



**POPULAR MATCH INDUSTRIES (PVT.) LTD.**

**UNIT - 4**

**(Safety Matches Manufacturing Unit)**

49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)  
REPORT**



**Sustainable Environmental Solutions**

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## EXECUTIVE SUMMARY

### 1.0 INTRODUCTION

#### 1.1 Title and Location of Project:

**M/s Popular Match Industries (Pvt.) Ltd. (Unit-4)** are in the process to establish a safety matches manufacturing unit located at **49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.**

**Head Office Address;** 4<sup>th</sup> Floor, Chapal Plaza, Hasrat Mohani Road, Off I.I. Chandrigarh Road, Karachi.

#### 1.2 Name of the Proponent

The proponent of the subject proposed project (establishment of a safety matches manufacturing unit) is Kamran Ali Roshan who is Executive Director of the company.

#### 1.3 Name of the Organization Preparing the Report

M/s Sustainable Environmental Solutions has performed this EIA Study. The name, qualifications & other details of persons / team members performing or carrying out the said environmental study has been discussed in the next section. However, contact details of company & representatives are as under:

#### Consultant Company / Firm Details:

Contact: Sustainable Environmental Solutions  
Address: Office S-9, 2<sup>nd</sup> Floor, Fazal Apartments, 5-Faiz Road, Muslim Town,  
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#### Representatives Details:

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### 2.0 SCREENING

The standardized approach i.e. defined in applicable regulations was applied. The proposed project was assessed based upon a set of criteria determined by Environmental Protection Agency (EPA) i.e. Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022 provided by Government of Punjab were considered for the purpose of screening mainly.

As the current proposed project (safety matches manufacturing unit) is of the nature of Manufacturing & processing but not mentioned in the same group by its



name or categorically, however the proposed project by its features / characteristics of manufacturing process, raw materials to used and the capital cost, require EIA Study to carry out. Hence according to the regulations “**Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022 the proposed project falls in Schedule II; category J-Other Projects; Any other project for which filling of an EIA is required**” made under section 12 of Punjab Environment Protection Act 1997 (Amended 2012) under which the Environmental Impact Assessment (EIA) study is mandatory for getting Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

### 3.0 SCOPING

Scoping is the process of identifying the key environmental issues and is perhaps the most important step in an EIA. It occurred early in the project cycle at the same time as outline planning and pre-feasibility studies. Several groups, particularly decision makers, the local population and the scientific community contributed in helping deliberate the issues which should be considered, and scoping is designed to canvass their views. At this stage the option exists for cancelling or drastically revising the project; equally it may be the end of the EIA process if the impacts be found to be insignificant. Once this stage has passed, the opportunity for major changes to the project is restricted.

Scoping for this particular proposal was carried out with two main objectives

- i. To pinpoint the problems early allowing mitigating design changes to be made before expensive detailed work is carried out.
- ii. To ensure that detailed prediction work is carried out for important issues. So that after identifying the key issues, a full-scale EIA is considered and it incorporates terms of reference for further studies.

### 4.0 CONSIDERATION OF ALTERNATIVES

This section covers the project alternatives considered including site alternatives, design / technology alternatives, environmental alternatives and economic alternatives for establishment of the proposed industrial unit sustainable. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options are adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety. In particular, it outlines the following options that were considered for this project.

### 5.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

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

The applicable laws for the environmental study of the proposed project are briefly given below:

- ◆ National Conservation Strategy, 1992
- ◆ PEPO, 1983 & PEPA, 1997
- ◆ Punjab Environmental Protection Act-1997 (Amended 2012)
- ◆ National Environmental Policy, 2005
- ◆ (Draft) Punjab Environmental Policy, 2005
- ◆ Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022
- ◆ Guidelines for Preparation and Review of Environmental Reports, 1997
- ◆ National Environmental Quality Standards
- ◆ Punjab Environmental Quality Standards
- ◆ Guidelines for Critical and Sensitive Area
- ◆ Policy and procedures for the Filling, Review and Approval of Environmental Assessments, 1997
- ◆ Guidelines for Public Consultation, 1997
- ◆ Factories Act, 1934
- ◆ Punjab Wildlife Protection Act, 1974
- ◆ Forest Act, 1927
- ◆ Explosive Act, 1884
- ◆ Pakistan Penal Code, 1860

## 6.0 DESCRIPTION OF THE PROJECT

M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) (Head Office Address; 4<sup>th</sup> Floor, Chapal Plaza, Hasrat Mohani Road, Off I.I. Chandrigarh Road, Karachi) are in the process to establish a Safety Match Box Manufacturing Unit located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.

The description of the proposed project is as under:

### 6.1 Brief outline of the Proposal

The subject proposed project is a Safety Matches Manufacturing Unit located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur. The capital cost (including Land Cost, Construction Cost, Plant/Machinery Cost & other Installation Cost) of the proposed project will be approximately PKR 630 Million. The subject proposed project site is spread over an area of 351,000 SFT (78 Kanal) whereas the total covered area will be 63,288 SFT and rest of the area (294,704 SFT) will be open. The installed capacity of the proposed unit will be 5000 cartons / day. A separate storage godown with covered area of 14,400 SFT will be constructed for the storage raw materials safely. The site is located near Multan Road where numbers of industrial units are located in the proximity of proposed site, the proposed project area is self-developed industrial area.

## 7.0 DESCRIPTION OF ENVIRONMENT

The environmental studies have been carried out in and around the project area to get baseline environmental data and to know physical, ecological and socio-economic conditions. The information has also been obtained through site visits, interaction/consultation with people living/working in and around the project



area. People have been interviewed and interaction has been made with the other stakeholders. Information has also been obtained from laboratory analysis, Govt. Departments and review of previous studies. During this study physical (topography, geology/seismology, stratigraphy, land use, climate, surface and ground water resources, air quality, noise level, traffic volume), ecological (flora and fauna) and socio-economic components (demographic studies, infrastructure of the area, social amenities, health, education, economic condition, employment in the area, women status, cultural, archeological sites and religious status) have been studied.

## **8.0 IMPACT ASSESSMENT**

The primary function of an environmental impact assessment study is to predict and quantify the magnitude of potential impacts, assess and evaluate the magnitude. The impact assessment forms the basis for development of Environmental Management Plan. Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible.

