ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

ORICA AGROCHEMICALS

[A PLANT FOR FORMULATION OF AGROCHEMICALS]
CHOWK AZAM ROAD NEAR KHAN COTTON FACTORY
TEHSIL AND DISTRICT LAYYAH



Mahar Fahad Masood Sumra
Orica Agrochemicals
Chowk Azam Road near Khan Cotton Factory
Tehsil and District Layyah

Final Report
(Ferbuary 2022)

Prepared by

GREEN REVOLUTION
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INITIAL ENVIRONMENTAL EXAMINATION REPORT (EIAR)

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ACKNOWLEDGEMENT & DISCLAIMER

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Acknowledgement

The Team of Experts, who carried out this Environmental Impact Assessment (IEE), are thankful to the proponent, sponsors, planners, designers and contractors of the unit, who helped directly and indirectly in conducting this IEE in the best professional manner. The study relates to comprehensive examination of the likely or the foreseeable environmental and social impacts of construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah". The plant will be setup as an environment friendly facility, where all activities, processes and operations will be carried out in perfect conformity with environment. The products to be formulated at the plant will be made available to various end-users through a network of the accredited dealers/retailers. The Team of Experts presents its special gratitude for the proponent, **Mahar Fahad Masood Sumra**, Proponent, Orica Agrochemicals, Layyah. The Team of Expert Professionals is thankful to all persons, staff members of the proponent and others for the invaluable contributions and support they provided during visits of the site by the Team of Experts, which helped in accomplishing the IEE in the way it should have been.

Disclaimer

The instant Environmental Impact Assessment report (EIAR) presents an examination and assessment of the most likely environmental and social impacts of the project named, construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah". The plant will be setup as an environment friendly facility, where all activities, processes and operations will be carried out in perfect conformity with environment. The formulated products will be made available to various end-users through the network of accredited dealers/retailers. The report presents an examination and evaluation of all and various actual and the potential environmental impacts of the plant with reference to the likely disturbances, if any, to the prevailing baseline environmental and social profile of the area/site. The report is project specific and of limited applicability and liability to the extent of the activities and the operations relating to the project during its setup and the subsequent operation phases only. The report has been prepared in compliance to the applicable provisions of the Punjab Environmental Protection Act 1997 and other relevant bylaws, rules, regulations and guidelines concerning the subject with a view to seek environmental approval (EA) of the project from the Environmental Protection Agency, Punjab.

All rights of the report are reserved with the proponent and the environmental consultant. No part of this report can be reproduced, copied, published or transcribed in any manner or cited in a context different from the purpose for which it has been prepared, except with prior permission of the proponent and the authoring consultant.

Team of Experts

The Team of Experts, who accomplished the instant IEE, included the following members:

- Prof. Dr. Muhammad Nawaz Ch., Professor Emeritus (Environment), Punjab University, Lahore
- Prof. Dr. Naseer Ahmed (Environmental Geologist & EIA Specialist), former Head of Geology Deptt., Punjab University, Lahore
- Prof. Dr. Iftikhar Hussain Baloch (Environmental Geologist & EIA Specialist), former Principal, College of Earth & Environmental Sciences, Punjab University, Lahore
- Dr. K B Mughal (Environmental Management Specialist), former Visiting Faculty, CEES, Punjab University, Lhr
- Dr. Habib ul Haq (Environmental Design & Structure Specialist)
- Engr. Mukhtar A Khan (Civil Engineer & Design Specialist)
- Engr. Jamshed Yaqub (Chemical Engineer)
- Mr. Shahid Ali (Environmental Ecologist)
- Mr. Muhammad Azeem (Environmental & Resettlement Specialist)
- Mr. Khurram Jameel (Environmental Geologist)
- Mr. Kashif Ikram (Environmental Lawyer and Jurist)
- Ms. Saira Irum (Environmental Sociologist)
- Ms. Uzma Riaz Bhatti (Office Support)

ABBREVIATIONS

ABBREVIATIONS

Acronym	Full Text
BHU	Basic Health Unit
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantities
C&W	Communication & Works Department
COD	Chemical Oxygen Demand
Db	Decibel
DHQH	District Headquarters Hospital
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environment Protection Department
ERS	Emergency Response System
ESH	Environmental Safety and Health
ESHU	Environmental Safety and Health Unit
ESRMP	Environmental, Social & Risk Management Plan
GDP	Gross Domestic Product
GoPk	Government of Pakistan
HMP	Hazard Management Plan
HR	Human Resource
IEE	Initial Environmental Examination
IEER	Initial Environmental Examination Report
IWT	Indus Water Treaty
JICA	Japan International Cooperation Agency
PEQS	Punjab Environmental Quality Standards
NOC	No Objection Certificate
Pak EPA	Pakistan Environmental Protection Agency
PEPA	Punjab Environmental Protection Act
PM	Particulate Matter
PSDP	Public Sector Development Programme
RHC	Rural Health Centre
SECP	Securities and Exchange Commission of Pakistan
SPM	Suspended Particulate Matter
SW	Solid Waste(s)
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UBC	Uniform Building Code
WHO	World Health Organization

EPA'S GUIDELINE PROFORMA CHECKLIST

EPA'S GUIDELINE PROFORMA & CHECKLIST FOR IEE/EIA REPORTS

GUIDELINES FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS CHECKLIST

FILE TRACKING NO. : _____

CHECKLIST (IEE/EIA)

PAK EPA GUIDELINES FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS, 1997

Required Content	IEE/EIA Report		
	Page No.	Remarks (If Any)	Lacking
Executive summary:			
1. Title and location of project			
2. Name of the proponent			
3. Name of the organization preparing the report			
4. A brief outline of the proposal (type, process, technology and land requirement)			
5. The major impacts			
6. Recommendations for mitigation measures			
7. Proposed monitoring			
Screening: Whether the project requires IEE or EIA, as per Regulations			
Introduction:			
1. Purpose of report			
2. Identification of the project and proponent			
3. Details of consultant			
4. Brief description of nature, size and location of the project			
Description of the project:			
1. Type and category of project			
2. Objectives of project			
3. Alternatives considered realistically (in detailed) and reason for their rejection			
4. Location and site layout of the project (may be annexed at the end of report)			
5. Land use of the site			
6. Road access			
7. Vegetation features of the site			
8. Cost and magnitude of operation			
9. Schedule of implementation			
10. Description of the project (Process flow chart/steps, technology, raw materials, products and by-products)			
11. Restoration and rehabilitation plans			
Description of Environment: Clear-cut picture of existing environmental resources:			
1. Baseline physical environment			
2. Baseline ecological environment			
3. Baseline socioeconomic environment			
4. Lab reports of environmental analyses (alongwith soil tests, geo-investigations in case of building projects and industries)			
5. Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)			
Screening of potential Environmental impacts and mitigation			

measures on/during:			
1. Project location			
2. Design			
3. Construction phase			
4. Operation phase			
5. Potential environmental encashment measures			
Environmental management and monitoring program:			
• Description of proposed mitigation actions			
• Schedule for implementation and environmental budget			
• Environmental management team alongwith their roles and responsibilities (by name or position)			
• Proposed monitoring programme to assess performance or output of EMP			
• Proposed EMP reporting and reviewing procedure			
• Any training needs required to ensure implementation of EMP and monitoring plans			
Stakeholders' consultation: Communicate the possible impacts and concerns to the following to assist further analysis and decision making			
• Proponent's environmental management team			
• The responsible authority			
• Other departments and agencies			
• Environmental practitioners and experts			
• Affected and wider community			
Appendices:			
1. Glossary			
2. List of abbreviations			
3. Lists of individuals and organizations consulted alongwith their written feedback			
4. Sources of data and a full list of all reference material used			
5. Terms of references of environmental reports and those given to individual specialists			
6. Approvals from other concerned departments			

Commencing Environmental Examination and Assessment

The Punjab Environmental Protection Act 1997 prescribes two broader categories of evaluation of the environmental impacts of a project. These are:

- Environmental Impact Assessment, abbreviated as IEE, and
- Environmental Impact Assessment, abbreviated as EIA

Both categories of environmental appraisals have been defined in the following words in the Punjab Environmental Protection Act:

"**Environmental Impact Assessment**" 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 adverse environmental effect for requiring preparation of an environmental impact assessment.

"**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.

The first step towards evaluation and appraisal of the likely, potential or the expected environmental impacts of an activity or a project is to determine and find out as to what type of environmental appraisal the project will be subject to. That is to say whether the project warrants and an Environmental Impact Assessment (IEE) or a comprehensive and in-depth environmental impact assessment (EIA) or none. In this regard, the Regulations named, "Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations 2000" provide a guideline as to whether the project would require IEE or EIA. Schedule-I of the said Regulations contains a list of the projects requiring IEE. Similarly, Schedule-II contains a list of the project requiring EIA. There are number of projects that will not require either an IEE or an EIA at all. The provisions with regard to such like projects are contained in Regulation 5 of the IEE/EIA Regulations 2000. According to the said provision, the Environmental Protection Agency Punjab (EPA-Pb), on the written recommendations of the Environmental Assessment Advisory Committee, may ask for environmental appraisal (IEE/EIA) required for a particular project. However, this determination will be based on a scientific, objective and rational criterion and not on whims, wishes and discretion of the officers of the EPA-Pb.

The instant proposition is the setting-up of a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. The plant will be setup only after its environmental approval from the EPA-Pb. It may be appreciated that setting-up of such a plant is mentioned neither in Schedule-I nor in Schedule-II of the IEE/EIA Regulations. Therefore, such a facility will not require any IEE or EIA. However, being an environment-respecting citizen, the proponent considers it expedient to submit the project to an EIA. Hence, the instant EIAR. It is noteworthy that a plant for formulation of medicinal preparations generally is devoid of any adverse impacts on the environment.

Format of the Report

Generally, the format of an IEE/EIA is either project-specific or area-specific or a combination of both. The instant proposition is the setting-up of a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. Keeping in view the nature, scope and extent of the activities concerning setting-up of the plant, the instant EIA has been prepared according to the combination format. The baseline environmental conditions, which provide the comparative basis to ascertain the extent of the likely environmental impacts of an activity or a project, have been described according to this format approach. The section on the baseline environmental profile contains a detailed description of the baseline characteristics of the area and the district of the project, wherever relevant.

Apart from other pertinent aspects, the EIAR provides an insight into the likely environmental and social impacts of setting-up of the plant by adjudging them against the standard environmental and social impact assessment guidelines, rules and regulations of the Government of the Punjab as well as other international organizations (like the World Bank, WHO etc.). Format of the report, to the extent possible, is in consonance with the prevailing international best practices in the field of environmental examination and assessment.

The study has relied primarily on the data and information already available with the proponent and other agencies and department of Government of the Punjab. However, wherever so required, additional data and

information has been gathered through various reliable sources, which included visits of the site by the Team of Experts for evaluating the impacts with relation to geographical and social contexts of the proposed project.

The format and mode of environmental impact examination/assessment has been kept, as far as practicable, in conformity to the national and international practices in the field of IEE/EIA. The study therefore contains examination of the essential baseline conditions, likely or foreseeable disturbances or impacts to those conditions, and the mitigation measures/recommendations in respect of the environmental impacts of the proposed project both during setup and during subsequent operation of the plant. This, of course, included evaluation of the potential and the actual positive or negative impacts on the physical (tangible) & abstract (non-tangible) environments. The study covers all aspects of the proposed project including civil-, mechanical-, electrical-works and the spectrum of activities concerning production operations. Reliance has been placed on the following sources in preparing the instant IEE Report:

1. Environmental Guidelines for Selected Infrastructure Projects, Office of the Environment, Asian Development Bank, 1993
2. Environmental Impact Assessment Guidelines, Government of Pakistan, Ministry of Housing & Works (Environment & Urban Affairs Division 1986
3. Guidance for Implementing the Environmental Impact Assessment (EIA) Process, Central Environmental Authority, Ministry of Forestry & Environment, Government of Sri Lanka
4. Introduction to Environmental Impact Assessment, Principles & Procedures, Process, Practice and Prospects, John Glasson

In accordance with the above-referred sources, the instant EIAR comprises the following sections/subsections:

- ✓ EPA's Guideline Proforma
- ✓ Acknowledgment & Disclaimer
- ✓ Abbreviations and Acronyms used in the EIAR
- ✓ Executive Summary
- ✓ Introduction to the Project
- ✓ Brief Description of the Project and its Salient Features
- ✓ Baseline Environmental Profile of the Site/Area/District
- ✓ Radius of Influence of the Site/Activities
- ✓ Examination of the likely Disturbances to the Baseline Profile
- ✓ Description & Characterization of the likely Environmental Impacts of the Project
- ✓ Measures to Avoid, Control and Mitigate the Foreseeable Environmental Impacts of the Project
- ✓ Environmental and Social Environmental Management and Risk Avoidance Strategy and Plan
- ✓ Consultations with the Important Stakeholders alongwith Outcome
- ✓ Considerations of the various Alternative Options of the Project
- ✓ Strategy, Methodology and Modalities of carrying out the IEE
- ✓ A Brief Outline of the Environmental Legal Framework and its relevance to the Project
- ✓ References, Sources and Bibliography

On account of its format based on the above given scheme of things, the instant EIAR is fully comprehensive and contains all essential details to help the EPA-Pb to review it critically for the grant of environmental approval of the project as envisaged under the PEP Act 1997.

Executive Summary:

1.	Title and location of the project	Construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah". The plant will be setup on a vacant land owned by the proponent on Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah.
2.	Name of the Proponent	Mahar Fahad Masood Sumra, Proponent, Orica Agrochemicals. Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah.
3.	Name of the organization preparing the report	"Green Revolution" (A leading environmental management consultant). The consultant has prepared the report in accordance with the applicable rules, regulations, guidelines and provisions of other relevant laws in vogue. "Green Revolution" have their Head Office at Lahore and branch offices in the Federal Capital and the Provincial Capitals of Karachi, Peshawar and Quetta.

4.	A brief outline of the proposal	The project essentially is setting-up of a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. In this way, the plant will be a secondary and dependent production unit, as there will not be any primary or original manufacturing of any items or products. On account of the simple physical nature of mixing of various ingredients in the set forth ratios, without any chemical process or generation of any pollutants and or wastage by-product, the plant will be an environment friendly unit. The site selected for setting-up the plant is a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. There will not be any fixed installed production capacity of the plant. The production capacity has been envisaged to upscale with passage of time. The expected production capacity starting from the 1st to the 5th year of production will rise @ 5% per annum. It will likewise continue to increase every year, as the demand may be. The main sections of the plant will be, as enlisted below: 1. Input materials/raw materials receiving and storing section 2. Product mixing, formulation and production section 3. Product inspection and quality control section 4. Product packaging and storage section 5. Quality control laboratory 6. Admn block and site office with allied facilities 7. Green areas and open spaces 8. Other ancillary and support facilities In addition to the above, other facilities at the plant will include the following: 1. In-going and out-going gate(s) with security/ watch and ward system 2. Masjid 3. Cafeteria / canteen 4. Parking areas 5. Power/generator room 6. Warehouse 7. Weigh bridge (optional) 8. Fire Fighting System as per National Fire Protection Association (NFPA-20, 22, 24 & 30) 9. Boundary wall 10. CCTV and security surveillance system 11. Janitorial and sanitation services 12. Water supply system 13. Utilities and amenity services 14. Other operation support facilities Whereas, the ground floor will be used primarily for preparing the dry or powdered products; the first floor will be used mainly for preparing the liquid products. As per the information provided by the proponent, the main objective underlying setting-up of the plant is formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. The primary consideration is to capture market potential of the products to be formulated at the plant. The idea is to cater for market demand and to compete with other producers of the like products. The site selected for setting-up of the plant is situated on Chowk Azam Road near Khan Cotton Factory Layyah. Owing to this disposition, the site will not have any environmental interaction with the exterior. As per the site survey, there is not any large size human settlement within the radius of

		influence of the chosen site. The site/plant will not have any negative interaction with the existing industrial units around. The plant will be a standalone production unit. The plant will be a modern and efficient unit that will employ cleaner production technology. The production processes and the product quality will conform to the applicable standards and specifications of the applicable standards and the applicable legal framework of the concerned regulatory agency, if and wherever applicable. The international best practices of the sector shall be kept in view with regard to quality of the products to be formulated at the plant. Some basic design features of the plant will be as under: ▪ All incoming raw materials will be received at the designated area/enclosure at the premises. ▪ The incoming materials will be checked thoroughly with respect to their quality and characteristics at the designated area for the purpose. ▪ The inspected, checked and quality conformant materials will be labelled and stored separately. ▪ The quality-cleared materials will be transferred to the production hall. ▪ The active ingredients, base ingredients, carrier ingredients and the additives will be thoroughly mixed in the respective machines and formulated into desired product(s), as per the applicable standards (UK, USA, EU or other). ▪ The plant will formulate/produce number of good quality agrochemicals, as per their market demand. ▪ The formulated/finished products will be packed in appropriate packing and stored temporarily in the outbound warehouse for onward dispatch to the market/clients. ▪ The freshwater for various and miscellaneous needs at the plant will be obtained from a groundwater pump. It will be stored firstly in an underground water tank, from where it will be lifted and poured into an overhead reservoir. This arrangement will ensure round the clock and uninterrupted supply of water for all and various needs. The combined water holding capacity of both tanks (underground and overhead) will be around 50 MT. ▪ There will be a separate firewater storage tank of capacity 50 metric tonne (50,000 Litres) to store water for fire protection and control. This dedicated water storage arrangement will make the water always available to fight out accidental outbreaks of fire at the plant, if there be any. ▪ In addition to water-based firefighting system, there will be a parallel and independent network of standalone chemical fire extinguishers. These foam-based fire extinguishers will be available at key-points at the premises. They are good for the small-scale fires. ▪ The proponent has selected the instant site owing to number of advantages i.e., availability of a vacant plot of the desired dimensions; availability of amenities and utilities; location on a main road; easiness of transportation of the raw materials to and the finished products from the site; and safe distance from any nearby settlement. These and various other beneficial advantages have prompted the proponent to select the instant site. The site is bound on its north by the approach road. ▪ As per the field survey, there is no large size human settlement within a radius of 1.5 km from the site. ▪ The proponent will setup the plant in exact accordance with the applicable byelaws and terms and conditions of the EA. The experts of the relevant fields have prepared the basic design features and layout plan of the plant keeping in view the ground requirements and the applicable industrial buildings standards.

		▪ Green Revolution, Lahore is providing consultancy and advisory services with respect to environmental aspects including its IEE. ▪ The basic design and layout are ready and construction of the main building and the support infrastructure will be taken immediately upon environmental approval from the EPA-Pb. The proponent will procure the manufactured raw materials (active ingredients, base ingredients, carrier ingredients, additives and others) either from their primary manufactures or traders/importers. The proponent will only mix these materials, as per the applicable standards formulary. In this way, the product formulation operations at the plant will only be a secondary or dependent production activity down the line. There will not be any primary or original manufacturing of anything at the plant. The plant will employ cleaner production technology and will not produce any environmental pollutants (air emissions, effluents, wastewaters and or solid wastes) of any sort. The primary consideration is to capture market potential of the products to be formulated at the plant. The idea is to cater for market demand and to compete with other producers of the like products. The site selected for setting-up of the plant is situated on Chowk Azam Road Layyah. Owing to this disposition, the site will not have any environmental interaction with the exterior. As per the site survey, there is not any large size human settlement within the radius of influence of the chosen site. The site/plant will not have any negative interaction with the existing industrial units around. The plant will be a standalone production unit. The site selected for setting-up of the plant is located on Chowk Azam Road Layyah. Owing to this geophysical disposition, the site will not have any interaction with the exterior. As per the site survey, there is not any human settlement within the radius of influence of the site. The plant will not have interaction with the existing industrial units around. It will be an independent standalone production unit. A few other objectives, as can be reckoned regarding setting-up of the plant, include the following: ▪ To formulate good quality agrochemicals in order to capture the due market share and cater for demand of the clientele/consumers in the country and abroad. ▪ To bring-in modern and efficient production technology in the country, as the machinery and equipment to be installed at the plant will be smart, intelligent and efficient. ▪ To provide opportunities of employment, jobs and business prospects for the locals and other people. ▪ To help upgrade the socio- economic conditions of the area through heavy investment and the resultant economic turnover, trickling down and vertical down trending of the fruits of investment. ▪ To help correct the market distortions of demand and supply of the commodity and to ensure stabilization of its prices in the country. Owing to usage of the cleaner production technology and installation of modern and efficient machinery, there will not be the generation of any untoward pollutants (air emissions, liquid wastewater and or solid wastes) beyond the prescribed environmental standards (PEQS).
5.	The major impacts	The plant is being setup for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. One of the underlying aims is to capture market share of the product(s) and introduce product diversification. The plant will be setup after assessment of its likely environmental impacts and environmental approval from EPA-Pb. The setting-up of the plant will not have any significant environmental impacts, as it will not produce any

		environmental pollutants or obnoxious by-products. There will not be the generation of any air emissions, effluents, wastewater and or solid wastes. All input materials will be consumed fully in formulating the products, leaving nothing behind. The plant will be located on Chowk Azam Road Layyah. Being a cleaner production plant, it will be devoid of any environmental impacts. Hence, not any specific recommendations are needed with regard to environmental implications of the plant. Nonetheless, the proponent is expected to implement the ordinary and the generally accepted good housekeeping practices. As a part of product diversification and production enhancement programme, the proponent intends to formulate/produce various other alike products in the future. The impacts whereof will be discussed at the time of implementation of the future expansion programme.
6.	Recommendations for mitigation measures	The plant will be an environment friendly facility, where all activities, processes and operations will be carried out in perfect conformity with environment. It will be setup after assessment of its likely environmental impacts and grant of its environmental approval from the EPA-Pb. The setting-up of the plant will not cause any environmental impacts, as it will use the cleaner production technology for production operations. The plant will be setup on a vacant land, measuring 1 acre, situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. Its setting-up and operation will be devoid of any environmental impacts, whatsoever. Hence, not any specific recommendations are warranted with regard to environmental aspects of the plant. Nonetheless, the proponent is expected to implement the ordinary and the generally accepted good housekeeping practices. As a part of product diversification and production enhancement programme, the proponent intends to formulate/produce various other alike products in the future. The impacts whereof will be discussed at the time of implementation of the future expansion programme.
7.	Proposed monitoring	The setting-up of the plant will be devoid of any notable environmental impacts. The product formulation operations at the plant will employ cleaner production technology. Therefore, construction as well as operation of the plant will not be associated with generation of any wastes, effluents or air emissions. Nevertheless, enforcement of the monitoring regime by the proponent, as given in this EIAR and the environmental approval to be granted by the EPA-Pb, is emphasized. The proponent should establish a responsive monitoring mechanism, consisting of an independent ESH Unit for monitoring environmental performance of the plant. A qualified environmentalist will head the ESHU. Additionally, the proponent will enter into a long-term agreement with "Green Revolution" for carrying out regular annual and special environmental audits, inspections, monitoring and management reviews. The consultant will suggest the appropriate measures for addressing the likely environmental concerns, if any. The periodic monitoring reports, as and when generated, will be submitted to the local office of the EPA, as well as EPA-Pb, if indicated.

Screening:

1.	Whether the project requires IEE or EIA, as per Regulations?	A plant for formulation of agrochemicals is mentioned neither under Schedule-I nor under Schedule-II of the IEE/EIA Regulations 2000. Hence, construction or operation of such a plant does not require any environmental approval. Nevertheless, the proponent being an environment caring citizen has volunteered to file the instant EIAR for review and approval of the EPA-Pb. The proponent will not start the construction unless the EPA-Pb has granted its environmental approval in advance, as per the timeframe prescribed under Section 12 of the PEP Act 1997.

Introduction:

1.	Purpose of the report	The primary purpose of the report is to present a critical review and examination of the likely and the foreseeable environmental concerns and issues germane to setting-up of the plant on a vacant land. Another purpose of the report is to present a set of mitigations measures, if any, as are required essentially to counter the likely or the foreseeable environmental impacts of the project.
2.	Identification of project and proponent	**Project**: Construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah". **Proponent**: Mahar Fahad Masood Sumra, Proponent, Orica Agrochemicals, Layyah.
3.	Details of the consultant	"Green Revolution" (A leading environmental management consultant). The consultant has prepared the report in accordance with the applicable rules, regulations, guidelines and provisions of other relevant laws in vogue. "Green Revolution" have their Head Office at Lahore and branch offices in the Federal Capital and the Provincial Capitals of Karachi, Peshawar and Quetta.
4.	Brief description of nature, size, and location of project	**Nature**: A plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The proponent will procure the pre-formulated, primary, base, active and carrier materials (local and imported) from their original manufacturers. The primary input materials (active and base/carrier ingredients) will be mixed in approved ratios, as per the applicable standards, and formulated into desired end products. The plant will employ cleaner production technology and will not produce any air emissions, effluents, wastewater and or solid wastes. **Size**: The plant will be setup on a vacant land measuring 1 acre. **Location**: The plant will be setup on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah (see Google Map). **Description**: As given above.

Description of the project:

1.	Type and category of the project	**Type:** A plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The proponent will procure the pre-formulated, primary, base, active and carrier materials (local and imported) from their original manufacturers. The primary input materials (active and base/carrier ingredients) will be mixed in approved ratios, as per the applicable standards, and formulated into desired end products. The plant will employ cleaner production technology and will not produce any air emissions, effluents, wastewater and or solid wastes. **Category:** A plant for formulation of agrochemicals is mentioned neither under Schedule-I nor under Schedule-II of the IEE/EIA Regulations 2000. Hence, construction or operation of such a plant does not require any environmental approval. Nevertheless, the proponent being an environment caring citizen has volunteered to file the instant EIAR for review and approval of the EPA-Pb. The project will be a non-invasive, non-intrusive and a benign industrial proposition. The plant will be setup only after its environmental approval from the EPA-Pb. The plant will employ cleaner production technology with respect to its production operations. It will be fitted with smart and

		efficient machinery and equipment. Being a modern and efficient plant, It will not produce any untoward pollutants, as might affect or interact with the sensitive environmental parameters.
2.	Objectives of Project	The primary objective underlying setting-up of the plant is formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The product innovation and quality assurance to cater for market demand of the product(s), alongwith reduced reliance on import of such like can be counted another collateral benefit. The product(s) to be formulated at the plant will be consumed by various end-users, particularly the aged, ailing and nutrition deficient persons across the country. The plant will be an efficient and based on smart technology. Currently, the site is lying as a vacant land. The land area is sufficient in terms of the space requirements for the purpose. It needs no reiteration that the plant will be setup in accordance with the applicable bylaws of the GoPb and other agencies. As is evident from above discussion, the objective underlying setting-up of the plant is to ensure availability of the formulated products for the end-users easily and cost effectively. Another objective is to capture market share of the commodity's business. The socioeconomic benefits coming in the wake of setting-up of the plant will help in uplifting of the socioeconomic conditions and lifestyle of the neighbourhood populace. This can be counted as another advantageous benefit of setting-up of the plant. Similarly, impetus to commercial activities and creation of new job opportunities for the locals, which will come in the wake of setting-up of the plant, will be another inseparable benefit of the Plant. The setting-up of the plant will ensure timely availability of the products, to be formulated here, even for the far off and distant areas of the country and thereby bringing-in financial benefits for the people of those areas from dependent trading of the products. Thus, apart from the primary objectives, there will be host of secondary benefits coming in the trail of setting-up of the plant, which will be beneficial for the country from various perspectives. The setting-up of the plant is in line with the "Industrial Policy" of Government regarding promotion of small and medium size industry in the country. The concerned authority has already approved the layout map and granted permission for setting-up of the plant, subject to NOCs from relevant line departments. Viewing from this backdrop, the primary objective of setting-up of the plant, apart from abating environmental pollution, is to ensure optimal availability of the formulated products in the country smoothly and easily. Additionally, the following can be reckoned as a few other objectives coming in the wake of setting-up of the plant: ▪ To keep adequate stocks of the products to ensure their timely availability to various end-users as per their demand ▪ To improve the overall health and nutrition status index of the country from availability the products to be manufactured here ▪ To reduce environmental pollution and degradation by employing cleaner production technology ▪ To uplift and improve socioeconomic conditions of the area and the neighbourhood ▪ To raise new job opportunities that will automatically come in the wake of setting-up of the plant ▪ To add to the landscape beauty and environmental aesthetics by constructing an environment conformant building and other structures ▪ To add to local greenery by planting trees and developing green areas at the premises and around ▪ To add to the national GDP

3.	Alternatives considered realistically (in detailed) and reason for their rejection	Consideration of the alternatives is not warranted, as the instant proposition is only the setting-up a plant for at a selected site for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be setup after its requisite environmental approval from the EPA-Pb. The plant will be located on a vacant land, measuring 1 acre, situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. Any alternative of site, location, size or any other parameter will not be more advantageous compared to the instant proposition.
4.	Location and site layout of the project (may be annexed at the end of report)	**Location**: The plant will be setup on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah (see Google Map). **Site Layout:** The layout map is attached as **Annex-1** of the instant EIAR
5.	Land use of the site	The land use of the site is 100% industrial and industry supportive, as it is situated on Chowk Azam Road Layyah amidst various existing industrial units.
6.	Road access	The site is situated on Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah (see the Google Earth Map).
7.	Vegetation features of the site	The site is devoid of any vegetative features, as it is a vacant land. The proponent plans to develop the site by removing all sorts of bushy vegetation and unwanted shrubs in order to provide a clear, clean and levelled land for setting-up the plant.
8.	Cost and magnitude of operation	The construction cost of the plant will be around Rs. 10 million or less. The annual business turnover is expected to be of the same tune of around Rs. 10 million or less.
9.	Schedule of implementation	The project will be implemented as a one-go activity within the shortest possible span upon completion of all essential prerequisites and other required formalities.
10	Description of the project (Process flow chart/steps)	The description of the project has been already given above in detail. The process flow charts and diagrams are given in the main text of the EIAR and as annexes appended to the EIAR.
11	Restoration and rehabilitation plans	The proposition essentially is setting-up a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be setup on a vacant land on Chowk Azam Road, Layyah. As the plant will be setup on a virgin land in predominantly industrial settings in accordance with the applicable building bylaws, not any restoration or rehabilitation plans are relevant or warranted. The setting-up of the plant will not involve demolition of any built-up structures, damage to any public infrastructure or displacement, dislocation or relocation of any persons or communities. Therefore, not any restoration/rehabilitation plans are relevant.

Description of Environment: (clear-cut picture of existing environmental resources)

1.	Baseline physical environment	The description of the environmental resources and the socioeconomic profile of the area has been given at length in Section on "Baseline Environmental Profile". In nutshell, all the physical, ecological and socioeconomic resources of the area are paltry and insignificant. The site is an earmarked for the purpose by the local land revenue administration.
2.	Baseline ecological environment	-as above-
3.	Baseline socioeconomic environment	-as above-
4.	Lab reports of environmental analyses	A proposal subject to IEE does not require any extensive lab investigations. Moreover, the plant will be located on Chowk Azam Road, Layyah in industrial settings. The plant will be setup after its requisite environmental approval from the EPA-Pb, although no such approval is required under the law. The instant proposition is setting-up a plant for

		formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. Therefore, lab reports are neither relevant nor required.
5.	Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)	The site, being a vacant land, amidst some existing industrial units, is suitable for setting-up of the plant here. The instant proposition is setting-up a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be setup only after its environmental approval from the EPA-Pb, although none is required under the law.

Screening of potential environmental impacts and mitigation measures on/during:

1.	Project location	There is no likelihood of any adverse environmental impacts of siting of the plant at the selected site. The proposition is only the setting-up a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be located on Chowk Azam Road, Layyah. By virtue of this disposition, it is devoid of any sort of environmental impacts relating to location and or land use change.
2.	Design	There is no likelihood of any adverse environmental impacts from project design. The proposition is only the setting-up a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be constructed according to its approved layout plan and engineering design after its due vetting and approval by the concerned agencies and authorities. The plant will be setup after its requisite environmental approval from EPA-Pb. It will be located on Chowk Azam Road, Layyah. By virtue of its approved layout map and design, in accordance with the building bylaws and location in industrial settings, it will be devoid of any environmental impacts relating to design. A copy of the approved layout design is appended to the EIAR.
3.	Construction phase	The plant will be setup on a vacant land on Chowk Azam Road, Layyah. In addition to construction of the plant's building, there will be side-by-side installation of the machinery and equipment inside the newly constructed building. Hence, there will not be any environmental impacts of setting-up of the plant, as construction of the building and installation of machinery and equipment therein will not have any environmental bearing.
4.	Operational phase	The plant will be setup on a vacant land on Chowk Azam Road, Layyah. The operation of the plant will be in synchronization with the requisite production parameters. It will share number of common resources and facilities, as are being provided by the local administration. Hence, there will not be any environmental impacts of operation phase of the plant.
5.	Potential environmental encashment measures	Massive tree plantation, development of greenbelts and grassy lawns inside the plant premises and the vicinity have been proposed as the prime environmental enhancement measures. Construction of septic tanks for the treatment of the sanitation origin wastewater and recirculation of the process wastewater should be employed to ensure water use conservation. Owing to simple physical nature of the formulation operations, there will be no need of installation of any air pollution control system with the plant machinery. Provision of safety equipment and right kind of apparel and tools for the workers has also been proposed.

Environmental management and monitoring program:

1.	Description of proposed mitigation actions	The relevant mitigation measures for each type of activity have been given in detail in Section-4 of the instant EIAR titled as, "Potential Environmental Impacts and their Mitigations". The said chapter may be consulted for in-depth appraisal of the likely impacts and their detailed mitigation measures.

2.	Schedule for implementation and environmental budget	The setting-up of the plant will be taken up as a one-go activity immediately after grant of its environmental approval by the EPA-Pb. As regards the environmental budget, all necessary details have been given under subsection 5.3 of Section 5 of the EIAR and may be consulted, as and when needed.
3.	Environmental management team alongwith their roles and responsibilities (by name or position)	The proponent shall setup an environmental health and safety unit for managing all the environment, sanitation, janitorial and like aspects, during both setup and operation of the plant. Further details in this regard are contained in the relevant subsection of the EIAR and may be consulted, as and when needed.
4.	Proposed monitoring programme to assess performance or output of EMP	An elaborate and detailed programme of environmental monitoring to assess performance output of the EMP has been given in the relevant section of the EIAR and may be consulted, as and when needed.
5.	Proposed EMP reporting and reviewing procedure	As given in table 5.5a under Section 5 of the EIAR.
6.	Any training needs required to ensure implementation of EMP and monitoring plans	Complete detail has been given under subsection 5.8 of Section 5 of the EIAR and may be consulted, as and when needed.

Stakeholders' consultation: (Communicate the possible impacts and concerns to the following to assist further analysis and decision-making):

1.	Proponent's environmental management team	The stakeholders and public consultation are not required in case of an EIAR. The instant report is an EIAR only i.e., examination of the potential environmental impacts and nothing more than that. Therefore, involvement of stakeholders/public consultation is not required in the instant case at all. The details regarding the environmental management team of the proponent have been given under subsection 5.4 of Section 5 of the EIAR and may be consulted, as and when needed.
	The responsible authority	The proponent and the environmental management team. All necessary details in this regard have been given under subsection 5.5 of Section 5 of the EIAR and may be consulted, as and when needed.
	Other departments and agencies	All necessary details in this regard have been given under subsection 5.10 of Section 5 of the EIAR and may be consulted, as and when needed.
	Environmental practitioners and experts	All necessary details in this regard have been given under subsection 5.6 of Section 5 of the EIAR and may be consulted, as and when needed.
	Affected and wider community	Nil

Appendices:

1.	Glossary	See the information given under the heading "Glossary" in EIAR.
2.	List of abbreviations	See the information given under the heading "Abbreviations" in EIAR.
3.	Lists of individuals and organizations consulted along with their written feedback	See the information given in **Annex-6** of the EIAR.
4.	Sources of data and a full list of all reference material used	See the information given under the heading "References" in EIAR.
5.	Terms of references of environmental reports and those given to individual specialists	See the information given in **Annex-7** of EIAR.
6.	Approvals from other concerned departments	Requisite information has been given at relevant places in the EIAR.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

ES.1: Title & Location of the Project

Title: Construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah".

Location: Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah.

This project-specific Environmental Impact Assessment report (EIAR) alongwith an environmental, social and risk management and monitoring plan (ESRMP) presents a detailed account of the likely and the foreseeable environmental and social impacts, if any, as may be expected from setting-up of the plant. The plant will be setup only after its requisite environmental approval from the EPA-Pb. The plant will be a facility for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be setup on a vacant land on Chowk Azam Road, Layyah. The proponent is a seasoned entrepreneur and has vast experience of manufacturing of the intended products.

The primary objective underlying setting-up of the plant is to setup a modern and efficient unit for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage, which are in high demand in the country and abroad. These products are meant to enhance agricultural yield by providing essential minerals, nutrients, fertilizers, soil softeners, productivity enhancing substances, pesticides, rodenticides, weedicides and other substances that are essential for healthy crop-growth over an agriculturally healthy soil. The primary function of these formulations is to correct and optimize the nutritional, mineral and electrolytic needs of the soil and the plants. The plant will be a new and efficient production unit. Efficient and high performance machinery and equipment will be installed at the plant for carrying out the requisite jobs. As mentioned earlier, the plant is being established for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The site is located on Chowk Azam Road, approx. 5 km from Layyah City. Because of its location on Chowk Azam Road, Layyah, the site is accessible easily from all parts of the country through the national and regional road network. In any case, Chowk Azam Road will serve as the principal approach road for the plant.

The instant EIAR presents a detailed account and analysis of the various likely, foreseeable or potential environmental as well as social impacts of the proposition, if there be any, pertaining to both setup and operation phases. In doing so, the report presents a review of the environmental impacts of the proposition with particular reference to their spatial and temporal extent, magnitude, nature and time of occurrence. The report highlights the various activities and the sources, which could be responsible for the genesis of the most likely adverse impacts, if there be any, on the various environmental parameters as well as on the sensitive bio-indicators. It would be pertinent to mention here that review, assessment, screening, evaluation and mitigation of the negative environmental impacts of a project or activity, likely to affect the environment, is a legal obligation of the proponent, as envisaged under the environmental laws of the province[1]. This report, therefore, is in fulfilment of this legal obligation on the part of the proponent.

ES.2 Name of Proponent

Mahar Fahad Masood Sumra, Proponent

Orical Agrochemicals is a company formed for the formulation of agrochemicals and other allied OTC products. The company is registered with the appropriate registration authority. The chief executive of the company is Mahar Fahad Masood Sumra. The principal line of business of the company is formulation of good quality agrochemicals for agricultural usage. The registered office of the company is in Layyah, Punjab. The company intends to setup a plant for formulation of good quality agrochemicals, primarily for agricultural usage. With this backdrop, the company has bought the instant plot on Chowk Azam Road. The site, owing to its location on Chowk Azam Road Layyah, is ideal for setting-up the plant here. The majority of the requisite facilities, amenities and infrastructure, as are required for an industrial unit of the type, are available here.

As regards its construction and operation, the proponent intends to setup and operate the plant in strict accordance with the applicable bylaws, regulations, rules and guidelines of the Federal/Provincial Governments, EPA/EPD and other concerned regulatory agencies. It need no mention that both construction and operation of the plant will be conformant to the applicable international standards, protocols and safety

[1] Section 12 of the Punjab Environmental Protection Act, 1997

requirements for such like plants, as have been or may be set forth by the international organizations, entities and the supervisory bodies relevant to the subject.

ES.3 Name of Organization Preparing Report

"Green Revolution", Environmental Management & Legal Consultants, Lahore. "Green Revolution" (A leading environmental management consultant). The consultant has prepared the report in accordance with the applicable rules, regulations, guidelines and provisions of other relevant laws in vogue. "Green Revolution" have their Head Office at Lahore and branch offices in the Federal Capital and the Provincial Capitals of Karachi, Peshawar and Quetta.

ES.4 Brief Outline of the Proposal

The project essentially is setting-up of a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. In this way, the plant will be a secondary and dependent production unit, as there will not be any primary or original manufacturing of any items or products. On account of the simple physical nature of mixing of various ingredients in the set forth ratios, without any chemical process or generation of any pollutants and or wastage by-product, the plant will be an environment friendly unit. The site selected for setting-up the plant is a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah.

There will not be any fixed installed production capacity of the plant. The production capacity has been envisaged to upscale with passage of time. The expected production capacity starting from the 1st to the 5th year of production will rise @ 5% per annum. It will likewise continue to increase every year, as the demand may be. The main sections of the plant will be, as enlisted below:

1. Input materials/raw materials receiving and storing section
2. Product mixing, formulation and production section
3. Product inspection and quality control section
4. Product packaging and storage section
5. Quality control laboratory
6. Admn block and site office with allied facilities
7. Green areas and open spaces
8. Other ancillary and support facilities

In addition to the above, other facilities at the plant will include the following:

1. In-going and out-going gate(s) with security/ watch and ward system
2. Masjid
3. Cafeteria / canteen
4. Parking areas
5. Power/generator room
6. Warehouse
7. Weigh bridge (optional)
8. Fire Fighting System as per National Fire Protection Association (NFPA-20, 22, 24 & 30)
9. Boundary wall
10. CCTV and security surveillance system
11. Janitorial and sanitation services
12. Water supply system
13. Utilities and amenity services
14. Other operation support facilities

Whereas, the ground floor will be used primarily for preparing the dry or powdered products; the first floor will be used mainly for preparing the liquid products.

As per the information provided by the proponent, the main objective underlying setting-up of the plant is formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. The primary consideration is to capture market potential of the products to be formulated at the plant. The idea is to cater for market demand and to compete with other producers of the like products. The site selected for setting-up of the plant is located on Chowk Azam Road Layyah. Owing to this disposition, the site will not have any environmental interaction with the exterior. As per the site survey, there is not any large size human

settlement within the radius of influence of the chosen site. The site/plant will not have any negative interaction with the existing industrial units around. The plant will be a standalone production unit.

The plant will be a modern and efficient unit that will employ cleaner production technology. The production processes and the product quality will conform to the applicable standards and specifications of the applicable standards and the applicable legal framework of the concerned regulatory agency, if and wherever applicable. The international best practices of the sector shall be kept in view with regard to quality of the products to be formulated at the plant. Some basic design features of the plant will be as under:

- All incoming raw materials will be received at the designated area/enclosure at the premises.
- The incoming materials will be checked thoroughly with respect to their quality and characteristics at the designated area for the purpose.
- The inspected, checked and quality conformant materials will be labelled and stored separately.
- The quality-cleared materials will be transferred to the production hall.
- The active ingredients, base ingredients, carrier ingredients and the additives will be thoroughly mixed in the respective machines and formulated into desired product(s), as per the applicable standards (UK, USA, EU or other).
- The plant will formulate/produce number of good quality agrochemicals, as per their market demand.
- The formulated/finished products will be packed in appropriate packing and stored temporarily in the outbound warehouse for onward dispatch to the market/clients.
- The freshwater for various and miscellaneous needs at the plant will be obtained from a groundwater pump. It will be stored firstly in an underground water tank, from where it will be lifted and poured into an overhead reservoir. This arrangement will ensure round the clock and uninterrupted supply of water for all and various needs. The combined water holding capacity of both tanks (underground and overhead) will be around 50 MT.
- There will be a separate firewater storage tank of capacity 50 metric tonne (50,000 Litres) to store water for fire protection and control. This dedicated water storage arrangement will make the water always available to fight out accidental outbreaks of fire at the plant, if there be any.
- In addition to water-based firefighting system, there will be a parallel and independent network of standalone chemical fire extinguishers. These foam-based fire extinguishers will be available at key-points at the premises. They are good for the small-scale fires.
- The proponent has selected the instant site owing to number of advantages i.e., availability of a vacant plot of the desired dimensions; availability of amenities and utilities; location on a main road; easiness of transportation of the raw materials to and the finished products from the site; and safe distance from any nearby settlement. These and various other beneficial advantages have prompted the proponent to select the instant site. The site is bound on its north by Chowk Azam Road.
- As per the field survey, there is no large size human settlement within a radius of 1.5 km from the site.
- The proponent will setup the plant in exact accordance with the applicable byelaws and terms and conditions of the EA. The experts of the relevant fields have prepared the basic design features and layout plan of the plant keeping in view the ground requirements and the applicable industrial buildings standards.
- Green Revolution, Lahore are providing consultancy and advisory services with respect to environmental aspects including its IEE.
- The basic design and layout is ready and construction of the main building and the support infrastructure will be taken immediately upon environmental approval from the EPA-Pb.

The proponent will procure the manufactured raw materials (active ingredients, base ingredients, carrier ingredients, additives and others) either from their primary manufactures or traders/importers. The proponent will only mix these materials, as per the applicable standards formulary. In this way, the product formulation operations at the plant will only be a secondary or dependent production activity down the line. There will not be any primary or original manufacturing of anything at the plant. The plant will employ cleaner production technology and will not produce any environmental pollutants (air emissions, effluents, wastewaters and or solid wastes) of any sort.

