sanitary system will be developed on temporary bases.

6.9.4 Impacts on Surface Water

Excessive runoff, especially in rainy days, due to different activities to be carried out during construction phase can result in the increase of Total Dissolved Solids (**TDS**) and Total Suspended Solids (**TSS**) in small water channels. Similarly, untreated sewage can result in high value of Chemical Oxygen Demand (**COD**) and Biochemical Oxygen Demand (**BOD**) of surface water.

Mitigation

- » The workers will be provided with washrooms and toilets at site.
- » Proper sanitary system will be developed on temporary bases.
- » Wastewater effluent from construction equipment, washing-yards should be passed through the primary treatment process to remove macro contaminants before discharging it into natural streams.

6.9.5 Impacts on Air Quality

Due to the construction activities like excavation, clearing, leveling, compaction, material transportation, earthing/ grounding etc. dust will be generated which will ultimately increase the Particulate Matter (PM) value in the area. Gaseous emissions from the heavy machinery and vehicles will also come out and this will affect the quality of ambient air. This may also pose health risk to the construction workers and residents who suffer from respiratory ailments.

Mitigation

- » Periodic environmental monitoring and testing of emissions from vehicles should be carried out in order to keep the concentration of various pollutants including CO, Noise & Smoke within the PEQS limiting value.
- » Ambient gaseous monitoring for various pollutants like CO, NO₂, SO₂, PM₁₀ etc. should also be carried out periodically.
- » Periodic maintenance of the machinery will be carried out to reduce the concentration of emissions.
- » Haul-trucks carrying earth, sand, aggregate etc. will be kept covered with tarpaulin to help contain construction materials and being transported within the body of each carrier between the sites.
- » Tyres of the vehicles and heavy machinery will be washed and the waste water produced as a result of this activity will be reused after due treatment. This will reduce concentration of PM in the ambient air.

6.9.6 Noise

Project activities like compaction, use of heavy machinery during the clearing of the site and trolleys and trucks used for the transportation of materials will create some noise and vibration. The noise may affect the workers and residents of the surrounding communities of the project site.

Mitigation

- » Engines of vehicles visiting the project site should be properly tuned-up.
- » Use of heavy machinery should be restricted to daylight hours in order to minimize noise pollution and vibration arising from the construction site.
- » To bring down noise levels within the PEQS limiting values, noise control measures should be taken such as provision of silencers on the heavy construction vehicles and sound insulation materials should be used as barriers.
- » Wide zone of green plants will also help decrease sound levels.
- » As the proposed project is going to be constructed in the area far away from residential communities. This will further reduce the exposure of noise to the surrounding communities.

6.9.7 Water Consumption

During the construction of project approximate quantity of water will be used and it will not exert any significant effect on water table.

Mitigation

Not required.

6.9.8 Waste Generation

During the construction of project waste will be generated such as debris waste including clay, sand, crush, stones, paper, plastic, wood pieces, iron and steel as scarp, wires, rags, ropes etc., sewage and solid wastes from construction camp.

Mitigation

- Most of construction waste will be utilized on site to fill excavated sites or recycled; remaining of it will be properly disposed-off/ landfilled.
- Septic tanks will be constructed for the treatment of sewage waste from construction camps and other construction activities. After due primary treatment of sewerage in septic tanks, it will be disposed-off in drain passing nearby the project site.

6.9.9 Construction Debris

Each phase of the development will produce solid waste, the disposal of which, if not managed properly could have negative impacts on the site and surrounding area.

Mitigation

- » A site waste management plan should be made the responsibility of the project contractor to provide for the designation of appropriate waste storage area on the site and a schedule for the timely collection and removal of construction debris to an approved dump site.
- » Only small quantity of the waste will be produced as no major excavation is involved in the project.

6.9.10 Health and Safety of Workers

The construction activities will impose certain negative impacts on health and safety of the workers, however mitigation measures will be required to minimize/ eliminate health and safety related negative impacts of the project.

Mitigation

Implementation of the following measures will ensure health and safety of the workers during the proposed construction stage:

- » The Contractor will ensure that the workers / laborers are trained in safety procedures for all relevant aspects of construction.
- » Proponent of the Project will make regular checks to ensure that the contractor is following safety working procedures/ safety measures.

- » Formal emergency procedures will be developed for proposed project site in case of an accident. First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident.

6.9.11 Impacts on Flora & Fauna

No trees will be cut down in the vicinity of proposed project site which will be preserved. The establishment of the proposed project will not affect the fauna of the area.

Mitigation

Following mitigation measures will be adopted to restore the environment as much as possible.

- » Impact mitigation calls for protecting and restoring as much of the original condition on the development site as possible.
- » In an effort to preserve the existing biodiversity, naturally occurring plants such as those used primarily by the birds for food and shelter should be planted for their survival. This would ensure that primarily native plants are used in the landscape plan thus minimizing the use of imported species and eliminating the introduction of potentially invasive species.
- » Using bird feeder may encourage the displaced avifauna to remain in or return to the general vicinity, thus maintaining the existing biodiversity.
- » The project contractor should be subject to punitive penalties for removal or damage of ecologically valuable trees designated for protection or relocation (if any).

6.9.12 Transportation of Construction Materials

Transportation of heavy machinery implies heavy traffic on the roads leading to the site with possible impacts to the surrounding area (dust, spillage, emissions and noise). Use of uncovered vehicles for transportation of construction materials can lead to inadvertent dispersal of materials during heavy rains or high winds during dry periods. This could have a negative impact on the residents of the surrounding.