All the potential environmental impacts had been identified during literature review, visits of project site and nature / manufacturing process of the proposed project. Various types of environmental issues likely to crop up during life cycle of project are grouped in different phases; project location related impacts, project design related impacts, construction phase impacts and operational phase impacts.

## **9.0 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

The impacts during all of three stage design, construction and operation of the proposed project such as impacts on physical environments including changes in land use/appearance, seismic hazard, soils/geology, impacts on topography, impacts on air quality, noise pollution, impacts on ground water, water consumption, wastewater generation, solid wastes, emergency conditions; ecological environment including impacts on flora & fauna and socio-economic environment including health and safety of workers, etc. have been considered and estimated/assessed in the light of public comments, public interviews and in meetings with stakeholders.

The impacts of proposed project activities during all the phases (design, construction and operation) have been considered and their remedies have been suggested. These impacts may be on soil, topography, climate, water consumption, the health and safety of workers, surface and ground water, air quality, flora and fauna, existing utilities and impacts due to noise, wastewater, and solid waste generation.

Mitigation measures will be adopted while construction & operational phases of the proposed project such as treatment of sewage, development of solid waste management plan, implement environmental monitoring plan (ambient air / stack emissions monitoring, ground water quality, sewage/wastewater quality check &



noise level monitoring) during construction & operational phases, overhauling / maintenance schedule & inspection plan, EMMP implementation, firefighting arrangements, to ensure the health & safety of workers, emergency procedures / emergency preparedness plan, etc.

### 9.1 The Major Impacts

The major Impacts arising from the proposed project are as under in the following table:

IMPACTS	DETAILS / RISKS
<b>Impacts on Air Quality</b>	During regular operations of the proposed project, air emissions will mainly be generated from operations of biomass boiler and standby power generator, which may require proper safety & precautionary measures in place to avoid any degradation of ambient air of the area.
<b>Noise</b>	During the operational stage of the subject proposed project, the noise will be produced from operations of manufacturing plant / machinery, biomass boiler & standby power generator. Noise levels will be increased at some negligible level near the production hall, boiler and standby power generators but it will be mitigated properly if not, may have moderate negative impact.
<b>Water Consumption</b>	During regular operational phase of the proposed project water will mainly be used in washing of chemical buckets, toilets/washrooms, kitchen, etc.
<b>Wastewater Generation</b>	The wastewater will be produced from different sources like washing of chemical Buckets, toilets / washrooms & kitchen / mess, etc.
<b>Solid Waste Generation</b>	During the operational phase of the subject proposed project, no any type of hazardous nature solid waste will be produced. Recyclable nature (non-hazardous waste) including wood, empty carton, packaging waste, polythene bags, etc. will be produced. Moreover, organic waste will also be produced from kitchen/mess.
<b>Emergency Response</b>	The operation of the proposed project will involve workers and visitors who may become ill or have work related accidents. In addition, disasters including natural & anthropogenic such as earthquakes, floods, heavy rainfall / thunder storm & fires due to electrical short circuiting, overheating, etc. may occur which have to be considered for minimizing their impacts.
<b>Impacts on Flora</b>	Operation of the proposed project will not exert significant negative impact overall on flora of the site and also flora of local /surrounding area.
<b>Impacts on Fauna</b>	Noisy operation of machines, boiler, standby power generators will have some negligible impact on fauna (wild birds). It will be minor negative impact if not mitigated properly.
<b>Health &amp; Safety of Workers</b>	The workers especially working in the production hall / production area may be at health risk, because there are always chances of accident, incident, near miss, dangerous occurrence, work related ill-health while working at workplace. The workers may face ill-health, disease and temporary & permanent disability in case of severe injury and may face fatality in case of severe accident. If they do not properly train and provided with Personal Protective Equipment (PPEs) this will be major negative impact if not mitigated properly.

## 9.2 Recommendations for Mitigation Measures:

Following mitigation measures are recommended for the protection & safety of environment:

IMPACTS	MITIGATION MEASURES
<b>Impacts on Air Quality</b>	<p>In order to minimize air pollution, following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>▪ An air quality monitoring and improvement plan will be developed and implemented to keep the air pollution level within the limits of Punjab Environmental Quality Standards (PEQS)</li> <li>▪ Cyclone and wet scrubber will be installed at stack of Biomass Boiler to minimize PM and other flue gases according to the requirements of PEQS.</li> <li>▪ Standby power generators will be placed at concrete foundation equipped with shock absorber rubbers, sound proof canopy, silencer, smoke arrestor and stack with proper height.</li> <li>▪ Maintenance and overhauling schedule will also be developed.</li> <li>▪ Standby power generator and boiler will be maintained or over hauled well within time according to schedule and periodically checked or inspected to avoid any excessive smoke.</li> <li>▪ No leak system by proper maintenance of valves, seals &amp; flanges</li> <li>▪ Well capped containers</li> <li>▪ Good housekeeping,</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>▪ Proper foundation of the plant machinery, standby power generator &amp; boiler will be designed and constructed to cope with the problem of tremor / vibration which will consequently abate the noise problem.</li> <li>▪ Noise level monitoring and improvement plan will be developed and implemented with letter &amp; spirit.</li> <li>▪ The standby power generators and boilers will be over hauled and well-tuned according to the schedule to avoid excessive noise.</li> <li>▪ Proper set back will be provided from the boundary wall which will also help to minimize / eliminate the noise pollution.</li> <li>▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber.</li> </ul>
<b>Water Consumption</b>	<ul style="list-style-type: none"> <li>▪ At open places the grassy lawns will be developed to recharge the water table which is help to control the surface runoff during rainy season.</li> <li>▪ More landscaping will also be done at available open place after completions of project</li> <li>▪ The overall nature of the area is agricultural it is also help to recharge the water table.</li> <li>▪ The workers will be given training to avoid wastage of water.</li> <li>▪ Regular inspection of water tapes, valves and water lines as per schedule or periodically will be undertaken.</li> </ul>
<b>Wastewater Generation</b>	<ul style="list-style-type: none"> <li>▪ Bio-cleaner based technology WWTP / ETP with capacity of 6000 gallons / day will be installed for the treatment of the wastewaters to fulfill the compliance of PEQS.</li> <li>▪ After treatment, the treated wastewater will be used for watering of vegetation / landscaping within the project premises.</li> </ul>
<b>Solid Waste Generation</b>	<ul style="list-style-type: none"> <li>▪ The wood will be used in biomass boiler of the proposed project.</li> <li>▪ The recyclable waste including empty carton, packaging waste, polythene bags, etc. will be handed over to EPA Approved waste</li> </ul>