The primary consideration is to capture market potential of the products to be formulated at the plant. The idea is to cater for market demand and to compete with other producers of the like products. The site selected for setting-up of the plant is located on Chowk Azam Road, Layyah. Owing to this disposition, the site will not have any environmental interaction with the exterior. As per the site survey, there is not any large size human settlement within the radius of influence of the chosen site. The site/plant will not have any negative interaction with the existing industrial units around. The plant will be a standalone production unit.

The site selected for setting-up of the plant is located on Chowk Azam Road, Layyah. Owing to this geophysical disposition, the site will not have any interaction with the exterior. As per the site survey, there is not any human settlement within the radius of influence of the site. The plant will not have interaction with the existing industrial units around. It will be an independent standalone production unit. A few other objectives, as can be reckoned regarding setting-up of the plant, include the following:

- To formulate good quality agrochemicals in order to capture the due market share and cater for demand of the clientele/consumers in the country and abroad.
- To bring-in modern and efficient production technology in the country, as the machinery and equipment to be installed at the plant will be smart, intelligent and efficient.
- To provide opportunities of employment, jobs and business prospects for the locals and other people.
- To help upgrade the socio- economic conditions of the area through heavy investment and the resultant economic turnover, trickling down and vertical down trending of the fruits of investment.
- To help correct the market distortions of demand and supply of the commodity and to ensure stabilization of its prices in the country.

Owing to usage of the cleaner production technology and installation of modern and efficient machinery, there will not be the generation of any untoward pollutants (air emissions, liquid wastewater and or solid wastes) beyond the prescribed environmental standards (PEQS).

ES.5 Major Impacts

The plant is being setup for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. One of the underlying aims is to capture market share of the product(s) and introduce product diversification. The plant will be setup after assessment of its likely environmental impacts and environmental approval from EPA-Pb. The setting-up of the plant will not have any significant environmental impacts, as it will not produce any environmental pollutants or obnoxious by-products. There will not be the generation of any air emissions, effluents, wastewater and or solid wastes. All input materials will be consumed fully in formulating the products, leaving nothing behind. The plant will be located on Chowk Azam Road, Layyah. Being a cleaner production plant, it will be devoid of any environmental impacts.

As regard the process operations, they constitute simple physical mixing of the active and other ingredients without any chemical reaction. Noticeably, the 'raw materials' in the instant case are the primary materials, as prepared by various primary manufacturers. The proponent will only buy the pre-formed raw materials from the market and mix them in prescribed ratios to prepare the desired finished product. After formulation, the finished products will be packed into appropriate packing and stored temporarily in the outbound warehouse. After testing, quality control check and completion of other formalities, these will be supplied to the market.

Owing to the simple physical nature of the formulation operations, there will not be the generation of any pollutants (air emissions, effluents, wastewaters and or solid wastes) or other unwanted substances. Since, there will not be the generation of any air emissions, there is no need of installation of any air emission control system/devices. As regard the wastewater (both the sanitation and the non-sanitation origin), it will be treated in the septic tanks and thereafter in the wastewater treatment plant, if any is installed. The proponent will install a wastewater treatment only and only if its installation is warranted from the production operations. As far as the solid wastes are concerned, the major portion will consist of PET/HDPE bottles, cardboard cartons, plastic bags and miscellaneous packing material @ of approx. 10 to 15 kg per month. Additionally, there will be generation of some garbage and kitchen trash consisting of the leftover food residues from the canteen, cafeteria and offices @ of approx. 10-15 kg per month. The reusable and recyclable solid wastes will be collected separate from the non-reusable and will be sold to the local junk vendors for their safe reuse and recycling. The food based residue, kitchen garbage and pantry trash will be disposed of through the solid waste management system of the local municipality. In this way, almost all solid wastes, as might be produced at the plant, will be disposed of in a safe and environment friendly manner. The paper and cardboard-based waste will be recyclable. The innocuous solid waste generated at the plant will not affect the ambient environment because owing to the effective waste management system, there will not be any likelihood of its entrance into the waste stream. Nevertheless, some of the operational activities may affect the ambient environment unless mitigated by employing suitable mitigation measures well ahead of time to abate their adverse impacts, if any.

The plant will be setup by constructing all of its components as per the standard protocol for such like units in conformity with the applicable bylaws of the regulatory agencies and the GoPb. Installation of the machinery and equipment will follow the guidelines of their manufacturers. Owing to its siting on a vacant land in predominantly industrial settings, there will not be any environmental and social impacts on the nearby

communities. However, there could be some other insignificant and unimportant impacts, some of which may be as under:

- Consumption of freshwater for various construction activities (construction phase impact)
- Consumption of freshwater for various process operations and other generic activities (e.g., human consumption) all during operational life of the project (an operation phase impact)
- Generation of wastewater in the form of occasional machinery washout as well as sanitation wastewater from toilets and washrooms at the premises (an operation phase impact)
- Exhaust emissions from the standby generators (an operation phase impact)
- Increased movement of carriage vehicles on the road serving the site may cause blowing of the drag dust from the wheels of the moving vehicle (a construction phase impact)
- generation of indoor noise from running of the process machinery (an operation phase impact)
- Consumption of electricity by the project machinery with consequential backend impacts (an indirect and secondary operation phase impact)
- Receipt back of the lift back of the unsold stock from the market
- Generation of wastewater from the worksite toilets and pantry as a result of various activities during project's operation (an operation phase impact)
- Generation of solid waste from miscellaneous human activities during the project's operation phase (an operation phase impact)
- Likelihood of the risks of personal injuries to the workers operating the plant machinery and equipment (an operation phase impact)

The plant will be setup only after assessment of its likely environmental impacts and grant of its environmental approval from the EPA-Pb. The setting-up of the plant will not have any significant environmental impacts, as it will use the prepared materials as the primary input materials. The setting-up and operation of the plant will be devoid of any environmental impacts, whatsoever. Hence, not any specific environmental mitigation and or abatement recommendations are relevant. Nonetheless, the proponent is expected to implement the ordinary and generally accepted good housekeeping practices.

As a part of product diversification and production enhancement programme, the proponent intends to formulate/produce various other alike products in the future. The impacts whereof will be discussed at the time of implementation of the future expansion programme.

A detailed account of the genesis of the above-referred insignificant and minor impacts, their potentiality to affect the ambient environment and the measures needed for their mitigations has been presented in the Chapter on "Environmental Impacts and their Mitigation" of this IEE Report. However, it would be suffice to state here that if the project operations are carried out in a sustainable manner in accordance with the ESRMP**,** as given in this IEE study, then the majority of these impacts, which are insignificant, are likely to be nullified.

ES.6 Recommendations for Mitigation Measures

The plant will be an environment friendly facility, where all activities, processes and operations will be carried out in perfect conformity with environment. It will be setup after assessment of its likely environmental impacts and grant of its environmental approval from the EPA-Pb. The setting-up of the plant will not cause any environmental impacts, as it will use the cleaner production technology for production operations. The plant will be setup on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. Its setting-up and operation will be devoid of any environmental impacts, whatsoever. Hence, not any specific recommendations are warranted with regard to environmental aspects of the plant. Nonetheless, the proponent is expected to implement the ordinary and the generally accepted good housekeeping practices.

The majority of the mitigation measures, as suggested in the instant IEE report, are activity based. For example, the inconveniences that may likely be caused to the neighbourhood persons during setting-up of the plant, if any, can be avoided by implementing the suggested mitigation measures. The exposed surfaces or the bare soils should be sprinkled with water regularly to reduce dust blowing therefrom. The local impacts on the ambient air quality, like blowing of the fugitive dust from various sources, can be avoided by regular water sprinkling of the bare soils. Similarly, dust blowing from the unpaved ground surfaces from vehicular movement during the operation phase, can be avoided by planting trees on all sides of the site. The risks of personal injuries from industrial accidents during the operation phase can be curtailed by promoting usage of safety equipment and by instituting a dependable and effective monitoring system for checking delinquencies in this respect. The workers doing welding, moulding, steel fixing and other high vulnerability jobs should take

all necessary precautions and use the recommended safety equipment and gadgets to avoid any untoward outcome.

ES.7 Proposed Monitoring

The setting-up of the plant will be devoid of any notable environmental impacts. The product formulation operations at the plant will employ cleaner production technology. Therefore, construction as well as operation of the plant will not be associated with generation of any wastes, effluents or air emissions. Nevertheless, enforcement of the monitoring regime by the proponent, as given in this EIAR and the environmental approval to be granted by the EPA-Pb, is emphasized. The proponent should establish a responsive monitoring mechanism, consisting of an independent ESH Unit for monitoring environmental performance of the plant. A qualified environmentalist will head the ESHU. Additionally, the proponent will enter into a long-term agreement with "Green Revolution" for carrying out regular annual and special environmental audits, inspections, monitoring and management reviews. The consultant will suggest the appropriate measures for addressing the likely environmental concerns, if any. The periodic monitoring reports, as and when generated, will be submitted to the local office of the EPA, as well as EPA-Pb, if indicated.

There is no denying the fact that the development projects should be subjected to environmental evaluation to avoid adverse environmental impacts, as may be likely to come in the wake of their implementation. The setting-up of the instant plant does not warrant any such examination or assessment for the following reasons:

- Firstly, setting-up of a plant for formulation of agrochemicals is not mentioned in any of the Schedules of the IEE/EIA Regulations. Therefore, neither any IEE, EIA nor any environmental approval is required for setting-up the plant.
- Secondly, the proponent is voluntarily submitting the instant IEE report to the EPA-Pb therefore, the plant will be setup under grant of its environmental approval from the EPA-Pb.
- Thirdly, the plant will be setup in strict accordance with the applicable bylaws, regulations, standards, and terms and conditions of the relevant regulatory authorities including the EPA-Pb.
- Fourthly, such like plants already exist and operational in the country without causing any environmental impacts. Owing to the simple physical nature of the product formulation operations, the majority of them are operating normally and without any adverse environmental impacts. It is therefore expected that setting-up of the instant plant will also be devoid of any adverse impacts, whatsoever.

It needs no mention that setting-up of the plant will be of great advantage to the proponent and the community. On the one hand, it will ensure production and availability of good quality agrochemicals, as per the applicable standards, for the end-users at affordable prices and on the other hand, it will contribute towards economic activities in the country. Therefore, setting-up of such like plants should be encouraged. The focus should be to bring down the prices of the products within the reach, access and affordability of the ordinary citizens. This will provide immediate as well as long-term relief to people. Nevertheless, concomitant to the same, respect for the environment should not be compromised on this count. The environmental aspects of a project should be accorded due importance in the planning, designing, construction and operation of such like facilities. It is the duty of the proponent to ensure that construction and operation of such like new setups will not affect the environment in an adverse manner. The proponent should further ensure that setting-up of the plant will not bring about unfavourable land use changes, large-scale exploitation of the natural resources, and irreversible pollution of the air, water, and the soil environments from emissions, effluents, solid wastes and other substances released during construction and the subsequent operation phase of the plant. It is therefore imperative that before starting construction of any such like unit, it is subjected to optional Environmental Impact Assessment, as envisaged under the Punjab Environmental Protection Act 1997. The objective of the IEE should be to ascertain the adverse impacts relating to both construction and operation phases and provide for remedial measures, wherever required in the best interest of the local and national environment.

As far as the instant project is concerned, the findings of the EIAR show that not any adverse impacts are expected either from its construction and or from operation. The whatsoever imperceptible environmental impacts as could be identified, are all insignificant and of no bearing. They are controllable by implementing the proposed mitigation measures and complying with the applicable environmental laws of the country. In the instant case, implementation of the environmental mitigation measures and the guidelines, as have been given in this document, are expected to bring down the negative environmental impacts of setting-up of the plant well within the fold of acceptable limits. Nevertheless, to ensure its long-term environmental sustainability, institutional arrangements must be put in place, which effectively control the undesirable impacts all during the construction phase and the subsequent operation life of the plant.

1

INTRODUCTION & BRIEF DESCRIPTION OF THE PROJECT

1. INTRODUCTION & BRIEF DESCRIPTION OF PROJECT

1.1 Screening

A plant for formulation of agrochemicals is mentioned neither under Schedule-I nor under Schedule-II of the IEE/EIA Regulations 2000. Hence, construction or operation of such a plant does not require any environmental approval. Nevertheless, the proponent being an environment caring citizen has volunteered to file the instant EIAR for review and approval of the EPA-Pb. The plant will be constructed only after its environmental approval from the EPA-Pb.

1.2 Purpose of Report

The purpose of the instant report is to present a comprehensive Environmental Impact Assessment (IEE) of the proposition. The proposition is Construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah". The plant will be setup in accordance with its environmental approval to be accorded by the EPA-Pb. The instant report presents a detailed review of the various likely environmental impacts of setting-up of the plant. In addition to examination of the relevant impacts of the construction phase, the report presents an overview of the foreseeable and the likely impacts of the operation phase of the plant.

The IEE report presents a critical review of the activities and the production operations of the plant and its various subcomponents. The report presents a review of the nature, magnitude and implications of the environmental and the social impacts of the proposition against the standard environmental parameters as prescribed under the provincial Environmental Quality Standards (PEQS). The environmental and social impacts of the various activities in relation to setting-up of the machinery and the process operations during lifelong operations of the plant are the two key areas of focus of the study.

Besides evaluating the environmental profile of the plant, the report outlines a comprehensive mechanism for addressing the various environmental concerns particularly those relating to usage of freshwater for the various process and non-process activities. The report suggests a long-term framework of monitoring the impacts of the process operations for early detection and remediation of the environmental issues that may come up during the operation of the plant. Additionally, the report outlines a robust and dependable mechanism to ensure optimal environmental performance of the plant from an across the board implementation of the mitigation guidelines.

1.3 Identification of the Project & Proponent

Project: Construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah".

Proponent: Mahar Fahad Masood Sumra, Proponent, Orica Agrochemicals, Layyah.

1.4 Environmental Consultant

M/s Green Revolution are acting as the accredited consultant for conducting a detailed and in-depth IEE of the plant in accordance with the rules, regulations, guidelines and provisions of relevant laws in vogue. The below named persons will act as the focal persons for an on behalf of the proponent and the consultant:

Table 1.4: Contact Details of the Focal Persons of the Proponent and the Environmental Consultant

Project Proponent	Environmental Consultant
Mahar Fahad Masood Sumra Proponent Orica Agrochemicals Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah	Kashif Ikram Chief Executive, Green Revolution Office No. 5, Ground Floor, Al-Majeed Centre, Link Faridkot Road, Lahore Email: green_sul@gmail.com Mob: 03334222232

1.5 Brief Description of the Nature, Size and Location of the Project

Nature: A plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The proponent will procure the pre-formulated, primary, base, active and carrier materials (local and imported) from their original manufacturers. The primary input materials (active and base/carrier ingredients) will be mixed in approved ratios, as per the applicable standards, and formulated into desired end products. The plant will employ cleaner production technology and will not produce any air emissions, effluents, wastewater and or solid wastes.

Size: The plant will be setup on a vacant land measuring 1 acre.

Location: The plant will be setup on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah (see Google Map).

Brief Description: The project essentially is setting-up of a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. In this way, the plant will be a secondary and dependent production unit, as there will not be any primary or original manufacturing of any items or products. On account of the simple physical nature of mixing of various ingredients in the set forth ratios, without any chemical process or generation of any pollutants and or wastage by-product, the plant will be an environment friendly unit. The site selected for setting-up the plant is a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. The plant will be setup only after its requisite environmental approval from the Environmental Protection Agency Punjab (EPA-Pb).



2

BRIEF DESCRIPTION OF THE PROJECT

2. BRIEF DESCRIPTION OF THE PROJECT

2.1 Type & Category of Project

Type: A plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The proponent will procure the pre-formulated, primary, base, active and carrier materials (local and imported) from their original manufacturers. The primary input materials (active and base/carrier ingredients) will be mixed in approved ratios, as per the applicable standards, and formulated into desired end products. The plant will employ cleaner production technology and will not produce any air emissions, effluents, wastewater and or solid wastes.

Category: A plant for formulation of agrochemicals is mentioned neither under Schedule-I nor under Schedule-II of the IEE/EIA Regulations 2000. Hence, construction or operation of such a plant does not require any environmental approval. Nevertheless, the proponent being an environment caring citizen has volunteered to file the instant EIAR for review and approval of the EPA-Pb.

The plant will be a non-invasive, non-intrusive and a benign industrial proposition. It will be setup only after its requisite environmental approval from the EPA-Pb. It will be sited on Chowk Azam Road, Layyah. The plant will employ cleaner production technology with respect to production operations. It will be fitted with smart and efficient machinery and equipment. Being a modern and efficient plant, it will not produce any untoward pollutants, as might affect or interact with the sensitive environmental parameters.

2.2 Objectives of the Project

The primary objective underlying setting-up of the plant is formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The product innovation and quality assurance to cater for market demand of the product(s), alongwith reduced reliance on import of such like can be counted another collateral benefit. The product(s) to be formulated at the plant will be consumed by various end-users, particularly the aged, ailing and nutrition deficient persons across the country. The plant will be an efficient and based on smart technology. Currently, the site is lying as a vacant land. The area of the plot is sufficient in terms of the space requirements for the purpose. It needs no reiteration that the plant will be setup in accordance with the applicable bylaws of the GoPb and other agencies. As is evident from above discussion, the objective underlying setting-up of the plant is to ensure availability of the formulated products for the end-users easily and cost effectively. Another objective is to capture market share of the commodity's business.

The socioeconomic benefits coming in the wake of setting-up of the plant will help in uplifting of the socioeconomic conditions and lifestyle of the neighbourhood populace. This can be counted as another advantageous benefit of setting-up of the plant. Similarly, impetus to commercial activities and creation of new job opportunities for the locals, which will come in the wake of setting-up of the plant, will be another inseparable benefit of the Plant. The setting-up of the plant will ensure timely availability of the products, to be formulated here, even for the far off and distant areas of the country and thereby bringing-in financial benefits for the people of those areas from dependent trading of the products. Thus, apart from the primary objectives, there will be host of secondary benefits coming in the trail of setting-up of the plant, which will be beneficial for the country from various perspectives.

The setting-up of the plant is in line with the "Industrial Policy" of Government regarding promotion of small and medium size industry in the country. The concerned authority has already approved the layout map and granted permission for setting-up of the plant, subject to NOCs from relevant line departments. Viewing from this backdrop, the primary objective of setting-up of the plant, apart from abating environmental pollution, is to ensure optimal availability of the formulated products in the country smoothly and easily. Additionally, the following can be reckoned as a few other objectives coming in the wake of setting-up of the plant:

- To keep adequate stocks of the products to ensure their timely availability to various end-users as per their demand
- To improve the overall health and nutrition status index of the country from availability the products to be manufactured here
- To reduce environmental pollution and degradation by employing cleaner production technology

- To uplift and improve socioeconomic conditions of the area and the neighbourhood
- To raise new job opportunities that will automatically come in the wake of setting-up of the plant
- To add to the landscape beauty and environmental aesthetics by constructing an environment conformant building and other structures
- To add to local greenery by planting trees and developing green areas at the premises and around
- To add to the national GDP

2.3 Project Alternatives

Consideration of the alternatives is not warranted, as the instant proposition is only the setting-up a plant for at a selected site for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be setup after its requisite environmental approval from the EPA-Pb. The plant will be located on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. Any alternative of site, location, size or any other parameter will not be more advantageous compared to the instant proposition.

2.4 Location and Site Layout

Location: The plant will be setup on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah.

Site Layout: The layout map is attached as **Annex-1** of the instant EIAR

2.5 Land Use of the Site

The land use of the site is 100% industrial and industry supportive, as it is lying as a vacant land on Chowk Azam Road, Layyah.

2.6 Road Access

The site is situated on Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah (see the Google Earth Map).

2.7 Vegetation Features of the Site

The site is devoid of any vegetative features, as it is a vacant land situated on Chowk Azam Road, Layyah. The proponent will plan and develop the plot by removing all sorts of bushy vegetation and unwanted shrubs and will clear, clean and level the plot for setting-up of the plant here.

2.8 Cost & Magnitude of Operation

Cost:

Magnitude:

2.9 Schedule of Implementation

The plant will be setup as a one-go activity within the shortest possible span subject to completion of all essential prerequisites and other required formalities.

The proponent intends to construct the plant as a one-go activity on fast track basis and within the shortest possible time immediately upon completion of the requisite codal formalities and obtaining of the different NOCs & licences from the concerned regulatory agencies. The proponent has already started the spadework in this regard. The instant EIAR is one of these preliminary steps towards completion of the requisite formalities prior to setting-up of the plant. The landscaping and external beautification of the premises will be taken side-by-side alongwith installation of the machinery and equipment of the plant. Thus, by the time the setting-up of the plant complete, the premises will present a beautiful picturesque scene of soothing ambience and aesthetics owing to completion of the simultaneous beautification work.

Excluding the concept planning and the preliminary spadework, setting-up of the plant will be taken up as a one-go composite activity from procurement of the building materials and machinery to their transportation to the site and its installation onsite. The various support activities like those that fixing of electrical equipment, installation of fire extinguishers and setting-up of the quality control laboratory etc. will be carried out side by side to ensure concurrent completion of all components of the plant. The proponent intends to contract out

the setting-up (installation of the machinery, equipment and other works to a contractor of standing and repute having experience of setting-up such like plants. However, wherever necessary, services of the experts of the field will be hired to ensure the best quality construction of the plant in the best professional manner. The setting-up of the plant will comprise the following essential components:

2.9.1 Preconstruction Phase

- Obtaining of the suitable land for constructing and setting-up the plant
- Preparation of the various project documents, layout maps and engineering drawings etc.
- Conducting various investigative studies such as geo-technical studies, environmental examination and economic feasibility studies, if needed
- Obtaining consents, approvals and NOCs from different regulatory agencies and departments of the Government, wherever applicable
- Selecting the appropriate and the most efficient machinery and equipment for production of the desired products according to the requisite standards
- Signing the contracts and agreements for various jobs, procurements, installations, and implementation of the plant or its sub components

2.9.2 Construction Phase

- Cleaning the premises and removing any debris or unwanted materials upon completion of construction
- Moving and shifting the machinery and equipment to the site for commencement of construction work
- Procuring and installing the machinery and equipment
- Constructing underground and overhead water tanks for storing freshwater
- Provision of temporary worksite toilets and washrooms for the labour during the construction phase
- Setting-up of a machinery repair and maintenance workshop

2.9.3 Post Construction Phase

- Routine and emergency maintenance as well as other repair works (of the machinery, equipment, transport, building etc.)
- Maintenance of the supply line and stock of the primary raw materials (active and base/carrier ingredients) and various other input materials in requisite quantities
- Outbound supply and marketing of the finished products
- Measures for environmental management of the project premises including freshwater management, wastewater collection and disposal, solid waste collection and disposal, janitorial services, horticulture, and beautification (plantation of trees, exotic shrubs and ornamental flowers)
- Maintenance and upkeep of the plant's security and the firefighting system (risk/hazard management)
- Provision of the healthcare for the factory workers and social wellbeing of the neighbouring communities (corporate social responsibility)
- Environmental audit and compliance monitoring (annual as well as periodic)

The main activities for setting-up and operation of the plant include the following:

- Essential topographic, hydrological, geological, and tectonic studies and surveys of the site to ascertain the baseline environmental conditions, if and where needed
- Detailed architectural, engineering, environmental, economic, social, and cost-benefit feasibility and technical studies, if and where needed
- Completion of the codal and legal formalities and obtaining of NOCs and other go ahead clearances from the concerned regulatory agencies of the Government, if and where needed
- Preparation of the project documents containing the project's scope of activities, mode of execution, and mechanism for supervision of project related activities, if and where needed
- Awarding of the contract for setting-up the project machinery as per proponent's code of practice, if and where needed
- Monitoring and supervision of the installation and fabrication works for ensuring its proper execution quantitatively as well as qualitatively, if and where needed
- Removal of the unspent materials, production process wastes and debris and its safe disposal, if & where needed
- Operations, maintenance and monitoring of the project activities all during the operation phase

2.10 Description of the Project (Process Flow)

The project essentially is setting-up of a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. In this way, the plant will be a secondary and dependent

production unit, as there will not be any primary or original manufacturing of any items or products. On account of the simple physical nature of mixing of various ingredients (active and base/carrier ingredients) in the set forth ratios, without any chemical process or generation of any pollutants and or wastage by-product, the plant will be an environment friendly unit. The site selected for setting-up the plant is a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah.

There will not be any fixed installed production capacity of the plant. The production capacity has been envisaged to upscale with passage of time. The expected production capacity starting from the 1st to the 5th year of production will rise @ 5% per annum. It will likewise continue to increase every year, as the demand may be. The main sections of the plant will be, as enlisted below:

1. Input materials/raw materials receiving and storing section
2. Product mixing, formulation and production section
3. Product inspection and quality control section
4. Product packaging and storage section
5. Quality control laboratory
6. Admn block and site office with allied facilities
7. Green areas and open spaces
8. Other ancillary and support facilities

In addition to the above, other facilities at the plant will include the following:

1. In-going and out-going gate(s) with security/ watch and ward system
2. Masjid
3. Cafeteria / canteen
4. Parking areas
5. Power/generator room
6. Warehouse
7. Weigh bridge (optional)
8. Fire Fighting System as per National Fire Protection Association (NFPA-20, 22, 24 & 30)
9. Boundary wall
10. CCTV and security surveillance system
11. Janitorial and sanitation services
12. Water supply system
13. Utilities and amenity services
14. Other operation support facilities

Whereas, the ground floor will be used primarily for preparing the dry or powdered products; the first floor will be used mainly for preparing the liquid products.

As per the information provided by the proponent, the main objective underlying setting-up of the plant is formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage. The primary consideration is to capture market potential of the products to be formulated at the plant. The idea is to cater for market demand and to compete with other producers of the like products. The site selected for setting-up of the plant is located on Chowk Azam Road, Layyah. Owing to this disposition, the site will not have any environmental interaction with the exterior. As per the site survey, there is not any large size human settlement within the radius of influence of the chosen site. The site/plant will not have any negative interaction with the existing industrial units around. The plant will be a standalone production unit.

The plant will be a modern and efficient unit that will employ cleaner production technology. The production processes and the product quality will conform to the applicable standards and specifications of the applicable standards and the applicable legal framework of the concerned regulatory agency, if and wherever applicable. The international best practices of the sector shall be kept in view with regard to quality of the products to be formulated at the plant. Some basic design features of the plant will be as under:

- All incoming raw materials will be received at the designated area/enclosure at the premises.
- The incoming materials will be checked thoroughly with respect to their quality and characteristics at the designated area for the purpose.
- The inspected, checked and quality conformant materials will be labelled and stored separately.
- The quality-cleared materials will be transferred to the production hall.

- The active ingredients, base ingredients, carrier ingredients and the additives will be thoroughly mixed in the respective machines and formulated into desired product(s), as per the applicable standards (UK, USA, EU or other).
- The plant will formulate/produce number of good quality agrochemicals, as per their market demand.
- The formulated/finished products will be packed in appropriate packing and stored temporarily in the outbound warehouse for onward dispatch to the market/clients.
- The freshwater for various and miscellaneous needs at the plant will be obtained from a groundwater pump. It will be stored firstly in an underground water tank, from where it will be lifted and poured into an overhead reservoir. This arrangement will ensure round the clock and uninterrupted supply of water for all and various needs. The combined water holding capacity of both tanks (underground and overhead) will be around 50 MT.
- There will be a separate firewater storage tank of capacity 50 metric tonne (50,000 Litres) to store water for fire protection and control. This dedicated water storage arrangement will make the water always available to fight out accidental outbreaks of fire at the plant, if there be any.
- In addition to water-based firefighting system, there will be a parallel and independent network of standalone chemical fire extinguishers. These foam-based fire extinguishers will be available at key-points at the premises. They are good for the small-scale fires.
- The proponent has selected the instant site owing to number of advantages i.e., availability of a vacant plot of the desired dimensions; availability of amenities and utilities; location on a main road; easiness of transportation of the raw materials to and the finished products from the site; and safe distance from any nearby settlement. These and various other beneficial advantages have prompted the proponent to select the instant site on Chowk Azam Road, Layyah. The site is bound on its north by the main approach road.
- As per the field survey, there is no large size human settlement within a radius of 1.5 km from the site.
- The proponent will setup the plant in exact accordance with the applicable byelaws and terms and conditions of the EA. The experts of the relevant fields have prepared the basic design features and layout plan of the plant keeping in view the ground requirements and the applicable industrial buildings standards.
- Green Revolution, Lahore are providing consultancy and advisory services with respect to environmental aspects including its IEE.
- The basic design and layout is ready and construction of the main building and the support infrastructure will be taken immediately upon environmental approval from the EPA-Pb.

The proponent will procure the manufactured raw materials (active ingredients, base ingredients, carrier ingredients, additives and others) either from their primary manufactures or traders/importers. The proponent will only mix these materials, as per the applicable standards formulary. In this way, the product formulation operations at the plant will only be a secondary or dependent production activity down the line. There will not be any primary or original manufacturing of anything at the plant. The plant will employ cleaner production technology and will not produce any environmental pollutants (air emissions, effluents, wastewaters and or solid wastes) of any sort.

The primary consideration is to capture market potential of the products to be formulated at the plant. The idea is to cater for market demand and to compete with other producers of the like products. The site selected for setting-up of the plant is located on Chowk Azam Road, Layyah. Owing to this disposition, the site will not have any environmental interaction with the exterior. As per the site survey, there is not any large size human settlement within the radius of influence of the chosen site. The site/plant will not have any negative interaction with the existing industrial units around. The plant will be a standalone production unit.

The site selected for setting-up of the plant is located on Chowk Azam Road, Layyah. Owing to this geophysical disposition, the site will not have any interaction with the exterior. As per the site survey, there is not any human settlement within the radius of influence of the site. The plant will not have interaction with the existing industrial units around. It will be an independent standalone production unit. A few other objectives, as can be reckoned regarding setting-up of the plant, include the following:

- To formulate good quality agrochemicals in order to capture the due market share and cater for demand of the clientele/consumers in the country and abroad.
- To bring-in modern and efficient production technology in the country, as the machinery and equipment to be installed at the plant will be smart, intelligent and efficient.
- To provide opportunities of employment, jobs and business prospects for the locals and other people.
- To help upgrade the socio- economic conditions of the area through heavy investment and the resultant economic turnover, trickling down and vertical down trending of the fruits of investment.
- To help correct the market distortions of demand and supply of the commodity and to ensure stabilization of its prices in the country.

Owing to usage of the cleaner production technology and installation of modern and efficient machinery, there will not be the generation of any untoward pollutants (air emissions, liquid wastewater and or solid wastes) beyond the prescribed environmental standards (PEQS).

As a part of product diversification and production enhancement programme, the proponent intends to formulate/produce various other alike products in the future. The impacts whereof will be discussed at the time of implementation of the future expansion programme.

2.10.1 Construction Schedule

The envisaged schedule of construction is 06 months (180 days) from groundbreaking ceremony. However, the proponent intends to complete the construction on fast track basis ahead of the envisaged schedule to reap benefits of setting-up of the plant as quickly as possible.

2.10.2 Preconstruction Phase

- Conducting necessary feasibility studies including cost benefit analysis and expected internal rate of return
- Preparation of project documents, layout drawings, master plan, engineering designs and tentative cost estimates
- Conducting various investigative studies such as geo-technical studies, Environmental Impact Assessment, environmental impact assessment and economic feasibility studies, if and where relevant
- Conducting surveys for assessing the extent of physical span of the infrastructure, number of trees to be cut (if any) and removal of other impediments, if any
- Obtaining consents, approvals, and NOCs from different agencies and departments of the Government, wherever relevant and applicable
- Selecting the appropriate and the best suited machinery and equipment for fast track implementation of the project and completion of construction within the scheduled timeframe
- Signing of the contracts for various jobs relating to construction, procurement, installation, and fitting of the machinery, equipment and other essentialities
- Inviting objections from the public with regard and relevant to the project, if any, and to reconsider design parameters, if so needed

2.10.3 Construction Phase

- Procurement of materials, their transportation, onsite stacking and storage, if needed
- Setting-up of the nucleus office to manage and supervise the construction activities
- Carrying out excavations and diggings for the construction of civil and building structures, if any
- Onsite construction of the plant building and other civil and steel structures
- Offsite fabrication of the production plant/components and their shifting and installation at the site
- Construction of other ancillary and support structures complementary to the main project
- Installation of boundary lights for night time illumination
- External development, landscaping, beautification, tree plantation and floral ornamentations

2.10.4 Post Construction Phase

- Routine as well as emergency repair and maintenance works which may include annual repair and maintenance of the building and other support structures etc.
- Keeping the escape collection and firefighting system in an always ready to use state
- Periodic inspection and testing of the equipment, machinery and gadgets as per the inspection regime prescribed by concerned regulatory authority
- New plantations and replacement of trees and maintenance and upkeep of the green plants
- Environmental management of the Plant including storm water collection and disposal, solid waste collection and disposal, janitorial services, horticulture and beautification (plantation of trees, exotic shrubs and flowers), if required
- Regular environmental audit and compliance monitoring as per the schedule given by the EPA

2.10.5 Activities under the Project

The main activities pertaining to construction of the plant include the following:

- Pertinent consumer surveys to assess the economic feasibility of the project, if required
- Essential topographic, hydrological, geological, and tectonic studies and surveys to determine the relevant and most appropriate engineering parameters for construction and structural designing

- Detailed architectural, engineering, environmental, economic, social, and cost-benefit feasibility and technical studies
- Completion of the codal and legal formalities and obtaining NOCs and go ahead clearances from the concerned regulatory agencies of the Government
- Preparation of the project documents containing scope of activities, mode of execution, and mechanism for supervision of construction
- Awarding of contract for construction and allied works as per proponent's code of practice
- Monitoring and supervision of the work for ensuring its proper execution quantitatively as well as qualitatively
- Removal of unspent materials, construction wastes and debris from the site upon completion of construction as well as all during the span of construction
- Post construction maintenance and monitoring of various activities and operations

2.10.6 Labour and Human Resource Deployment

The project, being only a small-scale activity, will provide reasonable number of job opportunities for the skilled and the unskilled persons all during setting-up of the plant. It is estimated that approx. 10~15 persons of various trades will be employed at the site for setting-up and about the same number will be employed permanently for running and for routine repair and maintenance services all during operation phase of the Plant. The number of the indirect job opportunities and the income prospects will be three to four times the direct opportunities. **Table 2.10.6** presents estimated HR opportunities likely to come up in the wake of setting-up of the plant:

Table 2.10.6: Approximate Manpower & HR Deployment

Sr.	Job Category	Construction	Operation
1.	Senior Engineers	01	00
2.	Skilled Workers	13	10
3.	Unskilled & Semiskilled Workers	16	35
4.	Others (drivers, security guard, sweepers)	04	04
	Total	**34**	**39**

2.10.7 Power Requirements

In order to run various operations at the Plant, power will be required. Two separate sources of electricity have been proposed for the Plant. One connection will be from the main grid of power from K-Electric. It will be a metered connection and will suffice to meet all operational, residential, and other needs at the Plant. However, in order to ensure consistent supplies of electric power in case of failure/breakdown of K-Electric connection, there will be a self-starting power generator of appropriate capacity, commissioned at the plant. This alternate supply will ensure tackling of any emergency situation, accident, and smooth uninterrupted operations at the Plant.

2.10.8 Water Requirement/Usage

Water will be used at the Plant for various purposes. To meet with any emergency situation / accident, there will be a well-designed firewater system. This system will consist of a tube well type suction pump for extraction of groundwater and filling of the firewater tank. The firewater tank (capacity 50,000 litres) will always be kept filled with water to cater for emergency and firefighting. The firewater tank will be connected to a network of fire hoses, hydrants and monitors through the pressure pump. Water from the firewater tank will not be used for routine requirements. However, the water drained as a part of routine maintenance and safe operations of the tank will be used for watering the grass yards/plantation irrigation. The bore size for the firewater system will be 6" diameter (i.e., half cusec).

The water requirement for other purposes, e.g., at the administration and residential block, canteens, laboratories, washing, and other human and operational needs will be drawn from another independent tube well of quarter cusec capacity. There will be overhead tanks for storage of water to ensure consistent supply round the clock; whereas the turbine will be operated intermittently depending upon requirements. There will be provision for installation of another quarter cusec drill in the future if so required.

The quantities of wastewater generated at the plant would correspond to the total water intake. Most of this wastewater will be coming from the dwelling, administration block, and support operations. It will be treated first in large size septic tanks. The treated wastewater will be then disposed of through sump well. As regards the firewater, after one complete fill, the water in the firewater tank will be retained for approximately one

month and thereafter it will be drained out. This arrangement will prevent biological growth in the stored water. The water so drained will be used to irrigate the plantation at and around the premises.

The product formulation operations at the plant have been designed on the principle of maximum water conservation and usage of as little water as possible. The proponent has already installed the requisite number of groundwater turbines, as per applicable bylaws. There is no need of any additional borehole or turbine to be installed afresh for any of the plant operations. The water storage, supply and recycling system will suffice to cater for water needs of the plant. **Table 2.10.8a** presents the water requirements for normal operations of the plant and **Table 2.10.8b** presents water load of the firefighting system at the premises.

Table 2.10.8a: Water Requirements for Normal Operations

Category	Total staff	Water consumption
During construction	100	1000 litres
During operation	30	300 litres

Table 2.10.8b: Water Requirement for Firefighting System

No. of Tanks	Tank Capacity
01	250,000 litres (65,000 US Gallon)

2.10.9 Studies and Surveys for the Project

The Team of Expert Professionals, in conjunction with the proponent, carried out various studies and surveys relating to the project, such as:

- Studies and investigations into the baseline environmental profile of the area/site
- Relevant physical, geological, hydrological and topographical studies and surveys of the area
- Survey for the assessment of noise levels and their likely impacts on the environment
- Air quality investigation and lab analyses (not carried out yet)
- Water quality investigations and lab analyses (not carried out yet)
- Socioeconomic surveys and public consultations to ascertain stakeholders' concerns

The above-mentioned studies included physical surveys of the site and the visual observations of the site. Random public consultations were conducted to ascertain apprehensions and perceptions of the resident population. Direct interviewing and asking short questions was found the most suitable mode of soliciting the requisite information. Collective public gatherings were found a reliable mode of knowing the public perceptions and learning their viewpoint. Whereas, the majority of the persons consulted and interviewed, appreciated setting-up of the plant as a good initiative of the proponent for solving the problems associated with consumption of the conventional fuels by the motorists, vehicles owners, drivers and travellers; some of the interviewees criticized setting-up of the plant, just for nothing.

2.10.10 Benefits Likely to Accrue from the Project

The major benefits likely to accrue from setting-up of the plant have been enumerated in the sections above. These include not only the business prospects, social uplifting of the area but also availability and supply of range of formulated products for the end-consumers. The majority of the qualitative benefits will be those, as will be realized from accomplishment of the underlying objectives. Some of the significant quantitative benefits likely to accrue from setting-up of the plant can be enumerated as hereunder:

- The project indicators depict a positive cost to benefit ratio (CBR) showing that the project is feasible and is likely to bring forth economical and socio-cultural benefits in its wake
- The economic analysis of the project reveals a healthy Expected Internal Rate of Return (EIRR)
- The NPV of the project @10% is positive which makes execution of the project feasible
- There will be savings on account of environmental pollution abatement costs from doorstep availability of the products for the end-users
- There will be a decrease in the environmental pollution from employment of cleaner production technology
- The cumulative monetized benefits from the project will be in thousands of rupees per annum
- The setting-up of the plant is likely to create many new job and employment opportunities

The most significant positive impact of setting-up the plant will be the availability of adequate stocks of bio=supplements for their various end-users. The formulated products will be marketed through a network of dealers and retailers. The setting-up of the plant will benefit thousands of persons, who will be involved in its supply chain trade. The construction activities will follow a strict supervision and monitoring regime. The

onsite construction of the civil structures will not cause any environmental pollution from avoidance of generation of particulate and other pollutants during active construction phase.

The above-mentioned socioeconomic and environmental benefits of setting-up of the plant far outweigh its potentially negative or adverse impacts (although none), if any. Given the present state of affairs regarding demand and supply of agrochemicals in the country, the setting-up of the plant will be of great benefit for the people, area, and the environment for all times to come.

The project simply is setting-up a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. There will not be any undesirable emissions of smoke, soot, particulate matter and combustion gases. Thus, there will be healthy impacts on the local environment because of non-generation of any pollutants during setting-up of the plant. Some other positive and significant socioeconomic benefits of the Plant will be the opportunities of employment, training and skill development both for the professionals and for the general cadre personnel who would be employed or whose services would be hired in connection with setting-up of the plant. Another social benefit will be the income prospects for large number of persons (traders, shopkeepers, suppliers, vendors, service providers, mechanics, artisans etc.) who would be providing goods and services during setting-up and subsequently during operation of the Plant. In nutshell, setting-up of the plant can be considered as a big leap forward towards providing safer, cleaner and environment friendly fuel for the end consumers.

2.10.11 General Introduction to Agrochemicals

Agrochemicals are chemical products comprised of fertilizers, plant-protection chemicals or pesticides, and plant-growth hormones used in agriculture. In most cases, the term agrochemical refers to the broad range of pesticide chemicals, including insecticide chemicals, herbicide chemicals, fungicide chemicals, and nematicides chemicals (chemicals used to kill round worms). The term may also include synthetic fertilizers, hormones, and other chemical growth agents, as well as concentrated stores of raw animal manure. Agrochemicals, such as pesticides, are used to protect, manage, and enhance agricultural production. Agrochemicals are widely used in agriculture to manage pests and phytopathogens. Modern agriculture mostly depends on the use of various agrochemicals that have a significant contribution in enhancing efficient and economical crop production for meeting the food requirement of the fast-growing global population. For addressing the growing food demand, agrochemicals are profusely used in agriculture to bridge the gap between food production and consumption. An ideal pesticide generally acts to kill/inactivate the target harmful organism, is biodegradable, and does not leach down to the groundwater. Amendment of soils with agrochemicals has substantial impact on soil functions and nutrient cycling as well because these chemicals can influence several soil physicochemical properties such as soil moisture, pH, and soil organic carbon. Agrochemicals have a great influence on the shift of microbial population dynamics and communities of soil microorganisms along with many other biotic and abiotic factors ranging from soil characteristics to crop varieties. The use of agrochemicals primarily aims to ensure abundant food supply for humans. Agrochemicals help to increase crop productivity. These chemicals can be insecticides, herbicides, fungicides, nematicides, fertilizers, liming or acidifying agents, soil conditioners, pesticides, and animal husbandry chemicals. Application of agrochemicals helped to manage plant nutrition, plant diseases, and crop yield.

Historically, Sumerians from 4500 years ago have said to use insecticides in the form of sulphur compounds. Additionally, the Chinese from about 3200 years ago used mercury and arsenic compounds to control the body lice. Agrochemicals were introduced to protect crops from pests and enhance crop yields. The most common agrochemicals include pesticides and fertilizers. Chemical fertilizers in the 1960s were responsible for the beginning of the "Green Revolution", where using the same surface of land using intensive irrigation and mineral fertilizers such as nitrogen, phosphorus, and potassium has greatly increased food production. Throughout the 1970s through 1980s, pesticide research continued into producing more selective agrochemicals. Due to the adaptation of pests to these chemicals, more and new agrochemicals were being used, causing side effects in the environment.

2.10.12 General Introduction to Herbicides

Herbicides control weeds that compete with crops for light and nutrients. Herbicides can also prevent soil erosion and water loss by replacing or reducing the need for cultivation. Herbicides can be Selective, meaning they will only affect a certain type of plant and not another. This allows the spraying of a crop, leaving it unaffected, whilst controlling weed growth. They can be non-selective, meaning that all vegetation is controlled within the sprayed area. Herbicides also have non-crop uses, for example non-selective herbicides are used to keep train tracks clear and selective herbicides are used in gardens.

2.10.13 General Introduction to Weedicides

Weed is a term which describes any undesired vegetation and it consequently covers a very large spectrum of plants. Weeds are generally categorised as grasses or broad leaf weeds. The presence of weeds in a field plot can dramatically reduce yield.

2.10.14 General Introduction to Fungicides

Fungicides play a key role in keeping a crop healthy from fungal disease, which can have severe adverse effects on crop yield and quality. Fungicides are described as broad spectrum (e.g., effective on a wide range on fungi across the taxonomical groups) or specific (e.g., mildew-specific or oomycete-specific fungicides). A fungicide can be:

- Preventative: Prevents the establishment of infection
- Curative: Inhibits the development of an established infection which is not showing visible symptoms of disease
- An eradicant: Inhibits the development of an established infection which is showing visible symptoms
- An antisporulant: Prevents or reduces sporulation without necessarily stopping vegetative growth.