Mitigation

- » The construction activity will go on for a short period of time and there will be no worth mentioned impacts from this activity on the project area.
- » Arrangements should be made with contractors to ensure that the vehicles used for transporting materials and machinery to the site are appropriately sealed and covered to minimize dust.

» Dust producing materials such as sand or cement should be stockpiled in low enclosures and covered, away from drainage areas where they could easily be washed away during rainfall.

6.9.13 Traffic Congestion

During the construction of the project, movement of heavy trucks and machinery will have only a minor impact on the traffic of area as project is away from city where there is no heavy traffic.

Mitigation

No mitigation measures are required as this activity will be for a short period of time and the carrying capacity of Kahuta road is fair enough to accommodate this traffic for that much time period.

6.9.14 Employment Generation

During construction stage of the proposed project, about 30-35 workers / laborers will be engaged. This will be positive change.

Mitigation

Not required.

6.10 IMPACTS DURING OPERATIONAL PHASE

The potential environmental impacts of the proposed project along with the mitigation measures during the operational phase have been described as following:

6.10.1 Impacts on Climate

The operation of proposed project will not affect the climate of the area on overall.

Mitigation

Not required.

6.10.2 Change in land use

As mentioned earlier, the project site is open land. No trees will be cut down for this project. The equipment will be kept in proper condition to save the environment from any damage. Hence no significant adverse impact will happen.

Mitigation

Not required.

6.10.3 Impacts on Soils

The overall geology and soil quality is not expected to be adversely impacted due to the execution of the proposed project activities.

Mitigation

Vigorous plantation needs to take place at the open vacant spots by project proponent

so that soil becomes stabilized.

6.10.4 Effluent Generation

From the proposed project no process wastewater will be produced. Adequate quantity of ground water will be required to meet all the project requirements. Approximately 600 - 800 liters/ day of wastewater will be generated from toilets/ washrooms. This water will be treated via septic tanks before its discharge..

Mitigation

- » As there is no source of chemical contamination in the process water so the waste water to be generated will have no water contamination and the waste water quality will meet the prescribed limits of PEQS-Pakistan.
- » The sewerage water will be treated in septic tank.
- » The treated effluents will be used for sprinkling on the unpaved area, landscaped area, plants and vegetation within/ or around project site.
- » The remaining effluent of nominal quantity will be discharged into nearby drain through submerged sewerage pipes.
- » While laying sewage pipes, measures will be adopted to ensure that other pipes, wires or systems already existing in the route of the sewage pipes from the building to the main sewer line are not damaged.
- » Sewage lines, both on site and off site, shall be laid at reasonable distances away from drinking water supply lines so as to avoid contamination of the water supply by the leakages from the sewer.

6.10.5 Air Quality Deterioration

While operational stage of the proposed project there is no impact on air quality is anticipated.

Mitigation

Not required.

6.10.6 Noise and Vibration

There is no such significant impact of noise and vibration associated with operational phase of this proposed project.

Mitigation

Not required.

6.10.7 Water Consumption

Adequate quantity of underground water will be required to meet all the project requirements. Around 13000 gallons of water will be used in the process of making

concrete in batching plant. This water will become part of concrete mixture and will not be discharged. However, Water used for sanitation will be treated via septic tanks and will be discharged into nearby drain. To meet water requirement of project, two water bores of 350 feet each approximately are required along with necessary equipment like water boozers, water sprinklers etc. on site. The quality of water is also satisfactory. This factor also supports the decision regarding sitting of the project at the existing site.

Mitigation

Not Required.

6.10.8 Solid Waste Generation

During the regular operation of the proposed project 100-150 kg per day of municipal solid waste will be produced, only kitchen waste/ Municipal Solid Waste will be produced.

Mitigation

The solid waste above is recyclable. This solid waste will be disposed off in an environment-friendly manner in line with the local municipality and through a licensed contractor who should dispose of the solid waste at the designated site by the local municipality.

6.10.9 Health and Safety of Workers

The project activities will not impose certain negative impacts on health and safety of the residents. However, no mitigation measures will be required to minimize/ eliminate health and safety related negative impacts of the project.

Mitigation

Not required.

6.10.10 Employment Generation

During the regular operational stage of the proposed project approximately 15-20 workers will be engaged. This will be a major positive impact.

Mitigation

Not required

6.10.11 Fire Risk

There is always a chance of fire at any kind of premises/ buildings. If the fire-fighting arrangements may not arrange this will be a major negative impact.

Mitigation

The following mitigation measures will be adopted during the regular operational

stage of the proposed project:

- » Emergency Exits
- » Smoke Detectors
- » Fire Extinguishers (DCP 05 cylinders, AFFF 03 cylinders, CO2 02 cylinders, DCP 02 Trolleys)
- » Emergency Signs
- » Floor Marking
- » First Aid Boxes (02)
- » Fire-fighting Kit

6.11 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

Besides the concrete measures to be adopted as described above, the quality of environment will further be enhanced through the running of project in complete accordance with the 5RS Principles- Reduce, Reuse, Recycle, Refurbish and Retrofit. Good house-keeping will be the order of the day.

Proposed project will increase the land value, aesthetic value of area and will provide the tourists with proper facilitated residence to enjoy their visits.

During construction and regular operation of the project activity, persons will be employed. Local people will be preferred for employment. People of all categories will get employment during construction as well as operational phase of the project.

CHAPTER-7

ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

7.1 ENVIRONMENTAL MANAGEMENT

To implement the recommendations and suggestions for environmental protection included in Chapter 6, a comprehensive management plan is needed.