	<p>contractor.</p> <ul style="list-style-type: none"> <li>▪ Organic waste to be produced from kitchen / will be handed over to mess contractor who then will dispose off properly as per local Govt. policy like MSW wastes.</li> <li>▪ A track record of solid waste will be maintained.</li> </ul>
<b>Emergency Response</b>	<ul style="list-style-type: none"> <li>▪ A comprehensive Emergency Response Plan (ERP) for emergency / fire conditions and disastrous situations will be developed and implemented whole heartedly during the operational phase of the project.</li> <li>▪ Adequate internal and external water distribution system / fire hydrant system will be designed, which could also supply adequate quantity of water for firefighting during emergency.</li> <li>▪ Firefighting arrangements have been undertaken according to the requirements of Civil Defense Department and international standards.</li> <li>▪ Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic &amp; manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.</li> <li>▪ Emergency assembly points will be marked and factory workers will be trained to cope with any emergency situation.</li> <li>▪ Regular training workshops &amp; emergency / fire drills of workers will be scheduled to be held regularly.</li> <li>▪ All firefighting, emergency and safety equipment shall be frequently checked and properly maintained.</li> <li>▪ Safety signs, emergency exits, emergency routs will be displayed &amp; mentioned at many / appropriate places.</li> <li>▪ Emergency exits and routs will be kept clear from obstacles to avoid any hurdle / panic while emergency condition.</li> </ul>
<b>Impacts on Flora</b>	<ul style="list-style-type: none"> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be developed at available open places in the proposed unit.</li> <li>▪ To avoid any negative impact on flora of the site and flora of project area / outside area, air emissions and wastewater quality will be monitored and kept controlled within PEQS limits.</li> </ul>
<b>Impacts on Fauna</b>	<ul style="list-style-type: none"> <li>▪ Best and latest technology will be selected which have low operational noise and emissions.</li> <li>▪ Proper foundations will be constructed with shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.</li> <li>▪ Trees will be planted around the building as buffer zone and play as sound barrier.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract the fauna (wild birds) to nest here.</li> <li>▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.</li> </ul>
<b>Health &amp; Safety of Workers</b>	<p>To mitigate the hazards of health and safety of workers the following mitigations measures will be undertaken:</p> <ul style="list-style-type: none"> <li>▪ No worker aged below 18 years or over 60 years shall be employed for any job involving physical handling of hazardous</li> </ul>

	<p>substances.</p> <ul style="list-style-type: none"> <li>▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures.</li> <li>▪ Protective clothing and equipment comprising helmet of cloth cap, safety spectacles or goggles, respirators or masks, rubber or plastic gloves and safety shoes shall be available for all workers who may be exposed to any hazardous substance, and no worker shall be permitted on job unless and until he is wearing such protective clothing and equipment.</li> <li>▪ To avoid any potential environmental hazards the workers would be trained properly so that they know the potential hazard of chemical.</li> <li>▪ Proper cross ventilation shall be undertaken to avoid from any bad smell/odor.</li> <li>▪ There will be proper arrangement to handle accidental / disastrous situation.</li> <li>▪ The instructions for the workers, safety signs and precautionary / preventive measures for the costumers / visitors would be displayed at suitable / prominent places.</li> <li>▪ Adequate supply of water shall be made available to the workers for personal washing as well as for washing their protective equipment.</li> <li>▪ Protective clothing and equipment of the workers shall be washed and cleaned as often as required to ensure their efficiency.</li> <li>▪ No worker shall be permitted to eat, drink or smoke till he has removed his protective clothing and equipment, washed his hands and face and left the place of work.</li> <li>▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff.</li> <li>▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.</li> </ul>
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## 10.0 ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN

A complete Environmental Monitoring and Environment Management Plan are recommended to regulate the requirements of Punjab Environmental Protection Act PEPA 1997-(as amended 2012).

A summary of mitigation measures suggested in Section 6 will be implemented through Environmental Monitoring and Management Plan which will ensure the identification of adverse environmental impacts and help to minimize / eliminate the adverse environmental impacts. The implementation of Environment Management Plan covers the possible impacts at design related, construction and operational phases. For effective implementation of Environment Management plan an Environmental Management Committee (EMC) headed by an environmentalist already exists for operational and during construction phase the contractor will be responsible for environment protection measures and apply good construction techniques to prevent negative environmental impacts.

The proponent / contractor will hire trained staff to ensure the enforcement of Environmental Management Plan. The equipments will be kept in proper condition to save the environment from damage.

During construction phase air quality, ground water quality & noise level will be monitored on monthly basis whereas, in operational phase air quality, ground water quality, wastewater quality & noise level will be monitored on quarterly basis. The wastewater/sewage produced from the said project will be treated through ETP/WWTP. Then it will be discharged to wastewater channel of the area. The cooling water will be reused/re-cycled. Horticulture Team will be formed to attend the issues relating to cleanliness, up-keeping, aesthetic beauty of the project site, general environmental enhancement, tree plantation, vegetation promotion, planting of flowers and ornamental plants on site.

### **10.1 Proposed Environmental Monitoring**

To check the environmental performance of the project through its lifecycle and compliance of PEQS/NEQS environmental monitoring is essential part and tool which should be conducted to ensure effective surveillance of the environmental parameters at various stages of the project as development/construction and operational. The following environmental monitoring would be implemented:

#### **a. Ambient Air Quality Monitoring**

While construction and operational phases of the proposed project ambient air quality will be monitored as per PEQS/NEQS and report should be submitted to EPA.

#### **b. Noise Level Monitoring**

Noise levels will be monitored at different points and keep the noise levels will be within PEQS/NEQS limits and report should be submitted to EPA.

#### **c. Groundwater Quality**

Groundwater quality will also be monitored and check the compliance the parameters of PEQS/NEQS and report should be submitted to EPA.