2.10.15 General Introduction to Insecticides

Insecticides protect crops before and after harvest from potentially devastating pests that threaten yield and quality. Some insects are chewing pests (e.g., caterpillars & beetles) which feed on plant material itself (leaves, fruits, roots, etc.). This leads to a reduction of the photosynthetic area and yield. The damage caused can seriously weaken the plant. They can also cause serious loss during material storage. Others are sucking pests, which feed on sap (e.g., Aphids). This method of feeding can lead to serious viral transmission that can destroy a crop.

2.10.16 Types of Agrochemicals

There is a concerted effort to actively and conscientiously implement a broad range of agrochemicals to safely maintain and control the global food supply to ensure consistently high quality for widespread consumption. The various types of agrochemicals include the following:

- Pesticides, or chemicals engineered to destroy insects and other organisms, weeds, and funguses that could spoil crop yields;
- Synthetic fertilizers, for example ammonium nitrate (NH_4NO_3), which is designed to encourage crop growth by saturating soils with nutrients;
- Acidifiers and liming agents, engineered to alter the pH levels of soils to suit the planting properties of given crops;
- Soil conditioners, for example gypsum ($CaSO_4 \cdot 2H_2O$), which is designed to condition soils with high sodium (Na) contents to improve planting conditions;
- Growth hormones, or synthetic chemicals designed to increase growth rates in animals and crops.

The production methods vary, given the increasingly widespread classes or types of modern agrochemicals, but typically rely on large-scale production processes that begin with custom chemical building blocks. New and emerging agrochemical methods include the engineering of crops that are synthetically-resistant to herbicides, or that produce their own insecticides.

2.10.17 Name List of Machinery and Equipment to be installed

In order to ensure the desired quality and output of the finished products, both local and imported machinery, equipment, devices and instruments will be installed at the plant. **Table 2.10.17a** and **2.10.17b** present respectively list of the machinery for production department and the quality control laboratory, to be installed at the plant.

Table 2.10.17a: List of Machinery and Equipment (Production Section)

Sr.	Machinery/Equipment	Sr.	Machinery/Equipment
1.	Filling Machine	2.	Storage Tank
3.	Labelling Machine	4.	Capping Machine
5.	Mixing Tank	6.	Can Filling Machine
7.	Capsule Polisher	8.	Semi-auto Filling Machine
9.	Carton Wrapping Machine	10.	Bottle Wrapping Machine

11.	Spill Collection Trays	12.	Manual Filling Machine
13.	RO Water Tank (1000 Litre)	14.	Filter
15.	Slow Mixture (1200 Litre)	16.	Packing Belt
17.	Grinding Machine	18.	Mixing Machine
19.	Rotary Machine	20.	Granulator
21.	Packing Table	22.	Coating Machine

Table 2.10.17b: List of Machinery & Equipment (Quality Control Laboratory)

Sr.	Machinery and Equipment	Sr.	Machinery and Equipment
1.	UV Spectrophotometer	2.	Microscope
3.	Moisture Analyser	4.	Colony Counter
5.	Viscometer	6.	Laminar Air Flow
7.	pH Meter	8.	Vacuum Gauge
9.	Stability Chamber	10.	Friability Test Apparatus
11.	Water Bath	12.	Hardness Tester
13.	Hot Plate with Magnetic Stirrer	14.	Disintegration Test Apparatus
15.	Polarimeter	16.	Dissolution Test Apparatus
17.	Refractometer	18.	Precision Balance
19.	pH Strips	20.	Analytical Balance
21.	Beakers	22.	pH Meter
23.	Wash Bottles	24.	Volumetric Flasks
25.	Reagent Bottles	26.	Measuring Cylinders
27.	Ultrasonic Bath	28.	Conical Flask
29.	Test Tubes	30.	Emulsion Testing Cylinder
31.	Pippets	32.	Screw Cap Vial
33.	Glass Rods	34.	Funnels
35.	LCD	36.	HPLC Syringe
37.	CPU	38.	Spatulas

2.10.18 Name List of Input/Raw Materials to be used

Number of domestic, Local and imported input/raw materials will be used for product formulation. It is noteworthy that there will not be any primary manufacturing of any input/raw material at the plant. All the input/raw materials will be obtained from the market or their respective sources and will only be mixed in the prescribed ratios at the plant. **Tables 2.10.18** presents the list of the local/domestic input materials for formulating the different products.

Table 2.10.18: List of Input Materials

Sr.	Material	Sr.	Material
1.	Water	2.	Boric Acid
3.	MEA	4.	Zinc Sulphate Monohydrate (Powder Dust)
5.	Amino Acid Technical	6.	Sulphuric Acid
7.	Urea	8.	Phosphoric Acid
9.	Zinc Oxide	10.	Nitric Acid
11.	EDTA	12.	Hydrochloric Acid
13.	NAOH	14.	Filler
15.	Potassium Sulphate	16.	Sodium Sulphate

2.10.19 Name List of the Products to be formulated

Two primary types of formulated products will be formulated at the plant.

a). Dry or powdered preparations
b). Wet or liquid suspension preparations

Table 2.10.19(a): Name List of Dry and Liquid Products to be formulated

Sr.	Herbal/Unani Products	Sr.	Homeopathic Products
1.	Humic Acid Liquid	2.	Humic Acid Granular
3.	Zinc 10% Liquid	4.	NPK 886 Liquid
5.	Potash 30% Liquid	6.	Crop Supplement 10% Granular

7.	NPK 10% Liquid	8.	Boron 5% Liquid
9.	Amino Acid Liquid	10.	Bio Stimulant Liquid
11.	Zinc 21% Granular	12.	

Table 2.10.19(b): Name List of Pesticide Products to be formulated

Sr.	Herbal/Unani Products	Sr.	Homeopathic Products
1.	Emmamectin 1.9% EC	2.	Lambda Cyhalothrin 2.5% EC
3.	Chlorpyriphos 40% EC	4.	Biphenthrin 10% EC
5.	Leufanuran 5% EC	6.	Sega Pest Clear 3% EC

2.10.20 Future Products

As a part of product diversification and production enhancement programme, the proponent intends to formulate/produce various other alike products in the future. The impacts whereof will be discussed at the time of implementation of the future expansion programme. However, there is no such programme in the near future.

2.10.21 Product Formulation Operations (Process Flow)

The process flow charts of product formulation will be as given in the **Fig. 2.10.21a** and **Fig. 2.10.21b** below. For the production methods of the various products, see the relevant **Annexes**.

1. Receipt of the input materials (active, base/carrier ingredients and packaging) from their respective original manufacturers, vendors and dealers etc.
2. Quality inspection, tagging, labelling and safe placement (quarantine) of the raw materials in the inbound warehouse
3. Quality clearance of the raw materials for their usage for product formulation
4. Transfer of the input materials from the inbound warehouse to the production hall
5. Weighing and mixing of the active, base and carrier ingredients, as per the product formula and formulation of the requisite product by mixing the input materials in the appropriate machines as per the applicable standards/formulary
6. Sieving and filling of the products in the appropriate product containing packaging (bottles, jars, sachet, poly bags, etc.)
7. Final quality check, testing and quarantine before supplying the products to market
8. Transfer of the finished products to the outbound warehouse for safe storage
9. Dispatch of the finished products from the outbound warehouse to market / buyers Provision of after sale services
10. Provision of backup and after sale services

Fig. 2.10.21a: Process Flow of Product Formulation (Dry Preparations)

1. Receipt of the input materials (active, base/carrier ingredients and packaging) from their respective original manufacturers, vendors and dealers etc.
2. Quality inspection, tagging, labelling and safe placement (quarantine) of the raw materials in the inbound warehouse
3. Quality clearance of the raw materials for their usage for product formulation
4. Transfer of the input materials from the inbound warehouse to the production hall
5. Weighing and mixing of the active, base and carrier ingredients, as per the product formula and formulation of the requisite product by mixing the input materials in the appropriate machines as per the applicable standards/formulary
6. Filtration and filling of the products in the appropriate product containing packaging (bottles, jars, sachet, ampoules, etc.)
7. Final quality check, testing and quarantine before supplying the products to market
8. Transfer of the finished products to the outbound warehouse for safe storage
9. Dispatch of the finished products from the outbound warehouse to market / buyers Provision of after sale services
10. Provision of backup and after sale services

Fig. 2.10.21b: Process Flow of Product Formulation (Liquid Preparations)

2.11 Restoration & Rehabilitation Plans

The proposition essentially is setting-up a plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The plant will be setup on a vacant land on Chowk Azam Road, Layyah. As the plant will be setup on a virgin land, in accordance with the applicable building bylaws, not any restoration or rehabilitation plans are relevant or warranted. The setting-up of the plant will not involve demolition of any built-up structures, damage to any public infrastructure or displacement, dislocation or relocation of any persons or communities. Therefore, not any restoration or rehabilitation plans are relevant.

3

BASELINE ENVIRONMENTAL & SOCIOECONOMIC PROFILE

3. BASELINE ENVIRONMENTAL & SOCIOECONOMIC PROFILE

3.1 Baseline Environmental Profile

Description of the environmental settings (also referred to as "baseline", "existing", "background", or "affected environment") is an integral part of an environmental impact/environmental examination study. There are two major purposes of describing the environmental settings in an impact study, namely:

- To ascertain and evaluate the existing environmental quality, as well as environmental impacts of the alternatives being studied, including the no-action or no-project alternatives, and
- To identify environmentally significant factors or geographical areas that could preclude the development of a given alternative or alternatives

Additional purposes of describing the baseline settings include, but are not limited to, provision of sufficient information so that the decision makers and the study reviewers, who might be unfamiliar with the general location, may develop an understanding of the project needs and environmental characteristics of the area.

One of the significant environmental impacts of a developmental scheme would be the likely changes in the land use profile. If implementation of a developmental scheme involves massive conversion of agriculturally useful land into agriculturally or otherwise less useful lands or leads to deterioration of the ecological environment by substantially altering the land use pattern in a manner, which is less favourable for propagation of agriculture, then the resultant impacts can be labelled as deleterious and harmful for the environment. Conversely, if a developmental scheme envisages very little or negligible changes in the existing land use scenario or the new land usage is of superior nature, then the development is regarded an environment friendly activity to the extent of this parameter.

It would not be out of place to mention here that usually the format of an IEE/EIA is either project-specific or area-specific or a combination of both. Because of the nature of the project, the instant EIAR has been prepared according to the combination format. The baseline environmental conditions, therefore, have been described according to this format approach. The text following hereafter contains a description of the baseline characteristics of the area and the district, wherever relevant.

3.2 Studies and Surveys for Baseline Profile

The Team of Experts, in conjunction with the proponent and other concerned agencies, took-up various studies and surveys relating to the project, such as:

- Studies and investigations into the baseline environmental profile of the area, where relevant
- Physical, geological, hydrological, and topographic environmental surveys of area, where relevant
- Socioeconomic surveys of the area, where relevant
- Surveys about education profile and services in the area, where relevant
- Soil quality surveys and investigations, where relevant
- Water quality investigations and analyses
- Ambient noise profile in the vicinity of the site
- Social study surveys
- Surveys and interactive meetings with the neighbouring populations to know their understanding of the project and to solicit their specific concerns over the project, if any

The objectives of the social study surveys were:

- Finding out impacts of the project on education, health, hygiene, lifestyle and social value system of the workers and inhabitants within the project's zone of influence
- Any probable dislocation of the persons and property and removal of encroachments, if any from project's implementation, expansion or operation
- Assessing the prospects of employment and job opportunities and impacts on the economic portfolio of the beneficiary population in the area
- Ascertaining likelihood of cropping up of any social conflicts and sources of frictions with the neighbouring community or the locals
- Finding out any sources of social and physical nuisances for the project or the local community

The above-mentioned studies included visits and physical surveys of the sites and the nearby populations within a radius of 1 km from the project. The social surveys were carried out through random selection of the beneficiaries and the stakeholders. The nearby residents and the businesspersons, being the important stakeholders, were consulted in particular to solicit their views over various aspects of the proposition. Direct interviewing and soliciting the requisite information by asking short questions was found the best mode of eliciting the requisite information. The collective public gatherings were found another effective mode of procuring the requisite information. By and large, the stakeholders and the persons, who were consulted during the study, appreciated setting-up of the plant as beneficial to them from all angles and aspects. The baseline lab investigations are available as an annexure in the instant EIAR.

3.3 Environmental Description of the Site/Area

For the purpose of environmental description, a concentric area upto 0.1 km from centre of the site was taken as the project's assumed zone of environmental influence (**Fig. 3.3**). The plant will be setup on a vacant land situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. All essential and basic infrastructure like roads, electricity, natural gas, freshwater supply system, sewerage, drainage and sanitation system, solid waste management system and alike area available nearby. The proponent will also construct a wastewater treatment plant (WTP) for the treatment and disposal of the liquid wastewater, if so required and warranted. Currently, the site is a vacant land without any superstructure on it. **Fig. 3.3a to 3.3i** are the real time pics of the site prior to initiation of construction and **Fig. 3.3j to 3.3r** are the real time Google Earth imageries of the site. The geographical coordinates of the site are 31°.39'.07.42"N & 73°.13'.09.94"E, an altitude of 193 meter above sea level. The site is accessible through Chowk Azam Road, and in turn to various other destinations via the existing roadway network of the country.



Fig. 3.3: Assumed Zone of Environmental Influence of the Site



Fig. 3.3a: A real time pic of the site prior to start of construction work



Fig. 3.3b: A real time pic of the site prior to start of construction work



Fig. 3.3c: A real time pic of the site prior to start of construction work



Fig. 3.3d: A real time pic of the site prior to start of construction work



Fig. 3.3e: A real time pic of the site prior to start of construction work



Fig. 3.3f: A real time pic of the site prior to start of construction work



Fig. 3.3g: A real time pic of the site prior to start of construction work



Fig. 3.3h: A real time pic of the site prior to start of construction work



Fig. 3.3i: A real time pic of the site prior to start of construction work



Fig. 3.3j: A Google Earth Imagery of the Site

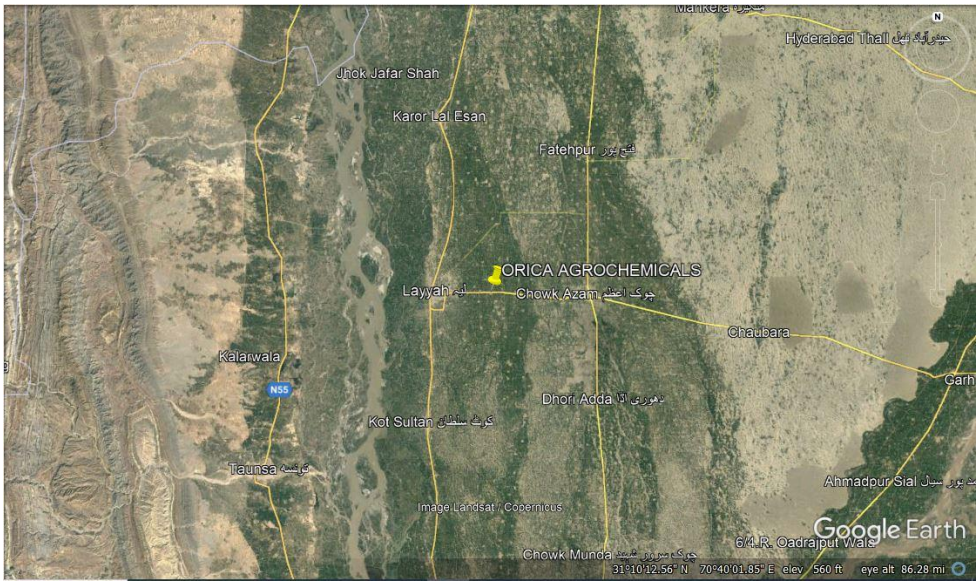

Fig. 3.3k: A Google Earth Imagery of the Site

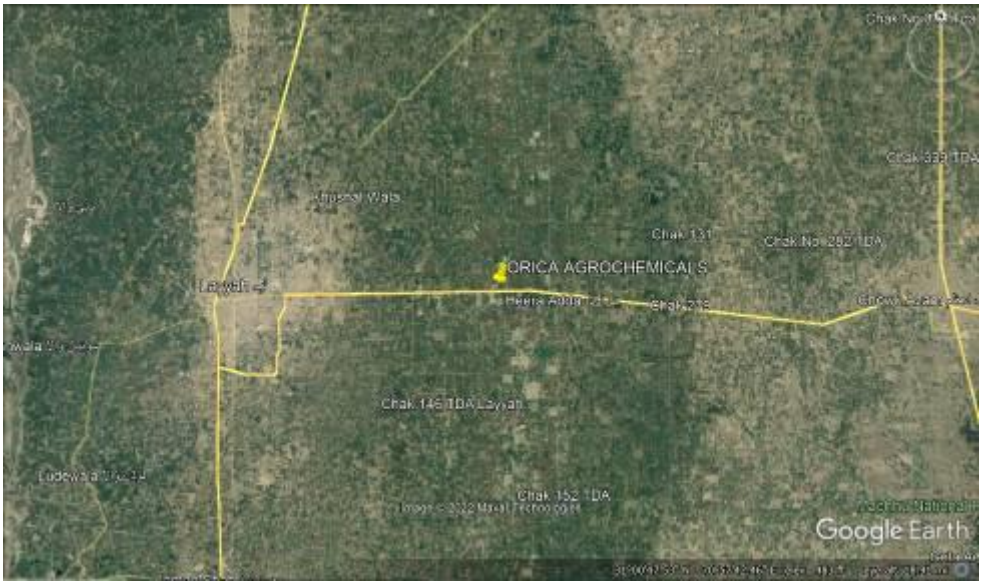

Fig. 3.3l: A Google Earth Imagery of the Site

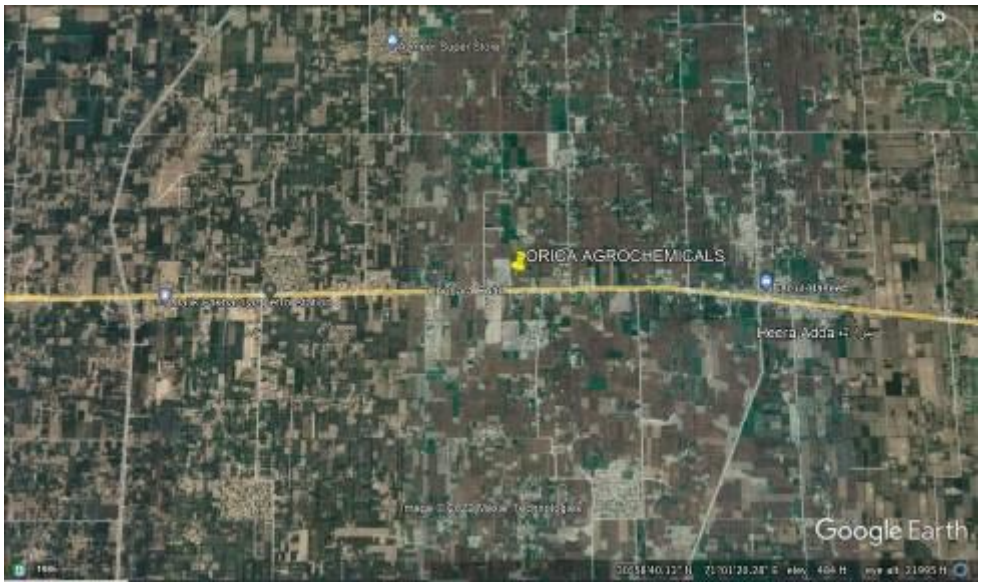

Fig. 3.3m: A Google Earth Imagery of the Site



Fig. 3.3n: A Google Earth Imagery of the Site



Fig. 3.3o: A Google Earth Imagery of the Site



Fig. 3.3p: A Google Earth Imagery of the Site



Fig. 3.3q: A Google Earth Imagery of the Site



Fig. 3.3r: A Google Earth Imagery of the Site

3.4 Geophysical Environment

The geophysical environment is that part of the overall environmental profile of an area that relates to the geological and physical entities in the area under study (the assumed radius of influence of the project in the instant case). Amongst number of various other parameters, the description of the geophysical environment includes, in particular, the narration of the site, location of the site, geology, hydrology, meteorology and atmospheric features of the site and the surrounding areas.

3.4.1 The District[2]

Layyah is an ancient land situated on the eastern (left) bank of river Indus. It is bounded on the north by districts Bhakkar and Dear Ismail Khan; on the west by district Dera Ghazi Khan and river Indus and beyond that Suleman Range; on the south by District Muzaffargarh; and on the east by district Jhang.

The ancient history of Layyah is not very much known. It probably remained under the suzerainty of Ashoka. It is claimed that Layyah somewhat flourished under the Mughal rule, particularly during the reign of Emperor Akbar. Upon decline of the Mughal power, Nadir Shah occupied the region for some time, followed by Ahmad Shah Durrani, whose armies frequently invaded India. After the decline of the Mughal Empire, the Sikh invaded and occupied Layyah. In 1846, the region came under control of the British, like rest of the Punjab, who started settlement of land here.

Geographically, District Layyah is located in the western part of the Punjab. The district is predominantly an agricultural district. However, it is reasonably industrialized. The local industry produces sugar, cement, handmade tiles, furniture and cloth. The district is also famous for the production of fine quality pulses and herbs. Owing to its proximity to the mighty Indus, the district consists of plain lands made of alluvial deposits brought down by the river. The soil is therefore extremely fertile. There are no special geographical features of the district worth mentioning, except that part of Thal Desert lies in Layyah.

The City of Layyah has considerably expanded during the recent years. The signs of expansion are visible along the outer rim of the city, where agricultural lands interpose with new constructions, inhabitations, and farmhouses[3]. Layyah is connected to other parts of the country via railway and roadway network. The approach road of the site provides a direct link of the site with the Layyah city and other destinations around.

Layyah is playing a pivotal role in country's economics and politics. There are number of technical and vocational training institutions that are imparting training in various trades e.g., mechanical, electrical, auto-engineering, welding, woodworking, and commerce. Vocational institutions for women are imparting training in hand and machine embroidery, stitching, and knitting. Sugarcane, wheat, and rice are the main crops of the district. Maize, jawar, bajra, cotton, moong, masoor, mash, and oilseeds, are also grown, but on a much smaller scale. Guava and citrus are the main fruits grown in the district. Mango, banana, leechi, jaman, and falsa are also grown in small quantities. The vegetables grown in the district include potatoes, carrot, cauliflower, and salad leaves. Tomato, onion, turnip, peas, chilly, and garlic are also grown in smaller quantities. District Layyah occupies an important position in the agriculturally rich and fertile area of the province commanded by the surface irrigation system of the Punjab.

After independence of Pakistan in 1947, many Muslims from India migrated to and settled in district Layyah. The predominantly Muslim population of the district supported the All India Muslim League and Pakistan Movement. After the independence of Pakistan in 1947, the minority Hindus and Sikhs migrated to India while the Muslim refugees from India settled here. Sheikh, Sayed, Qazi, Awan, Tarar, Theim, Bhatti, Kharal, Khokhar, Lali, Sipra, Nesoana, Seehar, Sivag, Dahar, Mohal and Cheema are the leading tribes of the district.

3.4.2 Location

The site is situated on Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah. All essential infrastructure, facilities and amenities like electricity, freshwater supply system, sewerage and drainage system, natural gas and security area available nearby. The site is a good choice for setting-up the plant here, as the following facilities and advantages are available here:

- Good road network
- Sewerage system
- Electricity distribution system

[2] Wikipedia
[3] Punjab Sustainable Development Strategy, EPD, Final Report, 2008

- High pressure gas pipelines
- Potable water
- Telecommunications system
- Computerized weigh station
- Informatory signage
- Mosques
- Petrol stations
- Social security and healthcare system for workers
- Civil Defence post and system

3.4.3 Geography

The site is bound on all sides by open and vacant plots except on the north, on which side it abuts the Chowk Azam Road, that provides the direct access to the site.

3.4.4 Topography

Topographically, the site is a vacant and unused land and available for taking up construction of the plant here. The site being in the command of river Indus and being a part of the floodplains of the Punjab, falls in the sub-montane zone of Himalayan foothills. This zone is characterized by flat lands mixed with some dry areas called bars. As such, the topographic features of the site are a reflection of the general topography of the Indus floodplains. Being an outporing of the typical of flat floodplains of the central Punjab, the site like the general floodplains is devoid of any significant topographic features. It may be interesting to mention that the relief of these flat floodplains has facilitated large-scale cultivation, development of an extensive irrigation network, construction of roads, railways and other infrastructure. The general surface gradient of the area is from north to south and from west to east with a gentle slope of 0.2 to 0.3 m per kilometre[4]. According to the Google map imagery, the elevation of the site is 212m above the sea level[5]. The most important natural surface water channel of the area is river Indus, which is the biggest rivers of the Indus Riperian System. It is noteworthy that under the Indus Water Treaty of 1965, the waters of the three easter rivers (Ravi, Sutlej and Beyas) have been given to India and the waters of the three western rivers (Chenab, Jhelum and Indus) have been given to Pakistan. The area being an irrigated floodplain, there are numerous irrigation channels and wastewater drains spread all over the wider area around the site. Apart from the above given desciption, the area does not exhibit any other special physical, geological and geomorphologic features.

3.4.5 Geology

Geologically, the lands at the site are made up of alluvial deposits of clay, sand and loam. The lands of the floodplains of the Indus, of which the site as well as the site is a part, are mantled lightly with alluvial deposits that were transported from the Himalaya foothills over the centuries. The underlying bedrock is composed of the Precambrian metamorphic to the tertiary consolidated rocks. The overlying alluvium consists of Pleistocene to recent unconsolidated deposits of sand, clay and silt. The formation age of the alluvium ranges from Pleistocene to recent times, the latter being prominent near the riverbanks and the former around the central portions of the plains[6].

3.4.6 Seismology

According to the Seismic Survey Map of Pakistan, Layyah falls in the seismic zone, which has the seismic activity equivalent to zone “2A” of the Earthquake Zones Classification of the United States Uniform Building Code, 1997 (UBC-97). This zone is associated with unknown geological conditions and the reported earthquake damage is “moderate”. Nevertheless, earthquakes of magnitude up to five on the Richter scale, which generate ground acceleration up to 0.1 g, have been reported for this zone[7]. No major earthquake has been reported during past two decades in the district[8]. According to Pakistan Building Code of 2007, district Layyah falls in Zone-4[9] of the seismic zoning map of Pakistan. This zone has very low seismic activity.

3.4.7 Soil Morphology

By their very nature and composition, the soils at the site are contiguous with soils of the wider area around and are granular to amorphous mix of sand, silt, clay, and loam. The texture, morphology, and moisture

[4] Geological Features of Punjab, Lecture Notes, Dr. M Nawaz Ch., Punjab University, Lahore
[5] Topo-sheets of District Layyah, Survey of Pakistan, 2020
[6] Geological Survey of Pakistan <www.gsp.com.pk>
[7] Geological Survey of Pakistan <www.gsp.com.pk>
[8] Geological Survey of Pakistan, www.gsp.gov.pk
[9] http://www.pec.org.pk/buildingcode.aspx

holding capacities of these soils show some intrinsic variations as one travels from north to south and from east to west. Generally, the soils in the Indus floodplain comprise relatively older alluvial deposits brought in by the mighty Indus and its tributaries. The site is no exception to the same. The soil crust is composed of alluvial deposits consisting of silt, clay, sand, and loam. Clay and silt formations occur in discontinuous layers with limited lateral extent. Their thickness is generally less than five meters[10]. Because of presence of a rich surface irrigation network, fertility and the yield per acre of the soils is good[11].

3.4.8 Surface Hydrology

River Indus is the major surface water channel of the area, but is located far away from the site. Under the Indus Water Treaty, waters of the three eastern rivers of the country (Ravi, Beyas, and Sutlej) have been given to India, whilst those of the western rivers (Indus, Jhelum and Chenab) have been given to Pakistan.

River Indus is the largest freshwater body of the area. It is the largest river of the Indus Basin followed by Chenab. **Plate 2.3.7** presents layout of the Indus basin system & **Table 2.3.7** presents typical physical and chemical quality of the surface waters in the wider project area.



Fig 3.4.8: Layout of the Indus River Basin

The pollution of surface waters in Pakistan is assuming serious proportions, because the untreated industrial and municipal effluents are thrown into the nearby rivers with impunity. This problem is more conspicuous in case of the three eastern rivers because of lesser volume and lower flow of the river water. The dilution of the poured-in untreated raw sewage direct into the river waters, especially near the city reaches, has been producing alarming pollution of the river waters is therefore quite lower. As a result of the unscrupulous pouring in of the effluents, the water quality of the rivers has been deteriorating. The canals are not saved from the nuisance of direct pouring of raw sewage. **Table 3.4.8** presents typical physical and chemical quality of the surface waters of the area.

It may be mentioned as a passing refrence that pollution of surface waters in Pakistan has assumed serious proportions as the untreated industrial and municipal effluents are thrown into the nearby rivers with impunity. This problem is more conspicuous in case of the three eastern rivers because of lesser volume and slow flow of the river water. The pouring of untreated raw sewage direct into the river waters, especially near the city reaches, has been producing alarming pollution of the river waters. As a result of the unscrupulous pouring in of the effluents, the water quality of the rivers has been deteriorating. The canals are also not saved from this nuisance of the direct pouring of the raw sewage into them.

Table 3.4.8: Surface Water Quality of the Area

Sr.	Parameter	Unit	Results	Sr.	Parameter	Unit	Results

[10] Punjab Sustainable Development Strategy, EPD, 2008
[11] Punjab Sustainable Development Strategy, EPD, 2008

1.	Alkalinity	m.mol/l	7.11	2.	Bicarbonates	mg/l	369
3.	Calcium	mg/l	50	4.	Chlorides	mg/l	51
5.	Hardness	mg/l	375	6.	Iron	mg/l	0.07
7.	Nitrate	mg/l	1.69	8.	Phosphate	mg/l	0.28
9.	Sulphates	mg/l	121	10.	TDS	mg/l	780
11.	Turbidity	NTU	0.8	12.	pH	--	6.9
13.	Total coliform	In 100 ml	5 – 8	14.			

3.4.9 Groundwater

Owing to its location in the floofplain of the Punjab and because of proximity to river and canal waters, the rate of groundwater recharge through downward infiltration in the area is reasonably fair. The groundwater system at the site is in flux with the recharge occurring from downward infiltration of river and canal waters to the aquifer beneath. Infiltration from precipitation runoff is another source of groundwater recharge[12]. Water table in the area was hit at a depth of around 30~35 metres[13]. There are number of groundwater turbines, water pumps and hand pump installed in the wider area around the site. It may be added as a passing reference that abstraction of groundwater by hand pumps is fast declining mainly because of persistently lowering water table. Motorized pumps have replaced the hand pumps, as they are much more convenient to operate. The general quality of the groundwater of the site is satisfactory and conforms to the WHO Guidelines for potable water.

The groundwater at the site, like the wider area of the district, is in flux with the recharge occurring from infiltration of the river and the canal waters as well as from the surface precipitation. River Chenab flows along the eastern side and River Jhelum flows along western side of the district and are a source for recharge of groundwater in the area, particularly after heavy rainfalls and floods. Owing to the natural east to west topographical gradient, the groundwater of the region and of the site per se exhibits the flow characteristics conformant to area's topography. As per water quality inspection, the groundwater is of good potable and irrigable quality with no visible impurities.

Government has installed reasonable number of tubewells in the district for drawing up and supplying the groundwater to domestic and commercial consumers. As there is deficiency of the canal irrigation water, many of the landowners in the area have installed their own tubewells privately for abstracting groundwater to cater for their groundwater needs.

The common modes of groundwater abstraction include hand pumps, tubewells and turbines. As reliability of the canal water for irrigation, owing to various factors, is not of the desired level, the district has a large number of tubewells, both in the public and in the private sector, for extracting groundwater primarily for agricultural needs but also for other uses such as domestic consumption and industrial needs. The number of the existing tubewells and the pace of groundwater abstraction exhibit the aquifers to be of reasonable reserve. It will be pertinent to mention that tubewell irrigation is the second major mode of irrigation in the province. According to "Agricultural Statistics of Pakistan", irrigation by tubewells accounts for nearly 30% of water consumption for agriculture[14].

According to Bureau of Statistics, Government of Punjab, there exist 44,995 tubewells in the district. The number of tubewells was around 14,120 in early eighties. Thus, tubewells have approximately trippled in about 40 years[15]. The proposed site and its surrounding areas are both canal and tubewell irrigated. According to hydrogeological mapping of the area, the groundwater yield in the vicinity of the site varies between 50-150 m^3/hr down to the 150m and the aquifer is moderately thick and extensive[16]. **Table 3.4.9a, 3.4.9b & 3.4.9c** present respectively the number of tubewells, typical groundwater quality, and microbiological quality of the groundwater of the district[17].

Table 3.4.9a: Number of Tube wells in the District

Total			Diesel			Electric		
Pvt.	Govt	Total	Pvt.	Govt	Total	Pvt.	Govt	Total
44971	44	44995	44801	1	44802	170	23	193

[12] Water Quality Status in Pakistan, Pakistan Council of Research in Water Resources, Islamabad, 2020
[13] Geotechnical Investigations of the Site
[14] Agriculture Statistics of Pakistan, Ministry of Agriculture, Islamabad, 2020
[15] Punjab Development Statistics, Bureau of Statistics, GoPb, 2020
[16] Hydrogeological Map of District Layyah, WAPDA, 2020
[17] Punjab Development Statistics, Bureau of Statistics, GoPb, 2020

Table 3.4.9b: Groundwater Quality of the Site

Sr.	Parameter	Unit	WHO Desirable Level	WHO Max Permissible Level	Results
1.	Temperature				30°C
2.	pH	--	7.0~8.5	6.5~9.2	6.9
3.	Odour	--	Unobjectionable		Odourless
4.	Colour	P.C.U	05 Units	50 Units	Colourless
5.	Taste	--	Unobjectionable	Unobjectionable	Tasteless
6.	Turbidity ppm Silica Units	NTU	05 Units	25 Units	--
7.	Total Dissolved Solids	--	500	1500	815
8.	Calcium as Ca^{++}	ppm	75	200	80
9.	Magnesium Mg--	ppm	50	150	53
10.	Total hardness as $CaCO_3$	ppm	100	500	410
11.	Total alkalinity as $CaCO_3$	ppm			300
12.	Sulphate as SO_4^-	ppm	200	400	180
13.	Chloride as Cl^-	ppm	200	600	99
14.	Conductivity at 25°C	µs/cm			1160

Table 3.4.9c: Microbiological Quality of Groundwater of the Site

Sr.	Parameter	Results	Sr.	Parameter	Results
1.	Total plate count/ml	NA	2.	Total coliforms (MPN/100 ml)	NA
3.	Faecal coliforms (MPN/100 ml)	NA	4.	E. coli (MPN/100 ml)	NA

3.4.10 Meteorology & Climate

The site is a part of district Layyah. The district per se is located in the far south plain lands of the province. The overall climate of the site and of the district is generally dry with scanty rainfall. Summers are very hot with little or no rainfall. Winters are extremely cold. The mean winter temperature (December / January) ranges between 6.5°C and 10.5°C. The mean summer temperature remains around 39°C with frequent spells crossing 44°C. The mean of the maximum temperature ranges between 29-30°C and mean of the minimum ranges from 19 to 20°C. Spring and autumn seasons are the most pleasant parts of the year and full of colourful activities. The average annual precipitation in Layyah for the past 10 years (2010-2020) has been 229 mm. The wind flow is gentle during most of the year with occasional and sporadic dust storms during the peak summers. The past climatic records show that rain rich years occurred at a cycle of 15-20 years with an intervening dry period in between[18].

The cropping cycle of the area is divided into a dry period called "rabi", which extends from October to March and a wet one called "kharif", which extends from May to October. Substantial part of the annual precipitation (approx. 50% of annual total) occurs in July and August[19]. The meteorological and climatic features of the site are as given in **Table 3.4.10**.

Table 3.4.10: Climatic Features of the Area

Sr.	Parameter	Value	Sr.	Parameter	Value
1.	Classification of Climate	Hot humid (Tropic)	2.	Wind Direction	East/Southeast
3.	Wind Intensity	Weak to moderate	4.	Average Rainfall (annual)	<229 mm
5.	Rainy Season Duration	July to September	6.	Dry season Duration	October to June
7.	Average Temp (Annual)	19-20 °C	8.	Average Temp (Summer)	36-38 °C
9.	Average Temp (Winter)	6.5-10.5 °C	10.		

3.4.11 Air Quality

Owing to predominately rural settings of the area, the general air quality of the site and that of district itself is good and meets the ambient air quality standards of Pakistan as well as the Air Quality Guideline Values of the WHO except for the particulate matter and the dust[20]. Due to movement of light and heavy traffic vehicles on Chowk Azam Road, the level of the fugitive dust in the area is relatively a little bit higher than the deeper area, away from the road. Since the plant is situated on a main road, the level of the resident dust here is a bit

[18] Based on data obtained from Pakistan Meteorology Department, Lahore
[19] Based on data obtained from Pakistan Meteorology Department, Lahore
[20] Monitoring of Air Quality in the Punjab EPD

higher than the surroundings, but the optical visibility is satisfactory. Because of this disposition, the air quality profile is reasonably good with low levels of dust and pollutants. No evidence was found of contribution of pollutants to the local air from stack emissions from the local industry, brick kilns and other stationary sources, as none were found existing in the area. At the time of visit inspection of the site, the general atmosphere at the site was found clear from particulate dust and had good visibility.

The air quality profile of the country particularly that of some major urban centres shows concentrations of some of the air quality parameters higher than the WHO Guideline Values as well as the prescribed Punjab Environmental Quality Standards (PEQS). According to a joint air quality investigation of the major districts in the country by the Pak-EPA and the Japan International Cooperation Agency (JICA), the average suspended particulate matter (SPM) in the study districts was 6.4 times higher than WHO Guideline Values.

The levels of sulphur dioxide, carbon monoxide, and oxides of nitrogen also exceeded the acceptable standards in some areas, but the average levels were below the Guideline Values[21]. Another similar study revealed higher concentrations of SPM in the ambient air[22]. However, barring congested urban centres, air quality in rest of the province generally conforms to WHO Guideline Values[23]. **Table 3.4.11** presents the ambient air quality profile of the area.

Table 3.4.11: Ambient Air Quality Profile of the Area

Parameter	Ozone (ppb)	SO_2 (ppb)	NOx (ppb)	NO (ppb)	CO (ppm)	Dust ug/m^3	Humidity (%)	Wind speed (m/s)
Conc.	5.9	10.8	42.0	30	8	395.7	23-35	1.0-2.1

3.4.12 Effluent Disposal

As the site is still a vacant land, therefore, there is no generation of sanitary origin wastewater from the site, per se. Similarly, there is also not any generation of industrial effluents or industrial discharges, since the plant has not been setup here, as yet. However, the proponent will construct a sanitary wastewater collection and disposal system for the management of the sanitary origin wastewater from the plant pursuant to its construction. Similarly, the proponent will also construct a wastewater treatment plant, for the treatment and disposal of the industrial effluents, discharges and the wastewaters to be generated from the plant, if any.

3.4.13 Background Radiological Characteristics

The background radiological characteristics of the site are nil. The X-ray machines, scanners and the radiotherapy equipment in use at the biomedical facilities at the major hospitals in the city, which is at least 5 km from the site, have some radioactive sources installed in them. However, the quantum of emission of radioactivity from these sources is negligible and does not contribute much towards background ambient radioactivity levels around. As such, there are no known radiological installations in the district, which may constitute to background radioactivity levels.

3.4.14 Ambient Noise Characteristics

The ambient noise levels at the site are insignificant. This is because of the uninhabited position of the area and open disposition of the site, which is a vacant land situated on a main road. As far as the nearby city of Layyah is concerned, the noise level vary from place to place and from time to time. Generally, the levels of the ambient and background noise are found higher during the peak hours and near the busy road junctions, in the vicinity of industrial establishments, commercial concerns and educational institutions. They are generally higher during morning and evening. In order to examine the noise potential of the site, the study team carried out a noise measurement survey, results of which are depicted in **Table 3.4.14a**. Similarly, **Tables 3.4.14b & 3.4.14b** present the hypothetical ambient noise characteristics and their impacts on human health and behaviour.

Table 3.4.14a: Noise Record at the Site

Date	Time	Noise (dB)
06.12.2021	23:00	50
06.12.2021	23:30	50
07.12.2021	00:00	50
07.12.2021	00:30	45
07.12.2021	01:00	45

Date	Time	Noise (dB)
07.12.2021	12:00	85
07.12.2021	12:30	85
07.12.2021	13:00	85
07.12.2021	13:30	90
07.12.2021	14:00	90

[21] 3-Cities Investigation of Air and Water Quality (Lahore, Rawalpindi, Islamabad), JICA/Pak-EPA, 2001
[22] 2-Cities Investigation of Air and Water Quality (Gujranwala and Faisalabad), JICA/Pak-EPA, 2003
[23] Air Quality Monitoring in Six Districts of Punjab using Physico-Chemical Techniques, EPD, GoPb, 2005

07.12.2021	01:30	40	07.12.2021	14:30	90
07.12.2021	02:00	35	07.12.2021	15:00	90
07.12.2021	02:30	35	07.12.2021	15:30	85
07.12.2021	03:00	40	07.12.2021	16:00	90
07.12.2021	03:30	35	07.12.2021	16:30	85
07.12.2021	04:00	40	07.12.2021	17:00	90
07.12.2021	04:30	40	07.12.2021	17:30	90
07.12.2021	05:00	45	07.12.2021	18:00	85
07.12.2021	05:30	50	07.12.2021	18:30	85
07.12.2021	06:00	50	07.12.2021	19:00	90
07.12.2021	06:30	55	07.12.2021	19:30	95
07.12.2021	07:00	60	07.12.2021	20:00	95
07.12.2021	07:30	60	07.12.2021	20:30	85
07.12.2021	08:00	65	07.12.2021	21:00	85
07.12.2021	08:30	65	07.12.2021	21:30	80
07.12.2021	09:00	70	07.12.2021	22:00	75
07.12.2021	09:30	65	07.12.2021	22:30	65
07.12.2021	10:00	70	07.12.2021	23:00	60
07.12.2021	10:30	70	07.12.2021	23:30	55
07.12.2021	11:00	70	08.12.2021	00:00	50
07.12.2021	11:30	65	08.12.2021	00:30	45

Table 3.4.14b: Expected Noise Level at Different Project Locations

Sr.	Location	Noise Level (dB)
1.	Active machinery construction zone	85-90
2.	Offsite areas	70-75
3.	Loading & unloading areas	80-90
4.	Offices & Support Facilities	50-70
5.	Parking Area	40-50
6.	Residential Area of the Project	60-75

Table 3.4.14c: Noise Annoyance Levels for Resident Communities

Day-night average sound level (dB)	Hearing Loss	Average Community Reaction (Likely)	Significance
75 and above	May begin to occur	Very severe	Noise is likely to one of the important adverse aspects of the community environment
70	Will not likely to occur	Severe	-do-
65	Will not occur	Significant	-do-
60	Will not occur	Moderate to slight	-do-
55 and below	Will not occur	Un-noticed	-do-

3.5 Ecological and Biological Environment

The ecological and biological environment of an area is likely to be affected by large-scale developmental schemes. The disturbances and imbalances in the ecological and or biological environment can adversely affect the biodiversity features of an area. The biodiversity of an area generally reflects the abundance and richness of the biological and or the ecological resources. The subsections hereunder contain discussion of the important impacts of setting-up and operation of the plant on the eco-biological environment as well as on the biodiversity characteristics of the area.

The site per se is devoid of any specific or major plantation except a few ordinary trees, the number of which is less than five, presently. There are no horticulture, and or wildlife parks and planned gardens at or around the site. The linear plantations along the roads, railway line, and water channels constitute another floral resource of the district[24]. It may be mentioned as a passing reference that owing to consistent human interventions over the centuries, the existing natural habitat of the area is largely a modified form of the original habitat of tropical thorn forests. Construction of an extensive irrigation network during early 20th century paved the way for transformation of the Tropical Thorn Forests into agricultural lands. This has led to a changed landscape and loss of wildlife. The predominant habitat of the district is the Tropical Thorn Forest.

[24] Brief on Punjab Forest Department, Punjab Forestry Research Institute, Faisalabad, 2020

3.5.1 Local Flora and Fauna

There is no specific flora and fauna indigenous either to the site or within the assumed radius of influence of the site. Similarly, there are no special indigenous or migratory species of aviary or wildlife particular to the site area. The biodiversity features are insignificant. Some common forms of weed, bush, and self-grown plants are found in the open agricultural lands of the area around[25]. The major forest plantations in Layyah are in the form of linear plantations along the canal banks, roads, crop field boundaries, and in recreational and botanical parks. There are no large-scale manmade forest plantations in the district. The predominant species of the plants include shisham (*dalbergia sissoo)*, eucalyptus, silver oak, and kikar (*acacia nilotica*). In addition, there are varieties of self-grown grass species standing along the surface water bodies.