The objective of the Environmental Management Plan (EMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the proposed project activities. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA are adequately mitigated, either totally prevented or minimized to an acceptable level. The required actions to achieve those objectives will be successfully adopted by the concerned institutions or regulatory agencies. The implementation of EMP will be carefully coordinated with design and management program of the project to ensure that relevant mitigation measures are implemented at the most appropriate stage and resources are properly allocated to achieve the desired results.

The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensuring that safety recommendations are complied with.

7.2 INSTITUTIONAL CAPACITY

7.2.1 Environmental Committee and its Responsibilities

Project Proponent will constitute an Environmental Management Committee including at least one qualified and experienced environmental scientist / engineer who will be responsible for the environmental management and supervisory affairs during the different stages of the project. This person can be hired by the management or can be on contract basis. The responsibilities of the EMC are as follows:

- To ensure implementation of all the proposed mitigation measures during different stages of the proposed project;
- To organize routine monitoring of water, air quality, noise etc.
- To develop operational guidelines and implementation schedule.
- Receiving complaints from people in the vicinity of the project and concerned

institutions and assisting the local environmental authority including establishing liaison with EPA.

- To ensure that project is being implemented in an environmental friendly manner, causing least harm to the existing environment including flora and fauna, geology and soil, surface and ground water, air quality, existing utilities etc. as already discussed in Section 6.
- To look after the efficiency of Horticulture Committee (HC).

A team will be formed named as ‘Horticulture Committee’ (HC) to attend the issues relating to cleanliness, up keeping, aesthetic beauty of the project site, general environment enhancement, tree plantation, vegetation’s promotion, planting of flowers and ornamental trees on site.

Project proponent will be responsible for the execution of the project with coordination of the client. The proponent will be bound to follow the provisions of the contract documents especially about the environmental protection measures and apply good management techniques and methodology without damaging the existing environment. Obligation(s) of the proponent, to safeguard and mitigate adverse impacts and rehabilitate the environment will be addressed through environmental provisions in the contract document(s) as already highlighted in Chapter 6 and through adequate implementation at site.

7.3 TRAINING SCHEDULES

The management staff and labor of proposed project will be trained about the requirements of Environmental Management System, including but not limited to the environmental health and safety, efficient use of resources, emergency response, fire protection and safety / security issues etc.

In order to raise the level of professional and managerial staff, they need to upgrade their knowledge in the related areas. The project management will play a key role in this context.

Environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult to implement effective environmental protection measures. Domestic training program is proposed to train the staff. Training Plan has been formulated as part of EMP which is presented as Table 7.1 below:

Table 7.1: Staff Training Plan

Objective	Regular training & learning opportunities are an investment that helps employees to prosper their skills for their own and the organization's benefit.
Responsible	M/S SMADB-SHAHRUKH (JV)
In-charge	Project Management
Trainer/ Facilitator	Internal and External Trainers
[Sign here]	

Training Schedule*:

Following training schedule will be adhered to train the workforce of **Asphalt Plant** internally and by external trainers. Tool box talk will be the regular feature of this training plan on weekly basis.

Training Topics	Month 1-4				Month 4-8				Month 9-12			
Environmental Compliance of applicable laws												
Safe Use of Machinery												
Code of Conduct												
Health & Safety												
Emergency Drill												
First Aid												
Handling of hazardous material and use of PPE												
Environmental Safeguards												

*Please note – orientation/trainings will continue to be conducted twice a year, per the mentioned schedule.

Training will continue to be provided at 8:00 a.m. The entire training sessions will last approximately 3.5 hours, but may take as long as 4 hours, depending on the number of people in attendance.

New staff should be made aware of this training/orientation session, at the time of hire.

7.4 IMPACTS & MITIGATION MEASURES

The EMP provides comprehensive mitigation and management measures for the following phases of the project:

7.4.1 Summary of Impact & Mitigation Measures

This section of EMP provides summary of management principles for the construction & operational phase of the project. The impacts on environment which are likely to be generated during execution of these phases are described in table 7.2.

7.4.2 Mitigation Plan for Construction & Operational Phase

This section of EMP provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and therefore, the contractor will be required to comply with the specifications to the satisfaction of the project Manager and Environmental Control Officer, in terms of the construction contract.

This section of EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedure and responsibilities are required from proponent within the operation and maintenance phase are satisfied.

7.5 Environmental Monitoring Program

It will be in the fitness of the things to operate this project under the Environmental Management Plan. Regular monitoring of all the significant environmental issues is essential to check the compliance status of EMP. The main objective of the monitoring will be;

- To verify the results of the environmental study with respects to the proposed project.
- To estimate the trends of concentrated values of the issues, which have been identified as critical and then planning the mitigating measures.
- To assess the efficiency of pollution control mechanism.
- To ensure that any additional parameters, other than those identified in the EIA report, do not turn critical after the commissioning of proposed project.

Environmental monitoring program for proposed project is described in table 7.3.

7.6 ENVIRONMENTAL BUDGET

The cost for environmental management and monitoring will be the part of contract of Contractor and Consultants respectively. However, a lump sum amount of PKR 0.5

million will be allocated by the project proponent as cost for environmental training, monitoring and tree plantation for a period of one year during construction and operation of the project. After that, monitoring program will be revised in consultation with EPA and cost will be revised accordingly.