#### **d. Wastewater Quality**

Wastewater quality parameters will also be monitored as per PEQS/NEQS limits and report should be submitted to EPA.

### **11.0 STAKEHOLDERS CONSULTATION**

Consultations and discussions with stakeholders have been carried out on formal and special issues. Consultation is the tool of communication between project holder and public living / working around the project area. Its goal is to improve decision-making and build understanding with individuals, groups and organizations. Such involvement increases long-term viability of the project and



helps to resolve constrains if any at the initial stage. During the social impact assessment study, stakeholders were consulted in groups and individuals were interviewed. Group discussions were held to obtain feedback from the stakeholders. The proximity of the project area is a self- developed industrial setup, however overall the area all around, is rural / agricultural in nature. Discussions were held with Government and private offices and shops as well as EPA Punjab, Lahore.

## **12.0 CONCLUSION & RECOMMENDATIONS**

The mitigation measures recommended in the EIA Report are sufficient to commence, complete and operate the project in environment friendly manner. The proposed project is suitable from environmental point of view. Recommendations have also been suggested for the safe operation of the unit as well as for the protection of environment.



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## Section 1: INTRODUCTION

### 1.1 General

This section of the report provides an overview of the project including purpose of the project & report, identification of project & proponent, approaches and methodology, extent of EIA study, objective of the project, scope of study, details of consultant, brief description of nature, size & location of project, etc. And it also depicts need for Environmental Impact Assessment (EIA) for the proposed Safety Match Box Manufacturing Project.

### 1.2 Company Profile

#### a. Popular Group of Industries:

Since 1947, Popular Group of Industries are one of the most progressive business structures of Pakistan, with handsome operations that reach out across industries. The Popular Group is principally engaged in the manufacturing, servicing, trade and export of foods, juices, textiles, safety matches and other products across different industries.

Extensive expeditions of benchmark triumphs and creation of radical products have made the Popular Group what it is today. Popular Group use our experience to shape markets and the future of the economy and the society by creating more value and serving our customers better every day. Throughout the years, Popular Group have gone from quality to quality, acquiring and spearheading some of the most renowned businesses and brands in Pakistan and abroad.

The Popular Group welcomes diversity whole-heartedly. Be it venturing into newer industries and products lines, or acquiring and retaining the best talent across functions, and making intellectual and technological advancement in different business categories. Popular Group believe in attaining the highest standards of quality in everything we do.

#### b. Popular Match Industries:

Since 1971, Popular Match Industries has been a leader in innovation in the matches market of Pakistan, by selling quality matches brands.

Popular safety matches brands are renowned. They include SURKHAB, LUCKY, CHINGARI, BULBUL, PAJERO & Sea-Eagle. We also offer our corporate buyers Safety Matches Manufacturing according to their brand needs. These include both local and international clients. We never compromise on quality and are recognized in the market as a quality goods producer

### 1.3 Proposed Project Introduction

M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) (Head Office Address; 4<sup>th</sup> Floor, Chapal Plaza, Hasrat Mohani Road, Off I.I. Chandrigarh Road, Karachi) are in



the process to establish a Safety Match Box Manufacturing Unit located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.

#### 1.4 Purpose of Report

The main objectives of this Environmental Impact Assessment (EIA) Report are to identify the baseline environmental, biophysical and socio-economic conditions, to examine project alternatives including alternate sites, and to study the potential impacts along with formulation of suitable mitigation measures for an environment friendly implementation of the proposed project site and around the project area.

The report provides relevant information, as required under the officially approved format, to help the decision makers i.e. EPA Punjab before issuing the Environmental Approval.

#### 1.5 Identification of the Project and Proponent

##### a. Identification of the Project

The subject proposed project is basically a safety match box manufacturing unit where safety matches will be produced.

##### b. Proponent

The proponent of the subject proposed project (establishment of a safety match box manufacturing unit) is Kamran Ali Roshan who is Executive Director of the company.

#### 1.6 Need for Environmental Impact Assessment (EIA)

It is mandatory provision to carry out Environmental Reports (IEE / EIA) to obtain Environmental Approval from provincial agency for different projects before commencement of construction or operation.

##### a. Section 12 of PEPA-1997 (as amended 2012):

##### **Initial Environmental Examination and Environmental Impact Assessment –**

(1) According to the Section 12 of Punjab Environmental Protection Act, 1997 (As Amended 2012) *“(1) No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof”.*

(2) The [Provincial Agency] shall:-

(a) review the Initial Environmental Examination and accord its approval, or require submission of an Environmental Impact Assessment by the proponent; or



(b) review the Environmental Impact Assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the Environmental Impact Assessment be re-submitted after such modifications as may be stipulated, or reject as being contrary to environmental objectives.

#### **b. Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022**

The current proposed project (safety matches manufacturing unit) is of the nature of Manufacturing & processing but not mentioned in the same group by its name or categorically, however the proposed project by its features / characteristics of manufacturing process, raw materials to used and the capital cost require EIA Study to carry out hence as per “Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022 the proposed project falls in Schedule II; category J-Other Projects; Any other project for which filling of an EIA is required”.

#### **c. Environmental Approval / NOC Under Section 12**

So, in the light of above mentioned laws and regulations Environmental Approval/NOC under section 12 of Punjab Environmental Protection Act, 1997 (as amended 2012) for the establishment of the proposed project (safety matches manufacturing unit) is mandatory. To obtain the above mentioned Environmental Approval/NOC this EIA Study has been carried out.

This Environmental Impact Assessment (EIA) Study will cover the Section 12 of PEPA, 1997 (amended 2012) for obtaining the Environmental Approval for construction or operation of the proposed project.

### **1.7 Approaches and Methodology**

The existing information to establish a database for the EIA of the proposed project was collected from different government departments; review of previous studies and through site visits of the proposed project.

The SIA of the proposed project site was conducted through consultation with the community. The locals / stakeholders were interviewed to get their comments and views regarding the development of the proposed project. The proximity of the proposed site industrial (though the area is of agricultural nature in the broad spectrum); the persons working in different industries and locals have been interviewed.

### **1.8 Extent of EIA Study**

Following factors during design, construction and operational phases have been taken into account to assess the Environmental Impacts of the proposed project:

- Environmental Impacts due to land use, location, waste generation, utility services consumption, noise, oil/fat generation etc.