It may be mentioned as a passing reference that owing to consistent human interventions over centuries, the existing natural habitat of the area is largely a modified form of the original habitat of tropical thorn forests. Construction of an extensive irrigation network during early 20th century paved the way for transformation of the Tropical Thorn Forests into agricultural lands. This has led to a changed landscape and loss of wildlife. The predominant habitat of district is Tropical Thorn Forest[26]. A list of some common flora and fauna along with biological names found in the area/district are given at **Tables 3.5.1a & 3.5.1b.**

Table 3.5.1a: Some Common Flora of the Area along with Botanical Names

Sr.	Common / Local Name	Botanical Name
1.	Jand	Prosopis spicigera
2.	Van	Salvadora obeoides
3.	Peelu	Salvadora Percica
4.	Keekar	Acacia Nilotica
5.	Shisham	Dalbergia
6.	Baqain	Azadrachta indica
7.	Shreen	Albizzia Lebeck
8.	Popular	Popules deltoids
9.	Sufeda	Eucalyptus canaldulensis
10.	Pippal	Phycus Religiosa

Table 3.5.1b: Some Common Fauna of the Area along with Zoological Names

Sr.	Common / Local Name	Zoological Name
1.	Geedarh	Cannis aurius
2.	Sayyarh (Khargosh)	Lepus capensis
3.	Percupine (Seh)	Hysterix Indica
4.	Black partridge (Teetar)	Electoris melanocephala
5.	Eagle (Cheel)	Mitrus migrans
6.	Vultures (Giddh)	Gyps futros
7.	Bulbul	Pycnonodus xynthopygos
8.	Pigeon (Kabootar)	Treron waalia
9.	Dove (Fakhta)	Streptopilia roseogrisera
10.	Ducks (Batakh)	Anas spp



Fig 3.5.2a: Ecological Map of Punjab



Fig 3.5.2b: Wildlife Map of Punjab

[25] Punjab Sustainable Development Strategy, EPD, 2008
;[26] Punjab Sustainable Development Strategy, EPD, 2008

3.5.2 Protected and Ecologically Sensitive Areas

There are not any notified ecologically protected areas within the zone of environmental influence of the site. As can be seen from the ecological and wildlife maps inserted here as **Fig 3.5.2a & 3.5.2b**, there are any sites neither of ecological importance nor of wildlife in and around the site and the district.

3.6 Socio-Cultural Environment

This section presents baseline profile of the socioeconomic and sociocultural features of the area.

3.6.1 Demographic Profile

The existing status of population count of the mauza could not be found due to non-availability of the pertinent data. Therefore, the demographic profile of the district has been used as an alternative for ascertaining the baseline conditions pertaining to this aspect.

The population of the district, which was 1121 thousand in the 1998 Census, is now crossing over 1566 thousands[27]. The average rate of population growth of the district is 3.21 percent per annum[28]. With the existing growth rate, the population is expected to double by 2025. The urban population is 114,000 (12.8%) and the rural population is 977,000 (87.2%). Overall sex ratio is 107 males per 100 females[29]. Layyah has considerably expanded during the recent years. The sign of expansion are visible around the cities, where agricultural lands interpose with new constructions, inhabitations, and farmhouses[30]. Some useful demographic data of the district has been given in **Table 3.6.1.**

Table 3.6.1: Demographic Profile of the District

Tehsil	Area (km^2)	1951	1961	1972	1981	1998	2021 (Pro)
Chaubara	2755	17	36	65	94	161	
Karor	1824	50	92	174	226	369	
Layyah	1712	95	145	256	346	591	
Total	**6291**	**162**	**273**	**495**	**666**	**1121**	**1566**

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020) *(Thousands)*

3.6.2 Land Use/Agricultural Profile

As the site is a vacant, uncultivated land situated on a main road in predominantly industrial settings, the land use profile of the site, per se, is insignificant and irrelevant with respect to the wider area around. The area outside the boundary wall of the site is mostly agricultural land. It may be mentioned as a passing reference that barring the residential areas of the major urban settlements, the open lands in Layyah are predominantly under agricultural usage. Agriculture is the most common occupation of the majority population in district Layyah. The crops grown include cotton, sugarcane, wheat, rice, maize, millets, potatoes, fodder, and some indigenous fruits like mango and citrus.

Owing to various factors, the project area has developed tremendously during the recent past. Resultantly, there has been a marked shift in the land use in the district from agricultural to residential, commercial and industrial categories and from open lands into built-up structures. This change is continuing with an enhanced pace, particularly in the peripheral rim around big towns. Whereas, land use profile in the major towns is predominantly that of permanent and the fixed structures, it is of mixed type in the suburbs and along the outer rim of the main towns, where agricultural lands still interpose with new fixed developments, constructions and inhabitations.

Despite some industrialization, agriculture is still the predominant economic activity of the district. Layyah is famous for sugarcane. Resultantly, there are number of sugar mills in the region. Sericulture, horticulture, and aviculture are also gaining popularity as the emerging economic activities. Investments in honeybee- sheep-, goat-, fish-, poultry, and dairy farming are also increasing, as the opportunities exist in these sectors. The major seasonal crops include wheat, rice, maize, and vegetables. Other agricultural products include fodder, fresh vegetables, and lattice[31].

[27] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015
[28] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015
[29] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015
[30] Punjab Sustainable Development Strategy, EPD, Final Report, 2008
[31] Punjab Sustainable Development Strategy, EPD, Final Report, 2008

The reported area of Layyah is 628,000 hectares, out of which 473,000 hectares is cultivated land and the remaining is uncultivated[32]. The combined cropped area both for rabi and kharif crops is 596,000 hectares. Area under forest cover, however, is only 1,000 hectares. Area not available for cultivation, i.e., partly occupied by fixed structures, buildings, roads, etc is 155,000 hectares.

The principal modes of irrigation in the district are the surface channels supplemented by tubewells. Rainfall accounts only for a small proportion of the irrigation supplies. The land use pattern, agricultural profile and production of main vegetables of the district is given in **Tables 3.6.2a & 3.6.2b**.

Table 3.6.2a: Land Use/Agricultural Profile of the District

Reported Area	Cultivated Area	Uncultivated Area	Cropped Area
628	473	155	505

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020) *(Thousand hectares)*

Table 3.6.2b: Production of Main Vegetables

Vegetable	Production (m. tons)		
	2016-17	2017-18	2018-19
Potatoes	75699	67304	62733
Carrot	11533	11589	15676
Cauliflower	5786	6047	6352
Turnip	3166	3376	3434
Ladyfinger	2867	2985	3396
Onion	2874	2318	1792
Tomato	974	784	694

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020) *(Thousand hectares)*

3.6.3 Industrial Profile

There is no big industry worth the name in the project area, except Layyah Sugar Mills. According to the survey status of the industry, conducted by the Directorate of Industries, Government of Punjab, there are 132 industrial units operating in the district. The district, being one of the politically important districts of the province has a mixed economy of industrial sector, agriculture sector, services sector, commercial sector, and the expatriates' income. The pace of industrialization in the district has remained impressive since after creation of Pakistan. There are a number of small to medium industrial estates, where numbers of small to large industrial units exist. The Layyah Chamber of Commerce & Industry is the main hub of industrial economic activities in the district. The district has over 500 small to large industrial and cottage units absorbing an average daily labour force of 49,000 persons[33]. A glimpse of the industrial profile of the district is given in **Tables 3.6.3a & 3.6.3b**.

Table 3.6.3a: Census Statistics of Manufacturing Industry

District	Census Year	No. of Factories	Avg. Daily Employment	Gross value of industrial production
Layyah	2018-19	6	1	3016 M

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020) *(Thousand hectares)*

Table 3.6.3b: Number of Registered Factories & Employment Status

District	Factories & Employment		
	<100	>100	Total
District Layyah	130	2	132

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020) *(Thousand hectares)*

3.6.4 Healthcare Facilities Profile

There is no major healthcare facility in the designated zone of environmental influence of the project area. The public sector health facilities of the district include one District Headquarter Hospital (DHQH), three Tehsil Headquarter Hospitals (THQH), and number of Rural Health Centres (RHCs) and Basic Health Units (BHUs). A few private clinics, home based healthcare facilities and some small to medium size medical care facilities are seen while travelling along the major roads. The major healthcare setup nearest to the facility site is the DHQH Layyah, which is located in the city of Layyah. The hospital is providing all types of diagnostic, therapeutic and

[32] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015
[33] Punjab Industrial Directory, Directorate of Industries, GoPb, 2010

preventive healthcare services including major surgeries. The hospital provides healthcare facilities to the surrounding population and even to the patients from other parts of the districts.



The number of healthcare facilities, their service level, and the area-coverage is reasonable and satisfactory. There is fair number of general and specialized healthcare facilities for providing round-the-clock medical care services. The DHQ hospital has Nursing School for training of nurses and some offer different paramedical and laboratory technician courses as well. The hospital also offers internship facilities for the fresh medical graduates. There are number of private healthcare facilities of comparable standard and quality. The number of private clinics has grown in the recent past. The public sector healthcare facilities include large hospitals, RHCs, BHUs, Rural Dispensaries[34]. These are providing primary to secondary level outdoor and indoor healthcare services for the affording patients. However, there is no medical teaching hospital in the district. **Tables 3.6.4a & 3.6.4b** depict respectively a gist of the healthcare profile of the district and a list of some common diseases prevalent in the area[35].

Table 3.6.4a: Healthcare Profile of the District

Hospitals		Dispensaries		RHCs		BHUs		TB Clinics		SHC	MCH
No	Bed	No	Bed	No	Bed	No	Bed	No	Bed		
4	400	5	0	2	40	16	32	0	0	7	1

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020) *(Thousand hectares)*

Table 3.6.4b: Some Common Diseases of the Area *(Source: Health Dev Statistics Pb, 2020)*

Sr.	Disease	Sr.	Disease
1.	Influenza (endemic)	11.	Typhoid fever
2.	Whooping cough	12.	Leprosy
3.	Measles	13.	Conjunctivitis
4.	Infantile diarrhoea	14.	Dermatitis
5.	Amoebic dysentery	15.	Glaucoma
6.	Bacillary dysentery	16.	Pneumonia
7.	Infectious hepatitis	17.	Mumps
8.	Viral hepatitis	18.	Arthritis
9.	Tuberculosis	19.	Allergic rhinitis
10.	Malaria	20.	Nutritional deficiency

3.6.5 Education Facilities Profile

There are two main streams of education setup in the area:

- Formal school education according the Government syllabi
- Informal madrassah education in madrassah attached with masjids or run by religious organizations

[34] A Brief Introduction to Punjab Health Sector Reforms Program, PMIU, 2015
[35] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015

The educational facilities in the district range from primary level Masjid-Maktab[36] schools to Degree Colleges and highly specialized research institutions or centres of excellence. There are number of Government Primary Schools in the villages and towns in the area around. However, there is no public sector university in Layyah. There is good number of technical and vocational training institutions and fair number of special education institutions in the district run by the Technical Education and Vocational Training Authority (TEVTA) and the Department of Special Education, respectively[37]. There are number of privately owned schools, academies and tuition centres. The literacy rate of the district, as per 1998 Census, is 38.7%. The male literacy rate is 53.0% and the female 23.4%. The literacy rate in the urban population is 62.5% and in the rural folk 34.9%[38].

While travelling in the area, one comes across number of privately owned schools and tuition academies, but outside the zone of environmental influence of the site. The geographical spread of the public sector or the government schools in the district is fair. Colleges for both boys and girls are also present at approachable. The primary level education facilities are being upgraded under the Punjab Education Sector Reforms Programme[39]. As regards the site, there is not any educational institution in the immediate vicinity of the site. **Tables 3.6.5a & 3.6.5b** present respectively the educational facilities profile and literacy rate of the district.

Table 3.6.5a: Educational Profile of the District

Masjid Schools	Primary Schools	Middle Schools	High Schools	Colleges
19	1244	241	143+14	16+2+11+3

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020)

Table 3.6.5b: Literacy Ratio in the District

Literacy Ratio	Urban Literacy	Rural Literacy	Male Literacy	Female Literacy
51.90%	64.20%	42.50%	60.90%	42.20%

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020)

3.6.6 Livestock and Farming

The agriculturally fertile lands are a big asset of the country. However, because of its fast engulfment by the housing and other non-agrarian sectors, availability of lands for agricultural pursuits has squeezed over the time. The site being a predominantly rural locality, is devoid of livestock and or farming. However, the livestock, goat, and sheep farming have been traditionally an attractive profession of the farming community of the district. In a way, livestock is complimentary and dependent to agricultural farming. However, because of its fast engulfment of the fertile agricultural lands by the housing and other non-agrarian sectors, availability of lands for agricultural pursuits has squeezed over the time. Nevertheless, agriculture and livestock farming are still the major sources of income for the peri-urban and the rural communities of the district. A number of small to medium size dairy and cattle farms can be seen in the villages in the wider area around. These dairy farms provide fresh milk for the residents of the nearby cities. Because of number of factors, livestock-, goat-, and sheep farming are becoming attractive sectors of investments. In a way, livestock is complimentary and dependent on the agricultural farming. Usage of the husbandry for ploughing and for farming purposes is at the decline and is being replaced rapidly by mechanical implements of farming. Government and commercial financial institutions are granting liberal loans to the farmers and the growers for purchasing agricultural machinery[40]. **Table 3.6.6** presents some statistical data about the livestock resources of the area/district.

Table 3.6.6: Livestock Resources of the District

Cattle	Buffaloes	Sheep	Goats	Work Animals
327,000	213,000	275,000	373,000	36,000

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020)

3.6.7 Infrastructures Profile

The site, owing to its siting on a main road, has almost all the basic public infrastructure. The construction and development of the missing infrastructure by the Government is in progress. The electricity poles have been installed and the sewerage drainage network is being laid. It need no reiteration that provision of all essential infrastructure as required for hassle free setting-up and running of the industry here is the primary responsibility of Government. The Chowk Azam road, on which the site is situated, offers an excellent driving

[36] Mosque is called "Masjid" in Urdu Language. Maktab is Urdu equivalent of school
[37] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015
[38] Punjab Development Statistics, Bureau of Statistics, GoPb, 2015
[39] Info by School Education Deptt. GoPb, 2020
[40] Punjab Development Statistics, Bureau of Statistics, GoPb, 2020

quality[41]. It may be noted that construction of roads and provision of related infrastructures in rural areas of the district are being upgraded under various development and upgradation packages.

As a part of its developmental agenda, the Government is focussing attention on the construction of farm-to-market roads (FMR) in the district and building of other infrastructures through the "Khushal Pakistan Programme" under the Public Sector Development Programme (PSDP). Construction of the roads under various programmes has substantially improved agricultural marketing and timely transportation of the produce from farm to markets.

Being the district headquarter, the city of Layyah is a major transport hub and is well connected to other parts of the country through roads and railway network. Many of the trains moving between Karachi and Peshawar halt at Layyah. The road transport is available for almost all the major cities of Pakistan. The nearest airport is DG Khan Airport, about 25 Kilometres away from the site. **Table 3.6.7** presents the road network and infrastructure profile of the district.

Table 3.6.7: Infrastructure Profile (Length of Roads in km) of the District

National Highways	Motorway	Provincial Highways	R&B Sector	FMR	Sugarcane Cess Road	Ex-Distt. Council Roads	Total Length
00	00	452.85	25.76	982.83	28.63	68.30	1558.37

(Source: Punjab Development Statistics, Bureau of Statistics, GoPb, 2020)

3.6.8 Socioeconomic Profile

The site being a vacant land, uncultivated and unused land, is devoid of any socioeconomic profile of any sort. The majority of the residents of the nearby villages rely upon animal husbandry for sustenance and income and tend to rear cows, sheep, goats for milk and meat. Small-scale cottage and the agro-based industry are on the rise. Many of the locals travel to find work in bigger urban centres and metropolises like Faisalabad, Islamabad, Lahore, and Karachi.

The people of the rural areas depend largely on livestock for their livelihood and usually keep buffaloes, cows, sheep, goats and bullocks. Cash income of the people is small. As far as employment is concerned, abundant opportunities of business, trade and industry exist. A large section of population is absorbed in services sector, mainly in the civil government. A few are working abroad as expatriates. Large sections of population are engaged in agricultural sector i.e., farming and livestock raising. The mean income level of the people is around Rs. 3,000~5,000 per month. Opportunities of income enhancement exist in the business, trade, industry and agriculture in the district.

Communication facilities in the form of regular landlines and mobile telephony are available in the entire district. Telecommunication system in the form of regular landline, broadband wireless telephony, and mobile telephone connections is one of the growing areas. Internet facility through dialup and broadband DSL is available. The majority of the educational institutions in the public and private sector have computers for aiding in teaching and making the students computer literate.

The main occupations of the population are farming, shop keeping, service (government & public), working abroad and working as labourer. According to the statistics relating to income of the main occupational classes, per capita per day income ranges from Rs. 21 to Rs. 77 for the main occupational groups. The per capita income appears to be related to the officially announced poverty line of Rs. 878.64/capita/month (Pakistan Economic Survey, 2020) that comes to Rs. 29.28 per capita per day. The latest estimate of inflation-adjusted poverty line per capita per day comes to Rs. 34.82 in 2019, up from Rs 29.28 in 2017-18. The analysis reveals that except for households, whose members are in Govt. or private service, or whose family members have gone abroad, the other occupation classes in the area are living below the official poverty line.

3.6.9 Culture, Religion, Customs, Traditions and Specialties

The site being a vacant land, is devoid of any historical culture, customs, tradition, religious practices and the specialties. The people of the area predominantly are Muslims. Punjabi, with variant dialects, is the native language and is spoken widely in the district. However, Urdu is gaining popularity and is becoming the lingua franca, particularly amongst the youngsters and the educated youth. People generally respect "chadar" (women headgear symbolic of women respect) and chardewari (privacy), i.e. they do not mingle up with women publicly and stay away from others houses and respectfully wait to be called in or the residents to

[41] Punjab Development Statistics, Bureau of Statistics, GoPb, 2020

come out from their houses. A reasonable proportion of womenfolk observe the purdah (veil) etiquette, i.e., they remain secluded from outsiders. However, womenfolk do participate in almost all sort of social, cultural, economic, educational, and service activities[42]. Although Joint family system is the predominant mode of social life, yet "nucleus" or small family system is also found because of socio economic compulsions and attitudinal shifts in the youth.

The culture of the district is a mix of three different traditions Punjabi, Colonial and Immigrants. The people are generally religious and conservative. The two main languages spoken in the region are Punjabi and Urdu. However, considerable number of people speaking Saraiki and Pushto are also settled in the district. By and large, the residents are co-operative and willing to live peacefully. The linguistic and caste based ties and preferences appear to be reasonably strong. Everyday commodities as well as items of luxury are freely available in the district.

Although Joint family system is seen in number of households in the surrounding areas, yet the nucleus or small family system is fast emerging as the preferred mode of living, particularly in the urban areas, because of socio economic compulsions and attitudinal shifts in the youth.

3.6.10 Historical & Archaeological Sites

As can be seen from the information provided in **Table 3.6.10**, there is no historical site within the zone of environmental influence of the site. There is not any antiquity protected under the Federal legislation i.e., the Antiquities Act 1976 or the Punjab Special Premises Ordinance 1985[43].

Table 3.6.10: Historical and Archaeological Sites in the District

Federally Protected	Provincially Protected
▪ Nil	▪ Nil

3.7 Lab Reports of Environmental Analyses

Lab reports of the proposed project site are attached for kind perusal. The relevant environmental lab analyses parameter is a part of EIA reports.

3.8 Suitability of the Site

The site, being a vacant land, owned and possessed by the proponent, situated on Chowk Azam Road, Tehsil and District Layyah, is suitable for the setting-up of the plant here. The plant will be constructed only after grant of its environmental approval from the EPA-Pb.



[42] Based on information obtained during professional team's visit to the site
[43] Punjab Development Statistics, Bureau of Statistics, GoPb, 2020

4

ENVIRONMENTAL EXAMINATION & MITIGATIONS

4. ENVIRONMENTAL IMPACTS & MITIGATIONS

4.1 Environmental Impacts and Mitigations

This instant section describes the aspects of environmental examination both of the setting-up and the operation phase of the plant on the physical, biological, social aspects of the environment. The report presents an outline of the measures for mitigation of the identified impacts. Both the primary and secondary as well as the direct and the indirect impacts have been discussed with respect to their immediate and the ultimate impacts on the various environmental quality parameters and the social significance.

Unlike the large-scale developmental projects, the instant project, because of its relatively smaller size, scale and spread, is likely not to produce any significant or even insignificant impacts on the local physical, biological and social environment within or out of the project's zone of environmental influence. The setting-up of the plant will require some civil works in the form of construction of buildings for administration and allied and ancillary purposes as well as for the machinery and equipment. The building construction and installation of machinery and equipment will not take much time. On account of its being a small sized unit, there will not be any massive civil work construction. The construction plan of the plant has been designed in such a manner, as to cause no disturbance to the environment.

All and various activities relating to setting-up of the plant (such as civil, mechanical & electrical works etc.) will be carried out concomitantly in a single phase. The interaction of these activities with the environmental parameters and the possible impacts on the baseline environment profile (positive & negative; visible & invisible; concrete & absolute; and reversible & irreversible) have, therefore, been examined jointly. The sections and subsections, following hereinafter, present a discussion and analysis of the various foreseeable environmental and social impacts, if any (although none is expected) during both phases i.e., the construction and the subsequent operation phase. Besides presenting analysis of the likely impacts, the discussion presents an outline of the mitigation strategy and the best-suited mitigation measures for avoiding and addressing the identified adverse impacts, if any. The report presents discussion and analysis of the various primary and the secondary impacts as well as the direct and the indirect impacts of the Plant with respect to their immediate and the ultimate or distant effects on various environmental quality parameters & social factors of significance, wherever relevant.

The environmental impacts of the project are likely to arise mainly from consumption of various materials as well as other resources during setting-up and operation phases. It is expected that some machinery running on fossil fuel (like petrol, diesel) will be employed during construction. The end-of-pipe exhaust emissions from engines of this machinery and generation of noise during its usage may produce some limited scale and momentary impacts on the local environment. Additionally, generation and disposal of unspent materials, debris, solid wastes and wastewater may be associated with some other insignificant and transitory impacts of construction. The plant will be an industrial setup for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage in an environment friendly manner. The majority structures will be of iron and steel interposed with masonry works e.g., construction of plant and office buildings and alike. Therefore, the majority of the impacts concerning the construction will be temporary and transitory in nature, e.g., noise and debris generation. They will abate once setting-up of the plant is complete and the machinery is taken off the site.

As against the negative impacts, there will be number of positive impacts of setting-up of the plant. These would include availability of jobs for both skilled and unskilled personnel, income prospects for the persons involved in carriage and transport of materials and goods for setting-up of the plant, and above all easy availability of range of products to be formulated here. The premier most positive benefit of the plant will be the ubiquitous availability of good quality agrochemicals, across the country. The ailing humanity, particularly the aged, women, nutrition-deficient and other vulnerable sections of the society will benefit greatly from availability of good quality and other soil enriching products. Because of these benefits, it is suffice here to state that the positive benefits of setting-up the plant will far outweigh the potentially negative impacts, if any, particularly, whence most of the latter are insignificant and mitigable. The environmental and social impacts of the plant during its operation, if any, are likely to remain confined to the chances of industrial accidents, which can be mitigated easily by acting upon the mitigation measures as have been given in the EIAR.

4.2 Impact Assessment Methodology

The instant IEE Report is based on the standard impact assessment methodology as prescribed by Government of Pakistan[44]. In accordance with the said methodology, comparative analysis, both of the negative and the positive impacts has been carried out with respect to the existing baseline conditions. The said comparison follows a parametric and a non-parametric scheme i.e., how and to what extent various environmental quality parameters (e.g., those relating to soil, air, water, and aesthetics) and non-parametric aspects (economy, social value system, employment, lifestyles, and behavioural patterns) will be influenced by various activities within the Plant's zone of environmental influence.

The Modified Impact Assessment Matrices (**Tables 4.2a & 4.2b**) and a specific questionnaire (**Table 4.2c**) have been used for identification, screening and characterization of the unmitigated as well as the residual impacts on the physical, biological and social aspects using a numerical scale from (-)2 to 0 to (+)2 respectively. The value (-) 2 denotes high adverse impacts, (-) 1 low adverse impacts, 0 insignificant impacts, (+) 2 high beneficial impacts, (+) 1 low beneficial impacts, and N denotes nil impacts. This method of scaling up of the magnitude of the impacts helps in easy appreciation of the nature, quantum and effect of the impacts.

4.3 Impact Mitigation Strategy

The mitigation measures, as presented in this document, are intended to prevent and reduce the foreseeable impacts of the activities during setting-up of the plant. The mitigation strategy for countering the adverse impacts is built on the following hierarchy of choices:

- Avoiding a particular impact altogether by taking or not taking a certain action or activity
- Minimizing the impact by limiting the degree or magnitude of the action and its implementation
- Rectifying the impacts by repairing, rehabilitating or restoring the affected environment
- Reducing or eliminating the impacts over the time by preserving and maintaining the operations all during life of the action
- Compensating for the impacts by replacing or providing substitute resources or environments
- Installing pollution control system and devices wherever indicated and necessary
- Improving landscape of the site to augment aesthetics and to reduce visual intrusion
- Reducing transmission of unwanted noise from site or spots of noise generating activities
- Taking any other appropriate step on the basis of feedback information of construction, usage and operation

It is advisable that these measures are implemented in a sequential order, beginning with avoiding the impacts and thereafter adopting the next sequential choices according to the ease of their implementation and cost considerations. Adoption of the above outlined mitigation strategy is expected to ensure long-term environmental and social sustainability of the project.

4.4 Probable Environmental Contaminants

The type and quantity of air pollution, wastewater and solid wastes from an industrial unit will depend on different parameters. These parameters include the type, quality and amount of the raw materials used, the auxiliary agents employed, the fuels used, the production methods employed and various other factors and parameters relevant to that particular plant.

The three classical types of wastes, i.e., solid wastes, wastewaters, and air emissions are likely to originate from almost all industrial concerns. However, in the instant case, the simply physical activities of mixing of active and carrier ingredients will not involve any chemical processes. Hence, there is no likelihood of generation of obnoxious wastes, wastewaters and or air emissions except in the exhaust/vents of some machinery running on fossil fuel (e.g., diesel generator). Therefore, construction as well as operation of the plant will not be of any significance from environmental standpoint.

4.4.1 Liquid Wastewaters

freshwater is used in virtually all industrial concerns, as good quality water is essential for various process operations, wherever relevant, and for overall human and personal needs. While a number of parameters may be considered in evaluating the effects of the wastewaters generated in any operation, it has been found that three of them are of principal significance, viz:

[44] Environmental Impact Assessment Guidelines, GoPk Islamabad, 1997

1) BOD_5: which indicates the oxygen demand of the effluent / wastewater and thus measures the organic oxygen consuming materials;
2) TSS: for measuring the loads of suspended materials which could interfere with water quality and other physical characteristics of water;
3) pH: for assessing the acidity or alkalinity of the wastewaters.

On an individual basis, and depending upon the source of wastewater, the chemical oxygen demand (COD), temperature, acidity/alkalinity, total coliforms, faecal coliforms, total dissolved solids (TDS), and nutrients may be of significance.

4.4.2 Air Emissions

The plant will be simply a facility for formulation of good quality agrochemicals. The formulation activities will not involve any chemical or like process operations. Owing to employment of cleaner production technology and simple physical nature of the formulation operations, there will not be the generation of any stack or air emissions. Another check will be provided through computer-aided software monitoring of the production operations. The computer software will not allow an activity to take place unless all requisite security checks and procedural steps have been fully taken. The plant will be fitted with a warning system to alarm about smoke and gaseous dust from the plant area/premises. In case of any escape of smoke, gases or particulate, the detection and warning system will trigger-on automatically. The triggering of the safety system will stop the machinery forthwith and until removal of the fault. In this manner, entry of smoke and gaseous matter in the ambient air will be forestalled. In addition to effective control over air emissions, development of greenbelts and generous tree plantation at the site will improve ambience and aesthetic outlook of the premises. The hydrocarbon fumes from exhaust pipes of the vehicles, if any, will be captured by the vegetation/plantation.

4.4.3 Solid Wastes

There will be no solid waste generated at the Plant except some kitchen garbage, food trash, and other routine waste in small quantities from the residential, administration, cafeteria, and drivers' rest-area inside the plant. The solid wastes to be generated during setting-up will include domestic waste from sewage, waste oil, polythene and plastics, packing material, lubricants, containers and unused / broken pieces of construction materials. The waste to be generated during operation phase will include primarily the foodstuff trash, paper and stationery from offices and ordinary wrappers, shopping bags etc. The solid waste to be generated will be collected on daily basis and will form part of the solid waste of the town municipal administration. The proponent will pay the required charges / fee for this purpose to the concerned solid waste collection agency.

4.5 Impacts and Mitigations relating to Design & Planning Phase

The discussion following hereinafter relates to impacts of the setting-up of the plant on various important environmental parameters.

4.5.1 Design & Layout Planning

The subsections following hereinafter present a discussion on environmental impacts of the plant's design and planning stage. As per the information provided by the proponent, a professional engineer has prepared the design and layout plan of the Plant perfectly in accordance with the laid down criteria, guidelines and specifications of the regulatory authority. However, the proponent will carry out building construction through the hired-on-contract labour force and a petty contractor. Therefore, both the proponent and the petty contractor will be responsible for the aspects relating to design and construction of the plant in accordance with the design criteria and specifications of the regulatory authority. The scope of work will include preparation of detailed design criteria, design analysis, design calculations, detailed technical drawings and quality control procedures necessary for design of the Plant together with O&M costs. The contractor will carry out the additional site investigations, if necessary, for developing and drafting a construction schedule sufficient to meet the requirements by adhering to the same.

i) Likely Impacts

- An aesthetically poor designed building/structure

ii) Activities Likely to Produce the Impacts

- Architectural designing and layout planning of the building/structure

iii) Mitigation Measures

- Services of a professional consulting engineer of experience and repute should be hired for preparing the layout plan, engineering features and design of the plant in consultation with the sponsoring agency and the proponent. The engineering design should cater for all and various physical requirements of the Plant commensurate to climatic conditions of the broader area. The proponent has already carried out these steps by designing the plant as per the applicable conditions of the regulatory agency
- All structural, layout and engineering designing of the Plant should be in strict conformity with the applicable bylaws, building codes and the engineering parameters of the international bodies as well as the Pakistan Engineering Council
- Design of the building should conform to overall aesthetics of the area

4.6 Impacts and Mitigations relating to Construction Phase

The discussion following hereinafter relates to impacts of the setting-up of the project on various important environmental parameters.

4.6.1 Parametric Impacts of Construction Phase

The subsections following hereinafter present a discussion on various parametric impacts of setting-up of the plant.

4.6.1.1 Soils and lands

Impacts on the soil quality will emanate mainly from excavation of the ground for laying foundations. Since, there will not be any massive civil structures; there will not be impacts on soils and lands

i) Likely Impacts

- Generation of dugout and excavated soil from digging of foundations etc.

ii) Activities Likely to Produce the Impacts

- Soil digging and excavation

iii) Mitigation Measures

- All dugout soil be preferably backfilled
- Excess dugout soil may be provided to the neighbouring landowners for filling of depressions and levelling of their lands, if there be such a demand from them

4.6.1.2 Surface Water Quality

As mentioned earlier under Chapter 2, there are not any surface water channels near or in the zone of environmental influence of the site. Therefore, no likelihood of any interaction with surface waters.

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures

- Nil

4.6.1.3 Groundwater Abstraction and Quality

There will be hardly any usage or consumption of freshwater for setting-up of the plant. The freshwater requirements relating to setting-up will be met by procuring water from local water supplying contractors. If needed, a borehole will be constructed for obtaining groundwater through a water pump or turbine or tubewell, as may be feasible.

Reasonable quantity of water will be required during setting-up. The approx. water requirement for setting-up of the plant will be 5,000,000 gallons. The borehole for the firewater tank / system will be used to cater for the requirements during setting-up. Another borehole will be drilled for additional water requirements during setting-up. It will be used subsequently for the water requirements of the support facilities. Being of small discharge, extraction of water through the two boreholes is likely not to compete with water resources of the area. After construction, the water requirement will be considerably reduced. It will be required for normal routine human needs of the staff and the drivers coming with tank trucks for loading and unloading.

Requirement for firewater system will also become stable. Pumping will be required for replacement of the previously stored water on prescribed intervals. There is no population or human settlement nearby the site. Pumping out of the extra water during the temporary phase of construction therefore is not going to affect the community water supplies.

Generally, construction activities, per se, do not cause groundwater contamination. The groundwater quality is likely to be affected only if wastewater (from any source) somehow succeeds in reaching to the groundwater aquifer. The most plausible route is a groundwater borehole. Therefore, if any borehole is constructed, it will be under direct supervision of a qualified engineer to avoid construction of a faulty borehole.

i) Likely Impacts

- Likelihood of competitive consumption of groundwater vis-à-vis other users
- Likelihood of lowering of water table from excessive withdrawal of groundwater beyond yield of aquifer
- Likelihood of contamination of groundwater from downward movement of pollutants along borehole line from construction of a faulty borehole

ii) Activities Likely to Produce the Impacts

- Abstraction, withdrawal and consumption of groundwater
- Construction of a groundwater borehole

iii) Mitigation Measures

- Ensure implementation of water use conservation practices
- The borehole should be constructed under the direction supervision of a qualified engineer
- Excessive and unwanted withdrawal of groundwater be avoided. Overhead tanks may be constructed to store and release water for various needs to avoid frequent withdrawal / pumping of groundwater

4.6.1.4 Wastewaters and Effluents

Setting-up of the plant will not generate any wastewaters, whatsoever

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures

- Nil

4.6.1.5 Solid Wastes

Setting-up of the plant will not generate any solid wastes, whatsoever

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures

- Nil

4.6.1.6 Air Quality

Setting-up of the plant will not produce any permanent air quality impacts. The controlling of the dust emissions during construction and operation of the plant will be useful in minimizing nuisance conditions and consequently health (respiratory and eye) complications. It is recommended that a standard set of feasible dust control measures be implemented during setting-up of the plant. Emissions of minor contaminants (nitrogen oxides, carbon dioxide, sulphur oxides, and particulate matter PM_{10}) that may appear in the exhausts from the heavy construction machinery be also included. The proponent is committed to implement effective measures that will reduce air quality impacts associated with plant's construction phase. All personnel working on the project will be trained on methods for minimizing air quality impacts during setting-up of the plant. This means that the workers will be trained regarding the minimization of emissions during setting-up of the plant.

Specific training will be focused on minimizing dust and exhaust gas emissions from heavy machinery and vehicles. The vehicle drivers should follow the instructions to minimize unnecessary trips, refill petrol fuel tanks in the afternoon, and minimize idling of engines.

i) Likely Impacts

- Generation of airborne particulate dust from setting-up activities as well as drag dust from wheels of moving vehicles

ii) Activities Likely to Produce the Impacts

- Various construction and setting-up activities, particularly emissions from engines of the vehicles and heavy machinery employed for construction works

iii) Mitigation Measures

- Dust emissions should be controlled by following measures:
  - Frequent watering of all active construction areas/sites, when necessary
  - All loose materials like sand, soil should be covered with suitable impervious material e.g., tarpaulin, to avoid and prevent flying off dust particulates. All trucks to maintain at least two feet of freeboard
  - Preference should be given to pave the bare soils/area e.g., parking area. If pavement is not possible, then application of soil stabilizers may be considered. Else, the kacha areas be sprinkled frequently with used water to help prevent flying off dust therefrom
  - Instead of dry sweeping, use wet sweeping of the hard and paved areas like access roads, parking areas and staging areas at the active construction site(s)
  - Exposed surfaces should be regularly wetted in a manner that effectively keeps down the dust
  - Stockpiles of fine materials (e.g., marl) should be wetted or covered with tarpaulin during windy conditions
  - Site workers be provided dust masks for use during dry and windy conditions or while doing diggings
  - The neighbourhood communities, if any exist within zone of environmental influence of the site, be informed in advance of any soil digging or alike activities that are likely to produce dust etc. to help them to make necessary protective arrangements

- Following measures may be adopted to counter and control exhaust emissions during setting-up of the plant:

  - The idling time of the vehicles should be minimized, as far as possible
  - Engines of the vehicles should be switched during idling period
  - Engines of all vehicles, machinery and equipment be properly tuned and well-maintained

4.6.1.7 Noise and Vibrations

Generally, the noise and vibrations are of significance only if their levels exceed the prescribed limits. The noise levels higher than a threshold can produce psychological and social impacts of distracted attention, irritation and short-temperedness. However, owing to non-cumulative property of sound and vibrations, the impacts are reversible and of significance only during continuation of the noisy activities. It is expected that heavy construction machinery will be employed for construction activities. The usage of the heavy machinery, such as hydraulic excavator, mobile service crane, dumper trucks and tipper lorries is likely to generate some noise. The amount of noise will depend on size, engine type, age and condition of the machinery to be used. The contractor will be expected to provide proper personal protective equipment and well planned programs for equipment usage.

i) Likely Impacts

- Annoyance to exposed persons
- Distraction of attention and psychological implications

ii) Activities Likely to Produce the Impacts

- Ordinary and routine operational activities

iii) Mitigation Measures

- Noise masking devices like earplugs, ear covers etc. may be provided to the exposed persons
- All noise producing machinery and equipment be tuned and calibrated to reduce noise generation
- Noise masking barriers be placed around noise producing machinery and equipment e.g., compressors, diesel generators, heavy-duty drilling machines etc.
- Preference be given to install newer and modern equipment that produces lower noise (quiet equipment)

- All noisy activities housed preferably be taken during daylight hours when the levels of background noise are higher to take advantage of masking effect of the background noise levels
- Make efforts to reduce idling time of the vehicles to reduce duration of noise generation from their engines. The vehicle drivers be instructed to switch of the engines, if they foresee a longer idling time

4.6.1.8 Access, Easement, Health, Wellbeing, and Worksite Safety

Setting-up of the plant will not cause any issues of access, easement, health, wellbeing, and worksite safety, whatsoever.

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures

- Nil

4.6.1.9 Smell and Odour

Setting-up of the plant will not generate any smell or odour, whatsoever

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures

- Nil

4.6.2 Non-Parametric Impacts of Construction Phase

The subsections following hereinafter present a discussion on the non-parametric impacts of setting-up of the plant.

4.6.2.1 Site Preparation

The site preparation work may include activities relating to site clearing, de-weeding of the site, filling of depressions and levelling of land etc. The waste generated from site clearing activities be collected and placed at one corner of the site. The local waste-pickers be encouraged to pick-up useful things from it. The organic contents of the waste e.g., dry branches of shrubs, bushes etc. may be provided to nearby residents for usage as a biomass fuel. The remaining inorganic part may be used as a backfill material.

i) Likely Impacts

- Flying off dust and particulate matter
- Collection of mixed waste comprising organic and inorganic matter

ii) Activities Likely to Produce the Impacts

- Land clearance activities for preparing the land for taking up construction of superstructures

iii) Mitigation Measures

- Not any specific mitigation measures warranted
- The organic portion of the land clearance waste, e.g., tree branches, be reused as fuel by security staff

4.6.2.2 Land Use Change

Land use change from a more useful purpose to a less useful purpose is considered generally a kind of negative environmental impact. As regards the instant project, there will not be any land use change from setting-up of the plant on the selected site. The site is a vacant land and therefore available for setting-up the plant. Owing to this disposition, there will not be any land use changes, whatsoever from setting-up of the plant, here.

i) Likely Impacts

- No land use change

ii) Activities Likely to Produce the Impacts
- Setting-up of the plant will not cause any land use change

iii) Mitigation Measures
- Not any specific mitigation measures needed

4.6.2.3 Solid Wastes
The generation of the ordinary solid wastes during setting-up of the plant will not be of any significance and hence of no relevance.

i) Likely Impacts
- Not any generation of solid wastes during setting-up of the plant, except some ordinary trash from consumption of foodstuff by the worksite labour and staff etc.

ii) Activities Likely to Produce the Impacts
- Not any specific activities except consumption of some foodstuff by the worksite labour and staff

iii) Mitigation Measures
- The foodstuff based trash be disposed through the local waste management system

4.6.2.4 Access, Easement, Health, Wellbeing and Worksite Safety
There might be some environmental and social impacts pertaining to rights of access, easement, healthcare, community wellbeing and worksite safety during setting-up of the plant. Improper and poor structural design can lead to construction of a poor quality structure, which in turn can produce psychological, behavioural and health impacts on the users of the facility. A poorly designed structure can be troublesome for the users and the neighbourhood persons. Haphazardly placed materials and construction debris on or near the site can cause impedance of movement, risks of personal injuries and inconvenience for the workers and exposed persons. Non-observance of the worksite safety instructions and non-use of safety gadgets during setting-up or operation of the plant can increase vulnerability of the exposed persons to adverse health and personal safety impacts.

i) Likely Impacts
- Obstruction of movement of the persons from haphazardly placed construction materials and or debris at the worksite
- Risks of personal injuries from disorderly placed materials, debris etc.

ii) Activities Likely to Produce the Impacts
- All and various construction and demolition activities

iii) Mitigation Measures
- Ensure placement and storage of the raw materials and debris at the designated enclosure at the premises
- Ensure affixing of appropriate signage at appropriate places at the site

4.6.2.5 Cutting and Removal Trees and Crops
Setting-up of the plant will not involve cutting and removal of any trees, whatsoever

i) Likely Impacts
- Not any impact as there will not be any tree cutting

ii) Activities Likely to Produce the Impacts
- Not any specific activities as there will not be the cutting of any trees

iii) Mitigation Measures
- Generous tree plantation and development of greenbelts be taken up to enhance aesthetics, ambience and outlook of the site, preferably side by side with construction of the plant

4.6.2.6 Construction Waste
Setting-up of the plant is likely to generate some construction waste and debris such as broken bricks, pieces of stone, tiles, bits of iron and steel, paints, wood pieces, pipe pieces and host of other materials. Disposal of

these unspent materials will be all the more essential before handing over the building by the contractor to the proponent. The primary responsibility of the safe and secure disposal of these materials will be of the contractor. It is recommended that this construction waste be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses.

Preference should be given to use these leftover materials at some other construction site. Else, these may be provided, free of cost, to the local communities who may use them in the construction of their houses etc. Likewise, these can be sold out to local junk vendors for reuse and recycling. In order to reduce generation of the leftover materials, the proponent shall put in efforts to ensure that construction materials requirements are carefully budgeted and the amount of leftover materials is kept minimal.

It is further recommended that the proponent should consider use of recycled or refurbished construction materials, wherever possible. Purchasing and using once-used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris to be disposed of as waste at the completion of construction.

i) Likely Impacts

- Generation of unspent, leftover and useless construction and demolition waste with attended impacts

ii) Activities Likely to Produce the Impacts

- Construction activities involving procurement and usage of construction materials

iii) Mitigation Measures

- Preference be given to use durable and long-lasting materials that will need not to be replaced frequently, thereby reducing the amount of construction waste to be generated over time
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements
- Preference be given to use building materials that have minimal packaging to avoid generation of excessive packaging waste
- Preference be given to use construction materials containing recycled content where possible, in accordance with accepted standards

4.7 Environmental Impacts of the Operation Phase

The discussion following hereinafter relates to some foreseeable impacts of Plant's operation phase on various important environmental parameters as well as non-parametric aspects. As a general rule, the potentiality of the negative impacts of a project is likely to increase with the number of persons using it. Higher the number of users, higher will be the amount of the wastes, effluents and air emissions generated. Thus, volumetric increases of consumption of resources and the resultant generation of effluents and emissions will be proportional directly to the number of users of the setup.

4.7.1 Parametric Impacts of the Operation Phase

The subsections following hereinafter present a discussion on parametric impacts of Plant's operation phase.