Table 7.2: Summary of Mitigation & Impact Assessment

Activity	Environmental Impacts	Mitigation	Manifestation	Methods of Implementation
Construction Phase				
1. Air Quality	– Dust resulting from construction work – Use of heavy machinery can generate exhaust and dust emissions – Dispersion of particles from stockpiles during high velocity wind – Smoke from burning of waste materials or burning of firewood in the labor camp	Necessary measures like sprinkling of water on regular basis especially during dry climatic conditions should be taken to limit pollution from dust and other windblown materials. Covering or use of wind sheets around the stockpiles to avoid air pollution through dispersion Periodic maintenance and management of all the construction machinery and vehicles Cutting and burning trees / shrubs for fuel will be prohibited. Instead gas cylinders should be used in the labor camp for cooking purposes. Similarly waste burning will not be allowed.	– During Construction Phase by Contractor with coordination of Proponent.	– Hiring of reputable contractor with sound knowledge of environment and HSE; – Regular inspection of storage material by competent person – Substantial training of Workers before commencement of work; – Monitor the performance of contractor/ workers.
2. Water Quality	– Run-off water from construction area – Inappropriate disposal of waste. – Open sewerage water disposal on land can	– Use of spill prevention trays and impermeable sheets to avoid. – contamination of the water – Furthermore, septic tanks will be constructed which will be cemented to prevent the domestic water contamination	– Construction Phase by Contractor with coordination of Proponent.	– Hiring of reputable contractor with sound knowledge of environment and HSE; – Regular inspection of site by competent person – Substantial training of Workers before commencement of work; – Monitor the performance of

	contaminate water quality and cause generation of mosquitoes and various other insects in the area. – Leakage of oil and chemical materials from construction activity	– Maximize the use of treated waste water on site (e.g. sprinkling purpose to control dust) – Proper disposal of waste material on dumping sites to avoid leachate generation – Prohibit illegal dumping of waste – The contractor will repair / replace / compensate for any damages caused by the Construction activities to the drinking water source/s.		contractor/ workers.
3. Solid Waste	– Construction waste from construction activities – Domestic waste from workers – Hazardous waste such as dry batteries and chemicals etc.	– Ensure prevention of inappropriate disposal of waste material – Conduct separate collection of construction and domestic waste to promote recycling and re-use – Ensure maximized use of construction debris on-site to fill excavations etc. – Dispose non-recyclable and hazardous waste material properly according to waste management rule. – Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No	– During construction and operational phase	Project proponent and Contractor

		waste or debris will be thrown in the river or other water bodies – Contractor will prepare waste management plan related to construction activities; get its approval from RE and ensure its full implementation		
4. Noise	Noise caused by construction machinery and vehicles used for mobilization of construction equipment and workers	– The contractor will strictly follow the NEQS for ambient noise – Control noise through control of working hours and selection of less noisy equipment. – Prohibit use of pressure horns – Proper maintenance of vehicles and construction equipment. – Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory	– In Construction Phase by Contractor coordination with Proponent	- Regular inspection of machinery by contractor. - Proponent ensure contractor working without harming environment.
5. Material Management	- Improper store leads to environmental pollution. - Harm to soil in case of chemical/oil leakage - Worker health injury	– Stockpiles shall not be situated such that they obstruct natural pathways – Stockpiles shall not exceed 2m in height unless permitted by Concerned Engineer on site	– In Construction Phase by Contractor	- Regular inspection of machinery by contractor. - Proponent ensure contractor working without harming environment.

		– If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either depending on the duration of the project. Stockpiles may further be protected by the construction of low brick walls around their bases – All substances required for vehicle/ machinery maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site – Hazardous substances / materials are to be transported in sealed containers or bags – Spraying of herbicides / pesticides shall not take place under windy conditions		
6. Biological Resources	– Removal of vegetation covers by cutting of trees, crops, herbs and shrubs – Fauna including birds and animals will be affected during excavation,	– Proposed project site does not involve cutting of any trees – Plantation of maximum number of trees. – Staff and workers should be instructed not to damage nearby vegetation of the surrounding area. – Open fires should be prohibited in	– Contractor and proponent responsibility to ensure safe environment.	- Regular inspection of machinery by contractor. - Proponent ensure contractor working without harming environment.

	– movement of labor and carriage of goods and machinery	the area to avoid the hazard of fire and impact on nearby flora and fauna. – Contractor staff should be given clear instructions that they should not hunt any birds/ animal in the project area/ site – Barriers/ fencing/ or boundary wall should be installed at project site to protect movement of animals at the project site during constructions. – Proper disposal of organic waste (if any) generated during the construction stage to avoid rodents and other insects' generation.		
--	---	--	--	--

7. Seismicity		– The design specification will be followed to withstand seismic loads in accordance with the Uniform Building Code (UBC) - 1997 and Building Code of Pakistan (BCP), Seismic Provisions - 2007, as required by local codes and standards⁶ for high degree of structural competence, reliability and ease of construction.(See section 6.6.2)	– Contractor with coordination of proponent and Engineer	- Building design should be according to Building code of Pakistan 2007.
8. Workers Health & Safety	- Poor housekeeping - Improper use of equipment - Unskilled staff - Lack of supervision	– Provision of Personal Protective Equipment to the workers – Provision of first aid box at work site to cope with emergency situation – Safety training to the workers – Safe driving training to the drivers – Adequate safety signs on site – Provide training regarding proper handling and use of chemicals/ paints – Install fire extinguishers at fire handling places	- Certified contractor and Proponent	- Proper training of workers. - Ensure worker have specific PPEs.

⁶ Structural design at present in Pakistan is designed as per UBC-97 and ACI 318-02M because of the local techniques, procedures, technologies and material available for concrete and other construction material. The building Codes BCP, SP-2007, Design of Concrete Structures by Arthur H. Nilson, Design of Reinforced Concrete by M. C. Cormac, Foundation Analysis and Design by J.E. Bowles will also be followed in due course of time upon availability of advanced materials and techniques in Pakistan.