- Environmental Impacts on physical resources i.e. soil, topography, geology, climate, air quality, etc. ecological resources i.e. flora and fauna as well as health and safety of workers.

## 1.9 Magnitude of Efforts

Visits to the project site and surrounding area have been done by team of Environmentalists. All the potential / possible stakeholders such as private community (locals and pedestrians) and EPA (local officials), Govt. of the Punjab have been contacted to get the relevant data, for preparation of EIA Study. Primary & Secondary Data has been analyzed and previous studies have been reviewed.

### 1.10 Detail of Consultants

M/s Sustainable Environmental Solutions (SES) has performed this EIA Study. The name, qualifications & contact details of persons / team members performing or carrying out the said environmental study is attached as annexure. The contact detail of representatives is as follows:

#### Consultant Company / Firm Details:

Contact: Sustainable Environmental Solutions (SES)  
Address: S-9, 2<sup>nd</sup> Floor, Fazal Apartments, 5-Faiz Road, Muslim Town, Lahore - Pakistan  
Tel: +92 42 35862622

#### Team Members:

The details about team members including qualification & experience is as under:

#### Waheed Ahmad

Team Leader / Coordinator  
Contact #: 0321-4111718

#### A. Qualification

- M. Phil Environmental Sciences (PU)
- M.Sc. Applied Environmental Sciences (PU)
- Post Graduate Diploma in Environmental Laws (PU)
- NEBOSH IGC "Occupational Safety & Health"
- IOSH "Managing Safely"
- One Year Diploma in Environmental Management (MIIM)
- HABC Level 2 in Fire Safety (QCF)
- International Workplace Health & Safety (British Safety Council)
- Occupational Health & Safety Management Training (OHSAS 18001)
- Environmental Audit Training; ISO 14001 – Lead Auditor Course

#### B. Experience

10 years of experience as Environmentalist for carrying out EIA Studies, IEE Studies, EMPs, Environmental Compliance Status Reports for various projects.

#### Yahya Aslam Bambal

#### A. Qualification



Team Member / Environmental Consultant	<ul style="list-style-type: none"> <li>• M. Phil Environmental Sciences (PU)</li> <li>• M.Sc. Applied Environmental Sciences (PU)</li> <li>• Post Graduate Diploma in Environmental Laws (PU)</li> <li>• NEBOSH IGC “Occupational Safety &amp; Health”</li> <li>• IOSH “Managing Safely”</li> <li>• HABC Level 2 in Fire Safety (QCF)</li> <li>• International Workplace Health &amp; Safety (British Safety Council)</li> <li>• Occupational Health &amp; Safety Management Training (OHSAS 18001)</li> <li>• Environmental Audit Training; ISO 14001 – Lead Auditor Course</li> <li>• Training in “Skills in Administration” (Pakistan Institute of Management)</li> <li>• “Value Based Management” (Pakistan Institute of Human Development)</li> </ul>
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### B. Experience

09 years of experience as Environmentalist for carrying out EIA Studies, IEE Studies, EMPs, Environmental Compliance Status Reports for various projects.

<b>Zia-Ud-Din Kasuri</b> <b>Advocate Supreme Court</b> (Member Legal)	<ul style="list-style-type: none"> <li>• M.A</li> <li>• LLM, M. Phil</li> <li>• LLB (Shariah &amp; Law)</li> <li>• Post Graduate Diploma in Environmental Laws (PU)</li> </ul>
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## 1.11 Brief Description of Nature, Size and Location of Project

### 1. Nature & Size

The subject proposed project is a Safety Matches Manufacturing Unit located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur. The capital cost (including Land Cost, Construction Cost, Plant/Machinery Cost & other Installation Cost) of the proposed project will be approximately PKR 630 Million. The subject proposed project site is spread over an area of 351,000 SFT (78 Kanal) whereas the total covered area will be 63,288 SFT and rest of the area (294,704 SFT) will be open. The installed capacity of the proposed unit will be 5000 cartons / day. A separate storage godown with covered area of 14,400 SFT will be constructed for the storage raw materials safely. The site is located near Multan Road where numbers of industrial units are located in the proximity of proposed site, the proposed project area is self-developed industrial area.

### 2. Location of the Project

The proposed projects site is located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.

## 1.12 Roles and Responsibilities

The executing firm/company of the proposed project will be the M/s Popular Match Industries (Pvt.) Ltd. (Unit-4). Roles and responsibilities have been proposed in the EIA report.

## 1.13 Implementation of Mitigation Measures

Proposed mitigation measures as defined in the EMP will be implemented with responsibilities assigned to various departments and agencies.

## 1.14 Role of Environmental Protection Agency, Punjab

The main responsibility of Environmental Protection Agency, Punjab will be to monitor the mitigation measures, which will be taken up or implemented by M/s Popular Match Industries (Pvt.) Ltd. (Unit-4).

## 1.15 Structure of the Report

Section 1 “**Introduction**” Briefly presents the project introduction, purpose of report, identification of project & proponent, details of consultant and brief description of nature, size & location of project.

Section 2 “**Screening**” this section covers the need of environmental study (IEE or EIA) and describes in which category the project falls as per Punjab Environmental Protection (Review of IEE & EIA) Regulations, 2022.

Section 3 “**Scoping**” briefly presents the scoping of impacts and mitigation measures, spatial and temporal boundaries of environmental assessment, important issues and concerns raised during consultation and significant impacts and factors to be determined.

Section 4 “**Consideration of Alternatives**” covers the different alternatives their selection and rejection criteria which includes Site alternatives, Design / Technology alternatives and environmental alternatives

Section 5 “**Policy, Legal and Administrative Frameworks**” Comprises the policy, guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed project.

Section 6 “**Description of the Project**” Presents relevant information about objectives of project, location and site layout of the project, land use on the site, road access, vegetation features of the site, cost and magnitude of operation, schedule of implementation, description of the project and restoration & rehabilitation plans

Section 7 “**Description of Environment**” presents clear cut picture of existing environmental resources including baseline physical environment, baseline ecological environment & baseline socioeconomic environment. Moreover, this

section also covers lab reports of environmental analyses and suitability of the site.