4.7.1.1 Soil and Land

The operation of the upgraded plant will not have any significant interventions with the local soil and land, in any manner, whatsoever.

i) Likely Impacts

- Not any impacts on local soil and land

ii) Activities Likely to Produce the Impacts

- Not any specific operational activities

iii) Mitigation Measures

- Generous tree plantation and development of greenbelts be taken up to enhance aesthetics, ambience and outlook of the site, preferably side by side with construction of the plant

4.7.1.2 Surface Water Quality

The operation of the upgraded plant will not have any interaction with any surface waters, as none exists in the area. The local geographical gradient does not suggest any likelihood of effects on the surface water from any of the operational activities, whatsoever.

i) Likely Impacts

- Not any impacts, as there are not any surface water near the site

ii) Activities Likely to Produce the Impacts

- Not any specific activities as there will not be any withdrawal of surface water for any of the operational activities. Furthermore, the operational activities at the Plant will not have any interaction with surface waters in any manner, whatsoever

iii) Mitigation Measures

- Not any specific mitigation measures are needed

4.7.1.3 Groundwater Abstraction and Quality

As mentioned earlier, there is hardly any requirement of freshwater for formulation of dry products. However, formulation of the liquid products will require calculated amounts of freshwater, primarily as a solvent. However, the volume of the water to be used for this purpose cannot be determined at this too early stage. Its volume and consumption ratio will be determined once the plant goes into operation, after completion of construction. As regards the water usage for other ordinary pursuits and non-process usages, the demand will be met easily from the existing groundwater resources. Notably, the shallow groundwater is not suitable for drinking but fit for miscellaneous non-drinking usages. Therefore, it can be used safely for all other needs, except drinking. The deep groundwater is fit for drinking. As the overall water consumption for the non-process needs at the plant will be quite insignificant, it will not cause any impacts on the groundwater quality and availability in the area.

i) Likely Impacts

- Usage of groundwater for human needs and operational activities at the plant and consequential lowering of water table in case of indiscriminate withdrawal of groundwater

ii) Activities Likely to Produce the Impacts

- Usage of water in cooling tower / chiller for various plant operations
- Usage of water for various human needs and other miscellaneous requirements

iii) Mitigation Measures

- Ensure water conservation through recirculation of water in the chiller / cooling tower
- Auto shut-off water taps should be fitted at the toilets, kitchens and other water usage points

4.7.1.4 Wastewaters and Effluents

The operation of the upgraded plant will not generate any excessive, offensive or obnoxious wastewaters and effluents, whatsoever.

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures

- Nil

4.7.1.5 Solid Wastes

The operation of the upgraded plant will not generate any type of process solid wastes, whatsoever.

i) Likely Impacts

- Nil

ii) Activities Likely to Produce the Impacts

- Nil

iii) Mitigation Measures
- Nil

4.7.1.6 Air Quality

Operation of the project will not produce any significant air quality impacts. The only likely sources of air emissions could be the accidental escape of the refrigeration gases, exhausts from the standby power generator and the engine exhausts from the vehicles coming to and leaving the premises. As mentioned earlier, the likelihood of flying off the particulate dust from the plant is almost zero as the formulation operation will be simple physical mixing of various input materials (active and base/carrier ingredients). The computer-aided leakage detection and control system will prevent any such occurrence. As regards exhaust emissions from generators and vehicles, these are integral part of such machinery and equipment and therefore of no significance. These will be alarming only if they exceed the prescribed limits, which can be checked effectively by doing regular inspection and monitoring of the vehicles and keeping their engines well-tuned. As such, there will be no air emissions.

i) Likely Impacts
- Likelihood of escape/flying off particulate dust from the plant during machinery operation
- Likelihood of exhaust emissions from engines of the standby power generator
- Likelihood of exhaust emissions from engines of the vehicles coming to and leaving the premises

ii) Activities Likely to Produce the Impacts
- Operational and production activities of the plant

iii) Mitigation Measures
- Strict observance of the prescribed procedures
- All operational activities be monitored from the control room for compliance with SOPs
- Regular inspection, monitoring and maintenance of plant's machinery and equipment be carried out and if any defect is discovered that should be removed and rectified forthwith
- The handling staff should be given proper and updated training in handling of materials and products
- The engines of the vehicles and the standby power generator should be inspected regularly and kept tuned
- Generous tree plantation should be taken to improve air quality

4.7.1.7 Noise and Vibrations

The operation of the upgraded plant will not be associated with any excessive noise and vibrations, whatsoever.

i) Likely Impacts
- Nil

ii) Activities Likely to Produce the Impacts
- Nil

iii) Mitigation Measures
- Nil

4.7.1.8 Access, Easement, Health, Wellbeing, and Worksite Safety

The operation of the upgraded plant will not cause any issues of access, easement, health, wellbeing, and worksite safety, whatsoever.

i) Likely Impacts
- Nil

ii) Activities Likely to Produce the Impacts
- Nil

iii) Mitigation Measures
- Nil

4.7.1.9 Smell and Odour

The operation of the upgraded plant will not generate any smell or odour, whatsoever.

i) Likely Impacts
- Nil

ii) Activities Likely to Produce the Impacts
- Nil

iii) Mitigation Measures
- Nil

4.7.2 Non-Parametric Impacts of the Operation Phase

The subsections following hereinafter present a discussion on non-parametric impacts of operation of the upgraded plant.

4.7.2.1 Electricity Usage

The upgraded plant will have its own transformer installed to cater for electricity requirements of operation.

i) Likely Impacts
- Nil

ii) Activities Likely to Produce the Impacts
- Nil

iii) Mitigation Measures
- Nil

4.7.2.2 Water Usage

The operations of the upgraded plant, will require reasonable quantities of freshwater. Additionally, freshwater will be required for various ordinary human, sanitation and other miscellaneous needs of the staff. As has been mentioned under Section 1, the strength of the operational staff will hardly exceed 10 persons ant any one time. If it is assumed that all 10 persons are always present and the average per capita consumption for all and various needs will be 50 litres per person per day, then the total volumetric requirement of freshwater for 10 persons will be 500 litres (0.5 m^3) per day, the maximum. Based on these calculations, the monthly consumption will be 15000 (15 m^3) litres and the annual consumption against the 280 days' work year will be 140000 (140 m^3) litres. This is just normal and without any significance.

During the plant's operation, water will be used primarily for the filling of the firewater tank and for allied support needs like the administration block, rest areas, cafeteria etc. The boreholes drilled for the firewater tank / system and of the utility pump for additional water requirements during setting-up of the plant, will subsequently be used for the water requirements of the support facilities. Being of small discharges, extraction of water through the two boreholes is likely not to compete with water resources of the area. The water drawn will be used for normal routine human needs of the staff and the drivers coming with tank trucks for loading and unloading. The firewater system will be independent of the utility pump. Firewater pumping will be required for replacement of the previously stored water at prescribed intervals, hence the overall extraction over a longer period of time (e.g., a month) will not be much.

There is no population or human settlement nearby the site. Pumping out of the extra water during the temporary phase of setting-up of the plant. Ttherefore is not going to affect the community water supplies. Similarly, the water that will be used for utility purposes will have no bearing on the combined available community water resources

i) Likely Impacts
- Generation of wastewater from usage of groundwater from usage by the labour and staff for various and miscellaneous human and other needs

ii) Activities Likely to Produce the Impacts
- Usage of water by the staff, labour and visitors etc. and generation of wastewater therefrom

iii) Mitigation Measures

- Water use conservation be ensured by fitting auto-shut off taps to allow as minimal usage of water as would be essential for a particular need or usage
- Signboards and placards with appropriately worded appeals and requests regarding prudent water usage be affixed at appropriate sites like toilets, pantries, mosque etc.

4.7.2.3 Solid Wastes

There will not be the generation of any solid wastes during operation phase of the Plant, except some very small quantities of ordinary type municipal wastes, which may be containing wrappings, papers, eatables, food residues, paper, glass, empty cans, tin bottles, food packaging, peelings, PET bottles, plastics, toys and rags. According to a study on the subject, such types of the municipal wastes contain relatively higher amounts of inorganics on comparative weight basis. The organic constituents of these wastes tend to putrefy early and therefore may give rise to foul smells particularly during hot summer days.

Practically, no solid waste will be generated except that of food remains, garbage, and trash from the administration block, cafeteria, drivers' lounge and support operations. This will be collected separately and transported to the municipal solid waste dumping site for disposal.

i) Likely Impacts

- Likelihood of ugly look of the premises from littering of scattered solid waste
- Likelihood of breeding of diseases causing organisms
- Putrefaction and foul smells

ii) Activities Likely to Produce the Impacts

- Consumption of foodstuff by labours and staff
- Ordinary office and other pursuits

iii) Mitigation Measures

- Appropriate arrangements be made for the collection and segregation of solid waste at the point of its origin. Waste collection bins be provided at appropriate locations at the premises. The collected waste should be disposed of through the local municipal waste stream
- Efforts should be taken to minimize generation of waste

4.7.2.4 Noise, Vibrations and Odours

There will not be the generation of any excessive or undesirable noise and vibrations during operation phase of the project. However, there will always be some background noise at the premises from ordinary and routine activities. The most likely sources of noise during operation phase will be the generator, compressor and the pumps. The amount of noise will depend on the size, type, model, age and condition of the motors and the pump to be used. As the operating hours will be the daylight hours, there will not be any nighttime noise generation, as might affect sleep and rest of the exposed persons. Nevertheless, the workers exposed to operational noise will be provided with noise-controlling and -masking equipment (PPEs).

i) Likely Impacts

- Annoyance to exposed persons
- Distraction of attention and psychological implications

ii) Activities Likely to Produce the Impacts

- Ordinary and routine operational activities

iii) Mitigation Measures

- Noise masking devices like earplugs, ear covers etc. may be provided to the exposed persons
- All noise producing machinery and equipment be tuned and calibrated to reduce noise generation

4.7.2.5 Health, Safety and Community Wellbeing

There will not be any impacts relating to health, safety and community wellbeing

i) Likely Impacts

- Accidental injuries to staff / workers

ii) Activities Likely to Produce the Impacts

- Carelessness and non-observance of SOPs

iii) Mitigation Measures

- The Operations Manager to ensure that the SOPs of a particular activity are implemented in letter and spirit
- It should be ensured that the workers put-on and use all necessary safety equipment

4.8 Summary of the Likely Environmental Impacts

An abridged and brief summary of the likely environmental and social impacts of the proposition is somewhat, as given hereunder:

- **Impacts relating to land use change**: The setting-up of the plant will not be associated with any land use change, as the plant will be setup on a vacant land, owned and possessed by the proponent. Hence, there will not be any land use change, as the site has been already marked for the purpose by the local land revenue administration. Therefore, no impacts of land use change in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Loss of livelihood and structural damages**: The setting-up of the plant will not be associated with any loss of livelihood and structural damage, as the plant will be setup on a vacant land, owned and possessed by the proponent. There are not any built-up structures or sources of livelihood upto a considerable distance from the site. Furthermore, there is no human population and or built-up structure at or around the site upto a considerable distance therefrom. The setting-up of the plant will not cause any damage to any structure or installation. Therefore, not any impacts of loss of livelihood and/or structural damage in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Acquisition of houses and allied structures**: The setting-up of the plant will not involve acquisition of any houses and allied structures, as the plant will be setup on a vacant land, owned and possessed by the proponent. There are not any built-up structures or sources of livelihood upto a considerable distance from the site. Furthermore, there is no human population and or built-up structure at or around the site upto a considerable distance therefrom. The setting-up of the plant will not cause any damage to any structure or installation. Therefore, not any impacts or likelihood of acquisition in any manner in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Cutting and removal of trees and crops**: The setting-up of the plant will not involve cutting and removal of trees and standing crops, as the plant will be setup on a vacant land, owned and possessed by the proponent. It is noticeable that there is neither any vegetation, biota or flora at or near the site. The setting-up of the plant will not cause any damage to living organisms, plants, flora or fauna in any manner in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impeachment of easement rights of the local community**: The setting-up of the plant will not be associated with impeachment of any easement rights of the local community, as the plant will be setup on a vacant land, owned and possessed by the proponent. There are not any built-up structures or sources of livelihood upto a considerable distance from the site. Furthermore, there is no human population and or built-up structure at or around the site upto a considerable distance therefrom. The setting-up of the plant will not cause impeachment of any easement rights of the local community. Therefore, not any impacts relating to this aspect in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts on groundwater**: The setting-up of the plant will not be associated with any major or significant impacts on the groundwater quality, as the plant will be setup on a vacant land, owned and possessed by the proponent. There are not any built-up structures or sources of livelihood upto a considerable distance from the site. Furthermore, there is no human population and or built-up structure at or around the site upto a considerable distance therefrom. The setting-up of the plant will not cause disturbance to the local groundwater, qualitatively or quantitatively. Therefore, not any impacts relating to this aspect in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts on surface water**: The setting-up of the plant will not be associated with any major or significant impacts on the surface water quality, as the plant will be setup on a vacant land, owned and possessed by the proponent. There are not any surface water channels or water bodies even upto a considerable distance from the site. The setting-up of the plant will not cause disturbance to the local surface waters (rivers, canals, watercourse etc.), qualitatively or quantitatively in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts of inadequate treatment and disposal of wastewaters**: The setting-up of the plant will not be associated with any major or significant impacts of inadequate treatment and disposal of wastewater, as the plant will be setup on a vacant land, owned and possessed by the proponent. The proponent will construct septic tanks of appropriate size and capacities for the treatment of the wastewater (primarily sanitation wastewater) to be produced at the premises. The septic tanks will also serve the plant during its operational phase. The setting-up of the plant will not cause any adverse impacts from inadequate treatment and disposal of wastewater in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts of inadequate disposal of the MSW**: The setting-up of the plant will not be associated with any major or significant impacts of inadequate disposal of solid wastes, as the plant will be setup on a vacant land, owned and possessed by the proponent. The proponent will construct septic tanks of appropriate size and capacities for the treatment of the wastewater (primarily sanitation wastewater) to be produced at the premises. The septic tanks will also serve the plant during its operational phase. In addition to his own arrangements, the proponent will take benefit from the centralized waste collection and management system of the local municipality. The setting-up of the plant will not cause any adverse impacts of generation, treatment and disposal of the solid wastes in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts of generation of ambient or neighbourhood noise**: The setting-up of the plant will not be associated with any major or significant impacts of generation of industrial noise, as the plant will be setup on a vacant land, owned and possessed by the proponent. The imperceptible and insignificant industrial noise to be generated from operation of the plant will not be of any relevance, as there is no human population within the radius of influence of the plant, as might be affected by the noise to be generated at the plant. The setting-up of the plant will not cause any adverse impacts of generation and annoyance from noise in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts on local air quality**: The setting-up of the plant will not be associated with any major or significant impacts on the local air quality, as the plant will be setup on a vacant land, owned and possessed by the proponent. Secondly, the simple physical operations of product formulation will not produce any air emissions. Owing to these peculiar features of the plant, installation of an air emission control and treatment system is not warranted at all. Owing to deployment of cleaner production technology, setting-up of the plant will not cause any adverse impacts on the local air quality in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Blowing-off of the drag dust**: The setting-up of the plant will not be associated with generation and or flying off drag dust from wheels of the vehicles coming to and leaving the premises, as the plant will be setup on a vacant land, owned and possessed by the proponent. The flying off drag dust will be insignificant, as the majority of the ground areas will be paved and not generating drag dust. The whatsoever little dust that will flew off the surface will remain localized and settle down instantly. Owing to paving of the open areas, there will not be the generation of any drag dust during setting-up of the plant, hence no adverse impacts relevant to this aspect in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impairment of air quality from exhausts of fossil fuel burning**: The setting-up of the plant will not be associated with any major or significant impacts on local air quality from fossil fuel burning, as the plant will be setup on a vacant land, owned and possessed by the proponent. The fossil fuel to be used at the plant will be mostly the LNG, which is a cleaner fuel without emission of pollutants from its burning.

Likewise, there will not be any emissions from the standby power generators, as the proponent intends to install the best quality generators with no or low vent emissions. Owing to use of good quality fuels and efficient performance of the machinery and equipment running on the fossil fuels, the setting-up of the plant will be devoid of any adverse impacts concerning this aspect in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts on ambient air quality**: The setting-up of the plant will not be associated with any major or significant impacts on the ambient air quality, as the plant will be setup on a vacant land, owned and possessed by the proponent. As there will not be the generation of any air emissions from the simple physical operations of product formulation, there will not be the need of installation of any air emission control equipment with the plant machinery. Owing to employment of cleaner production technology, setting-up of the plant will not cause any adverse impacts on the ambient air quality in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Likelihood of accidents and risks of personal injuries**: The setting-up of the plant can lead to risks of industrial accidents and the resultant injuries to the exposed workers. Since the plant will be setup on a vacant land, owned and possessed by the proponent, the chances of such an eventuality are quite minimal. The site is a declared industrial plot owned and possessed by the proponent. It is noticeable that non-observance of the standard safety precautions, operating procedures, steps for carrying out a particular activity in a safe manner and non-compliance of the recommended precautionary measures can render the workers prone to higher chances of worksite hazards and industrial accidents. It is imperative that all workers, particularly those working in vulnerable areas should put-on the requisite safety equipment and the right kind of apparel while on work. Similarly, smoking at the worksite, wearing loose clothes while on work and the tendency to avoid putting-on safety equipment and apparel while on work, should be strictly discouraged. The implementation of the recommended safety measure will help to avoid any likelihood of adverse impacts concerning this aspect, whatsoever (***The aspect under consideration is without any impacts and if there be any, are all mitigable***)

- **Likelihood of land instability and land sliding**: The setting-up of the plant will not be associated with any chances of land instability and land sliding, as the plant will be setup on a vacant land, owned and possessed by the proponent. The siting of the plant in the flat floodplains of the central Punjab will not cause any land instability, land sliding or any other alike impact. Therefore, no impacts of land instability or land sliding from setting-up of the plant in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts on local ecology, biodiversity and the habitat**: The setting-up of the plant will not be associated with impacts on the local ecology, biodiversity and habitat, as the plant will be setup on a vacant land, owned and possessed by the proponent. There is not any flora and fauna at and around the site. The setting-up of the plant will not involve cutting of any trees or plants. Nevertheless, if any tree is cut, although there are no chances, compensatory tree plantation @ two trees for every tree cut has been recommended as the prime mitigation measure to keep the local ecology intact. Therefore, no impacts on the local ecology, biodiversity and habitat in any manner, whatsoever (***The aspect under consideration is without any impacts and if there be any, are all mitigable***)

- **Displacement & resettlement issues**: The setting-up of the plant will not be associated with displacement and resettlement of the affected persons, as the plant will be setup on a vacant land, owned and possessed by the proponent. There is no human population around the site, as might be affected from setting-up of the plant. Therefore, no impacts of displacement and resettlement issues in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Social and cultural issues**: The setting-up of the plant will not be associated with any social or cultural issues, as the plant will be setup on a vacant land, owned and possessed by the proponent. There is no human population around the site, as might be affected from setting-up of the plant leading to social and cultural frictions. Therefore, no impacts concerning this aspect in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Impacts of likelihood of poor designing**: The setting-up of the plant will not be associated any likelihood of poor designing, as the plant will be setup on a vacant land, owned and possessed by the proponent. The layout design, architectural features and the engineering aspects of the plant have been designed by the competent professionals of the field in conformance with the prescribed guidelines, instruction and parameters of the concerned regulatory authorities. Therefore, no impacts concerning this aspect in any manner, whatsoever (***The aspect under consideration has no environmental and social impacts at all***)

- **Likelihood of risks of personal injury**: The setting-up of the plant can lead to risks of industrial accidents and the resultant injuries to the exposed workers. Since the plant will be setup on a vacant land, owned and possessed by the proponent, the chances of such an eventuality are quite minimal. The site is a declared industrial plot owned and possessed by the proponent. It is noticeable that non-observance of the standard safety precautions, operating procedures, steps for carrying out a particular activity in a safe manner and non-compliance of the recommended precautionary measures can render the workers prone to higher chances of worksite hazards and industrial accidents. It is imperative that all workers, particularly those working in vulnerable areas should put on the requisite safety equipment and the right kind of apparel while on work. Similarly, smoking at the worksite, wearing loose clothes while on work and the tendency to avoid putting-on safety equipment and apparel while on work, should be strictly discouraged. Adventurism on the part of the workers can be another cause of personal injuries. Even after observance of precautions, likelihood of the personal injuries from other causes cannot be ruled out altogether. However, efforts should be made to minimize occurrence of the risks of personal injuries by instituting a dependable hazard assessment and risk avoidance strategies. The implementation of the recommended safety measure will help to avoid any likelihood of adverse impacts concerning this aspect, whatsoever (***The aspect under consideration is without any impacts and if there be any, are all mitigable***)

4.9 Positive Impacts

The subsections following hereinafter present some positive impacts of the project.

4.9.1 Construction Phase Positive Impacts

4.9.1.1 Employment Opportunities

A significant positive impact coming in the wake of setting-up of the plant will be the availability of employment opportunities especially for labourers, unskilled workers and skilled workers. Employment opportunities will be of great benefit both economically and in a social sense for the persons to be employed at the site. In the economic sense, it means abundant unskilled labour will be used in setting-up the plant, hence economic benefits. Several workers including casual labourers, masons, carpenters, joiners, electricians, welders and plumbers are expected to get jobs on the site from start to the end. Apart from casual labour, semi-skilled and unskilled labour and formal employees are also expected to obtain gainful employment during setting-up of the plant.

4.9.1.2 Improving Economic Growth

Construction of the building and other parts of the plant/premises will require some indigenous building materials including cement, concrete, ceramic tiles, timber, sand, electrical cables, pipes, paints, wood etc. Local purchase of these materials will bring-in opportunities of income and economic prospects for the local dealers and sellers of these commodities and thereby direct economic benefits for them. Trading in these materials and commodities will contribute towards growth of the economy by contributing to the gross domestic product. The consumption of these materials, fuel oil and others will also add to the exchequer in the form of applicable taxes e.g., sales tax, withholding tax etc. This will increase Govt revenue. Consumption of these materials will also benefit their producers.

4.9.1.3 Boosting of Informal Sector

There are usually several informal businesses, which will come-up side by side with setting-up of such like projects. These include activities such as food vendors who benefit directly from setting-up of the plant. Staff members are expected to buy food and other commodities from them. This will promote the informal sector in securing some temporary income and hence livelihood.

4.9.2 Operation Phase Positive Impacts

4.9.2.1 Availability of the Product

Setting-up followed by operation of the plant will ensure easy and convenient availability of the formulated products for host of users. On account of their beneficial effects, the trend of using nutrition enriching products is on the rise in the country.

4.9.2.2 Reduction in Environmental Pollution

The product formulation processes generally are not associated with generation of any environmental pollutants. Therefore, formulation of the intended products will be a cleaner production process. The setting-up of the plant will thus help to reduce and abate environmental pollution, as cleaner production technology will be employed.

4.9.2.3 Employment Opportunities

Operation of the Plant will bring-in great opportunities of jobs and employment for scores of unskilled, semi-skilled and skilled personnel. It will open vistas of job opportunities for the management and technical top management positions. Additionally, operation of the plant will provide prospects of income and earnings for the service providers as well as commodity vendors who will be providing services and goods for running of the Plant. Offering of the share equity in the capital market will encourage investors to invest-in and thereby bring froth trickle-down fruits of investment and trade in the stock market.

4.9.2.4 Infrastructure Improvement

The setting-up of the plant will definitely help to improve local infrastructure from investment in this sector of the economy.

4.9.2.5 Improvement of Industrialization

Setting-up of the plant will improve the dependent industrialization as host of small and medium industry will be providing equipment, machinery, goods and services for the plant. On the one hand, it will bring-in prospects of income for the dependent industry and on the other hand, it will provide them with the opportunities to improve their manufacturing operations, production skills and production quality.

4.9.2.6 Increase in Govt. Revenues

There will be positive gain for the revenue system from payment of various taxes by the proponent to the public exchequer. The increase in the Govt. revenues will be in-turn spent on projects of public welfare and community well-being

4.10 Potential Environmental Enhancement Measures

Massive tree plantation, development of greenbelts and grassy lawns inside the plant premises and the vicinity have been proposed as the prime environmental enhancement measures. Construction of septic tanks for the treatment of the sanitation origin wastewater and recirculation of the process wastewater should be employed to ensure water use conservation. Owing to employment of cleaner production technology and the simple physical nature of the product formulation operations, there will not be the generation of any air emission. Therefore, there is no need of installation of air pollution control system with the plant machinery. Provision of safety equipment and the right kind of apparel and tools for the workers has also been proposed, as another potential environmental enhancement measure.

4.11 Benefits of the Project

The most significant positive impact of setting-up of the plant will be the availability of a modern and efficient plant for formulation of good quality agrochemicals. The setting-up of the plant will ensure effective availability of the formulated products for thousands of users in the country. In this manner, setting-up of the plant will bring-in positive impacts on the economic, commercial, business and developmental activities in the country.

The above-mentioned socioeconomic and environmental benefits of setting-up of the plant far outweigh its potentially negative or adverse impacts, if any. Given the present state of affairs and ever increasing demand of good quality agrochemicals, the setting-up of the plant will be of great benefit for the people, area, and the environment for all times to come, as it will ensure easy availability of the products for the end-users.

The plant simply will be a facility for formulation of good quality agrochemicals in an environment friendly manner followed by supply and distribution of the products to interested buyers. There will not be any undesirable impacts of setting-up of the Plant. Rather, there will be healthy impacts on the local environment from improved landscape, aesthetics and abatement of environmental pollution. In addition to the above listed benefits, some other significant socioeconomic benefits and positive impacts of the Plant will be the

opportunities of employment, training and the skill development both for the professionals and for the general cadre personnel who would be employed or whose services would be hired in connection with setting-up of the plant. Another social benefit of the Plant will be the income prospects for large number of persons (traders, shopkeepers, suppliers, vendors, service providers, mechanics, artisans etc.) who would be providing goods and services during setting-up and subsequently during operation of the plant. In nutshell, the setting-up of the plant can be considered as a big leap forward towards ensuring easy availability of good quality agrochemicals and other like products in the country for the end-consumers.





Table 4.2a

Modified Environmental and Social Impact Assessment Matrix (Unmitigated Impacts)

Environmental Components	Physical				Biological		Social and Socioeconomic																	
Project Activities	Land and Soil Degradation	Surface Water Quality	Groundwater Quality	Air Quality	Natural Vegetation	Wildlife	Access and Easement	Noise and Vibrations	Agriculture / Farming	Livestock	Odour and smells	Safety and Hazards	Aesthetic Value	Availability of food	Health and Wellbeing	Education/Skill enhancement	Gender Issues	Employment / Income	Community Empowerment	Price of Land	Community Participation	Archaeological Heritage	Social / Cultural Issues	Environmental enhancement
Site Selection	0	N	N	N	+1	N	N	0	-1	N	N	+2	+2	N	N	N	N	+2	+1	+1	+1	N	0	+2
Layout Plan / Engg. Design	N	N	N	N	+1	N	N	0	-2	0	N	N	+2	-1	+1	N	N	+2	+1	+2	+1	N	+1	+2
Construction Activities	-1	0	0	-1	+1	N	-1	-1	0	0	0	-1	-1	N	0	+1	0	+2	+2	+2	+2	N	0	+2
Campsite Activities	-1	0	0	0	0	N	-1	-1	0	0	-1	-1	-1	N	+1	+1	0	+2	+2	0	+2	N	0	+2
Project Usage	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Key: -2=High Negative Impact -1=Low Negative Impact 0=insignificant/Negligible impact
+1=Low Positive Impact +2=High Positive Impact N=No Impact

Table 4.2b

Modified Environmental and Social Impact Assessment Matrix (Mitigated & Residual Impacts)

Environmental Components	Physical				Biological		Social and Socioeconomic																
Project Activities	Land and Soil Degradation	Surface Water Quality	Groundwater Quality	Air Quality	Natural Vegetation	Wildlife	Access and Easement	Noise and Vibrations	Agriculture / Farming	Livestock	Odour and smells	Safety and Hazards	Aesthetic Value	Availability of food	Health and Wellbeing	Education/Skill enhancement	Gender Issues	Employment / Income	Community Empowerment	Price of Land	Community Participation	Archaeological Heritage	Social / Cultural Issues	Environmental enhancement
Site Selection	0	0	0	0	0	0	0	0	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	N	0	+2
Layout Plan / Engg. Design	0	0	0	0	0	0	0	0	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	N	0	+2
Construction Activities	0	0	0	0	0	0	0	0	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	N	0	+2
Campsite Activities	0	0	0	0	0	0	0	0	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	N	0	+2
Project Usage	0	0	0	0	0	0	0	0	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	N	0	+2

Key: -2=High Negative Impact -1=Low Negative Impact 0=insignificant/Negligible impact
+1=Low Positive Impact +2=High Positive Impact N=No Impact

Table 4.2c

Environmental Questionnaire

A: Environment / Resource Linkages:

Will environmental considerations, including present human land use pattern in the vicinity, be incorporated into the selection of technology, the location, scale & design of the plant?	Not relevant
Have hydrologic, geologic, seismological, and meteorological studies of the been made to anticipate and minimize possible damage to humans, fish & wildlife resources and vegetation?	Pertinent aspects have been studied
Does a comprehensive plan link the project to environmental aspects of raw materials, bye-product utilization, shipping, and processing?	yes

B: Project Design & Construction:

Have alternative sites or locations of the plant been considered in an effort to avoid or mitigate environmental degradation?	yes
What features for environmental protection will be incorporated in the design & operations?	As given in technical feasibility and EIA
Is there a comprehensive construction plan that takes into account ecological factors?	Yes
Are road patterns, land excavation, fill sites, refuse disposal activities etc., planned to minimize damage to the natural environment?	Yes
What provisions have been made for restoring sections of the construction area	Not relevant
Will construction personnel be exposed to unique local health problem, or will they introduce diseases?	No

C: Operations:

Do offloading & on-loading methods of handling petroleum & chemical products incorporate human & environmental safeguards?	Yes
What are the dangers of an explosion or spill of hazardous material	negligible
Will contingency plans, including manpower & materials, be available to cope with the accidents?	Yes
Has adequate attention been given to the design & construction of safe storage facilities for hazardous materials & refinery products?	Yes. But not relevant
Will floating roof tanks be employed?	No
What types and quantities of effluents or particulate emissions will the plant produce?	Oil & water mixing. Volatile vapours

(Adapted from the EIA Guidelines, Govt. of Pakistan)

5

ENVIRONMENTAL SOCIAL &RISK MANAGEMENT PLAN

5. ENVIRONMENTAL, SOCIAL & RISK MANAGEMENT PLAN

5.1 Environmental, Social & Risk Management Plan (ESRMP)

This section describes the environmental, social and risk management plan (ESRMP) for ensuring a smooth environmental and social management of the plant at all stages of activities and dealing with an emergency as and when it may occur during setting-up of the plant. The objective of including the ESRMP into this IEE report is to ensure prevention of any situation of emergency and in case of development of such a situation, steps required to be taken to manage the situation. The section contains a set of environmental guidelines for avoiding and or preventing the adverse environmental impacts of the plant. Additionally, an institutional setup for implementing the ESRMP, management of hazards and emergencies and importance of the compliance-monitoring programme has also been discussed.

The ESRMP is considered as the core area of an environmental examination. It focuses on environmental protection through minimization of the impending risks and the likelihood of occurrence of hazards. The ESRMP aims to ensure that adverse consequences of an emergency are addressed properly at all stages of the risk management from prevention to rehabilitation and resettlement of the affected individuals. The ESRMP provides a mechanism to reduce likelihood of occurrence of the risks to an acceptable level by adopting the risk prevention strategies. Wherever possible and applicable, the ESRMP provides for avoiding environmental risks and, in case they are unavoidable, then identification of the most direct and the best possible measures for reducing the extent of damage to persons and property. Additionally, ESRMP designates the special risk areas and proposes stringent measures for hazard avoidance at these high risk and sensitive areas. In nutshell, the objectives of the ESRMP will be as under:

- To provide an early warning system for the potential or actual risks
- To provide a systematic and implementable mechanism for risk characterization and risk mitigation
- To test effectiveness of the risk handling mechanism and hence improve upon the weaker areas
- To ensure that operational activities are carried out in a sound and secure manner by avoiding the probability of occurrence of the risks

Safety measures, including appropriate design solutions, onsite handling of the hazardous materials during setting-up of the plant, and resolution of social conflicts during operation phase of the plant constitute some major components of the ESRMP. The ESRMP aims to ensure that quality of the life values as well as cultural and religious sensitivities are fully preserved all through various stages of the project to avoid social severances and conflicts. Lastly, the ESRMP has been framed in line with the national legislative framework, environmental standards and regulations to ensure environmental compatibility of the Plant maximally.

5.2 Description of Proposed Mitigation Actions

The relevant mitigation measures for each type of activity have been given in detail in Section-4 of the instant EIAR titled as, “Potential Environmental Impacts and their Mitigations”. The said chapter may be consulted for in-depth appraisal of the likely impacts and their detailed mitigation measures.

5.3 Schedule of Implementation and Environmental Budget

The setting-up of the plant will be taken up as a one-go activity instantly upon grant of its environmental approval by the EPA-Pb. As regards the environmental budget, all necessary details have been given in the table below and may be consulted, as and when needed. A summary is as hereunder:

Table 5.3: Environmental and other budget

Sr.	Description	Amount (Million)
1.	Land	3.20
2.	Building	5.00
3.	Machinery % Equipment	5.00
4.	Capital	2.00
5.	Current	1.00
6.	Environment & Aesthetics	0.50
	Total	**16.70**

Funds will be required for efficient performance of the ESH Unit. It is therefore, suggested that funds are allocated by the proponent for funding the ESH Unit. Apart from expenses on maintenance, payment of utilities, salaries of the staff, external compliance monitoring by an environmental firm will also require allocation of money. It is, therefore, recommended that the project should have suitable environmental budget instead of charging it from contingency funds.

5.4 Environmental Management Team

The proponent shall setup an Environmental Safety and Health Unit (ESHU) for timely appreciation, identification, and reporting of the environmental issues relating the project and for taking necessary preventive and corrective measures for addressing the issues at various levels of responsibilities. Subject to feasibility, the ESHU may continue during the operation phase as well, but with a little changed composition and mandate. During the operation phase, the ESH may consist of the persons appointed by the proponent in consultation with the concerned persons. Expenses of the ESHU may be met from regular budget of the proponent. If needed, compulsory cess may be imposed in the form of service charges to meet expenses of the ESHU. The ESHU should be an independent functional unit headed by an ESHU Officer, who will be assisted by an appropriate number of subordinate officers, technical personnel, and others. The ESHU should be equipped with all essential equipment to manage any situation of emergency and disaster.

5.5 Roles and Responsibilities of the ESH Unit

The primary responsibility with respect to management of environmental issues at the Plant will rest with the ESH Unit. Some of these responsibilities may include the following. **Table 5.5a** presents the scheme of roles and responsibilities of the staff in a tabulated format. Likewise, **Table 5.5b** presents

- To generate periodic reports and fill-in the checklists on environmental and social performance of the project and the actions taken by the ESH Unit for rectifying the issues and removing bottlenecks
- To maintain liaison and linkages with the concerned municipal and regulatory authorities for troubleshooting and timely removal of bottlenecks concerning social issues at the premises
- To ensure smooth and timely implementation of the recommendations relating to risk avoidance and hazard prevention at the Plant premises
- To ensure troubleshooting of the problems relating to health, safety, environment and social issues all during setting-up of the plant
- To take all necessary steps to protect safety, sanitation and health of the labour and workers during setting-up of the plant, especially of those exposed to higher levels of risks to health and safety
- To prepare and execute awareness raising, educational and training programmes on safety, health and sanitation for the staff, labourers, officers and the neighbouring communities
- To make investigations of the causes of occurrence of accidents or hazards and take necessary steps to prevent occurrences of such events in the future

Table 5.5a: Roles & Responsibilities of Staff in EMP Implementation

Sr.	Position	Responsibility
1.	Manager (Engineering)	✓ performing technical and organizational role of construction works ✓ overseeing Implementation of EMP
2.	Project Manager	✓ Supervising construction works ✓ Schedule preparation and resource forecasting for engineering and other technical activities relating to the project
3.	Contractor(s)	✓ Undertake development of Plant in accordance with contract signed with the Proponent ✓ Adhere to Proponent HSE policies, procedures and other requirements while constructing the Project ✓ Implement aspects of EMP assigned to them
4.	Construction Manager	✓ Effective implementation of the EMP ✓ Regular performance reviews ✓ Corrective and/or remedial action where this may be required
5.	QHSE Manager	✓ Develop policies and procedures on the environmental, social, health and safety issues ✓ Oversee implementation of EMP ✓ Review and analysis of monitoring results and preparation of short reports to Project Manager ✓ Planning of training programs for personnel in accordance with relevant laws e.g.

		OSHA ✓ Oversee inspection of the facilities after completion of construction works

Table 5.5b: Proposed Organization Structure & Responsibilities in EMP Implementation

Sr.	Position	Responsibility
1.	QHSE Manager	✓ Oversee annual environmental, health and safety and fire audits
2.	QHSE Executive	✓ Preparation of environmental monitoring reporting and any permit applications ✓ Running of day-to-day requirements for EMP implementation ✓ Overseeing of construction process and ensuring the implementation of avoidance and mitigation measures ✓ Conducting monitoring and review of EMP implementation by contractors ✓ Inspect the constructed facilities after completion
3.	Environmental Consultant	✓ Periodically commissioned to undertake statutory environmental audits ✓ Guide the Proponent during implementation of the Environmental management plan
4.	OHS Consultant	✓ Carry out statutory health and safety audit of the Plant
5.	Fire Safety Inspector	✓ Carry out statutory Fire safety audit of the Plant

5.6 Proposed Monitoring Programme

An elaborate and detailed programme of environmental monitoring to assess performance output of the EMP has been given in the relevant section of the EIAR and may be consulted, as and when needed. Environmental monitoring is an essential tool for evaluating environmental performance of a project and ascertaining whether recommendations and the environmental mitigation guidelines are meeting with their intended goals. The prime objectives of the environmental monitoring will be to:

- Check whether mitigation and environmental enhancement measures are adequate, effective and actually implemented at the site
- Ensure compliance with legal and community obligations including safety on construction sites
- Provide as the means whereby impacts which were uncertain at the time of preparation of the IEE/EIA, or which were unforeseen, can be identified and appropriate corrective measures have been taken up
- Improve our knowledge and approach for similar projects, i.e., to provide information on the actual nature and extent of the key impacts and effectiveness on mitigation and enhancement measures in order to improve planning and execution of similar projects in the future

The EMP, as given in this EIAR, defines the monitoring mechanism and identifies a set of verifiable monitoring parameters to ensure that all proposed mitigation measures are implemented effectively and completely. As and where applicable, all tested parameters should be analysed in relation to the permissible standards set out in the PEQS or as prescribed by the international bodies.

5.6.1 Internal Compliance Monitoring

The ESH Unit will be responsible for internal compliance monitoring of the project during setting-up of the plant, particularly with respect to compliances of the ESRMP and the environmental mitigation guidelines. The incharge of the ESH will ensure observance of the ESRMP and EMP by the concerned personnel. He/she will ask for environmental compliance status and performance of the project from his juniors and will keep record thereof for taking necessary actions as and when required. **Annex-5** presents a prototype Internal Compliance Monitoring Proforma.

5.6.2 External Compliance Monitoring

Environmental performance monitoring or environmental audit in general terms is the systematic collection of data through a series of repetitive measurements for evaluating environmental health status of a project. External monitoring is a job of specialized nature and must be conducted by a third party (an environmental firm). It is, therefore, recommended that the proponent or the project management unit (if any such unit is setup) hire services of a professional environmental consultancy for carrying out this essential and important task. There is a good spectrum of categories and techniques of conducting environmental monitoring and auditing. However, in this case, external monitoring may be restricted to critically reviewing the implementation process of the ESRMP and the EMP, identifying any on-ground environmental issues of

concern, overall environmental performance of the project, and framing proposals and mechanisms for addressing various environmental issues. The primary purpose of the external monitoring will be to see that construction activities have been carried out in line with the mitigation strategy outlined in the ESRMP. Since, the operation stage i.e., usage of the facility for the intended purpose will be a lifelong and continuing activity, the external compliance monitoring or the environmental audit should be a regular annual feature.

As mentioned earlier, the primary purpose of the external compliance monitoring or post project auditing is to evaluate environmental compliance of various activities and their consonance to the mitigation measures and terms and conditions of the environmental approval from the EPA. The objectives of a compliance monitoring will be:

- To monitor compliances of the conditions set out in the project's construction permits, contract documents and operating licenses
- To review relevancy and applicability of the environmental impacts as predicted in the IEE for proper management of the risks and uncertainties
- To modify the mitigation recommendations or to develop revised mitigation measures if all environmental impacts could not be predicted earlier or not attenuated by the proposed mitigations
- To determine accuracy of the impact predictions and effectiveness of the mitigation measures in order to make use of this experience for future activities of the same type
- To review effectiveness of the environmental management and the disaster management plans

5.7 EMP Reporting and Recordkeeping

The ESHU will ensure a robust reporting and recordkeeping system. Such recordkeeping should be managed through a computer system and should be handy as and when required. The record may include the following:

- Reports of the periodic surveys
- Number and type of the gas cylinders
- Apparent condition of plant's machinery and equipment
- Cleaning and sweeping schedule of the premises
- Status of safety and emergency equipment
- Daily status report on sanitation, safety, environment and any reportable incident
- Annual, routine and special repairs
- Wages and salaries paid to the staff of the ESH Unit
- Record of receipt of raw materials and sale of finished products
- Other miscellaneous records, if any

5.8 Training Needs

The prime objective of the trainings and capacity building programmes will be to ensure long-term environmental sustenance of the project's operations and activities and to keep the ESH Manager and the project management abreast of the emerging issues, troubleshooting strategies, and modern techniques of environmental management and handling emergencies. The efficacy of trainings will be tested from quickness of the response to a crisis as exhibited by the preparedness exercises.

It is recommended to hold at least one training or practice drill session into environmental issues every six months all during the operational life of the project. The selected personnel and the employees posted on key points such as hulling section, milling section, fuel storage section, powerhouse, and at the entry / exit points may attend these training sessions. These training sessions should focus on issues of practical nature likely to come up during the project's operations. They should also focus on sensitizing the participants about environmental stakes of the project and its various process operations. The training programmes must cater for managing the on-ground environmental problems and the strategies for implementing the suggested environmental mitigation measures. A comprehensive training session or training workshop of appropriate duration be held annually with a much wider participation from the project management down to the plant workers. These workshops may focus on the policy issues, sustainable development strategies, and the troubleshooting mechanisms on the basis of the experiences of the preceding years. An external environmental consultancy of eminence and repute will be involved in making these training sessions and workshops meaningful.

5.9 Future Expansions

As a part of product diversification and production enhancement programme, the proponent intends to formulate/produce various other alike products in the future. The impacts whereof will be discussed at the time of implementation of the future expansion programme.

5.10 Responsibility of the Proponent towards Environmental Protection

The construction contractor, under instructions of the proponent, should act promptly to prevent noise, vibration, water contamination, air pollution and other nuisances to the environment resulting from activities relating to setting-up of the plant. The contractor must always keep the site clean and tidy all during setting-up activities. He should remove all construction debris, surplus soil and other wastes at the close of construction and properly transport them to the disposal site.

The contractors will be responsible for implementation of some of the EMP components. But this will not mean that the proponent will be absolved of his responsibility in this regard. The proponent will be fully responsible for ensuring across the board implementation of the EPA and other environmental enhancement and mitigation measures, as the ultimate responsibility for meeting all commitments will lie with the Proponent. The proponent will compel the contractors to meet the relevant responsibilities by means of specific conditions in the contract awards/work orders. Where there is concern over the capacity of contractors to take-up specific activities according to the system, the proponent will provide additional training to improve the capacity of the contractors. Activities of contractors will be overseen by the plant manager and staff, as appropriate. The proponent will put in place the following arrangements to support EMP implementation:

- Contractors will have certain key environmental functions included in their job descriptions and performance criteria. Critical among these is appointment of a qualified and well experienced manager
- The manager will be accountable for environmental (including social) management during setting-up.
- Specific responsibilities for the manager will include regular performance reviews and assurance of corrective and/or remedial action wherever these may be required. Regular (at least monthly) liaison between the construction manager, the project manager and the HSE manager and his/her team must be carried out. At the commencement of construction, weekly meetings be held.
- Meetings should review implementation of EMP requirements, highlight issues of concern, identify required interventions and prescribe corrective actions, schedule of implementation of corrective actions, allocation of appropriate budget and appointment of responsible parties. The plant Manager should receive minutes of meetings and should be invited to attend meetings at least once in a month.
- A code of practice for will be prepared and implemented. This code will guide the management and the workers in performing tasks. The code will include items relating to health safety and community relations.
- Information on the implications of setting-up of the plant will be disseminated before start of the work. The terms and conditions of the contracts will be key tools in managing many potential negative impacts such as transport related incidents. They will specify required environmental and social practices.

5.11 Hazard Management & Emergency Response System

The ESH Unit will act as the focal agency for dealing with risks and hazards all during construction and operation phases of the project. The ESH Unit will formulate and develop a Hazard Management Plan (HMP) and an Emergency Response System (ERS) to cater for any unforeseen eventualities, accidents, fires or worksite hazards. An outline of such a plan will be somewhat as under:

5.11.1 Safe Handling of Hazardous Materials

If any hazardous, inflammable or ignitable materials (petrol) are to be stored at the site (during both construction and operation phases), storing of these materials should be according to the prescribed instructions with respect to their storage, handling, movement and control. Only the persons duly authorized in this behalf should be allowed to handle them. The storage site must have arrangements for gravity collection of overflows, spills and leakages. The storage site must have fire-fighting arrangements. At least pressurized foam extinguishers should always be ready to combat fire.

5.11.2 Equipment for Emergency

All first-line-of-defence equipment and gadgets for handling emergencies should be made available at the site office. These may include rescue ladders, rescue chairs, ropes, first aid kits, stretchers etc.