		– Any loss of public/ private property will be compensated by the contractor – Regular checks should be carried out to ensure a contractor's is following safe working procedures and practices.		
9. Socio-economic Impacts	- Disturbance to local community by construction work	– Contractor's activities and movement of staff to be restricted to designated construction areas – The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous all the time – Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized – Provide walkways and metal sheets where required to maintain access for public or vehicle – The site must be kept clean to minimize the visual impact of site – Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors	- Contractor with coordination of proponent and Engineer	- Hiring of reputable contractor with sound knowledge of environment and HSE; - Regular inspection of storage material by competent person - Substantial training of Workers before commencement of work; - Monitor the performance of contractor/ workers.

10. Clearance of site from extra / surplus material and construction equipment	- Tree cutting, - damage to land - soil removal	- Noisy activities must be restricted to the times given in the Project. - Timely removal of waste from the site to avoid congestion at work place. - Construction waste should be collected and disposed separately from other waste. - Contaminated soil (if generated) due to accidental spills will be removed and transported to suitable site for disposal. - Safe transportation of construction equipment from the site. - The contractor must ensure that all structure, equipment, materials and facilities used or created on site for/ or during construction activities are removed. - Empty/available space will be covered with grassy lawns in addition of parks establishment as component of this project. - Use of native vegetation as a part of landscape. Ornamental plant species like roses, jasmine, and seasonal flowers can be used in proposed landscaping, which is a	- Contractor with coordination of proponent and Engineer	- Hiring of reputable contractor with sound knowledge of environment and HSE; - Regular inspection of storage material by competent person - Substantial training of Workers before commencement of work; - Monitor the performance of contractor/ workers.
---	---	---	--	--

		common practice in this part.		
Operational Phase				
1. Air Quality	- No	- During regular occupancy of the buildings, no activity is envisaged to take place which may generate dust of any significance. Under the policy of the management all care will be taken to keep the in construction activities environmentally sound and sustainable.	-	- Ensure by proponent and EPA
2. Water Quality - Wastewater/ Sewerage	- No	- Sewerage after due treatment will be discharged to drain passing nearby site. - Adequate disposal system shall be made available and maintain the sewer lines both on site and off site. - Sewage lines, both on site and off site, shall be laid at reasonable distances away from drinking water supply lines so as to avoid contamination of the water supply by the leakages from the sewer	-	- Ensure by proponent and EPA
3. Waste - Solid Waste/ Garbage	- Open dumping leads to epidemic diseases	- Implementation of waste management program consisting of reduce, reuse and re-cycling of materials - Systematic collection and protected storage of waste - All wastes to be generated during	-	- Ensure by proponent and EPA

		regular operations (occupancy) shall be collected daily through locally placed wastes collecting bins. – Of these, wastes like paper, plastics, wood, fused bulbs, fluorescence electric tubes, rags, plastic and metal cans, glass articles and like shall be sold in the market for reuse. Kitchen wastes including vegetables and fruits peels shall be disposed off into the wastes collection bins. Redundant electric gadgets, air coolers, electric fans, redundant furniture, house hold articles, office use equipment etc shall be sold in the markets (KABARIS). – The waste which is useless will be disposed of at appropriate and designated site – Prohibition of dumping of any contaminating material		
--	--	---	--	--

4. Noise & Vibration – Noise and vibration from water pumps etc. – Noise from vehicles used for mobilization of equipment/ raw material/ waste	– No	– In order to avoid noise in the project area, vehicles shall be operated as avoid use of horns – No activity producing extra ordinary levels of noise will be allowed in the society as a policy matter. – Adequate basis of equipment to reduce the vibration – Adequate enclosure of equipment to reduce noise.	–	– Ensure by proponent and EPA
5. Emergency Response	– In case of fire pollute environment. – Property loss.	– The design of buildings should include emergency exits and open space for gathering which can be used during emergency situation.	–	– Ensure by proponent and EPA

Table 7.3: Environmental Management Plan for Asphalt Plant

Sr #	Project Component & Impact	Targets to Achieve	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
Construction Phase					
1.	Air Quality – Dust resulting from construction – Use of heavy machinery can generate exhaust and dust emissions – Dispersion of particles from stockpiles during high velocity wind – Smoke from burning of waste materials or burning of firewood in the labor camp	– Compliance with prescribed PEQS to control air pollution	– Necessary measures like sprinkling of water on regular basis especially during dry climatic conditions should be taken to limit pollution from dust and other windblown materials. – Covering or use of wind sheets around the stockpiles to avoid air pollution through dispersion – Periodic maintenance and management of all the machinery and vehicles – Cutting and burning trees / shrubs for fuel will be prohibited. Instead gas cylinders should be used in the labor camp for cooking purposes. Similarly waste burning will not be allowed.	Construction Contractor with coordination of Proponent	Proponent/ EPA
2.	Water Quality – Run-off water from construction area – Drainage of wastewater on ground can contaminate the soil and groundwater. – Inappropriate disposal of waste. – Open sewerage water disposal on land can contaminate ground water and cause generation of mosquitoes and various other insects in the area. – Leakage of oil and chemical materials from construction	– Control of groundwater or surface water pollution from construction activities	– Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater – Maximize the use of treated waste water on site (e.g. sprinkling purpose to control dust) – Proper disposal of waste material on dumping sites to avoid leachate generation and contamination of groundwater – Prohibit illegal dumping of waste – The contractor will repair / replace / compensate for any damages caused by the Construction activities to the drinking water source/s. – Regular water quality monitoring according to determined sampling schedule; – The contractor shall ensure that construction debris do not find their way into the drainage system which can block	Construction Contractor with coordination of Proponent	Proponent/ EPA