Section 8 “**Impact Assessment**” briefly presents the primary function of an environmental impact assessment study and includes methodologies for impact identification and characteristics of impacts (nature, magnitude, extent & location, timing, duration, reversibility, risk).

Section 9 “**Screening of Potential Environmental Impacts and Mitigation Measures**” Deals with the potential environmental impacts and mitigation measures, which have been proposed to mitigate the environmental impacts of the proposed project including project location, design, construction phase, operational phase and potential environmental enhancement measures.

Section 10 “**Environmental Management & Monitoring Program**” Outlines description of proposed mitigation actions, schedule for implementation and environmental budget, environmental management team, proposed monitoring program to assess performance or output of EMP, proposed EMP reporting & reviewing procedure and any training needs required to ensure implementation of EMP and Monitoring Plans.

Section 11 “**Stakeholders Consultation**” consists of consultation with stakeholders, objectives of consultation, methodology of consultation, categories of stakeholders consulted, findings of overall discussion, etc.

Section 12 “**Conclusions & Recommendations**” This chapter will conclude the whole report and recommendations are suggested.

## Section 2: SCREENING

### 2.1 General

The subject proposed project is establishment of a Safety Matches Manufacturing Unit namely “M/s Popular Match Industries (Pvt.) Ltd. (Unit-4).” located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur. The capital cost (including Land Cost, Construction Cost, Plant/Machinery Cost & other Installation Cost) of the proposed project will be approximately PKR 630 Million. The installed / production capacity of the proposed unit will be 500 cartons / day.

Screening was performed at the first stage of the EIA process which resulted in a key EIA decision, namely to either conduct the assessment (based on the likely significant impacts) or not conduct it (in the anticipated absence of such impacts). Screening was done as early as possible in the development of the proposal in order for the proponent and other stakeholders to be aware of possible EIA obligations.

The standardized approach i.e. defined in applicable regulations was applied. The proposed project was assessed based upon a set of criteria determined by Environmental Protection Agency (EPA) i.e. Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022 provided by Government of Punjab were considered for the purpose of screening mainly.

### 2.2 Screening of Proposed Project

As mentioned in the previous section of this study, the current proposed project (safety matches manufacturing unit) is of the nature of Manufacturing & processing but not mentioned in the same group by its name or categorically, however the proposed project by its features / characteristics of manufacturing process, raw materials to used and the capital cost, require EIA Study to carry out. Hence according to the regulations “**Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022 the proposed project falls in Schedule II; category J-Other Projects; Any other project for which filling of an EIA is required**” made under section 12 of Punjab Environment Protection Act 1997 (Amended 2012) under which the Environmental Impact Assessment (EIA) study is mandatory for getting Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

Moreover, following factors were also considered at the earlier stage;

- Magnitude of change in environmental conditions
- Diversity of new features with the existing environment
- Potential for trans-boundary or over large area impact

- Number of people effected
- Likelihood of effecting receptors of other types (fauna and flora, businesses, facilities) be affected?
- Probability of affecting valuable or scarce features or resources be
- Risk of breached environmental standards
- Risk of affected protected sites, areas, features
- High/low probability of the effect occurring
- Long/short duration of effect
- Either effect is permanent or temporary
- Is the impact continuous rather than intermittent
- If it is intermittent will it be frequent rather than rare
- Reversibility of impacts
- The likelihoods to avoid, or reduce or repair or compensate for the effect

After detailed analysis on the basis of these factors; the proposed project was found suitable for Environmental Impact Assessment (EIA) Study rather than Initial Environmental Examination (IEE) Study.

### Section 3: SCOPING

Scoping is the process of identifying the key environmental issues and is perhaps the most important step in an EIA. It occurred early in the project cycle at the same time as outline planning and pre-feasibility studies. Several groups, particularly decision makers, the local population and the scientific community contributed in helping deliberate the issues which should be considered, and scoping is designed to canvass their views. At this stage the option exists for cancelling or drastically revising the project; equally it may be the end of the EIA process if the impacts be found to be insignificant. Once this stage has passed, the opportunity for major changes to the project is restricted.

Scoping for this particular proposal was carried out with two main objectives

- iii. To pinpoint the problems early allowing mitigating design changes to be made before expensive detailed work is carried out.
- iv. To ensure that detailed prediction work is carried out for important issues. So that after identifying the key issues, a full-scale EIA is considered and it incorporates terms of reference for further studies.

#### 3.1 Methodology

Before the scoping exercise can be fully started, the remit of the study was defined and agreed by the relevant parties depending on the institutional structure. At a minimum, those who contributed to determining the remit included those who decide whether a policy or project is implemented, those carrying out the EIA (Sustainable Environmental Solutions) and those carrying out parallel engineering studies relating to the proposal. Following is the step-wise methodology adopted for the scoping of subject proposal.

- The key interest groups, both governmental and non-governmental, were identified – they include EPA, surrounding community and workers & management of adjacent industries
- Since, the people who can be affected by the project need to hear about it as soon as possible; so, scoping session was held inviting the representatives from identified groups and briefing them about the proposal while establishing good lines of communication. Their concerns are discussed in the coming sections.
- The main EIA techniques used in scoping were baseline studies, checklists and matrices. These techniques collected and presented knowledge and information in a straightforward way so that logical decisions can be made about which impacts are most significant.
- The concerns of the stakeholders were listened and noted down. If possible, negative ones were resolved at the spot whereas others area incorporated in the EIA study and decisions are made accordingly.

### 3.2 Spatial and Temporal Boundaries of Environmental Assessment

Temporal and spatial boundaries for the effects assessment are defined by the characteristics of the project and the Valued Environmental and Cultural Components (VECC) being assessed. These boundaries encompass time periods and areas during and within which the VECCs are likely to interact with or be influenced by the project.