5.11.3 Standard Operating Procedures for Emergencies

The following standard operating procedures (SOP) be followed in case of any emergency, fire or accident:

(i) Preventive Measures

- Safety instructions and things-to-do-first should be displayed at prominent places at the premises. All workers and the residents should be asked to strictly observe the prescribed safety instructions
- All the workers present in the active construction areas and hazard zones must put-on safety equipment and gadgets (helmets, goggles gloves, aprons etc.) without exception. No worker should be allowed to enter the workplace without safety gadgets
- Only the persons duly authorized in this behalf should handle chemicals and hazardous materials
- Smoking should be strictly prohibited at the worksite, storerooms, workshop area, container offices and all close places. Smoking in open spaces can be done under permission from the site engineer
- No unidentified persons and unauthorised vehicles should be allowed access to construction sites during construction phase. A “no entry/authorized entry” board should be displayed at the entry points and a guard appointed thereat
- Fire extinguishers should be affixed at convenient and easily approachable locations

(ii) Communication Network/Intimation of Emergency

- Any person, worker or labourer who first notices or comes into knowledge of any fire, leakage, spills or other emergency, will immediately report it to the ESH Unit
- Intimation to other workers in the hazard zone will be communicated through a warning alarm or loudspeaker announcements under instructions of the officer incharge of the ESH Unit

(iii) Reporting and Event Logging

- A log of every incident/leakage/emergency should be kept and made part of the office record of ESH Unit
- Intimation of any such happening will also be given to the local police or local civil administration, if needed

(iv) Assembly Point

- The officer incharge of the ESH Unit shall mark a permanent assembly point both during construction and operation phases, where all employees and inmates shall gather first in case of an emergency or disaster
- Instructions and signage in this regard should be displayed at conspicuous locations all across the premises and the community areas

(v) First Line of Action

- Firstly, the office incharge of the ESH Unit or a person deputed by him will move to the site and will make a visual assessment of the situation. He will take further appropriate actions accordingly
- Only the persons authorised by the officer incharge of the ESH Unit, or working under his instructions should take further action. They will follow instructions of the supervisory officer

(vi) Second Line of Action

- If it is apprehended that the first line of action will be unable to cope with the situation, the second line of defence should be activated by calling the local municipal fire brigade, rescue service, police, or civil administration depending on nature of the emergency

(vii) Post Incident Rehabilitation/Restoration

- Once the acute emergency phase is over, efforts for restoring normalcy and rehabilitation should be initiated under instructions of the appropriate authorities or the project manager, if any existing

(viii) Preparedness Exercises and Practice Drills

- In order to assess efficiency of the ESRMP, SOPs and to keep the arrangements in this regard updated, the ESH Unit may arrange preparatory exercises and practice drills on random basis at the Plant

(ix) Liaison with the Local Authorities

- An updated list of telephone numbers, hotline numbers or other means of communicating with district and provincial disaster management organizations, civil administration and the police should be displayed at prominent places at the premises and the campsite
- The ESH Unit will periodically review and update this contact list

(x) Availability of First Aid and Medical Treatment

- The ESH Unit will arrange for the first aid and the basic medical care facilities to cater for a medical emergency. The medicines and disposables of the first aid box should be regularly updated and recouped

5.12 Environmental Guidelines

Table 5.12 presents necessary environmental management and mitigation guidelines relating to design, construction and operation stages of the plant. These guidelines in fact are the preventive and corrective actions that may be taken into consideration by the proponent, construction contractor and the persons involved in planning, design and implementation of construction of the plant. The primary objective of these guidelines is to avoid or reduce the risk of the likely damages to environment. These guidelines have been developed with a view to ensure that the identified adverse impacts relating to various environmental parameters are properly addressed by either adopting a preventive or a mitigation strategy. The guidelines also designate the persons and agencies for their implementation and thereby ensuring attenuation of adverse impacts to an acceptable level by adopting suitable administrative and or technical options.





Table 5.12

Environmental Management & Monitoring Guidelines

A) Design and Planning Stage

Environmental Guidelines	Responsibility
Design Aspects (1) Project's Design and Layout should: (a) have architectural features, to the extent possible, in conformity to general landscape of the vicinity/area (b) be in consonance with local climatic, environmental, and meteorological conditions (c) prefer usage of the local construction materials and goods to the extent possible (d) provide adequate space for movement of persons and vehicles at the site (e) make provisions for collection, treatment, and disposal of wastes and effluent in an environmentally sound manner by providing a well-designed solid waste and effluent handling system of appropriate capacity, if needed (f) provide adequate structural safeguards for avoiding contact of storm water with vulnerable project structures through provision of essential structures for collection, diversion and removal of storm water and surface runoff (g) provide for interconnects for crossing over of the watercourses coming in the line of the project structure, if any (h) provide adequate arrangements for treatment and disposal of wastewater from the temporary worksite toilets at the campsite and the project office, if any (i) Provide construction of septic tank system for collection, treatment and disposal of toilet wastewater from the temporary worksite toilets during construction, if required (j) be in accordance with the applicable byelaws, engineering and architectural codes (k) be in consonance to seismic zoning of the site/area (l) be in consonance to environmental zoning of the site/area (m) be energy efficient and environment friendly structure	▪ Project Proponent ▪ Design Consultant ▪ Construction Contractor

B) Construction Stage

Environmental Guidelines	Responsibility
Air Quality Concerns (1) Carryout dust and emission producing activities (e.g., operating machinery, loading/offloading of construction materials) preferably at evening hours to minimize inconvenience to the neighbouring residents, schoolchildren and villagers (2) Keep the construction machinery and vehicles adequately tuned up and well serviced to avoid emission of smoke and particulate from their exhausts abnormally (3) Use only new and unadulterated fuels and lubricants. Do not use spent oils (4) Avoid operating machinery and equipment in windy conditions (5) Cover loose materials (e.g., sand, soil) with canvas/plastic sheets while stacked onsite or transporting on a carriage vehicle. If sheeting is not possible, then lightly sprinkle the surface of fine materials with water (6) Display instructions at appropriate places requesting the vehicle drivers to lower down speed inside the premises and at the project to reduce blowing of drag dust and to avoid road accidents (7) Obscure and isolate the active construction zone by vertical shields/blinds, wherever necessary	▪ Project Proponent ▪ Construction Contractor

Environmental Guidelines	Responsibility
Water and Wastewater (1) Do not dispose of any raw (untreated) wastewater onto soil or land or into the adjacent agricultural/crop fields (2) All effluents and wastewaters from the project should be compulsorily subjected to appropriate type of treatment (e.g., a septic tank) before their final discharge into the environment and adjoining fields (3) Avoid throwing of liquids and solids into nearby water bodies, irrigation channels and crops (4) The washouts of the construction machinery, implements and gadgets should be disposed of through soaking pits (5) All freshwater and wastewater pipelines should be marked (or well secured if open) to avoid their accidental or mischievous damage by vehicles, animals, and miscreants (6) Provide rainfall containment structures or storm water diverting barriers/channels watercourses to avoid damage of road berms from accumulation of rainfall water	▪ Project Proponent ▪ Construction Contractor
Noise Pollution (1) Operate the noise producing construction machinery and equipment during daytime (2) Avoid operating construction machinery at night time (3) Carryout fabrication and loading/unloading activities preferably during daytime hours (4) Carryout regular maintenance of the machinery and equipment to reduce noise generation	▪ Project Proponent ▪ Construction Contractor
Public Utilities (1) Carryout excavations/diggings only after ascertaining that no gas, oil, telephone or public utility lines are passing through the area to be excavated (refer to local utilities layout map) (2) Devise a standard operating procedure for dealing with accidental damage to utilities alongwith an immediate restoration plan (3) If relocation of any public utility or facility (e.g., electricity poles) is involved, it should be carried out well ahead of start of construction works	▪ Project Proponent ▪ Construction Contractor
Cultural and Archaeological Heritage (1) Discovery of any remnants/relics of historical, cultural, or archaeological importance during excavations or diggings, if any, should be reported immediately to the concerned authority/archaeology department (2) Graves/graveyards should not be shifted without the consent of local people	▪ Project Proponent ▪ Construction Contractor
Social Environment/Worksite Safety (1) Make the site staff and the labour aware of risks of personal injuries and the ways of avoiding risks (e.g., wearing helmets, breathing masks, earmuffs, safety goggles, gloves, etc.) (2) Keep a first-aid box handy at the construction site during construction and an adequate healthcare setup during operation phases of the project (3) Heads/supervisors of various sections should be made aware of the standard operating procedures for dealing with emergencies and hazard management (4) Use indicative signage and warning boards throughout the premises during both construction and operation for information and guidance of the workers/employees (5) Waste and packaging materials should be collected, segregated, and stockpiled in covered sheds to avoid their contact with rainwater (6) The labour should be paid wages according to Government's notified minimum wage rates (7) Pay the same wages to women as to men for equal hours of work	▪ Project Proponent ▪ Construction Contractor

Environmental Guidelines	Responsibility
(8) Avoid child labour (9) Keep firefighting arrangements ready at the site all during construction and a full network of fire extinguishing arrangements once the project goes into operation (10) Do not allow cigarette smoking and lighting of fire near work places and near inflammable materials (11) Store the ignitable and inflammable materials separately and at a safe place away from any source of fire (12) Keep the residents in loop about the project by constituting the Neighbourhood Committee (13) carryout regular training sessions into the modern techniques of environmental management, risk avoidance and handling of emergencies for the project staff during construction and for the ESHU staff during operation phase	

C) Operation Stage

Environmental Guidelines	Responsibility
Water, Wastewater, and Effluents (1) Ensure that the existing and the new boreholes, if any are required, are constructed according to the applicable engineering and safety standards and are sealed off from the exterior to avoid any potential contamination of the groundwater through downward trickling of the wastewaters along the borehole lines (2) Carryout regular and periodic laboratory testing of groundwater and the drinking water for its quality and fitness for human consumption and other usages during the period of active construction (3) Ensure proper working of the septic tanks and avoid their dysfunction and stuck-up (4) Ensure regular cleaning and removal of grit from the drainage lines, shoots (5) Display appropriately worded instructions at prominent places requesting the users not to throw solids over the road surface (6) Immediately repair any leakages from or damage to water supply lines and the wastewater pipelines	▪ Project Proponent ▪ Construction Contractor
Air Quality, Aesthetics, and Landscape (1) If a generator or any other machinery or equipment running on fossil fuel has been installed at the site, ensure that it is regularly serviced and emissions are monitored to ensure that they remain within the PEQS limits (2) Display suitably worded requests for the motorists for keeping their vehicles tuned up to reduce emissions and noise (3) Liaise with the Forest Department for planting trees and vegetative cover during each plantation season. Protect the saplings by ensuring observance of the recommended watering and trimming schedule (4) Avoid open burning of solid wastes at the campsite (5) Ignitable or inflammable materials, if any, should be stored in accordance with the safety rules for their storage and handling (6) Develop and maintain the greenbelts, grassy grounds and shady areas around the project office buildings to enhance its aesthetics and ambience and energy conservation	▪ Project Proponent ▪ Construction Contractor
Solid Waste Management (1) Institute a well-designed solid waste collection and disposal system for the project (2) Designate locations and provide waste collection bins of appropriate capacities at these locations for depositing the solid wastes by the passengers (3) Ensure that the waste bins and the wastes deposited therein are safe from access of the foraging and other stray animals who may spread	▪ Project Proponent ▪ Construction Contractor

Environmental Guidelines	Responsibility
around the wastes and littering of the nearby areas (3) Ensure that the waste collection spots are safe from rainfall and storm water and that solid wastes will not be carried away by the storm water (4) Ensure that the organic and inorganic solids are collected and disposed of separately (5) Encourage reuse and recycling of solid wastes by displaying suitable instructions and appeals (6) display instructions prohibiting the residents from throwing solids into the wastewater system (7) Avoid and prevent open burning of solid wastes (8) Maintain cordial relations and close liaison with the local municipal authorities responsible for solid waste management for timely lifting of the solid wastes from the site, particularly during the summer season	
Noise, Vibrations and Odours (1) Prevent unauthorized display of fireworks and music by the labourers (2) Prevent establishing of workshops and commercial setups on the roadside except at the designated areas/spots (3) Ensure that the waste collection spots are safe from rainfall and storm water and that solid wastes will not be carried away by the storm water	▪ Project Proponent ▪ Construction Contractor
Health, Safety, and Wellbeing (1) Ensure that provision of utilities and essentialities such as freshwater supply are adequate and upto the mark for workers (2) Ensure periodic cleaning of the temporary water storage tanks (3) Ensure maintenance and functioning of the safety lights (4) Carry out regular and periodic inspection and updating of the project machinery as per approved standards	▪ Project Proponent ▪ Construction Contractor

6

STAKEHOLDERS' CONSULTATIONS

6. STAKEHOLDERS' CONSULTATIONS

This section describes the need, process and outcome of the consultations held with the relevant stakeholders and the neighbouring village community over environmental aspects of the project.

6.1 Objectives and Rationale of Consultations

The primary objective of the stakeholders' consultations was to learn and know the apprehensions, concerns and opinions of the key stakeholders over environmental implications of the project. The consultation sessions served as a source of first-hand information about expectations of the community and beneficiaries of the project. Dialogue with the stakeholders and recording their concerns at appropriate stages of the project can help to tailor various aspects of the project in line with stakeholders' aspirations and therefore likely to promote public acceptance of the project and its sub-components.

6.2 Identification of the Relevant Stakeholders

The consultation process began with identification of the most pertinent stakeholders. Efforts were made to identify the relevant stakeholders through a systematic process, based on the nature and degree of their actual and perceived stakes in the project. **Tables 6.2a and 6.2b** present various categories of the stakeholders and the nature of their stakes in the project pertaining both to construction and operation stages:

Table 6.2a: Stakeholders and Nature of their Stakes (Construction Phase)

Category	Stakeholders	Nature of the Stakes
Design & Construction Stage		
Project Funding Agency	▪ Proponent	▪ All those stakes which a funding agency would have i.e., achieving the desired objectives and reaping benefits of investment into the project
Project Sponsoring Agency	▪ Proponent	▪ That the project is carried on smoothly in accordance with scheduled timeline
Project Implementing Agency	▪ Proponent ▪ Project's Design Consultant ▪ Construction Contractor ▪ Sub-contractors and Labour ▪ Vendors of machinery, equipment and various goods and services for the Project	▪ That the project is implemented as per schedule and delays on whatsoever account are avoided ▪ That all bottlenecks and impediments are removed in a timely and effective manner ▪ That the bills are cleared in timely manner and payments are made as per contract agreement
Regulatory Authorities	▪ Environmental Protection Agencies ▪ Local District and the Municipal Administration ▪ Local Building Control Authority	▪ That constructions under the project conform to applicable building codes, rules, regulations, bylaws, and environmental standards
Project Users/Beneficiaries	▪ Proponent ▪ Construction contractors ▪ Persons employed at the project ▪ Goods & Service providers ▪ Others	▪ That the project is completed as per schedule and that they get maximum benefits from the project ▪ That the project structures meet with their needs and requirements
Public and Community	▪ Neighbourhood community, Industrialists, Residents, Vendors, Agriculturists and Landowners	▪ That the project activities do not affect their living, business, and civic rights in an adverse manner ▪ That the project activities are not harmful for their health, hygiene and aesthetic ambience ▪ That the locals are preferred in provision of jobs at the project

Table 6.2b: Stakeholders and Nature of Their Stakes (Operation Phase)

Category	Stakeholders	Nature of the Stakes

Operation Stage		
Project Funding Agency	▪ Proponent	▪ That the fruits of investment are fully realized to the desired extent and the objectives are achieved to a satisfactory level
Project Sponsoring Agency	▪ Proponent	▪ That the project operates as a successful venture and serves as a role model for replicating similar projects by others
Project Operating Authorities	▪ Proponent	▪ That operational bottlenecks are removed in a timely manner and the project's operations carries on smoothly
Regulatory Authorities	▪ Environmental Protection Agencies ▪ Local District and the Municipal Administration	▪ That the project remains conformant to the applicable rules, laws and the environmental standards
Project Beneficiaries	▪ Proponent ▪ Employees and Project Staff ▪ Persons providing services and goods at and for the project ▪ Others	▪ That the project provides all the services and facilities for which it has constructed ▪ That the project is safe and secure from any outside intrusion ▪ The food served at the project facilities (canteens, mess, cafeteria etc.) is of prime standard and quality ▪ That the project activities do not pollute the environment ▪ That appropriate training and capacity-building is provided to the project staff ▪ That operation of the project is free from corrupt practices and maladies and is geared to serve its underlying objectives ▪ That payment to suppliers are made in a timely manner without any hassle and problems
Public and Community	▪ Neighbourhood community ▪ Project beneficiaries	▪ That the project activities do not affect their living, business, and civic rights in an adverse manner ▪ That the project activities are not harmful for their health, hygiene and aesthetic ambience ▪ That the locals are preferred in provision of jobs at the project

6.3 Consultation Methodology

Onsite consultations were held with representatives of various categories of the stakeholders as were available during field visits of the site. Wherever found feasible, general public in the vicinity were also consulted to know their views and concerns over the project. The majority of these consultations were either one to one meetings or small and focused group discussions. **Annex-6** presents a list of the persons interviewed and consulted during the IEE.

6.4 Issues Discussed

The points listed below are some of the issues discussed during the consultations:

- Will the project be constructed in accordance with applicable codes, rules, and regulations?
- Will the structures be commensurate to their usage after completion?
- Will the contractors comply with the environmental requirements?
- Will there be any concerns, apprehensions, and views of the community and the stakeholders over the activities relating to design, construction and operational aspects? What are these?
- What will be the likely adverse impacts of the project on various components of the environment i.e., physical, biological, and social components?
- What will be the possible remedies for the concerns and apprehensions? How these concerns will be addressed effectively?
- Any particular and specific personal or site related concerns?
- What steps will be needed to ensure long-term sustainability of the activities under the project?

- How the project's operations will come upto expectations of the project's users and the beneficiaries

6.5 Outcome of the Consultations

The neighbourhood communities did not express any specific or significant concerns. Interestingly, different stakeholders had different perceptions and different concerns about the project. Some of the concerns and apprehensions relating to various aspects of the project are reproduced below:

6.5.1 Design Aspects

- The design aspects need to take into account the relevant engineering codes, byelaws, and the applicable governmental policies

6.5.2 Construction Aspects

- Non-sprinkling of water on kacha areas, bare soils and open surfaces may cause release of particulate matter and its release in the environment
- Delays in payments to the contractors, sub-contractors, suppliers and the labour can cause delays in the project's implementation
- Delays in handing over the site to the contractor and the later changes in the drawings and scope of work may result into slow progress of construction and delayed completion of the project
- Unnecessary interferences by the local regulatory agencies and the municipal authorities are also likely to cause delays in completion of the reject
- Disorderly and haphazard placement of construction materials could become a nuisance for the labour and other persons working on the project alongwith its attended consequences
- Construction related noise could be troublesome for the neighbourhood community
- Generation of dust and its deposition on exposed surfaces would require frequent dusting of the spoiled surfaces
- Poor maintenance and upkeep of the temporary diversions may be troublesome for the community
- There would be lot of dust blowing during construction, which may be troublesome for the neighbouring communities

6.5.3 Operation Aspects

- There could be disruptions and discontinuations in the supply of the machinery and equipment and other materials for timely completion of the project
- There could be non-payment or delayed payment of wages to the work charge and the temporary employees
- There could be unsatisfactory cleanliness of the premises due to administrative and supervisory lapses

6.6 Measures to Address the Concerns

Table 6.6 presents a summary of the concerns and apprehensions of various stakeholders of the project and the plausible measures to address them:

Table 6.6: Summary of Stakeholders' Concerns alongwith Remedial Measures

Persons Consulted	Concerns/Apprehensions	Remedial Measures
Environment Protection Agency	▪ Environmental and functional compatibility of the project ▪ An institutional setup for addressing the issues and concerns ▪ No or minimal delays at various milestones	▪ IEE, EMP and the Environmental Guidelines as given in this document will ensure environmental and functional compatibility of the project ▪ An Environmental Safety, Health and Social Management Unit (ESHU) will be setup to manage all environmental and social issues of the project during both construction and subsequent operation
District Executive Authorities	▪ The project carries on smoothly without creation of any serious impediments	▪ The core administration of the project as well as ESHU will ensure smooth functioning of the project without eruption of any unpleasant situation
Project Staff	▪ Wages are paid in time and no deductions are made therefrom on any count	▪ The core administration and the ESHU will ensure that all apprehensions are allayed in a timely manner

Persons Consulted	Concerns/Apprehensions	Remedial Measures
	▪ Good quality and hygienic food is served ▪ Social security cover is provided for the project staff and the labour	
Contractors	▪ Delays in construction and completion of the project and resultant escalation in construction costs ▪ Delays in clearing of the running bills/ payments ▪ Poor coordination between various departments and functionaries ▪ Changes in the drawings and scope of work ▪ Lengthy and tedious procedural requirements ▪ Interferences by the local regulatory agencies and the municipal authorities	▪ The majority of the contractors' concerns relate to procedural and management issues. The institutional setup proposed for environmental and social management of the project will help solve the problems
Office staff and other employees	▪ Non-fulfilment of promises by the project authorities ▪ Disruptions in the supply of essentialities like office stationery, diesel for generators, and ink for printers ▪ Non-payment or delayed payment of wages to the work charge and the temporary employees ▪ Unsatisfactory cleanliness of the premises ▪ Lack of appropriate working space for the employees ▪ Lack of space for placing the important record and files ▪ Lack of safe drinking water facility	▪ The majority of the concerns relate to procedural and management issues. The proposed institutional setup will help solve the problems
Neighbourhood community and shopkeepers	▪ Noise pollution ▪ Dust and air pollution ▪ Disorderly placement of construction materials ▪ Environmental compatibility of the project ▪ Neighbours are not displaced or their business are not affected ▪ Timely completion of the project ▪ Preference in provision of jobs to locals	▪ The ESHU will keep constant liaison with the neighbouring community and will resolve all disputes and differences in an amicable manner through negotiations and consultations ▪ Timely completion of the project will be ensured ▪ No person will be dispossessed or displaced from his land without paying for due compensation ▪ The proponent will give due preference in provision of jobs to the locals provided they otherwise qualify for the job as per the prescribed qualification and applicable conditions

6.7 Proponent's Environmental Management Team

The proponent shall setup an Environmental Safety and Health Unit (ESHU) for timely appreciation, identification, and reporting of the environmental issues relating the project and for taking necessary preventive and corrective measures for addressing the issues at various levels of responsibilities. Subject to feasibility, the ESHU may continue during the operation phase as well, but with a little changed composition

and mandate. During the operation phase, the ESH may consist of the persons appointed by the proponent in consultation with the concerned persons. Expenses of the ESHU may be met from regular budget of the proponent. If needed, compulsory cess may be imposed in the form of service charges to meet expenses of the ESHU. The ESHU should be an independent functional unit headed by an ESHU Officer, who will be assisted by an appropriate number of subordinate officers, technical personnel, and others. The ESHU should be equipped with all essential equipment for handling any situation of emergency and disaster.

6.8 The Responsible Authority

The primary responsibility with respect to management of environmental issues at the plant will rest with the ESH Unit. Some of these responsibilities may include the following. **Table 6.8a** presents the scheme of roles and responsibilities of the staff in a tabulated format. Likewise, **Table 6.8b** presents the proposed organizational structure and responsibilities of the authorities towards implementation of the EMP.

- To generate periodic reports and fill-in the checklists on environmental and social performance of the project and the actions taken by the ESH Unit for rectifying the issues and removing bottlenecks
- To maintain liaison and linkages with the concerned municipal and regulatory authorities for troubleshooting and timely removal of bottlenecks concerning social issues at the premises
- To ensure smooth and timely implementation of the recommendations relating to risk avoidance and hazard prevention at the Plant premises
- To ensure troubleshooting of the problems relating to health, safety, environment and social issues all during construction and operation
- To take all necessary steps to protect safety, sanitation and health of the labour and workers during construction and operation, especially of those exposed to higher levels of risks to health and safety
- To prepare and execute awareness raising, educational and training programmes on safety, health and sanitation for the staff, labourers, officers and the neighbouring communities
- To make investigations of the causes of occurrence of accidents or hazards and take necessary steps to prevent occurrences of such events in the future

Table 6.8a: Roles & Responsibilities of Staff in EMP Implementation

Sr.	Position	Responsibility
1.	Manager (Engineering)	✓ performing technical and organizational role of construction works ✓ overseeing Implementation of EMP
2.	Project Manager	✓ Supervising construction works ✓ Schedule preparation and resource forecasting for engineering and other technical activities relating to the project
3.	Contractor(s)	✓ Undertake development of Plant in accordance with contract signed with the Proponent ✓ Adhere to Proponent HSE policies, procedures and other requirements while constructing the Project ✓ Implement aspects of EMP assigned to them
4.	Construction Manager	✓ Effective implementation of the EMP ✓ Regular performance reviews ✓ Corrective and/or remedial action where this may be required
5.	QHSE Manager	✓ Develop policies and procedures on the environmental, social, health and safety issues ✓ Oversee implementation of EMP ✓ Review and analysis of monitoring results and preparation of short reports to Project Manager ✓ Planning of training programs for personnel in accordance with relevant laws e.g. OSHA ✓ Oversee inspection of the facilities after completion of construction works

Table 6.8b: Proposed Organization Structure & Responsibilities in EMP Implementation

Sr.	Position	Responsibility
1.	QHSE Manager	✓ Oversee annual environmental, health and safety and fire audits
2.	QHSE Executive	✓ Preparation of environmental monitoring reporting and any permit applications ✓ Running of day-to-day requirements for EMP implementation ✓ Overseeing of construction process and ensuring the implementation of avoidance and mitigation measures

		✓ Conducting monitoring and review of EMP implementation by contractors ✓ Inspect the constructed facilities after completion
3.	Environmental Consultant	✓ Periodically commissioned to undertake statutory environmental audits ✓ Guide the Proponent during implementation of the Environmental management plan
4.	OHS Consultant	✓ Carry out statutory health and safety audit of the Plant
5.	Fire Safety Inspector	✓ Carry out statutory Fire safety audit of the Plant

6.9 Other Departments and Agencies

The Civil Defence Department, the Directorate of Boiler Inspections and the District Administration have already granted their NOCs for setting-up of the plant at the selected site on Chowk Azam Road, Layyah. Likewise, the EPA-Pb is expected to grant its environmental approval in favour of the plant. On account of its non-polluting nature, the project is likely to fetch environmental approval from the EPA-Pb.

6.10 Environmental Practitioners and Experts

The proponent will enter into a long-term contract with the environmental consultant, Green Revolution, for overall supervision of the environmental aspects of the plant all during its operational life. The contracts will be made for three to five terms and will be renewed with mutual understanding, both of the proponent and the environmental consultant.

6.11 Affected and Wider Community

This aspect is not relevant, as the plant will be situated at a safe distance from any nearby dwelling or human settlement. Therefore, the neighbourhood community will not have any direct or indirect interaction with plant's construction and or operations. Hence, there is no affected community.

6.12 Stakeholder Consultation Techniques

In recognition of deveristy of views within any community, it is very important toi obtain a clear undertaking of the different stakeholder' views and concerns regarding the project and to analyse their capacity and willingness to be involved in some or all of the project and its planning process. It is important to be aware of how different power relations can distort the participation. It is also mporant to know that how community skills, resources and knowledge gcan be applied to improve the project implementation. All of this can be achieved by careful use of various tools of stakeholder consultation.

- Informal meeting with the communities in neighbourhood areas; men and elders attended there meetings.
- Focus group with women paricticpant in surrounding areas.

6.13 Stakeholders consuted

In consultation process for EIA, the following stakeholders were consulted.

- Local communities, men, women and elders attended the meetings
- Local Government represnattives.

6.14 Consultant with Government Official

Following officers of government department were consulted by the socio-envornmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc, in their offices, for instance.

STAKEHOLDER CONSULTATION WITH GOVERNMENT DEPARTMENTS

Sr. No.	Designation and Department	Concerns / Remarks
1.	Assisant Director Environment – EPA Layyah	It should be ensure that the Solid wate should be managed effeictively.
2.	Inspector Environment – EPA	Propoed project area is industrial in nature. Following mitgitation measures should be adopted.

		• The plantation in designated green zones should be carried out. • Proper disposal of the solid waste. • HSE management measure should be adopted and implemtned effectively.
3.	Superintendent District Council	Timely implementation of the project. HSE plant should be consulted at source.
Irrigation Departmen		
4	Senior Sub Engineer	Following measures should be adopt Constrution and insallation should be meet the standard of HSE.
5	Head Clerk	Proponent should facilitate to obtain documents for its prouejct .
Social Welfare & Bait ul Mall		
6	Social Welfare Officer	The management of the unit must concern with the department for welfare of geneal public and labour and funds will be donated to needy peson and rehiblitation.
DHQ HOSPOTIAL LAYYAH		
7	DHQLayyah	Health of the worker should be check by the qualified Medical Staff. Solid waste should be manage proper to ensure cleaness. First aid facility and emergency will be provie to the workers of unit at with the premises.

6.15 Consultation with local Community

The local people of the project consulted and their views were recorded in form of survey and presented in the table annexure.

Sr.	Name	Concerns / Comments
1.	Ali Hassan son of Majid Muhammad	Job Opportunity will ariase
2.	Malik Nasir Mehmood Son of Malik Allah Baksh	Business opportunity will enhance
3.	Muhammad Asif son of Abdul Satar	Bright Future prospective
4.	Zaheer Aslam son of Muhammad Aslam	investment will generate
5.	Muhammad Shuaib son of Shafeeq Ali	Economic condition of the community will prove.
6.	Muhammad Akram son of Muhammad Sadiq	Jobs and economics condition of layman upleft.
7.	Muhammad Shaban son of Khalid Parweez	Enahance saling of different products.
8.	Asim Mehmood son of Muhamad Asif	Labour opportunity will be increase.

6.16 Consultation with local Community

The community consultations demonstrated that goodwill towards the project proponent indeed exists. Approval project activities by communities was evident. The consultations were considered a good gesture and were appreciated; especially by men and women. The poverty level is such that communities are looking forward to any project proponent to improve their financial well-being to a great extent. Benefit from the project should be distributed judiciously and equitably among the primary stakeholders in the proeject area, and the proponent will continue to ensure that this principle is followed in this project and community development program.

6.16.1 Local Employment

Communities in the project area emphasized that local inhabitants should be given priority when people for related works and activities according to their skills.

6.17 Compensation

Compensation shall be paid for any damage if it is there. The compensation process should be transparent.

6.18 Interaction with Local Community

Non-local work force coming in the project area who will not be aware of the local customs and norms and may result in conflicts with the local community; keeping in mind the sensitive law and order id culture of area.

6.19 Settlement/ Relocation

The proposed site land is owned and possessed by proponent. No human population resides within project area. No structure of any significance (cultural, religious, ical, recreational or any other) stands on the land selected for the project. No flora or fauna; Belonging to endangered species is found within a safe distance from the site which is to be removed to some other part. Hence, no relocation and resettlement is required. Socio-economic as are attached as Annexure-XIV with EIA report.

4.7.6 Project Response

Respondents were in favor of the proposed project as it will raise the employment opportunities for the skill and unskilled labor. 98% favored the construction of the project keeping in view its importance.









FINDINGS & CONCLUSION

FINDINGS & CONCLUSION

Results of the instant IEE show that the setting-up of the plant for formulation of good quality agrochemicals, as per the applicable standards, primarily for agricultural usage followed by their supply to various end-users will not have any negative or adverse environmental impacts on the physical as well as the biological environment. The transitory and insignificant impacts, during setting-up of the plant will be all negligible and of no eventual consequence at all. As per findings of the IEE, there will not be any impacts, whatsoever. However, if any (although there is none) are found at a later stage, they will be all mitigable in character. Despite a comprehensive examination of the parametric and non-parametric aspects of the proposition, the Team of Experts Professionals could not find any negative impacts of the Plant. The transient impacts of the setting-up of the plant, as have been identified in the EIAR are all-reversible and can be made good by implementing the mitigation measures and the environmental monitoring programme as given in this IEE report. To conclude, the environmental and social impacts of the plant, if any, are countered by the availability of a neater, cleaner, safer and environment friendly setup for formulation of the intended products. In nutshell, the impacts of setting-up of the plant will be all positive in nature and beneficial for the environment, economy and the community.

The setting-up of the plant for formulation of good quality agrochemicals and their supply to interested buyers will be of immense advantage and benefit for the community and the environment. The findings of the IEE show that there will be not any exhaustive exploitation and consequential depletion of the local natural resources from setting-up of the plant. In view of the calculated scope and magnitude of the plant, the local resources will remain conserved and available for sustainable future development. The Plant will therefore bring-in positive and healthy improvements in the socio-economic environment of the area. The Plant will benefit thousands of the people, locally and distantly.

There is no denying the fact that the industrial projects should be subjected to environmental evaluation to avoid adverse environmental impacts, as may be likely to come in the wake of their implementation. The setting-up of the instant plant does not warrant any such examination or assessment for the following reasons:

- Firstly, setting-up of a plant for formulation of agrochemicals is not mentioned in any of the Schedules of the IEE/EIA Regulations. Therefore, neither any IEE, EIA nor any environmental approval is required for setting-up the plant.
- Secondly, the proponent is voluntarily submitting the instant IEE report to the EPA-Pb therefore, the plant will be setup under grant of its environmental approval from the EPA-Pb.
- Thirdly, the plant will be setup in strict accordance to the applicable bylaws, regulations, standards, and terms and conditions of the district administration, municipal authorities and regulatory agencies of Govt.
- Fourthly, such like plants already exist and operational in the country without causing any environmental impacts. Owing to the simple physical nature of the product formulation operations, the majority of them are operating normally and without any adverse environmental impacts. It is therefore expected that setting-up of the instant plant will also be devoid of any adverse impacts, whatsoever.

It needs no mention that setting-up of the plant will be of great advantage to the proponent, as it will ensure availability of the products for the end-users at affordable prices. There is no denying the fact that setting-up of the similar plants should be taken up on priority basis. The focus should be to bring these products within the reach, access and affordability of the ordinary citizens. This will provide immediate as well as long-term relief to the population. Nevertheless, concomitant to the same, respect for the environment should not be compromised, solely on this score. The environmental aspects of a project should be accorded due importance in the planning, designing, construction and operation of such like facilities. It is the duty of the proponent to ensure that construction and operation of such like new setups does not affect the environment in an adverse manner. The proponent should further ensure that setting-up of the plant does not bring about unfavourable land use changes, large-scale exploitation of the natural resources, and irreversible pollution of the air, water, and the soil environments from emissions, effluents, solid wastes and other substances released during construction and the subsequent operation/usage phases of the plant. It is therefore imperative that before taking up construction of any such like unit, it is subjected to optional Environmental Impact Assessment, as envisaged under the Punjab Environmental Protection Act 1997. The objective of the IEE/EIA should be to ascertain the adverse impacts relating to construction and operation phases and to provide for remedial measures, wherever required and indicated in the best interest of the local and national environment.

As far as the instant project is concerned, not any adverse impacts of setting-up of the plant could be found during this IEE. The whatsoever environmental impacts as could be identified, are all insignificant and of no bearing. They are controllable by implementing the proposed mitigation measures and by complying with the applicable environmental laws of the country. In the instant case, implementation of the environmental mitigation measures and the guidelines, as have been given in this document, are expected to bring down the negative environmental impacts of the plant well within the fold of the acceptable limits. Nevertheless, to ensure its long-term environmental sustainability, institutional arrangements must be put in place, which effectively control undesirable impacts during setting-up and the subsequent operational life of the plant.

In nutshell, the high-end positive impacts of the plant far outweigh all the low-end negative impacts, thereby rendering the Plant an **environmentally sustainable, compatible, feasible and implementable project**.

Lab Instruments





GLOSSARY

GLOSSARY

Absorption:
a volume process, in which one substance permeates another (soaking up).

Acidification:
adding acid to a substance to achieve acidic properties.

Acute Effect:
an adverse effect on any living organism in which severe symptoms develop rapidly and often subside after the exposure stops.

Acute Toxicity:
adverse effects that result from a single dose or single exposure of a chemical; any poisonous effect produced within a short period of time, usually less than 96 hours. This term is normally used to describe effects in experimental animals.

Adsorption:
a surface process; the accumulation of molecules of a gas or liquid to form a thin film on the surface of a solid (surface assimilation).

Aeration:
the act of mixing a liquid with air (oxygen).

Aerobic:
a biological process that occurs in the presence of oxygen alkali proton acceptor. A substance that, more or less readily, takes up hydrogen ions in a water solution.

Anaerobic:
a biological process which occurs in the absence of oxygen.

Biochemical:
Chemicals that are either naturally occurring or identical to naturally occurring substances. Examples include hormones, pheromones and enzymes. Biochemical function as pesticides through non-toxic, non-lethal modes of action, such as disrupting the mating pattern of insects, regulating growth or acting as repellents.

Biochemical Oxygen Demand (BOD):
The quantity of dissolved oxygen required by microorganisms in order to decompose organic matter. The unit of measurement is mg O_2/l. In Europe, BOD is usually measured after 3- (BOD_3), 5- (BOD_5) or 7-days (BOD_7).

Biodegradable:
that can be broken down physically and/or chemically by microorganisms. For example, many chemicals, food scraps, cotton, wool and paper are biodegradable.

Biodiversity:
the number and variety of different organisms in the ecological complexes in which they naturally occur. Organisms are organised at many levels, ranging from complete ecosystems to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystems, species and genes that must be present for a healthy environment. A large number of species must characterise the food chain, representing multiple predator-prey relationships.

Chemical Oxygen Demand (COD):
the amount of potassium dichromate, expressed as oxygen, required to chemically oxidise at approx. 150 ºC substances contained in waste water.

Diffuse Sources:
sources of similar diffuse or direct emissions which are multiple and distributed inside a defined area.

Dry Solids.

The mass of a material remaining after drying by the standard method of test.

EC_{50} (Effect Concentration 50):
The concentration at which effects are observed in 50 % of the test population after administering a single dose. Effects include the immobilisation of daphnia, inhibition of growth, cell division or biomass production, or the production of chlorophyll by algae.

Effluent:
physical fluid (air or water together with contaminants) forming an emission.

Emission:
the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into the air, water or land.

Emission Limit:
values the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during one or more periods of time.

Emmission:
occurrence and level of polluting substance, odour or noise in the environment.

End-of-Pipe Technique:
a technique that reduces final emissions or consumptions by some additional process but does not change the fundamental operation of the core process. Synonyms: 'secondary technique', 'abatement technique'. Antonyms: 'process-integrated technique', 'primary technique' (a technique that in some way changes the way in which the core process operates thereby reducing raw emissions or consumptions).

Eutrophication:
the pollution of a body of water by sewage, fertilisers washed from the land, and industrial wastes (inorganic nitrates and phosphates). These compounds stimulate the growth of algae, reducing the oxygen content in the water, and so killing animals with a high oxygen requirement.

Existing Installation:
an installation in operation or, in accordance with legislation existing before the date on which some piece of legislation is brought into effect.

Flue-Gas:
off-gas from firing/combustion processes.

Flux:
a substance that, even in small quantities, lowers the fusion point of material, in which it is naturally present (e.g. alkalis in clay) or of material to which it has been added (e.g. borax added to glazes).

Fugitive Emission:
emission caused by non-tight equipment/leak: emission into the environment resulting from a gradual loss of tightness from a piece of equipment designed to contain an enclosed fluid (gaseous or liquid), basically caused by a difference of pressure and a resulting leak. Examples of fugitive emissions: leak from a flange, a pump, a sealed or tightened equipment, etc.

Fugitive Emissions:
are a subset of diffuse emissions.

Glass:
a solid with no long range order in the arrangement of its atoms.

Installation:
a stationary technical unit where one or more activities are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution.

Kiln:

a high temperature installation used for firing the materials.

LC_{50} (Lethal Concentration 50):
The lowest concentration of a substance in water or ambient air in milligrams per litre sufficient to cause death in 50 % of the test population within a defined period (e.g. 96 hours for fish, 48 hours for daphnia).

LD_{50} (Lethal Dose 50):
The lowest dose of a substance administered to species such as mice and rats sufficient to cause death in 50 % of the test population within a defined period (no more than 14 days), expressed in milligrams of test substance per kilogram of bodyweight.

LOEC (Lowest Observed Effect Concentration):
The lowest experimentally determined concentration of a test substance at which adverse effects can be observed.

Monitoring:
A process intended to assess or to determine the actual value and the variations of an emission or another parameter, based on procedures of systematic, periodic or spot surveillance, inspection, sampling and measurement or another assessment methods intended to provide information about emitted quantities and/or trends for emitted pollutants.

Off-Gas:
general term for gas/air released during combustion processes or extraction processes at ambient temperatures.

Operator:
any natural or legal person who operates or controls the installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated.

Particulate Matter:
Dust

Pollutant:
A single substance or group of substances, which can harm or affect the environment.

Primary Measure/Technique:
a technique that in some way changes the way in which the core process operates thereby reducing raw emissions or consumptions (see end-of-pipe technique).

Secondary Measure/Technique:
see end-of-pipe technique.

Sintering:
A general term for the densification by heat of a powder compact to produce a polycrystalline body.

Sludge:
a suspension with a relatively high solids content.

Sorption:
the process, in which one substance takes up or holds another by either absorption or adsorption.

Specific Emission:
emission related to a reference basis, such as production capacity, or actual production (e.g. mass per tonne or per unit produced).

SS (Suspended Solids):
Soli content in water (See also TSS).

Standard State:
refers to a temperature of 273 K and a pressure of 1013 hPa.

TOC:
Total Organic Carbon.

TS (Total Solids):
Solid content before drying of the material.

TSS (Total Suspended Solids):
Solid content in water (See also SS).