Sr #	Project Component & Impact	Targets to Achieve	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	activity		them; – Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/ retention pond.		
3.	Waste – Waste from construction activities – Domestic waste from workers	– Proper & safe handling and disposal of construction related waste – Compliance with applicable waste management rules for hazardous and non-hazardous waste disposal – Implementation of waste management plan	– Ensure prevention of inappropriate disposal of waste material – Conduct separate collection of construction and domestic waste to promote recycling and re-use – Ensure maximized use of construction debris on-site to fill excavations etc. – Dispose non-recyclable and hazardous waste material properly according to waste management rules – Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the river or other water bodies – Contractor will prepare waste management plan related to construction activities; get its approval from proponent and ensure its full implementation	Construction Contractor with coordination of Proponent	Proponent/ EPA
4.	Noise – Noise caused by construction machinery and vehicles used for mobilization of equipment and workers	– Compliance with prescribed PEQS to control Noise pollution	– The contractor will strictly follow the PEQS for ambient noise – Control noise through control of working hours and selection of less noisy equipment. – Prohibit use of pressure horns – Provision of acoustic enclosures (hoods and shrouds) on generator – Proper maintenance of vehicles and construction equipment. – Minimize unnecessary use of pneumatic drills and other	Construction Contractor with coordination of Proponent	Proponent/ EPA

Sr #	Project Component & Impact	Targets to Achieve	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			noisy machinery – The personal protective equipment (PPE) will be provided to the workers and its usage will be made mandatory		
5.	Biological Resources – Removal of vegetation covers by cutting of trees, crops, herbs and shrubs – Fauna including birds and animals will be affected during excavation, movement of labor and carriage of goods and machinery	– Obligation to respect wildlife, Forest and Fisheries Laws. – Conserve biodiversity and its terrestrial as well as aquatic habitat	– Proposed project site does not involve cutting of any trees – Plantation of maximum number of trees. – Staff and workers should be instructed not to damage nearby vegetation of the surrounding area. – Open fires should be prohibited in the area to avoid the hazard of fire and impact on nearby flora and fauna. – Proper disposal of organic waste (if any) generated to avoid rodents and other insects' generation.	Construction Contractor with coordination of proponent	Proponent/ EPA
7.	Staff Conduct	– Timely completion of project activities	– The Contractor must monitor the performance of workers to ensure that point relayed during their induction have been properly understood and being followed	Construction Contractor	Proponent/ EPA
8.	Leakages/ spills/ Paints/ Used oil	– Compliance with standards set forth by “Guidelines for Oil Spill Waste Minimization and Management” issued by International Petroleum Industry Environmental Conservation	– Contractor will apply strict rules on his workers and labor to ensure that no spill or leakages are caused – Chemical waste will be disposed of in approved disposal site. – PPE will be enforced to use during the handling and application of chemicals – The contractor will employ the general criteria for oil and leakage at construction sites, as per standards	Construction Contractor	Proponent/ EPA

Sr #	Project Component & Impact	Targets to Achieve	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
9.	Workers Health & Safety	Associate – Prevention of any possibility of work site accident /impact on worker's health	– Provision of Personal Protective Equipment to the workers – Provision of first aid box at work site to cope with emergency situation – Safety training to the workers – Safe driving training to the drivers – Adequate safety signs on site – Install fire extinguishers at fire handling places – Any loss of public/ private property will be compensated by the contractor – Regular checks should be carried out to ensure a contractor is following safe working procedures and practices.	Construction Contractor	Proponent/ EPA
10.	Socio-economic Impacts	– Prevention of conflicts among locals and make the project socially acceptable – Empowerment of locals to possible extent – Increase in employment and business opportunities for locals	– Contractor's activities and movement of staff to be restricted to designated and within industry – The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous all the time – The site must be kept clean to minimize the visual impact of site – Noisy activities must be restricted to the times given in the Project Specification or General Conditions of contract – The Contractor are responsible for ongoing communication with those people that are interested in / affected by the projects – Employ local residents as much as possible	Construction Contractor with coordination of proponent	Proponent/ EPA
11.	Clearance of site from extra / surplus material	– Restoration of site to a similar	– Timely removal of waste from the site to avoid congestion at work place.	Construction Contractor	Proponent/ EPA

Sr #	Project Component & Impact	Targets to Achieve	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
		condition prior to the commencement of the work or to a condition agreed with the project management and landscaping of the site	– Care will be taken during handling and disposal of waste. . – Avoid mixing of hazardous waste with non-hazardous waste. – Safe transportation of construction equipment from the site. – Empty/available space will be covered with grassy lawns & ornamental plant species like roses, jasmine, and seasonal flowers		
Operational Phase					
1.	Air Quality Deterioration	– Compliance with Ambient air quality (PEQS) standards for control of ambient air pollution	– During regular operation of project, no activity is envisaged to take place which may generate dust of any significance. Under the policy of the management all care will be taken to keep the in operational activities environmentally sound and sustainable.	Project Manager	Project Proponent/ EPA
2.	Water Quality – Wastewater/ Sewerage	– Compliance with Wastewater standards	– Sewerage after due treatment will be discharged to drain passing nearby site. – Adequate disposal system shall be made available and maintain the sewer lines both on site and off site. – Sewage lines, both on site and off site, shall be laid at reasonable distances away from drinking water supply lines so as to avoid contamination of the water supply by the leakages from the sewer.	Project Manager	Project Proponent/ EPA