Spatial boundaries vary according to the nature of the VECC but generally are defined in terms of:

- A local study area (LSA), where project effects can be predicted with a reasonable degree of accuracy and confidence and impacts are likely to be most concentrated – most of the subject project impacts are local e.g. air emissions, increased noise levels, wastewater and solid waste management, etc.
- A regional study area (RSA) where, depending on conditions (e.g., seasonal conditions, habitat use, more intermittent and dispersed project activities) – subject proposal does not impose any regional impacts

Following table represents the characterization of potential impacts of subject proposal based upon the spatial boundaries;

**Table 3.1: Characterization of Potential Impacts Based Upon the Spatial Boundaries**

Sr. No.	Potential Impacts	Spatial Boundaries	
		LSA	RSA
1	Air Quality	✓	✓ (if beyond limits)
2	Increased noise levels	✓	
3	Groundwater degradation	✓	
4	Surface water deterioration	✓	
5	Soil quality	✓	
6	Working personnel's Health & Safety	✓	
7	Lowering of ground water table		✓
8	Flora & Fauna	✓	✓

Temporal boundaries for project-related effects are defined in terms of the project phases:

- **Baseline** – covers ecological, physical and human-related characteristics of the environment, prior to the initiation of the construction phase;
- **Construction** – includes all activities associated with project construction and before commencement of operational phase such as:
  - Infrastructure development;
  - mobilization of equipment and supplies to the site by road and air;

- Construction of site facilities including camp, infrastructure, stockpile, waste rock storage dump, water management facilities (diversions, settling ponds, seepage collectors) etc.
- **Camp operations** and personnel transport during construction;
- **Operations** – includes ongoing industrial processing, effluent disposal, waste management, noise levels, transport of raw materials, end products and personnel;
- **Decommissioning** – includes all activities to decommission industry and remove equipment and materials from the site, re-contour the site and restore drainage patterns to stable long-term conditions, and implement the final site reclamation procedures to prevent erosion and restore vegetation cover where feasible;
- **Closure** – refers to conditions that will exist on the site after the site is abandoned and re-vegetation is complete.

Temporal boundaries are also defined for the cumulative effects assessment, spanning baseline to a point in the future, within which project effects on VECCs are predicted to overlap with effects of other projects or activities.

### 3.3 Issues and Concerns Raised during Consultation

The representatives from EPA, surrounding industries and community attended the scoping session. They were briefed about the objective of session, the proposal and its type, applicable regulations and potential environmental and socioeconomic impacts that can be anticipated. Following is a list of concerns raised during the session;

What are checks and balances that exist to make sure mitigation is implemented correctly and how will follow-up happen?

- Will the locals be preferred for every sort of employment – skilled or unskilled?
- How health & safety of workers will be ensured throughout the construction and operational phase?
- What arrangements will be made for firefighting?
- How water will be conserved?
- How process solid waste and wastewater will be disposed of to not harm the environment?
- How noise levels will not be let increased?

All of these issues were sorted out during the session and recommendations are incorporated in the EIA study. However, most of the concerns were positive as

the proposed industry is believed to provide employment to a lot of local people thus contributing to national GDP. Also, it will bring industrial development in the country at the time when it is already trying to cope up with economic challenges.

### 3.4 Significant Impacts and Factors to be Determined

Substantial impacts that can be caused by the establishment of subject unit were identified and discussed with the key stakeholders. Recommendations for appropriate mitigation measures were also exchanged to be incorporated well in EIA study.

Following is the criteria adopted for determining significance of the potential impacts such as acceptability and mitigation measures requirement in relation to Ecological importance, Social importance, and Environmental standards;

**Table 3.2: Criteria for Significance of Impacts**

Categories	Impacts	Characteristics
Nature	Direct (D)	The environmental parameters are directly affected by the project construction or operation.
	Indirect (ID)	The environmental factor changes as a result of alteration in another parameter.
Duration of Impact	Short Term (ST)	The impact that last only during the construction of the proposed project e.g. noise from the construction activities.
	Medium Term (MT)	Lasting for a period of few months of a year; the project before naturally returning to the original condition such as loss of vegetation due to clearing of campsite, contamination of soil or water by fuels or oil.
	Long Term (LT)	Lasting for period much greater than medium term impact before naturally reverting to the original condition such as loss of soil due to erosion.
Geographical Extent	-	The geographical extent may be local or regional.
Project Phases	-	Designing (Pre-construction Phase), Construction Phase & Operational Phase
Reversibility of Impact	Temporary (T)	The impacts those don't cross ecosystem threshold value of resilience.
	Permanent (P)	The impacts that exceed ecosystem threshold value of resilience.
Likelihood of the Impact	Likely (L)	Impact will probably occur under most circumstances.
	Unlikely (UL)	Impact could occur at some time
	Possibly (P)	Impact may possibly occur at some time
	Rare (R)	Impact may occur but only under exceptional circumstances.
Impact Consequences Severity	Major (M)	When an activity causes irreversible damage to a unique Environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; has long-term effects (period of years) on socio-economic activities of significance or regional level.

	Moderate (Mo)	When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of flora or fauna; has short-term effects (period of months) on socio-economic activities of significance on regional level.
	Minor (Mi)	When an activity causes short-term reversible damage to an environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period; has short term effects on socio-economic activities of local significance.
	Negligible (N)	When no measurable damage to physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative of statutory requirements.

Following table represents the significance of determined impacts based upon above given criterion;

**Table 3.3: Significance of the Potential Impacts**

Categories	Impacts Significance	Potential Impacts						
		Air Quality Deterioration	Increased Noise Levels	Lowering of Groundwater Table	Surface Water Degradation	Soil Quality	Health & Safety	Flora & Fauna
Nature	Direct (D)	✓	✓			✓	✓	✓
	Indirect (ID)			✓	✓			✓
Duration of Impact	Short Term (ST)		✓				✓	
	Medium Term (MT)	✓				✓		✓
	Long Term (LT)			✓	✓			
Geographical Extent	Local	✓	✓			✓	✓	✓
Project Phases	Regional			✓	✓			
Reversibility of Impact	Temporary (T)	✓	✓		✓	✓	✓	✓
	Permanent (P)			✓				
Likelihood of the Impact	Likely (L)	✓					✓	
	Unlikely (UL)							
	Possibly		✓					✓

	(P)							
	Rare (R)			✓	✓	✓		
Impact Consequences Severity	Major (M)							
	Moderate (Mo)		✓				✓	
	Minor (Mi)	✓		✓				✓
	Negligible (N)				✓	✓		

Based upon this identification; mitigation measures are proposed in EIA study. Environmental Management and Monitoring Plan is prepared defining the monitoring program as well to effectively implement the recommended measures.