REFERENCES

REFERENCES

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16. Policy and Procedures for the Filing, Review, & Approval of Environmental Assessment Guidelines, Government of Pakistan 1997
17. Project Papers, Construction of “Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah”, 2021
18. Other Project Support Documents as provided by the Proponent, 2021
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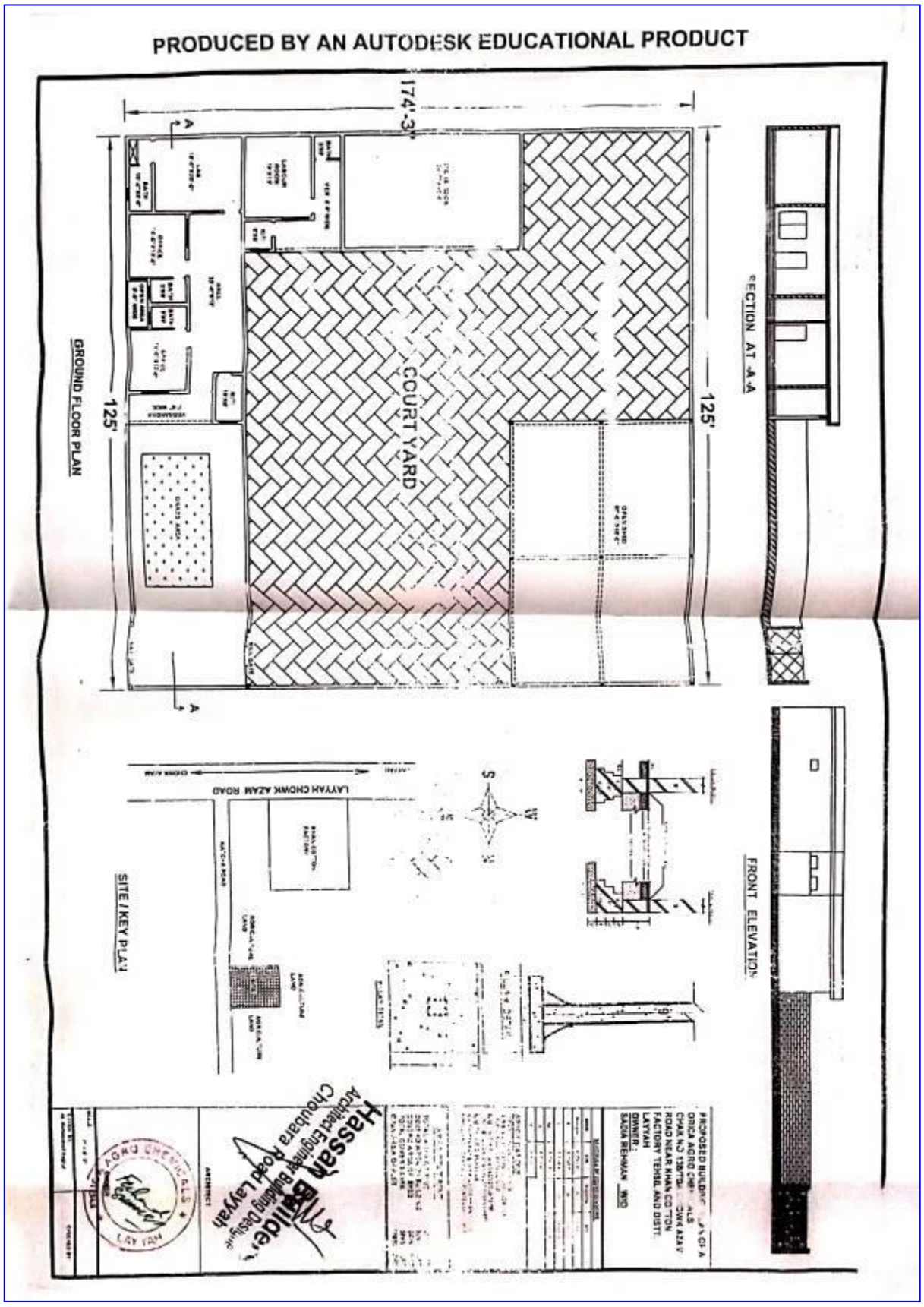
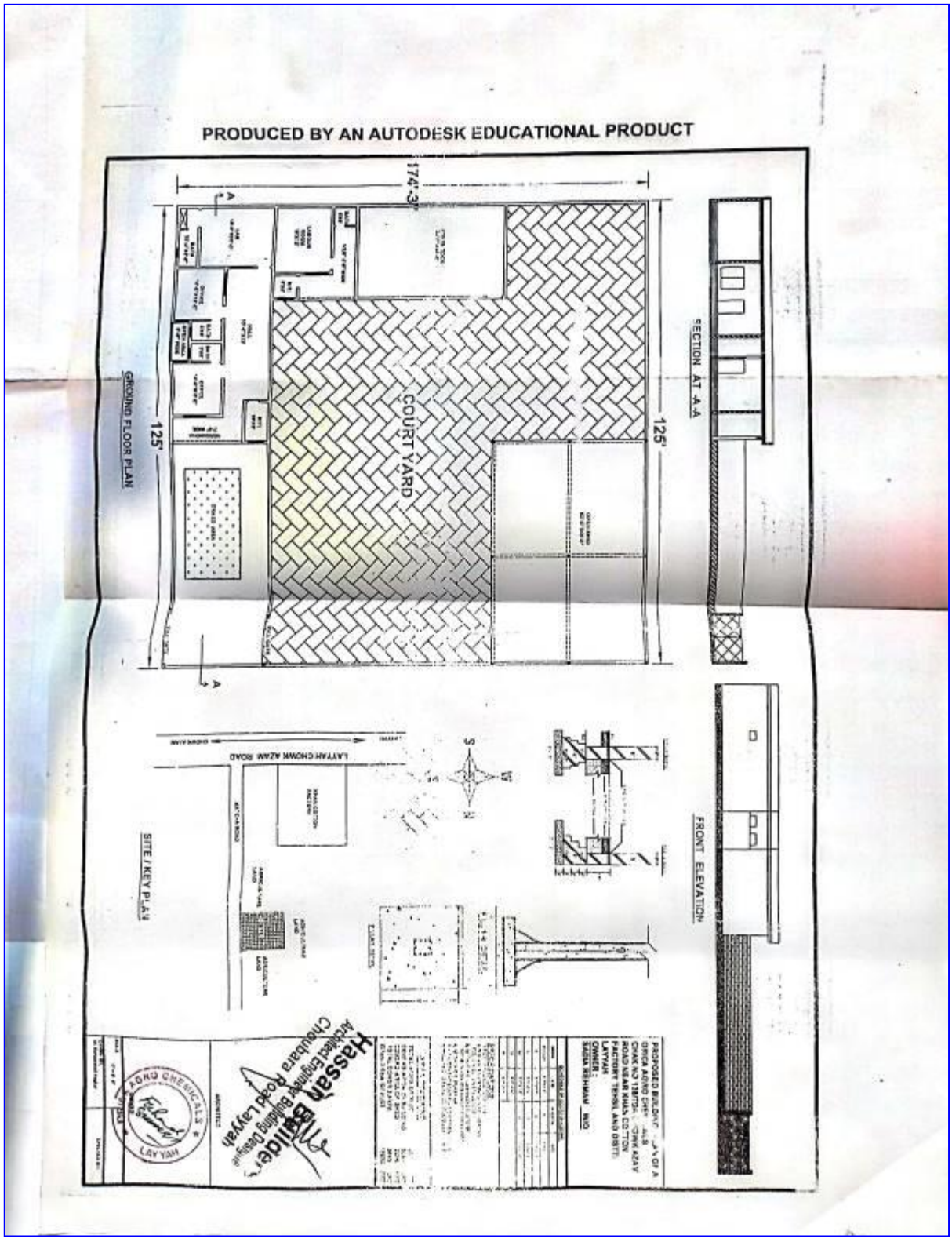
ANNEXES

Annex-1

Layout Map/Plan



Layout Map/Plan



Layout Map/Plan

Annex-2

Other Documents

FORM-D

[Vide Rule (a)]

MEMORANDUM ACKNOWLEDGEMENT

OF

DOCUMENT

NO. 19 /LYR Of 2018-2019

The Registrar of Firms, District Layyah, Hereby acknowledges the receipt of under mentioned Document/Documents and intimates that it has/they have been filed pursuant to the provisions of the Partnership Act, 1932.

FORM-II Notice Dated: 07.10.2021 for change in principle place of business from **Chak No. 148-A/TDA By Pass Road Tehsil & District Layyah** to **Chowk Azam Road Near Khan Cotton Factory Tehsil & District Layyah** of M/S ORICA AGRO CHAMICALS for record under section 60(i) of partnership Act. 1932.

FORM-V Notice dated: 07.10.2021 for change in constitution of Firm **M/S ORICA AGRO CHAMICALS, Chowk Azam Road Near Khan Cotton Factory Tehsil & District Layyah** w.e.f 05.10.2021 for record under section 63 (i) of Partnership Act, 1932.

LAYYAH

Dated. 20/10/2021

Tahir Mehmood
Registrar of Firms
District Layyah.

No. 370
Dated. 21-10-2021

REGISTRAR OF FIRMS LAYYAH

Registration Certificate

K618812

0030-14387372

E-STAMP

PB-LAY-99837CB45803ECC1

Non-Judicial

Rs 1,025/-

First Partner	: MAHAR FAHAD MASOOD SUMRA [32203-3469277-9]
Second Partner	: SADIA REHMAN [32304-0971021-6]
Agent	: ASAD NAWAZ [32203-4768653-7]
Stamp Duty Paid by	: MAHAR FAHAD MASOOD SUMRA [32203-3469277-9]
Issue Date	: 05-Oct-2021, 10:10:17 AM
Paid Through Challan	: 2021FB636857C98A
Amount in Words	: One Thousand and Twenty Five Rupees Only

ATTESTED

Notary Public
Oath Commissioner
Sc Layyah

Please Write Below This Line

PARTNERSHIP DEED.

Deed of agreement written on this 05.10.2021 by & between :-

1. **Mr. MAHR FAHAD MASOOD SUMRA S/O NOOR MUHAMMAD SUMRA** R/O CHAK NO 125-B/TDA NEAR GRID STATION TEHSIL & DISTRICT LAYYAH
2. **SADIA REHMAN W/O MAHAR FAHAD MASOOD SUMRA** R/O WARD NO 18 SUMRA HOUSE MOHALLAH QADIR ABAD LAYYAH

Whereas the aforesaid party of 2ND part and **MR ABDUL JABBAR SOMROO S/O HAJI ABDUL HAQ SOMROO** have been running the Firm **M/S ORICA AGRO CHEMICALS,CHAK NO 148- A TDA BY PASS ROAD TEHSIL & DISTRICT LAYYAH** in partnership with each other under a duly executed deed of partnership.

Whereas **Mr. ABDUL JABBAR SOMROO S/O HAJI ABDUL HAQ SOMROO** retired on the 05.10.2021 and now the party of 1st part **Mr. MAHR FAHAD MASOOD SUMRA S/O NOOR MUHAMMAD SUMRA** has decided to admit the part 2nd in the partnership and wise to change the Head office address into writing in order to clarify the position of each part for internal as well as external knowledge.

Hence this deed of partnership for such used.

1. That the name & style of the firm shall be **Mr. ORICA AGROCHEMICALS**
2. That the office of the firm shall be situated **CHOWK AZAM ROAD NEAR KHAN COTTON FACTORY LAYYAH,** which may be shifted of branches thereof may be opened at any other place/places in the country with the mutual consultation of the parties.
3. That the business of firm shall be construction works, or the firm may adopt any other line of business as and when agreed upon by the parties.
4. That the partnership deed shall take effect from 05/ 10 / 2021.
5. That the capital investment of the partners will be as per books of account which may further be increased or decreased accruing to the requirements of business without effecting the share proportion of the parties.

Partnership Deed

6. That the net profit or losses of the firm shall be as under.

i)Mr. MAHR FAHAD MASOOD SUMRA S/O NOOR MUHAMMAD SUMRA_____60%

ii) SADIA REHMAN W/O MAHR FAHAD MASOOD SUMRA_____40%

7. That the partner No.1 **Mr. MAHR FAHAD MASOOD SUMRA S/O NOOR MUHAMMAD SUMRA** shall be the managing partner of firm who will manage and conduct all the affairs of the partnership business diligently.
8. That the bank account shall be opened in the name of the firm, which shall be operate by the **Mr. MAHR FAHAD MASOOD SUMRA S/O NOOR MUHAMMAD SUMRA** or the partners will self-decision about deal the bank account.
9. Firm will be authorized to avail loan facility from any schedule bank against security.
10. That the accounts of the firm shall be properly maintained & the books of the firms be closed on 30th June of each year.
11. That the work & payments in the names of the partners shall be treated of the firm from the commencement of the partnership deed.
12. That each partner may withdraw some reasonable amount for his personal use but the same will be debited in his personal account.
13. That in the case of death of any partner his legal heirs will become the partner & amount of the deceased partner will be equal transferred in the name of his legal heirs.
14. That the partnership is "AT WILL" Butt Can't be dissolved till the clearance of bank loan.
15. That in case of any difference of opinion or dispute the same shall be settled mutually or be referred to an arbitration according to law.
16. That all the provisions of Pakistan Partnership Act, 1932 shall be applicable to this deed.

REGISTRAR OF FIRMS LAYYAH

THE PARTNERS HERE TO AFFIX THEIR SIGNATURES IN THE PRESENCE OF WITNESSES.

PARTNERS.

1. **Mr. MAHR FAHAD MASOOD SUMRA S/O NOOR MUHAMMAD SUMRA**
(32203-3469277-9)
2. **SADIA REHMAN W/O MAHR FAHAD MASOOD SUMRA**
(32304-0971021-6)

ATTESTED

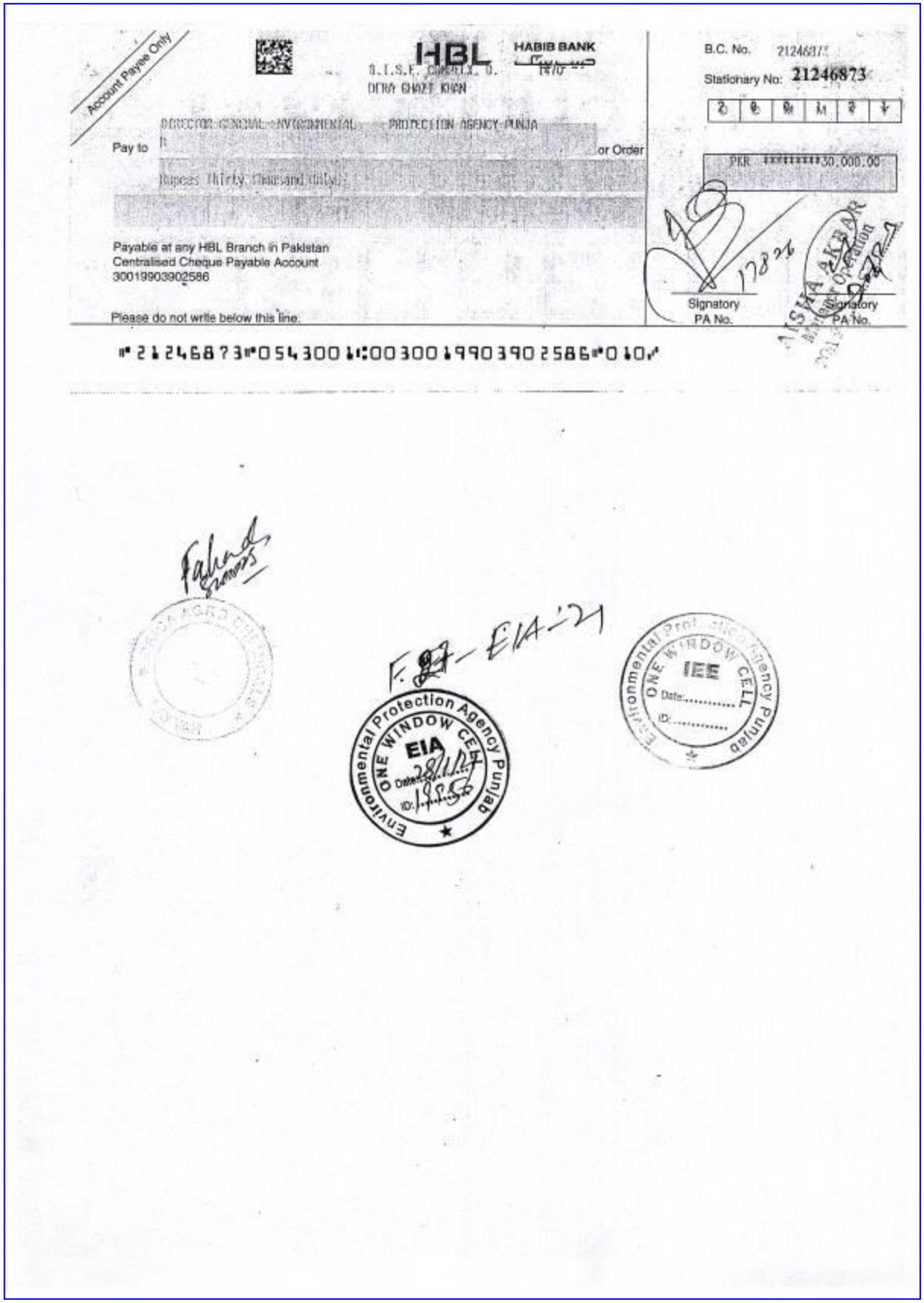
WITNESSES.

1. **ASAD MASOOD S/O NOOR MUHAMMAD SUMRA** (32203-5334573-7)
2. **JUNAID ZAFFAR S/O ZAFFAR IQBAL** (32203-41[illegible])

Hamayat Ullah Advocate Notary Public Oath Commissioner

E-STAMP CONTINUATION SHEET

Partnership Deed



Pay Order of EIA Review Fee

BW597186

Rupees 50 ۵۰ روپیہ

بیان حلفی

منکہ مسمی محمد رفیق ولد محمد دین مرحوم 32207-2061403-9

چک نمبر 138/TDA ڈاک خانہ لیہ تحصیل و ضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل و ضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم و یقین کی حد سے صحیح و درست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

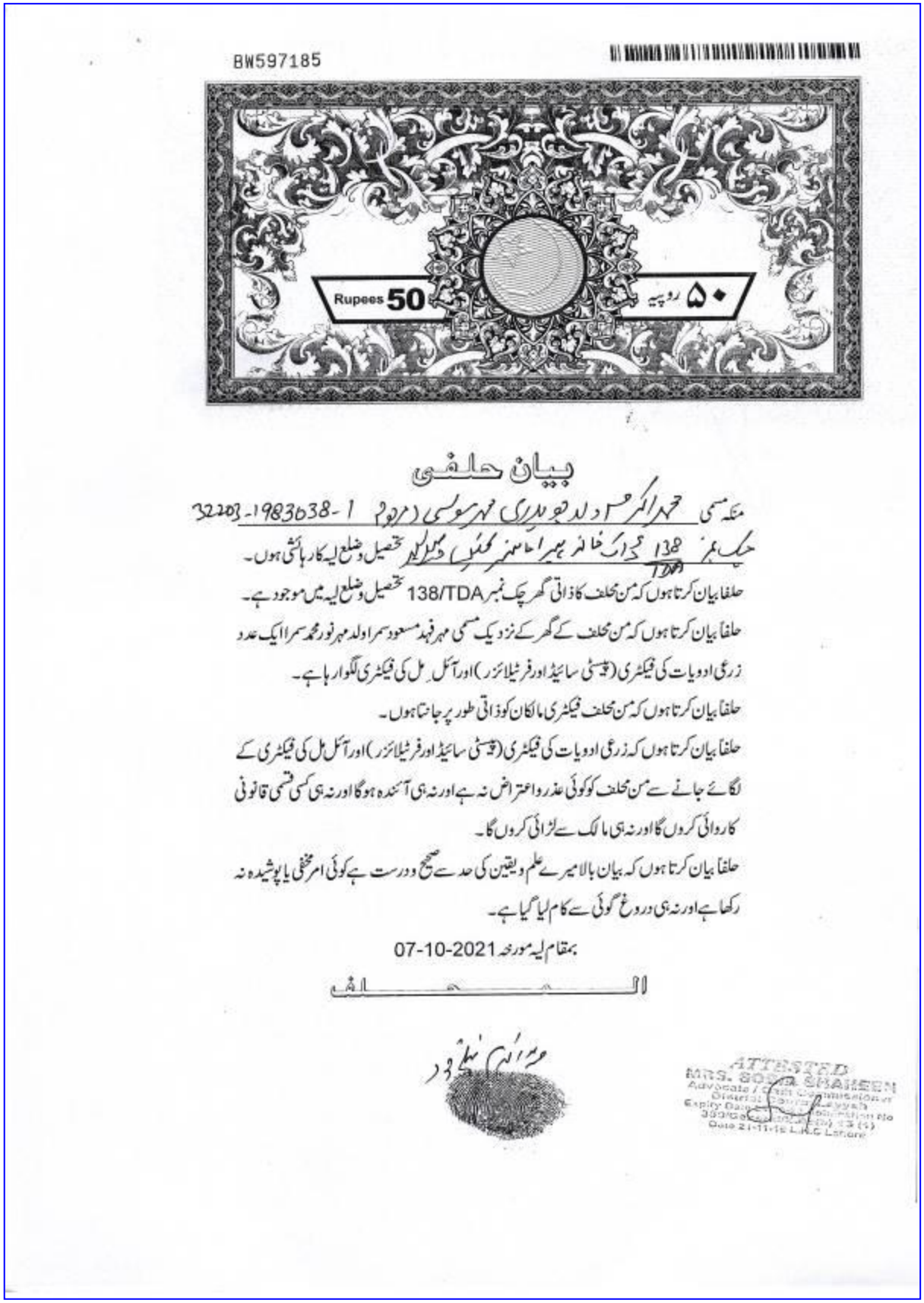
بمقام لیہ مورخہ 07-10-2021

المحلف

محمد رفیق

ATTESTED
MRS. SOBIA SHAHEEN
Advocate / Oath Commissioner
District Court, Layyah
Expiry Date [illegible]
Date 21-11-15 L.H.C Lahore

Affidavit of No Objection



BW597185

Rupees 50 ۵۰ روپیہ

بیان حلفی

منکہ مسمی محمد اکرم ولد چوہدری مہر موسی (مرحوم) 32203-1983038-1

چک نمبر 138 TDA ڈاک خانہ ہیرا ماسٹر کمیٹی وسیلہ تحصیل وضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل وضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر واعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم ویقین کی حد سے صحیح ودرست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

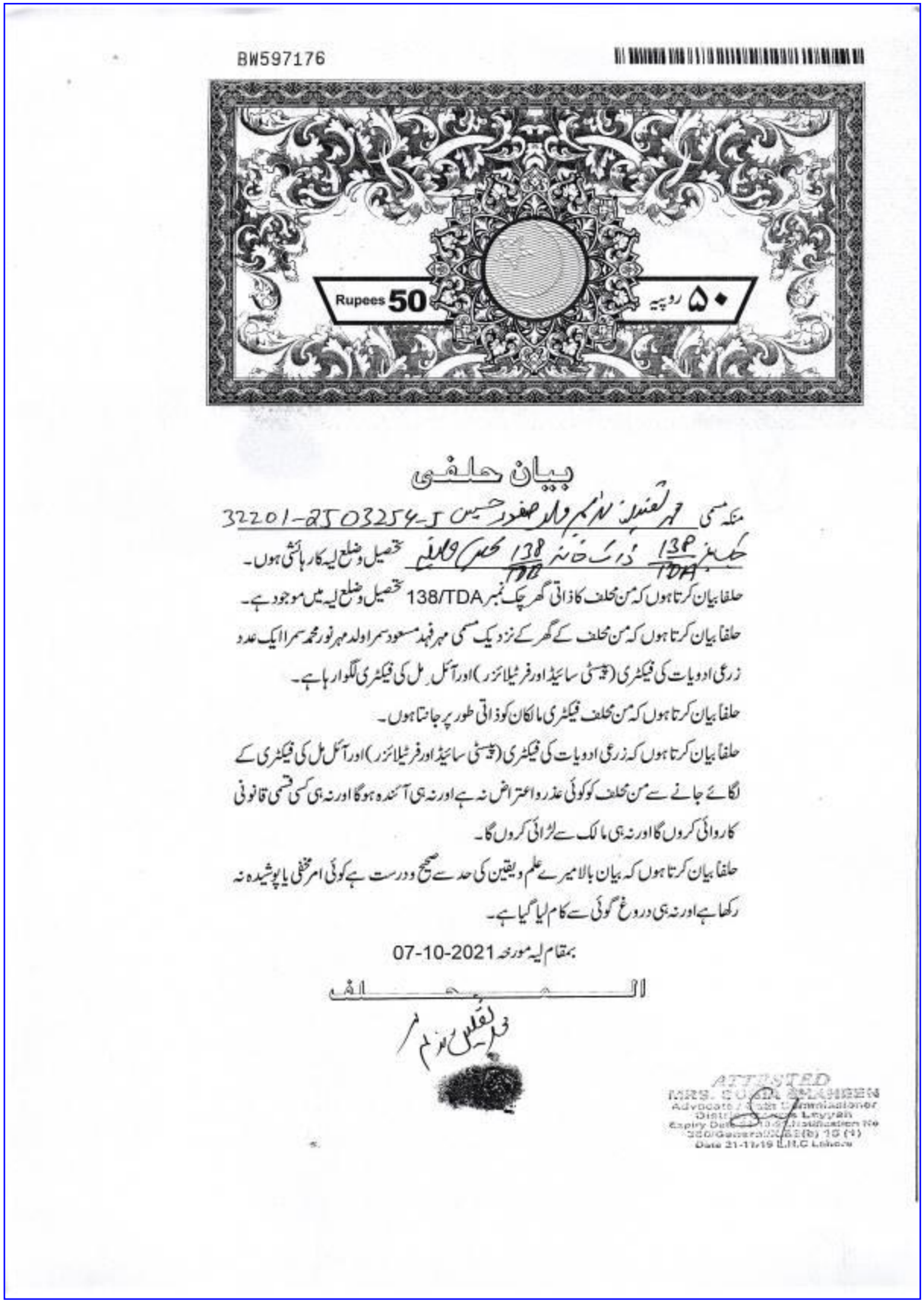
بمقام لیہ مورخہ 07-10-2021

المحلف

محمد اکرم نیلی خود

ATTESTED
MRS. SOOJA SHAHEEN
Advocate / Oath Commissioner
District Courts Layyah
Expiry Date [illegible]
Date 21-11-16 L.H.C Lahore

Affidavit of No Objection



BW597176

Rupees 50 ۵۰ روپیہ

بیان حلفی

منکہ مسمی مہر تقلین ندیم ولد صفدر حسین 32201-2503254-5

چک نمبر 138/TDA ڈاک خانہ 138/TDA تحصیل و ضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل و ضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

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بمقام لیہ مورخہ 07-10-2021

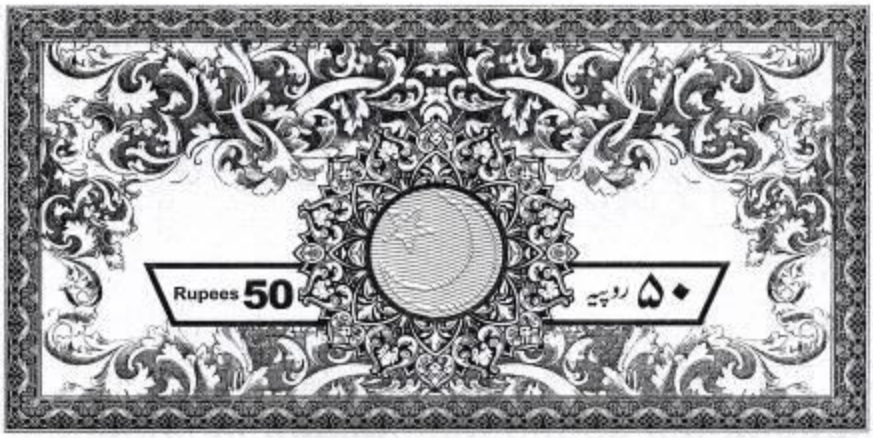
المحلف

مہر تقلین ندیم

ATTESTED
MRS. SONIA SHAHEEN
Advocate / Oath Commissioner
District Lahore Layyah
Expiry Date 21-11-21 Notification No
250/General/XXXI(B) 15 (1)
Date 21-11-19 L.H.C Lahore

Affidavit of No Objection

BW597187



بیان حلفی

منکہ مسمی اللہ وسایا ولد غلام حسن (مرحوم) 32203-2015957-1

چاہ ٹامی وارا ہمراہ انیس کچھی سکنہ ضلع لیہ تحصیل وضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل وضلع لیہ میں موجود ہے۔

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بمقام لیہ مورخہ 07-10-2021

الحلف

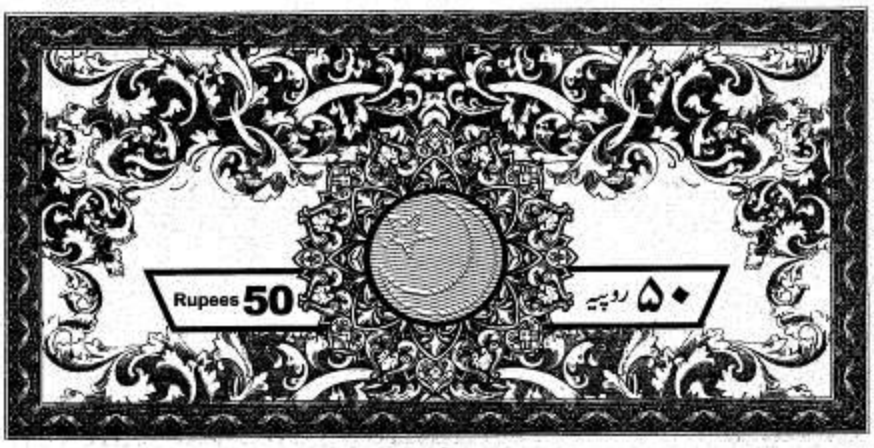
اللہ وسایا

ATTESTED
MRS. SOBIA SHAHEEN
Advocate / Addl. Commissioner
District Court Layyah
Exhibit Dated ... Identification No
365/Behaviral/P.S(b) 15 (3)
Date 21-11-19 D.H.C Lahore

Affidavit of No Objection

BW597184

Rupees 50 ۵۰ روپیہ



بیان حلفی

منکہ مسمی عمر دراز ولد کالو 32203-5240699-3

پتی جنوبی بستی صوبہ ولی شمر الشبہ کچھ تحصیل تحصیل وضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل وضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم و یقین کی حد سے صحیح و درست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

بمقام لیہ مورخہ 07-10-2021

المحلف

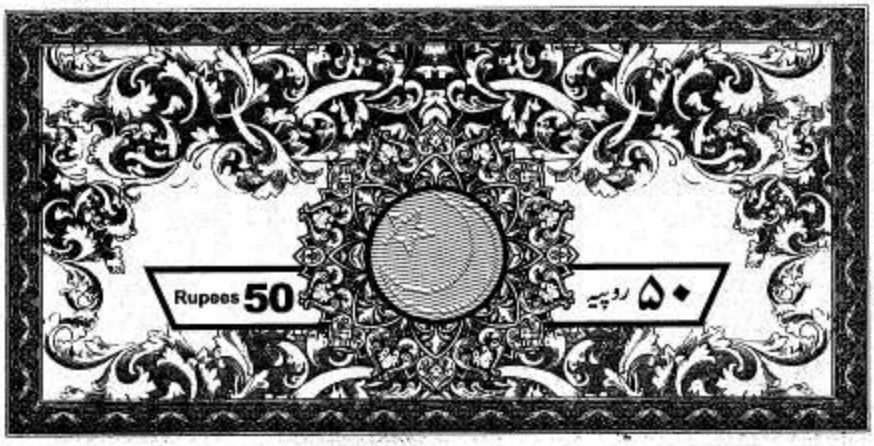
Umar dilraz.

ATTESTED
MRS. SOHA SHAHEEN
Advocate / Oath Commissioner
District Courts Layyah
Expiry Date [illegible] Notification No
[illegible] 15 (1)
Date 21-11-19 L.H.C Lahore

Affidavit of No Objection

BW597178

Rupees 50 ۵۰ روپیہ



بیان حلفی

منکہ مسمی عبدالغفور ولد اللہ ڈیوایا 32203-1200851-1
سٹی کوسنہ بھٹہ چوک، ڈوبونشیب تحصیل و ضلع لیہ تحصیل و ضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل و ضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

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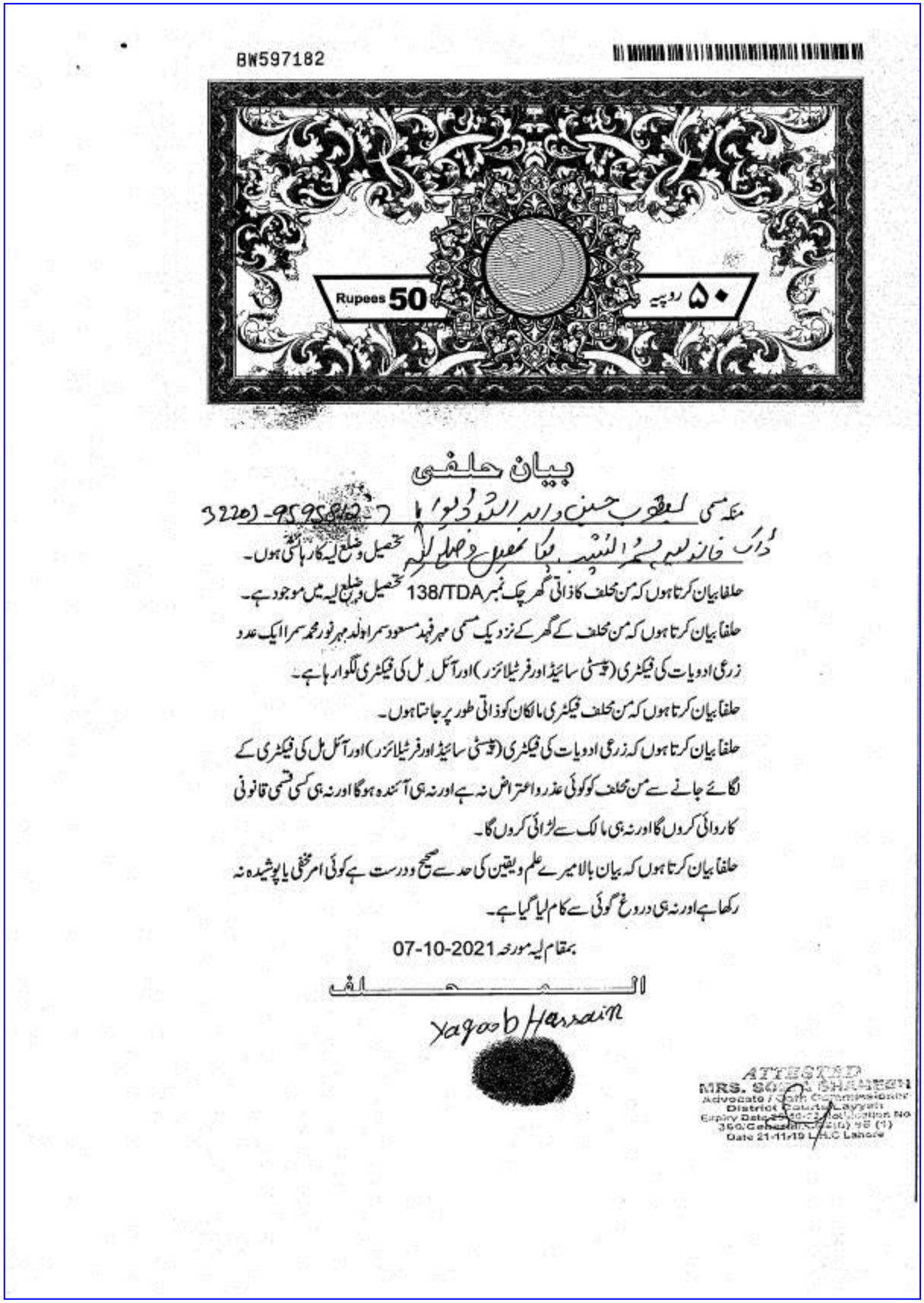
بمقام لیہ مورخہ 07-10-2021

المحلف

A. Lutf

ATTESTED
MRS. SOBIA SHAHEEN
Advocate / Sub Commissioner
District Bar Layyah
Expiry Date 31-10-2021
380/General/Kasur Registration No
Date 21-11-19 LBC Lahore

Affidavit of No Objection



BW597182

Rupees 50 ۵۰ روپیہ

بیان حلفی

منکہ مسمی یعقوب حسین ولد اللہ ڈیوایا 3220J-9595812-7

ڈرک خانہ لیہ جسمانی طور پر بقائمی ہوش و حواس لکھ تحصیل و ضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل و ضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈز اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈز اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم و یقین کی حد سے صحیح و درست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

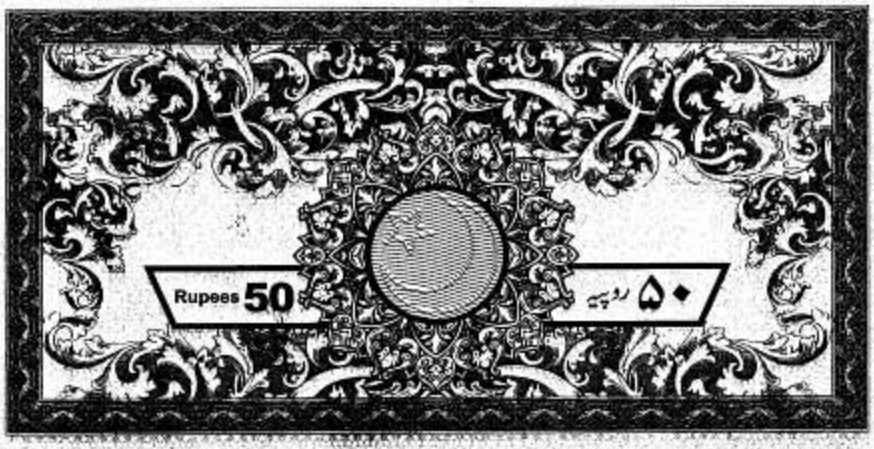
بمقام لیہ مورخہ 07-10-2021

المحلف

Yaqoob Hassain

ATTESTED
MRS. SOFIA SHAHEEN
Advocate / Oath Commissioner
District Courts, Layyah
Expiry Date 25-08-22 Notification No
350/Gehsahi/Cell(i) 98 (1)
Date 21-11-19 L.H.C Lahore

Affidavit of No Objection



بیان حلفی

مسمی مشتاق احمد ولد فدا حسین 35201-9495908-7

جملہ ہذا حلفیہ 138 TDA تحصیل وضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل وضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم و یقین کی حد سے صحیح و درست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

بمقام لیہ مورخہ 07-10-2021

الحلف

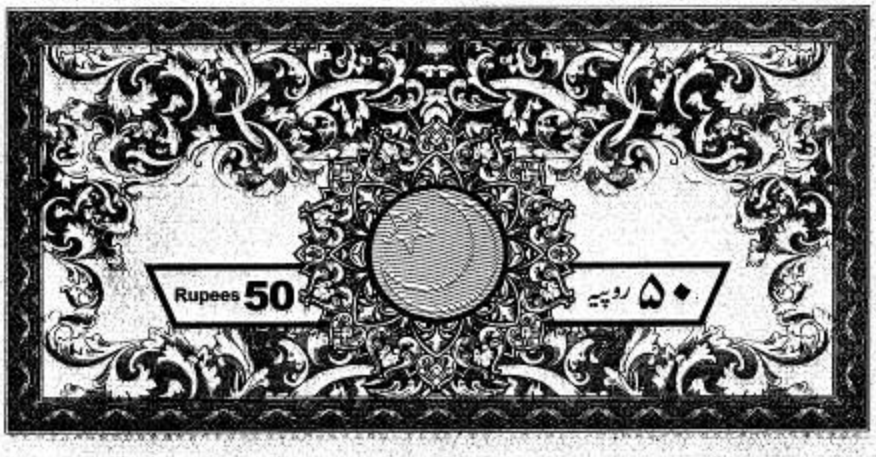
مشتاق احمد

ATTESTED
MRS. SOBIA SHAHEEN
Advocate / Oath Commissioner
District Courts Layyah
Expiry Date 20-11-2021 Notification No
320/Gen/Ad(X-Sh)/ 15 (1)
Date 21-11-19 Ld.C Lahore

Affidavit of No Objection

BW597177

Rupees 50 ۵۰ روپیہ



بیان حلفی

منکہ مسمی محمد شریف ولد محمد دین 3203-2061401-5

چک نمبر 138/TDA ڈاک خانہ تحصیل و ضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل و ضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے گھر کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم و یقین کی حد سے صحیح و درست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

بمقام لیہ مورخہ 07-10-2021

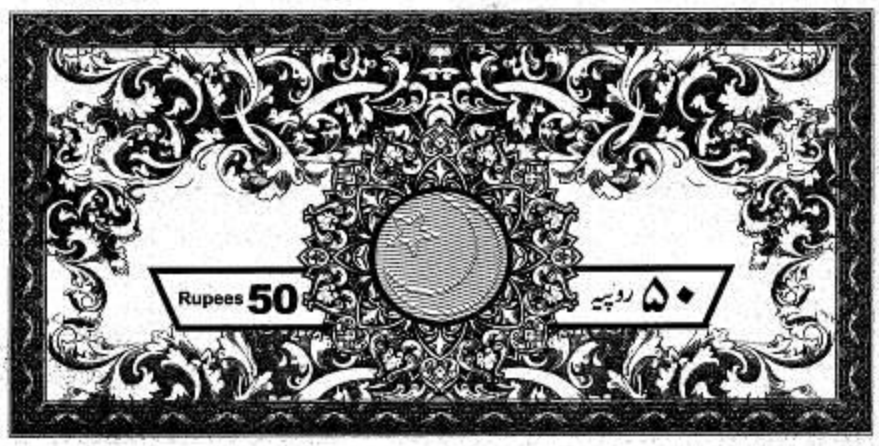
المحلف

ATTESTED
MRS. SONIA SHAHEEN
Advocate / Oath Commissioner
District Courts Layyah
Expiry Date 21-11-21 Notification No.
380/General/Z.B.(b) 18 (1)
Date 21-11-18 L.H.C Lahore

Affidavit of No Objection

BW597006

Rupees 50 ۵۰ روپیہ



بیان حلفی

منکہ مسمی مہر علی اظہر سمرا ولد مہر امیر محمد سمرا 32203-5034240-9

چک نمبر 125-B TDA ڈاکخانہ لیہ تحصیل وضلع لیہ کا رہائشی ہوں۔

حلفاً بیان کرتا ہوں کہ من محلف کا ذاتی گھر چک نمبر 138/TDA تحصیل وضلع لیہ میں موجود ہے۔

حلفاً بیان کرتا ہوں کہ من محلف کے رقبہ واقع چک نمبر 138/TDA تحصیل وضلع لیہ کے نزدیک مسمی مہر فہد مسعود سمرا ولد مہر نور محمد سمرا ایک عدد زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری لگوا رہا ہے۔

حلفاً بیان کرتا ہوں کہ من محلف فیکٹری مالکان کو ذاتی طور پر جانتا ہوں۔

حلفاً بیان کرتا ہوں کہ زرعی ادویات کی فیکٹری (پیسٹی سائیڈ اور فرٹیلائزر) اور آئل مل کی فیکٹری کے لگائے جانے سے من محلف کو کوئی عذر و اعتراض نہ ہے اور نہ ہی آئندہ ہوگا اور نہ ہی کسی قسمی قانونی کاروائی کروں گا اور نہ ہی مالک سے لڑائی کروں گا۔

حلفاً بیان کرتا ہوں کہ بیان بالا میرے علم و یقین کی حد سے صحیح و درست ہے کوئی امر مخفی یا پوشیدہ نہ رکھا ہے اور نہ ہی دروغ گوئی سے کام لیا گیا ہے۔

بمقام لیہ مورخہ 09-10-2021

المحلف

[redacted]

ATTESTED
MRS. SOBIA SHAHEEN
Advocate / Oath Commissioner
District Courts Layyah
Expiry Date 22-10-22 Notification No
330/General/Lab(s) 15 (1)
Date 21-11-19 L.H.C Lahore

Affidavit of No Objection

Annex-3

CNIC of the Proponent & Witnesses



CNICs



CNICs

Annex-4

Process Flow Chart & Production Methods

Process Flow of Product Formulation (Powder Preparations)

1. Receipt of the input materials (active, base/carrier ingredients and packaging) from their respective original manufacturers, vendors and dealers etc.
2. Quality inspection, tagging, labelling and safe placement (quarantine) of the raw materials in the inbound warehouse
3. Quality clearance of the raw materials for their usage for product formulation
4. Transfer of the input materials from the inbound warehouse to the production hall
5. Weighing and mixing of the active, base and carrier ingredients, as per the product formula and formulation of the requisite product by mixing the input materials in the appropriate machines as per the applicable standards/formulary
6. Sieving and filling of the products in the appropriate product containing packaging (bottles, jars, sachet, poly bags, etc.)
7. Final quality check, testing and quarantine before supplying the products to market
8. Transfer of the finished products to the outbound warehouse for safe storage
9. Dispatch of the finished products from the outbound warehouse to market / buyers Provision of after sale services
10. Provision of backup and after sale services

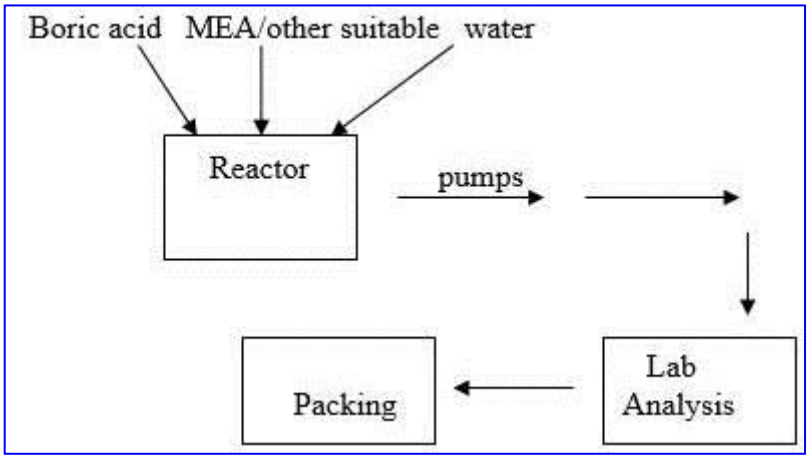
Process Flow of Product Formulation (Liquid Preparations)

1. Receipt of the input materials (active, base/carrier ingredients and packaging) from their respective original manufacturers, vendors and dealers etc.
2. Quality inspection, tagging, labelling and safe placement (quarantine) of the raw materials in the inbound warehouse
3. Quality clearance of the raw materials for their usage for product formulation
4. Transfer of the input materials from the inbound warehouse to the production hall

5. Weighing and mixing of the active, base and carrier ingredients, as per the product formula and formulation of the requisite product by mixing the input materials in the appropriate machines as per the applicable Standards/formulary
6. Filtration and filling of the products in the appropriate product containing packaging (bottles, jars, sachet, ampoules, etc.)
7. Final quality check, testing and quarantine before supplying the products to market
8. Transfer of the finished products to the outbound warehouse for safe storage
9. Dispatch of the finished products from the outbound warehouse to market / buyers Provision of after sale services
10. Provision of backup and after sale services

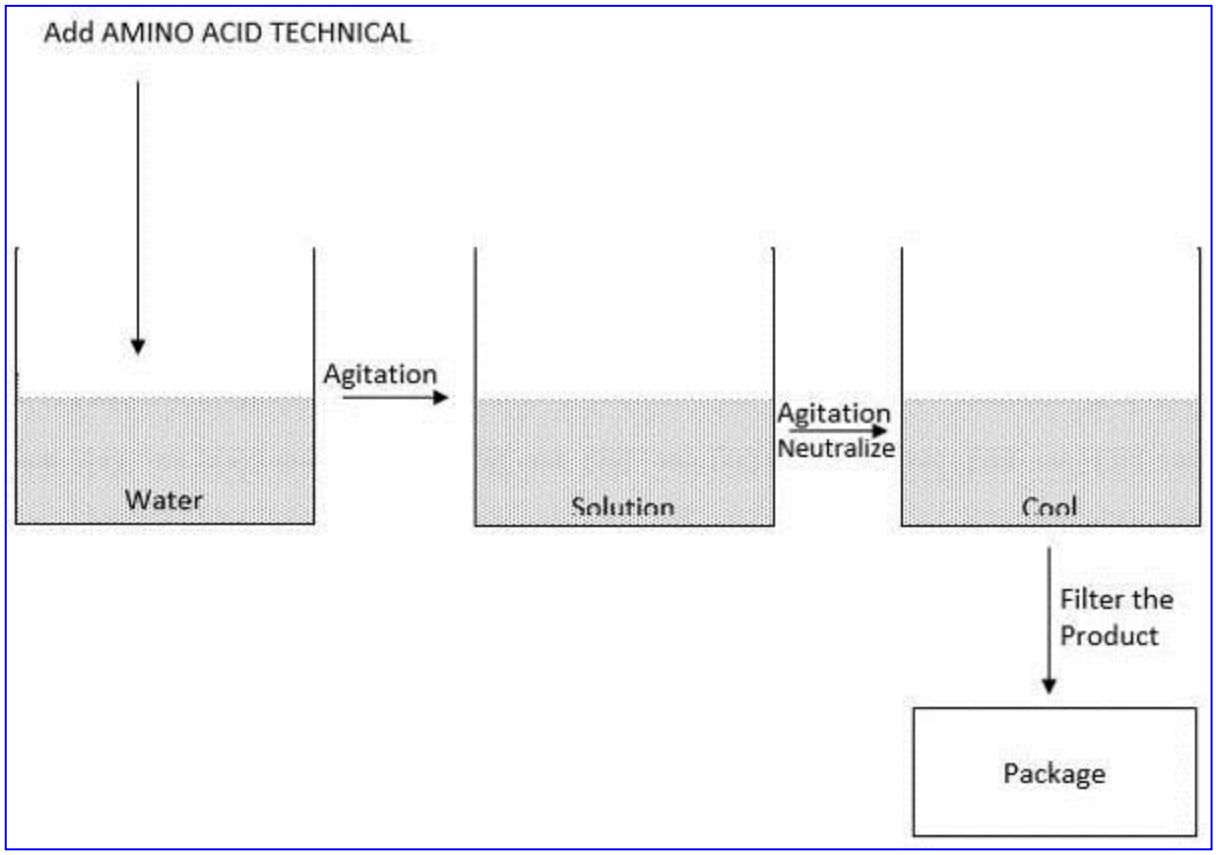
PRODUCTION METHOD OF BORON 5%

- ✓ Take the required material for making Boron 5 %
- ✓ Boric acid, Water , MEA or other suitable material to obtain Boron
- ✓ Mix these properly in a reaction mixture equipped with agitator and other suitable tools
- ✓ After mixing , take out the product for analysis
- ✓ Lab analysis is done to check the percentage
- ✓ After lab analysis is passed, product is filled in bottles and distributed



PRODUCTION METHOD GERMER (AMINO ACID 10% LIQUID)

- ✓ Take the required volume of the water in reactor vessel.
- ✓ Add slowly the required quantity of Amino Acid Technical solid in the water through agitation.
- ✓ After the mixing of the Amino Acid Technical, add slowly the required volume of Phosphoric Acid to neutralize the pH of the media.
- ✓ Cool down the product solutions Amino Acid 10% w/v.
- ✓ Analyse it, filter and sent to the package.