Sr #	Project Component & Impact	Targets to Achieve	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
3.	Waste – Municipal Solid Waste	– Compliance with waste management rules – Prevention of inappropriate waste disposal	– Implementation of waste management program consisting of reduce, reuse and re-cycling of materials – Systematic collection and protected storage of waste – Wastes like paper, plastics, wood, fused bulbs, fluorescence electric tubes, rags, plastic and metal cans, glass articles shall be sold in the market for reuse. – Prohibition of dumping of any contaminating material	Project Manager	Project Proponent/ EPA Punjab
4.	Noise & Vibration – Noise and vibration from generators & water pump	– Compliance with prescribed PEQS to control Noise pollution	– No activity producing extra ordinary levels of noise will be allowed – Adequate basis & enclosure of generator & water pumps to reduce the vibration & noise – Standby generator shall be curtailed within the limiting values of the Punjab Environmental Quality Standards.	Project Manager	Project Proponent/ EPA Punjab
5.	Environment quality enhancement measures: – Flowers and plants and trees – Aesthetic beauty of the buildings and the area	– Enhanced land value and scenic beauty of the area	– Plantations in and around the proposed facility must be carried out. – Fountains or other such aesthetic measures must also be taken into consideration in order to increase the beauty of area. – All other necessary measures shall also be taken to maintain standards of cleanliness so that the buildings may add to the scenic/aesthetic beauty of the area around.	Project Manager in close liaison with project proponent	Project Proponent/ EPA Punjab

Table 7.4: Environmental Monitoring Plan for Asphalt Plant

Parameter/Receptor	Location	Monitoring Parameter	Monitoring and Reporting Frequency
Physical Environment			
Water Quality	- Ground Water - Surface Water	Discrete grab sampling and laboratory testing of water samples.	- Sampling and laboratory testing should be done quarterly during construction stage and on annual basis during the operational stage. - Discharges from the facility should be tested for temperature, pH and turbidity.
Air Quality (Dust emissions, vent emissions)	- Tracks along road - Indoor air quality - Inside workplace/ Fuel Storage Area	Ambient Particulate Matter, flue gas emissions, fumes Monitoring. Physical Inspection for petrol leakages or drippings.	Ambient Air Monitoring should be conducted quarterly during construction stage and on annual basis during the operational stage.
Noise Levels	Selected locations along the access	Noise in dB(A)	Quarterly during the construction & annually during operational phase.
Pest Control	Petrol Filling facility	Spray of pesticides and fumigation to avoid spread of vectors.	Once in a year when needed during constructional phase of the project.
Ecological Environment			
Cutting of trees Tree plantation	In all Project Area during the execution of proposed project.	Landscaping.	Monthly during construction phase monitoring and annually during the operational phase.
Socio-cultural Environment			
Inconvenience to community/ Public Health	All around the Project Area	Consultations with community to get feedback about inconvenience due to the constructional activities to perform their daily routine chores.	Quarterly monitoring and reporting during the constructional period.

CHAPTER-8

RECOMMENDATIONS & CONCLUSIONS

8.1 RECOMMENDATIONS

The Environmental Impact Assessment (EIA) Report and survey results are finally evaluated to recommend the following:

- ◆ The present Environmental Impact Assessment (EIA) Report of Construction and development of **Asphalt Plant** meets the administrative and legal framework of the EPA Punjab.
- ◆ Care shall be given on the health and safety of workers during construction & operational phases of the project.
- ◆ The Proponent should assign trained staff for execution of proposed project activities.
- ◆ The Proponent should plant vigorously indigenous plants and trees in and around the project site.
- ◆ Consider Fire safety precautions to prevent or reduce the likelihood of a fire to break out.
- ◆ There should be adherence to safe working procedures to ensure health safety of workers.
- ◆ Mosquito repellent sprays/ fumigation should be carried out to keep facility disinfected and pest free and spread of disease vectors in control.

8.2 CONCLUSION

The EIA Report of **Asphalt Plant** located at D. Blouch Camp, Kahuta Bypass, Near Nathoot, District Rawalpindi – Pakistan is made to fulfill the legal requirement of Punjab Environmental Protection Act, 1997 [Amendment, 2012]. In order to address the potentially adverse impacts of the project, an EMP has been developed, which will further improve the environmental performance of the project. The EMP assigns roles and responsibilities, provide environmental guidelines and discuss the scope of Environmental Management Plan. The EIA Report has thoroughly assessed all the potential environmental impacts associated with the project. The environmental impacts identified by the study are manageable. Project specific and practically suitable mitigation measures are recommended to mitigate the impacts. This EIA concludes that proposed project will not pose any major adverse environmental impacts on environment if the anticipated impacts are properly mitigated and the Environmental management Plan is properly implemented. It is environment friendly project as it fosters the economic, social and aesthetic values of country without any environment degradation. The project solves various environmental and social problems already raised by the poor health care system in the Pakistan.

Therefore, the project under consideration does not require any further environmental study; hence the EIA Report has been completed for the said project so the project is recommended for the Environmental Approval and issuance of NOC from the EPA, Punjab.

LIST OF REFERENCES

The following documents, reports were consulted during the preparation of this report.

- » Data & information provided by the representatives of **M/S SMADB-SHAHRUKH (JV)**.
- » Project location/ layout maps etc.
- » Guidelines for the preparation and review of Environmental Reports, Pakistan Environmental Protection Agency, Government of Pakistan, October, 1997/2000.
- » Sectoral Guidelines for Environmental Reports-Major Chemical and Manufacturing Plants, Pakistan Environment Protection Agency, October 1997.
- » Pakistan Environment Protection Agency (Review of IEE and EIA) Regulations, 2000.
- » Hazardous Substances Rules, 2003, Pakistan Environment Protection Agency.
- » Handbook of Environmental Impact Assessment Vol. 1 & 2, Edited by Judith Petts, Blackwell Publishing, 1st Indian Edition, 2005.
- » Introduction to Environmental Impact Assessment; 3rd Edition; by John Glasson, Riki Therivel and Andrew Chadwick; 3rd Edition, 2005; by Routledge, Abingdon Oxon.
- » Introduction to Environmental Impact Assessment; J. Glasson, R. Therivel and A. Chadwick, UCL Press Limited, University College, London.
- » Environmental Guidelines for Selected Industrial Projects, Office of the Environment, Asian Development Bank, 1993.
- » Guidelines for Self- Monitoring and Reporting by the Industry,” Final Report, March 1998, approved by Pakistan Environmental Protection Council (PEPC), August 1999.
- » Pollution Prevention and Abatement Handbook, The World Bank, 1998.
- » Shreve’s Chemical Process Industries, McGraw-hill Book Company, N.York; 5th Edition, 1985.
- » Faith, Keyes and Clark’s, Industrial Chemicals, A Wiley Interscience Publication, N. York, 4th Edition, 1975.
- » Perry’s Chemical Engineer’s Handbook, McGraw-hill Book Company, N.York, 6th Edition, 1984.

- » Punjab Environment Quality Standards for Municipal and Liquid Industrial Effluents, Statutory Notification (S.R.O.), Government of Pakistan, Ministry of Environment, Local Government and Rural Development, S.R.O.549 (1)/2000, Islamabad, the 8th August 2000.
- » Punjab Environmental Quality Standards (PEQS) for Air, Water, Noise, Municipal and Liquid Industrial Effluents, 2016.
- » Punjab Environmental Quality Standards for Treatment of Liquid and disposal of Bio-medical Waste by Incineration, Autoclaving, Microwaving and Deep Burial, Government of Punjab Law and Parliamentary Affairs Department, Notification 119 of 2016.
- » Punjab Environmental Protection Act, 1997 [Amendment, 2012].
- » The Pakistan National Conservation Strategy, Environment and Urban Affairs' Division (presently- Ministry of Environment, Urban Affairs and Wild Life), Government of Pakistan, Islamabad.
- » Standard Methods for the Examination of Water and Wastewater, 19th Edition, 1995, Prepared and published jointly by: American Public Health Association, American Water Works Association, Water Environment Federation; Publication office: American Public Health Association, 1015 Fifteenth Street, NW Washington, DC 2005.
- » Standard Handbook of Environmental Engineering, By Robert A. Corbitt, 1989, McGraw-Hill, Inc.; New York, Usa.
- » Pakistan: Geography, Economy & People by Oxford Press Singapore.
- » Career's Geography of Pakistan, Published by Career's Books Publishers, Lahore; 2003.
- » Discussion Sessions with the Management and Technical Staff of **Asphalt Plant**.
- » Seismic Hazard Zones of Pakistan, by M. Anwaruddin Ahmad, Asma Ullah and Russell Nazimullah, Geological Survey of Pakistan (2006).
- » World Bank, Cement Industry, Occupational Safety and Health Guidelines (Sept. 1983).
- » International Finance Commission (IFC) Environmental, Health and Safety Guidelines, Environmental and Social Guidelines for Occupational Health & Safety (June 2003).
- » Survey of Pakistan Topo Sheet Number 43 D/14.

- » Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2000.
- » The Regulation of Mines and Oil-Fields and Mineral Development (Government Control) Act, 1946.
- » Environmental Assessment Requirements and Environmental Review Procedures of the Asian Development Bank, 1993.
- » Environmental Impact Assessment – Basic Procedure for Developing Countries, United Nations Environmental Program, 1998.
- » The World Bank Operational Directive 4.00 Annexure A, Environmental Assessment, 1999.
- » The World Bank Operation Policy 4.01 Annexure B, “Content of an Environmental Assessment Report for Category A Projects”, 1999.
- » Environmental Laws of Pakistan by Jawad Hassan, Advocate High Court, First Edition 2006, Published by Book Biz, Lahore, Pakistan.
- » Pakistan’s Environmental Laws And Their Compliance by Dr. Shoaib Qadar, Attorney-at-Law (Ohio, USA), Advocate (Punjab, Pakistan), Juris Doctor (U. of Cincinnati, USA) and Athar Rafique Dogar, Advocate (Punjab, Pakistan), M.A, LL.B. (Intl. Islamic U., Islamabad, Pakistan) Foreword by Mr. Asif Shuja Khan, Director General, Pakistan Environmental Protection Agency, Islamabad. Published by Lahore Law Times Publications.
- » Manual of Environmental Laws in Pakistan with Guidelines for Development of Green belts and International Convention & Protocols by Badar-Ul-Ameer Advocate, Published by Khyber Law Publishers, Edition 2004.

ANNEXURE-I
Land Lease Documents

ANNEXURE-II

Layout Plan

ANNEXURE-III
Site Location Map

ANNEXURE-IV

Other Documents

ANNEXURE-V

List of Team Members Performing EIA Study

ANNEXURE-VI
Air Quality Monitoring

ANNEXURE-VII
Background Noise Monitoring

ANNEXURE-VIII
Water Quality Monitoring

ANNEXURE-IX

Filled Performas of Stakeholder Consultations

PHOTOLOG