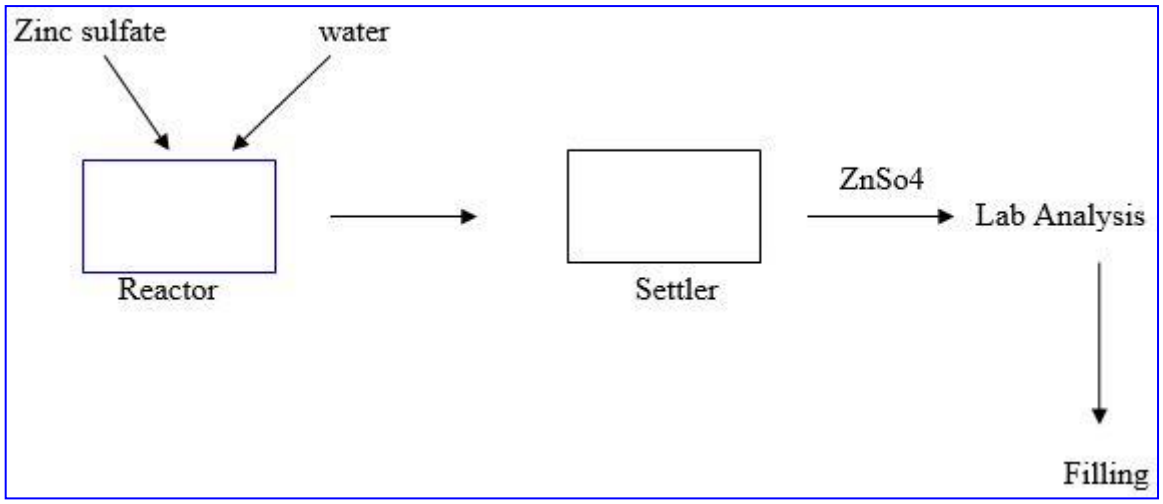


PRODUCTION METHOD ZINC 10%L

- ✓ Take the required raw material i.e., Zinc sulphate Monohydrate and water
- ✓ Mix these raw materials in a reactor equipped with agitator

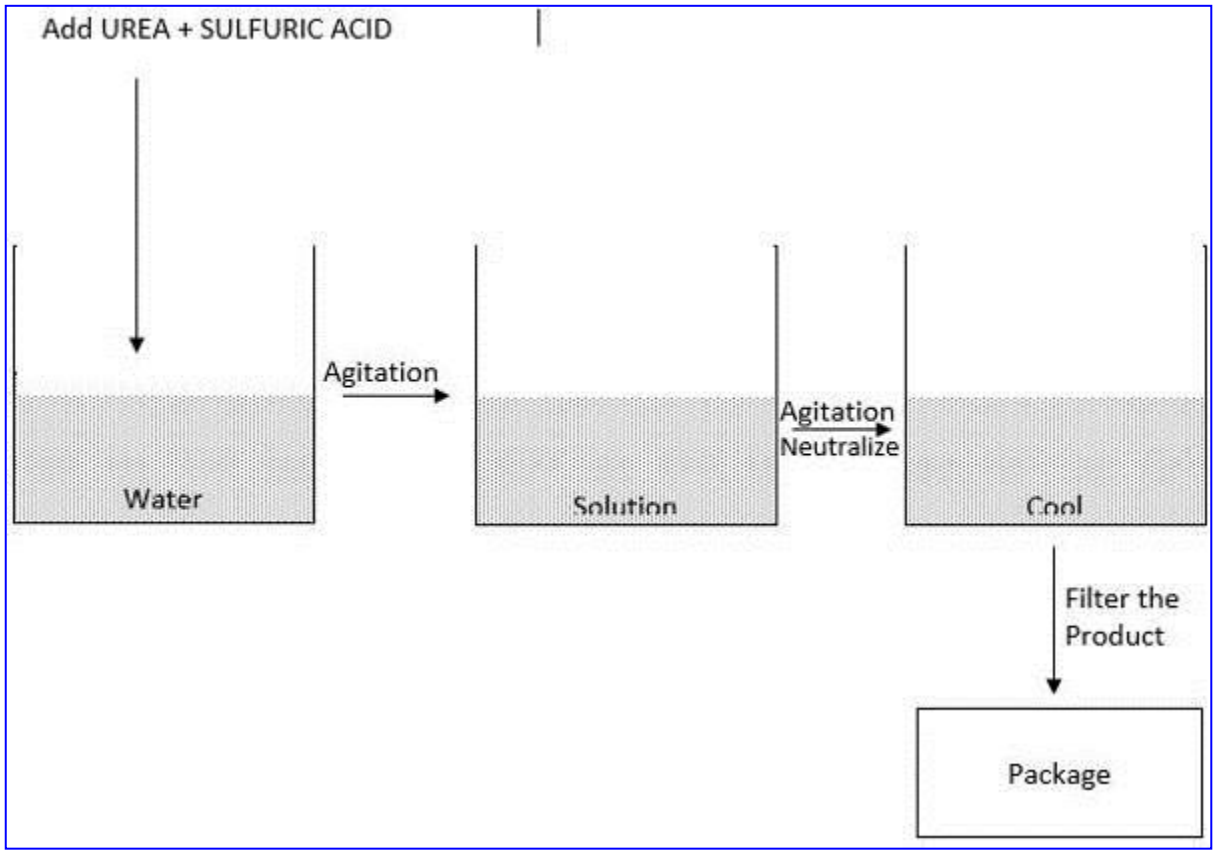
$ZnSO_4$ .H2O + H20 = $ZnSO_4$

- ✓ Shift the mixture into settler or settling tank through Pumps
- ✓ Lab analysis is done to check the percentage
- ✓ After lab analysis is passed, product is filled and distributed



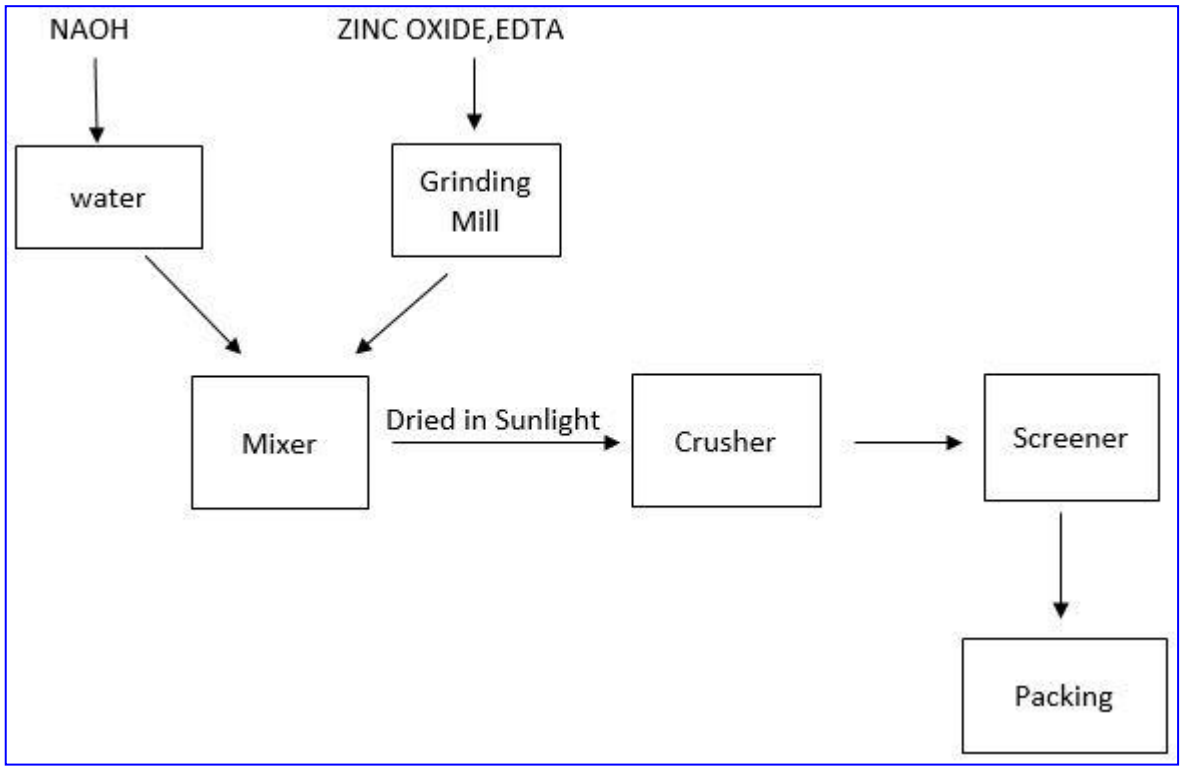
PRODUCTION METHOD "UPSIDE"(NITROGEN 20% W/V)

- ✓ Take the required volume of the water in reactor vessel.
- ✓ Add slowly the required quantity of Urea solid in the water through agitation.
- ✓ After the mixing of the Urea add slowly the required volume of Phosphoric Acid to neutralize the pH of the media.
- ✓ Cool down the product solutions Nitrogen 20% w/v.
- ✓ Analyse it, filter and sent to the package.



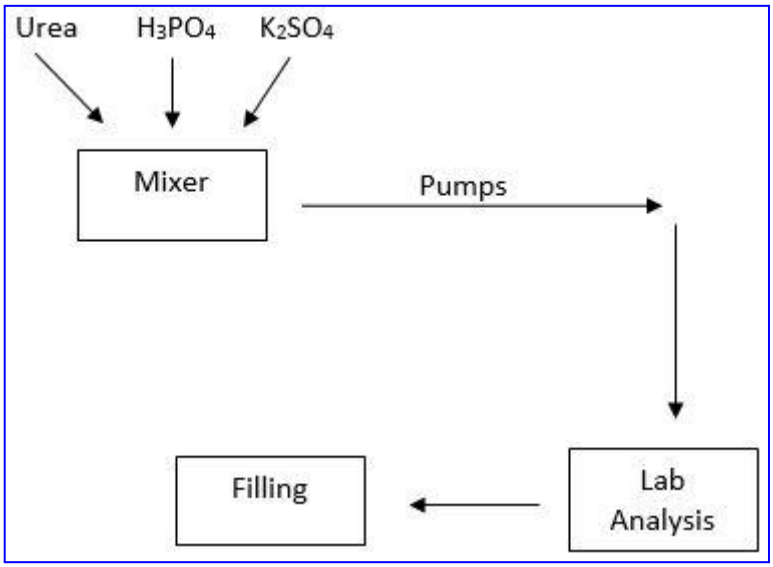
PRODUCTION METHOD OF MORYA (ZINC 5% CHELATED)%GRANULAR

1. **Testing of Raw Materials:** Zinc Oxide, EDTA, NAOH, Filler sample is collected and is sent to laboratory for testing.
2. **Grinding Process:** After the report is OK from laboratory, start the grinding of lignite in grinder up to 150 meshes which is best for the reaction of lignite.
3. **Reaction Process:** First of all, measured quantity of sulfuric acid is mixed with water and Zinc Oxide, EDTA to make the slurry in the tank. After that measured quantity of slurry and lignite are reacted in the mixer and after completion of reaction, product is shifted to drying area with the help of wheel barro.
4. **Drying:** Product from mixer is dried in the sunlight. During the drying process, the product is cut into small pieces for rapid drying.
5. **Crushing and Screening:** After drying, product is shifted to Crusher for crushing and screening to obtain the required product size.
6. **Packing:** After screening, the product is packed in 25 kg and 1 kg packing according to the requirement.



PRODUCTION METHOD OF N.P.K. 8:8:6 L

- ✓ Take the required raw material for making N.P.K 8:8:6
- ✓ Urea, Phosphoric acid, Potassium Sulphate are used in ratio of 8:8:6 respectively
- ✓ Mix these raw materials in a mixer equipped with agitator and suitable tools
- ✓ Pump out the product for analysis
- ✓ Lab analysis is done to check the required ratio
- ✓ After lab analysis is passed, product is filled in bottles and distributed



Annex-5

Survey Form at Project Location

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Ali Hassan son of Majid Muhammad
2.	Age:	40
3.	Marital Status:	Married
4.	If Married No. of Children:	4
5.	Designation / Profession :	Labour
6.	Qualification :	Middle
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my friend
9.	What do you thing about the project:	Yes, its good project and will create job opportunity
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Malik Nasir Mehmood Son of Malik Allah Baksh
2.	Age:	36
3.	Marital Status:	Married
4.	If Married No. of Children:	3
5.	Designation / Profession :	Guard
6.	Qualification :	Middle
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my relative
9.	What do you thing about the project:	Yes, its good project and it will benefit workers
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Muhammad Asif son of Abdul Satar
2.	Age:	35
3.	Marital Status:	Married
4.	If Married No. of Children:	5
5.	Designation / Profession :	Guard
6.	Qualification :	F.A
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my colleague
9.	What do you thing about the project:	Yes, its good project and it will benefit workers
10.	What do you think would be the positive/negative effect of the project?	I don't know much, but it will provide jobs
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Zaheer Aslam son of Muhammad Aslam
2.	Age:	28
3.	Marital Status:	Married
4.	If Married No. of Children:	1
5.	Designation / Profession :	Labour
6.	Qualification :	Primary
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my relative
9.	What do you thing about the project:	Yes, its good project and it will benefit workers
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Muhammad Shuaib son of Shafeeq Ali
2.	Age:	35
3.	Marital Status:	Married
4.	If Married No. of Children:	1
5.	Designation / Profession :	Guard
6.	Qualification :	Middle
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my friend
9.	What do you thing about the project:	Yes, a good project, as it will provide job opportunity
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Muhammad Akram son of Muhammad Sadiq
2.	Age:	30
3.	Marital Status:	Married
4.	If Married No. of Children:	4
5.	Designation / Profession :	labour
6.	Qualification :	Primary
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my relative
9.	What do you thing about the project:	Yes, its good project and it will benefit workers
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Muhammad Shaban son of Khalid Parweez
2.	Age:	33
3.	Marital Status:	Unmarried
4.	If Married No. of Children:	
5.	Designation / Profession :	Guard
6.	Qualification :	Middle
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my relative
9.	What do you thing about the project:	Yes, its good project and it will benefit workers
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Survey of the Project Area and Public Consultation Questionnaire
Regarding Project in the Context of Environmental Impact Assessment

****

Orica Agrochemicals

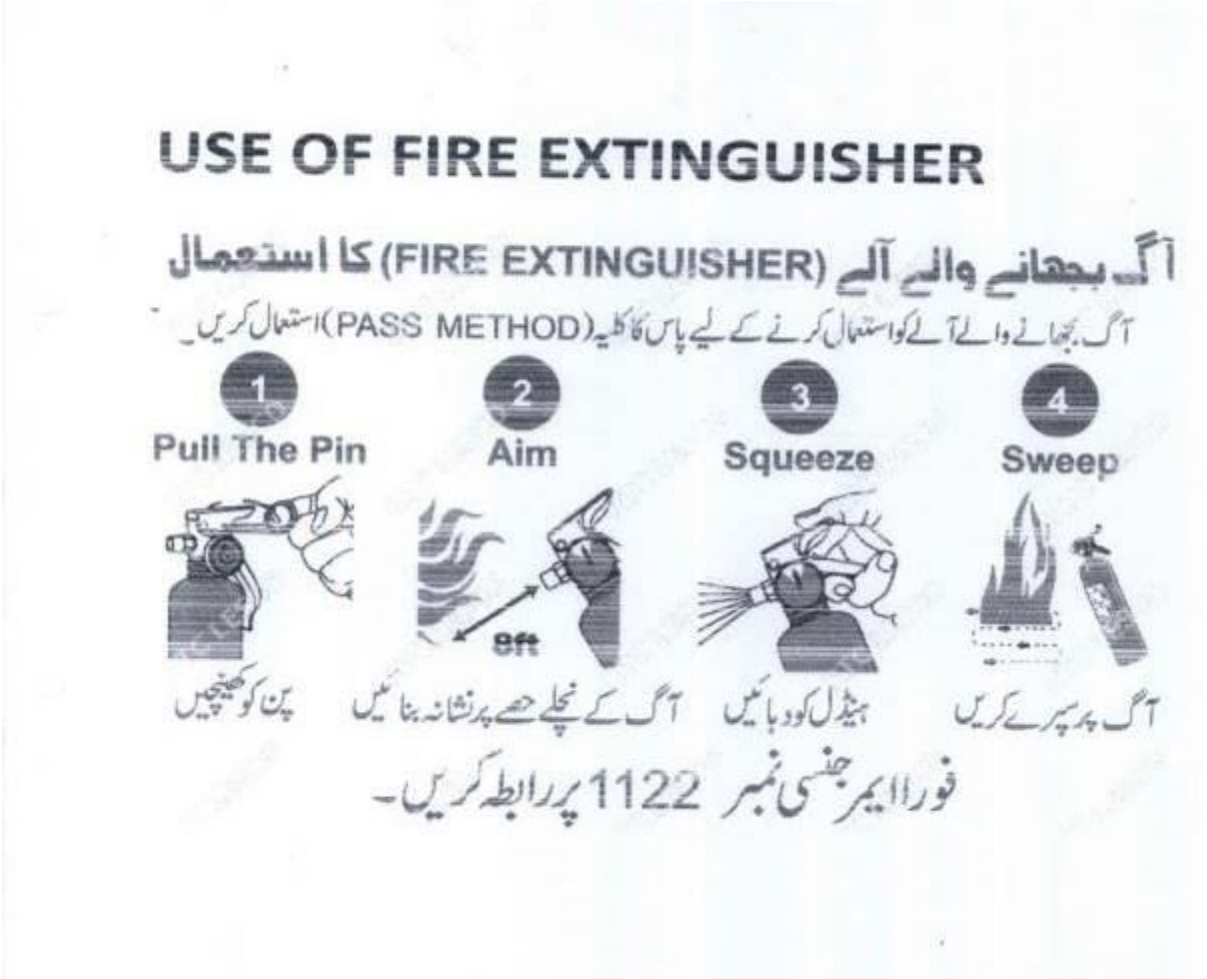
Chowk Azam Road near Khan Cotton Factory Tehsil and District Layyah

****

1.	Name of the person interviewed:	Asim Mehmood son of Muhamad Asif
2.	Age:	56
3.	Marital Status:	Married
4.	If Married No. of Children:	4
5.	Designation / Profession :	Tea Stall Owner
6.	Qualification :	Middle
7.	Address:	Layyah
8.	Do you know this project :	Yes, by my relative
9.	What do you thing about the project:	Yes, its good project and it will benefit workers
10.	What do you think would be the positive/negative effect of the project?	Positive effect of uplift the economy of the country
11.	What will be Health and safety issue due to this project in your point of view?	No health issue in my opinion, as it is simply the construction work
12.	Would you like to add anything else?	Nothing

Annex-6

Fire Fighting Equipment



Annex-7

Public Consultation and Information Disclosure
Socio-economic Survey of the Project Area

Consultation with the stockholders is a tool for managing two-way communication between the project sponsors 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 increase project's long term viability and enhances its benefits to locally affected people and other stakeholders. The public consultation was conducted for this project keeping in view the above theme.

Methodology

Identification of stakeholders

Stake holders in this project were identified keeping in view the **Guidelines for** Public **consultation published by Pakistan EPA, 1997.** The stake holders were identified from the following groups.

- Local people
- Affected Communities
- Proponents
- Management of unit
- Government Agencies
- NGO
- Influential people
- Technical persons
- Poor People

Techniques for Public Consultation

The following principals were kept to select the techniques or public consultation

- Provision of material / information in easy language
- Providing sufficient time to understand
- Providing discussion to understand the information in a friendly way
- Portraying the actual issues relating to the project
- Discussion at the place which has easily access to the people
- Selection the time when maximum people are available Selection of influential people of project area
- Including of poor people
- Selection of people who give true presentation of community make up Including technical people who has clear knowledge of on the issues relating to unit.
- Concerned government departments were selected who had liaison with the execution of the project and environmental approval.

Public Meetings and Group discussions

The surrounding area is agricultural and rural in nature therefore we decided to hold physical contact instead of using print or electronic media. The group discussion is the way of opinion making used in the Punjab since hundreds of years. It is reliable and unbiased way to get opinion of the people. The seminar or public gathering was avoided as the poor people cannot attend and unable to express his views without duress or influence of chaudry or wadera of the area or village.

Convenient Time and Place

The people in villages do not move away from village except in case of urgency. We went to them on their residences or work places. In this way no time and money of the people was spent and we got indiscriminate access to the concerned people. In this way the people who do not have money to travel to go to government departments got access to information and had opportunity to express his opinion in a liberal way.

Non-Government Organization

NGO are working in the area which are mostly exploiting

Limitations of the Public Consultation

We tried our best to include all segments of life in to account according to education and professions as per local distribution of the social formation. But we could not include the enough women in public consultation

process due to closeness of the society for women exposure to alien people and social taboo.

Questionnaire

After review of the available information a questionnaire was developed containing all necessary information and question covering positive and negative aspects of the unit. The questionnaire comprised of two parts. First part has brief description of the project and part II was divided in the following parts:

- Socioeconomic background
- Positive impact of the Zodiac
- Unit Acceptance level of the Project.

Public Consultation

The following stake holders were identified and meetings were held with them to inform them about the project design and know their response.

- Management of poultry unit
- Nobles of the area.
- Shopkeepers
- Farmers

Laborers

The socio-economic information was gathered through different techniques and methodologies and is derived from primary and secondary sources. Primary data were collected through following data collection tools: (i) Village profiles; (ii) Socio economic survey; Village profiles were carried out for all villages/settlements falling Project Area. An introductory leaflet about basic information of the project was prepared in Urdu and distributed among the people at public places. This helped the people to understand about the project pros and cons. Leaflet is attached. After one week the area was revisited by the team of experts and again asked the opinion of the people about the project in the form of well-designed social survey questionnaire.
Public consultations were also conducted in the area.

Issues Discussed

Following issues were discussed during the stakeholder consultation: Personal information

- Education status
- Income level
- Residence status
- Information about project
- Possible impacts on natural vegetation, land and properties;
- Beneficial factors and involvement
- Opportunities for the local people.
- Adverse effects of the project
- Scope of the report
- Acceptance of the project by the people of the area
- Scope of the environmental assessment report

Different segments of the society were included to reflect the true and unbiased opinion. From numberdar to labour all segments of the project area were interviewed. The offices at district level were approached to have their verdict on the project. The people who were interviewed through a questionnaire which showed the following results:

Gender:

Male	49
Female	1

Education level:

Primary	15	30%
Under matric	20	40%
Matric	10	20%
F.A.	2	4%
Graduation	3	6%
Post Graduate	0	0%

Occupation:

Farmer	20	40%
Labour	15	30%
Shopkeeper	10	20%
Government Service	5	10%

Water Pollution Problem:

Concerned about water pollution	0	0%
Don't show any concern about water pollution.	50	100%

Employment chances Direct and indirect:

Yes	50	100%
No	0	0%

Consent on project implementation:

Yes	50	100%
Conditional (Yes)	0	0%
No	0	0%

Apprehensions of the people of the area

- Low employment offer to local people during operation phase
- Social work in the area
- Health dispensary

Mitigation of the Peoples Apprehensions

i). No resettlement in involved
ii). Waste water will be treated before disposal
iii). Big opportunity for the local people during construction phase and small scale hances of job during operational phase.
iv). Parking of trolleys and trucks will be done within factory premises.
v). It will create employment opportunities.
vi). Project management will give priority to local people for employment
vii). Social welfare work through community uplift.

Annex-8

Emergency Preparedness and Response Plan

LPG Unit will be prepared to combat with any emergency, according to risk assessment carried out during site visit; the potential emergency scenario might be fire, first aid and security event.

In case of Fire
Fire safety management plan has been provided above.

In case of external threats or site Security:
LPG Plant will arrange 24/7 two armed security staff.

Goals of Disaster Management
Following are the aims of Emergency preparedness plan for the factory:
Reduce, or avoid, losses from hazards Assure prompt assistance to victims Achieve rapid and effective recovery.

Fire and Evacuation
In the Event of a Fire, Pull the Fire Alarm and Call 1122. If you see smoke or flames: Use CARE:

- Contain the fire by closing all doors as you leave
- Activate the nearest Fire Alarm pull station (Pull stations are located near building exits)
- Report the fire by dialing 1122
- Evacuate or extinguish (In most cases, it is best to Evacuate)

Use a Fire Extinguisher only if:
- You have been trained
- You have your back to an unobstructed exit
- You have a fully charged and proper type unit for the fire you are fighting
- The fire is contained, and you have reported the fire by **Fire Alarm** or activation
- Everyone else has left the area
- There is little smoke or flames

Never fight a fire if:
- It has left its source of origin
- You are unsure of the type of extinguisher you need or have
- If you can't control the fire within 30 seconds, abandon your efforts, close the door(s) and evacuate immediately

Building Evacuation
You should familiarize yourself with the evacuation routes. If an evacuation order is issued for your building, or if it were necessary to evacuate due to an emergency, fully cooperate with Safety and Security/Emergency personnel and:

- Take only keys, wallets and essential belongings with you
- If possible wear weather appropriate clothing
- If you are the last one to exit your room close, and lock doors Leave the building immediately
- Do not investigate the source of the emergency Walk, don't run, to the nearest exit
- Use stairs, not elevators
- Assist people with special needs
- If there is no immediate danger, persons with disability/mobility limitations should shelter in place and call Safety and Security at phones to report location and number of people needing assistance
- If there is imminent danger and evacuation cannot be delayed, the person with a disability should be carried or helped from the building in the best and fastest manner (the person with the disability is the best authority as to how to be moved out of the building)
- If you are unable to evacuate, call Safety and Security at and report your location
- As you make your way out, encourage those you encounter to exit as well
- Follow instructions of the Department of Safety and Security or other identified emergency personnel

- Wait for instructions before returning to your building after an evacuation

Medical Emergency

- If someone is injured or becomes ill:
- Stay Calm
- Dial 1122 and explain the type of emergency, the location, condition, and number of victims
- Let the dispatcher know of any safety hazards – chemical spill, fire, fumes, etc. Do not hang up unless told to do so by the dispatcher
- Do not move the victim unless there is danger of further injury if s/he is not moved Render first-aid or CPR only if you have been trained
- Do not leave the injured person except to summon help Comfort the victim until emergency medical services arrive
- Have someone stand outside the building to flag down the ambulance and/or Safety and Security when they reach the vicinity

Bomb Threat

If you receive a bomb threat, remain calm and:

1) Obtain as much information as possible:
- Write down the number from where the call is coming
- Write down the exact time of the call
- Write down as accurately as possible the statements made
- Listen to the voice to determine the sex, age, accents, lisps, tone, etc. (Note any
- distinguishing feature)
- Listen for background noises
- Try to signal for someone else to also listed on the telephone line, if possible
- Do not hang up and stay on the line as long as possible; wait for the caller to hang up

2) Keep the bomb threat caller talking, and ask as many questions of the caller as you can:
- When will the bomb go off? How much time remains?
- Where is the bomb located?
- What' does it look like?
- What kind of bomb is it?
- How do you know about this bomb?
- Why was it placed here?
- Who are you?
- What is your name?

3) Call to Department of Safety and Security

Utility Failure and Natural Disaster

These may include electrical outages, plumbing failure/flooding, gas leaks, steam line breaks, ventilation problems, elevator failures, etc.

- Remain calm
- If the building must be evacuated, follow the instructions on Building Evacuation Unplug all electrical equipment (including computers) and turn off light switches Use a flashlight: Do not light candles or use other kinds of flames for lighting
- If worker is trapped in an elevator, advise them to stay calm and tell him you are getting help, use the Call Button of Phone to call for help

Earthquakes

Earthquakes are more common in the Pakistan, In the event of an earthquake:

- Stay away from large windows, shelving systems, or tall room partitions
- Get under a desk, table, door arch, or stairwell
- If none of these is available: move against an interior wall and cover your head with your arms
- Remain under cover until the movement subsides
- After the shaking stops, survey your immediate area for trapped or injured persons and ruptured utilities (water, gas, etc.)
- Do not evacuate until instructed by emergency personnel

- After an earthquake:
- Put on enclosed shoes to protect against broken glass
- Evacuate if the building seems unsafe or if instructed to do so

Annex-9

Water Management Plan

Construction Phase

To prevent degradation and to maintain the quality of water sources, adequate control measures have been proposed to check the surface run-off, as well as uncontrolled flow of water into any water body. Following management measures are suggested to protect the water quality during the construction phase.

- Avoid excavation during monsoon season.
- Wastewater channels from the site would be connected to septic tank during construction and operation.
- To prevent surface and groundwater contamination by oil grease, leak proof containers should be used for storage and transportation of oil/grease. The floors of oil/grease handling area should be kept effectively impervious. Any wash off from the oil/grease handling area or workshop shall be drained through impervious drains, clarifiers or oil/water separators shall be constructed and effluent should be treated appropriately before releasing it.
- Construction activities generate disturbed soil, concrete fines, oil and other wastes. Onsite collection and settling of storm water, prohibition of equipment wash downs, and preventive of soil loss and toxic releases from the construction site are necessary to minimize water pollution.
- All stacking and loading areas should be provided with proper garland drains equipped with baffles to prevent runoff from the site

Operation phase

In the operation phase of the project, water conservation and development measures need to be taken including all possible potential for conservation of water, reuse, rainwater collection in reservoirs, and recycling of water. These could be in the following form:

- Water source development
- Minimizing water consumption
- Promoting reuse water after treatment
- Water source development shall be practiced by installation of well-designed water extraction pumps.

Minimizing water Consumption

Implementing water efficient fixtures such as 3 litres WC flushing cistern will minimize water consumption, sensor operated urinals and taps to minimize the wastage of water together with other water conservation measures. Furthermore, to ensure ongoing water conservation, an employee education and awareness program will be introduced for the employee of the unit. Dry type urinals will also be selectively.

Domestic usage

Use of water efficient plumbing fixtures uses less water with no marked reduction in quality and services. To install water less W.C. and urinals, this will help in conserving sufficient quality of water.

Leak detection and repair techniques

- Sweep with a broom and pan where possible, rather than hose down for external areas;
- Awareness campaign to disseminate knowledge on strategies and technologies that can be used for water conservation.
- Standard water information packet may be prepared and distributed. The information should include water conservation plans, methods being adopted in the complex and a list of essential and non-essential water uses.
- As new conservation efforts are implemented, the manager will communicate these changes accordingly.
- Paper methods of water use will be placed in the toilets and other areas of water consumptions
- Promoting reuse of water after treatment and development of closed loop systems.

Following section details the wastewater scheme suggested for the project.

- Wastewater management
- Sanitation infrastructure shall comprise of wastewater collection and conveyance system. The wastewater will be collected in the septic tanks

Annex-10

Noise Management Plan

No residential colonies are present near project location; moreover, the Project not intends to use any machinery. Only source for noise pollution will be generator, it is recommended to place generator 100 ft. away from workers work place. Noise levels were measured with noise meter. Noise levels at site are presented below.

Construction phase
To mitigate the impact of noise from construction equipment during the construction phase and other machinery (generator) during operation phase the following measures are recommended for implementation:

Job rotation and hearing protection
Workers employed in high noise areas will be rotated. Earplugs/muffs or other hearing protective wear will be provided to those working very close to noise generating machinery.

Operations Phase
To mitigate the impact of noise from diesel generator sets during the operational phase, following measures are recommended for implementation:

- noise emission control technologies
- Greenbelt development

Noise emission control technologies
All the diesel generator will be housed in suitable acoustics enclosure so that noise level at a distance of 6 to 7 meter do not exceed 75 dB (A).The diesel generator set LPG Unit will be equipped with walls and ceiling lined with glass wool to acoustically treat the noise levels.

PPEs
Workers will use Ear muffs during their working hours

Diesel Generator Set Emission Control Measures
The most important pollutant requiring control is NOX, as the impact of S02 emission is minimal because of the use of low (-0.05%) sulphur in diesel as fuel. All the DG set would be provided with emission control equipment's. The following mitigation measures are proposed for NOX reduction:

- Add-on emission control technologies;

Exhaust Gas Recirculation (EGR) technology will be used to reduce diesel nitrogen oxide (Nox) emissions. It is one of the principal methods used to reduce nitrogen oxide emissions from diesel engines. EGR technology will be used to reduce diesel nitrogen oxide (Nox) emissions by taking a carefully controlled portion of the inert exhaust gases, cooling it and re-introducing it to the combustion chamber when conditions are right to do so. This reduces the high concentration of Oxygen and the high temperatures in the combustion chamber, both of which are causes of Nox formation

Annex-11

Dust Control Plan

Earth moving

For any earth moving, conduct watering as necessary to prevent visible dust emissions from exceeding 50m in length in any direction.

- Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface.
- Areas which cannot be stabilized as evidenced by wind driven dust, must have an application of water at least twice per day to at least 80% of unstabilized area.

Distributed surface areas

Apply water to at least 80% of all inactive accessible distributed surface areas on daily basis when there is evidence of wind driven fugitive dust.

Unpaved road

Water all roads used for any vehicular traffic once daily and restrict vehicle speed 25km/h

Annex-12

Health Safety and Environment Plan

The purpose of this field HSE plan to identify the potential Impacts and to develop a mechanism for better management of health, safety and environment (HSE) issues to related to the project. The HSE objectives include but are not limited to the following:

- Relevant safety devices like belts, gloves and testers should be strictly used by the Labor at the work site
- Observance construction and safety codes to avoid all possible injuries during construction of the project.
- To ensure all personnel employed on the project are competent to carry out their designated tasks.
- Implement training programs that support the achievement of the unit's staff and personnel's competency in relation to health, safety and environment. Implement a hierarchy of communication forums that ensure that HSE concerns are raised and addressed at all levels of the organization. Introduce methodology of motivating good safety and environmental performance; Continuous monitoring to improve HSE performance HSE orientation sessions before starting work, Wearing of personal protective equipment
- Follow the messages and instructions displayed on HSE notice boards installed in the premises of the unit.
- Beware of emergency assembly points and escapes routes.
- Promptly reporting all accidents to the concerned environmental manager. Do not smoke or produce flame in NO Smoking areas.
- Regular medical check-ups will improve the working condition and efficiency of workers.
- Relevant safety devices like belts, gloves and testers should be strictly used by the operators at the work site.
- Safety of management, workers and visitors must be ensured.
- Observance operational safety codes.

Annex-13

Internal Monitoring Proforma

Sr.	Activity / Parameter				Yes	No
1.	Last clean-up of the drinking water tank?	1 month	3 month	6 month	1 year	Never
2.	Last water quality testing?	1 month	3 month	6 month	1 year	Never
3.	Is the emergency alarm system functioning properly? Any faults?					
4.	Any air borne emissions?					
5.	Any spillage of oils, lubricants, chemicals etc.					
6.	Is septic tank working well? Any overflows?					
7.	Are materials stored squarely?					
8.	Was tree plantation carried out during last plantation season?					
9.	Are diesel, chemicals, and other liquid items stored well and away from water / rain?					
10.	Any littering of floors / premises with solid waste?					
11.	Any smell from the storage compounds?					
12.	Are general parameters being followed?					
13.	Are the mitigation guidelines being followed?					
14.	Any other information? Please describe.					

Name	
Designation	
Signature	
Date	

Annex-14

Persons Interviewed & Consulted during IEE

Sr.	Name	Designation	Contact No.
1.	Mahar Fahad Masood Sumra	Managing Director Orica Agrochemicals	
2.		Director Orica Agrochemicals	
3.		Director Orica Agrochemicals	
4.		Manager Technical Orica Agrochemicals	
5.		Manager Admin Orica Agrochemicals	
6.		Assistant to Manager Admin	
7.		Advocate, Orica Agrochemicals	0321-7657245
8.		Neighbouring Residents	
9.		Office Bearers of Local NGOs	
10.		Local Public Representatives	

List of Persons and the Stakeholders Consulted during IEE

Annex-15

Terms of Reference (ToR)

The following Terms of Reference (ToRs) were agreed between the project proponent and the environmental consultant for carrying out the IEE of the proposed project titled, construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah".

Being an Environmental Impact Assessment, the IEE will be limited in its extent and scope to the ToRs agreed to between the proponent and the environmental consultant. The IEE will be conducted in accordance with international practices and the guidelines, rules, and regulations issued by the Government of Pakistan. The format and mode of environmental impact examination/ assessment shall be kept, to the extent possible, in conformity to the national and international practices in the field of IEE/EIA. The EIAR shall contain examination of the essential baseline conditions, likely or foreseeable disturbances or impacts to the baseline conditions, and the necessary mitigation measures/recommendations in respect of the environmental impacts of the proposed project both during construction and during subsequent functioning. This, of course, will include examination of the potential and actual positive or negative impacts on the physical (tangible) & abstract (non-tangible) environments. The IEE shall cover all aspects of the proposed project/activity including architectural, civil, mechanical, electrical works and the spectrum of services concerning it. The terms of reference (ToR) and scope of the IEE will include, though not limited to, the following aspects/activities:

- Carrying out an Environmental Impact Assessment (IEE) of the project and preparing the Environmental Impact Assessment report (EIAR) for and on behalf of the project proponent
- Formal submission of the report to the concerned agency for its review in compliance with the mandatory provisions of the rules on the subject
- Reviewing the project activities in context to all pertinent environmental perspectives and examining whether the project is environment friendly or otherwise
- Preparing the IEE Report in the light of the guiding principles, international practices, and the rules set forth in the Pakistan Environmental Protection Agency's Regulations on the subject of IEE/EIA
- Using the best-suited environmental examination and impact assessment methodologies, i.e., those that are most appropriate for the identification, screening and assessment of the possible negative or positive environmental impacts, in line with special nature of the project
- Identifying, investigating, examining, and preparing a comprehensive profile of the foreseeable impacts on the physical, biological, hydrological, economical, and socio-cultural environments likely to emanate from implementation of the proposed project in the project area and beyond
- Provision of any other advice and or technical expertise before, during, and after completion of the study and even thereafter, if so required by the proponent and covered by the scope of the MoU for the job.

Being an IEE, the report will be limited in its extent and scope only to the pertinent environmental parameters as defined in the Environmental Assessment Guidelines of the Government of Pakistan 1997 and the checklist proforma and guidelines of the EPA-Pb. The report shall begin, first by establishing the baseline or the existing environmental profile of the project site in particular and the district in general (wherever and whenever relevant), followed by identification of the adverse or the potentially negative impacts of the project. Besides identification of the potentially adverse or negative impacts, the following shall constitute a few other important aspects of the EIAR:

- Assessment of the spatial, temporal and social dimensions (such as extent, quantum. magnitude and time of occurrence) of the adverse as well as the beneficial impacts
- Assessment of the degree of disturbances to the baseline profile, if any
- Identification of the best-suited measures for mitigating the adverse impacts
- Presenting a workable environmental management plan for ensuring long-term environmental and socioeconomic sustainability of the project

The EIA shall take a stock of the project's potential of consuming the natural resources, raw materials and other items during construction and operation of the plant with reference to their rate of consumption and sustainable availability in the future. Ascertainment of the extent, quantum and magnitude of the adverse impacts onto the existing environmental profile of the area, identification of the best-suited measures for mitigating the identified adverse impacts, and finally the presentation of a practicable environmental management and monitoring plan for ensuring long-term sustainability of the project also form part of the scope of the IEE. The EIAR shall present a review of consumption of natural resources and the resultant

impacts of their consumption on the environment, particularly of the freshwater and energy. The EIAR shall also review the short-term and long-term effects of the groundwater abstraction for various project operations on the environment.

Additionally, the IEE Report to be prepared by the consultant shall comprises the following components:

- Description of the existing environmental settings or the baseline profile of the project's zone of social and environmental influence (the zone of influence has been taken only with respect to the extent of the spatial and temporal impacts of the project)
- Assessment and examination of the social and environmental implications of an adverse land use change emanating from implementation of the project
- Assessment of the most likely disturbances to various environmental parameters emanating from constructions and other related activities to be taken up by the project proponent, if any, following allotment of the land
- ESRMP containing guidelines for the proponent for avoiding and mitigating the predicted adverse impacts on the physical, biological, and socio-cultural environment

CONCLUSION

Based on an in-depth and extensive study of the probable present and the future impacts (both positive and negative) of the project, construction of "Orica Agrochemicals [A Plant for Formulation of Agrochemicals] Chowk Azam Road near Khan Cotton Factory, Tehsil and District Layyah", it is concluded confidently that the Plant will not cause any adverse impacts on the environmental profile of the site/area/district. The setting-up of the plant will rather bring in healthy and positive changes in the social, cultural, developmental, agricultural, and employment sectors of the area and the district. As per findings of the EIAR, there will be hardly any significant effects on the environmental profile. The whatsoever little impacts that are likely to come in the wake of setting-up of the plant can be mitigated in the light of the measures as suggested in the instant EIAR.

The findings of the IEE reveal that the impacts of setting-up of the plant on the physical and biological environment will be negligible and without any bearing. The results of the IEE shows that there will be no exploitation of the local natural resources, which will remain conserved and available for sustainable future development. The setting-up of the plant would rather bring-in positive and healthy improvements in the socio-economic environment of the area.



In nutshell, the high-end positive impacts of the plant far outweigh all the low-end negative impacts, thereby rendering the project an environmentally sustainable, compatible, feasible and implementable project.