## Section 4: CONSIDERATION OF ALTERNATIVES

### 4.1 General

This section covers the project alternatives considered including site alternatives, design / technology alternatives, environmental alternatives & economic alternatives for establishment of the proposed industrial unit sustainable. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options are adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety. In particular, it outlines the following options that were considered for this project;

### 4.2 Site Alternatives, their Selection and Rejection Criteria

#### 4.2.1 Selection Criteria

Selection of the site for the proposed industrial plant was governed by many considerations, both the economic analysis of the estimated costs as well as judgment as to the modifying effects of other factors which are more the matter of judgment rather than mathematical calculations, and have considerable effect on the smooth working of the business unit.

The sites were considered for the establishment of proposed unit in and around the Phool Nagar, District Kasur as there is a rapid trend of industrialization in the subject area. In the light of general discussion of the factors influencing the industrial location; the sites were evaluated based upon the following criteria;

**Land:** Suitability, adequacy, and comparable cost of the sites to install the plant and to expand it whenever feasible.

**Labor:** Availability and affordable wage rates – taking cost to benefit analysis into consideration – of the skilled, semi-skilled, un-skilled person is required.

**Transportation:** Regular and sufficient transportation facilities for delivery of materials, dispatch of finished products and for the use of the employees.

**Market:** Size of the local market and the cost of transporting to central markets vis-a-vis the extent of demand.

**Auxiliary Facilities:** Character of community regarding taxes, legal regulations, public up lift services, financial facilities, educational opportunities, etc.

In the light of this criteria; it was found most feasible to establish the proposed project industrial unit in subject project area because there is rapid trend of industrialization in this area moreover numbers of industrial units are currently working in this area. The decision was made based upon the following merits:

#### a. Roads and other basic infrastructure:

Basic infrastructure like roads, water, power, telephone, fax, Internet, etc. is available near the project site or in the proposed project area. Other

considerations are the availability of good road facilitates and the movement of raw materials & finished products at cheaper cost. The basic facilities are vitally important for the entire business to be run. These facilities also go in favor of the present site selection for the project siting.

#### **b. Trend of Industrialization in the area**

There is rapid trend of industrialization in the subject project area where numbers of industrial units are currently working / located such as Popular Foods, Nishat Chunian Textile Mills, Nishat Chunian Coal Power Plan, TUP Plastic Industry, Abu Bakkar Textile, Mima Knit Socks Manufacturing Unit, Tanveer & Brothers Steel Furnace, Kasmy Pack Pvt. Ltd. Pak Precise Pvt. Ltd. BBJ Pipe Industry, etc. Moreover, other numbers of industrial units are located the proposed project area / at Multan Road.

#### **c. Transportation of Raw Materials**

The site is located near Main Multan Road, further the approach road is also Metalled Road, so the transportation of raw materials to the proposed project site and finished products to the market is very easy. Therefore, this site is the most suitable from the transportations point of view.

#### **d. Availability of Manpower**

Technical, skilled and unskilled labor is required for construction and operation of the proposed unit. All categories of the labor required for the subject project are available conveniently and plentifully at affordable cost at the present site. This factor also supports the selection of present site for establishment of the unit.

#### **e. Market for the products:**

For the marketing of finished products, the market of second largest city of Pakistan i.e. Lahore, is available at a distance of a few Kilometers from the proposed project unit. In Lahore there are a number of dealers, stores, cash & carry, etc. where the demand of these products is very high. Transportation of the products to these markets from this site means a lot of transport charges savings. This positively impacts the profits. Accordingly, the present site is very suitable.

#### **f. Water:**

Under ground water is available in large quantities from a depth of about 100 to 150 feet. The underground aquifers are quite fit for requirements of the proposed project to run. This also favors of the selection of the current site.

#### **g. Environment:**

And lastly, environmental considerations are extremely important for industrial siting. The proposed project site is situated in the Self Developed Industrial Area

where numbers of industrial entities are working in the neighboring / close vicinity of the project site however the project area is rural setting / agricultural in nature.

Settings around the proposed project site and in the proposed project area do not show any sensitivity of environment and no any sensitive segment of the environment is present. The area is agricultural in nature in a broad spectrum and there are limited species of flora and fauna, mainly cultivated crops are grown up in the agricultural land/fields of area. For more details, refer to the next section wetlands, wildlife or sensitivity of environment.

These factors carried important weightage in selection of the present site for the project. This factor too supports for the selection of the said site. Taking into consideration all the above-described factors the selected site is the most suited for installation of the project.

#### **h. Residential Area / Community Center:**

There is no any residential area / community center located near the proposed project site. This also makes the site suitable.

#### **4.2.2 Rejection Criteria**

Many alternate sites have been considered which have been rejected due to following reasons:

##### **a) Non availability of basic infrastructure**

One of the basic reasons to reject the other sites were non availability of basic infrastructure like water / sewerage system, roads network, and other basic infrastructure which is essential for running of project.

##### **b) The site surrounded by or near residential area**

Second reason to reject the other alternate sites is surrounded by residential area.

##### **c) Non availability of labor**

To run a project man power is basic / major requirement of the project so the others sites were rejected due to non-availability of labor in these areas.

##### **d) Non availability of Electricity / transmission lines in the area**

Many sites of those have not even electricity supply in the area.

#### **4.3 Design / Technology Alternatives, their Selection and Rejection Criteria**

Selection of plant / machinery technology is the main consideration which may make the project sustainable and environment friendly. So, keeping in view these considerations most modern and latest state of the art technology machinery for

safety matches production and other related equipment will be purchased which will meet the international standards. Therefore, from design and technological point of view best technology will be adopted to safe guard the environment and produce the safety matches according to international standards. The following most modern, advanced and latest state of the art technology machines will be purchased:

- CC Saw
- Peeling Machines
- Chopping Machines
- Impregnation Machine
- Dry Chambers
- Polishing Drum
- Severs (All Type)
- Turnkey Projects (Matches)
- Simplex Machine
- Di-cutting Machine
- Printing Machine
- Screen Printing Machine
- Box Filling Machines
- Inner & Outer Combining Machines
- Wrapping & Packing

#### **4.4 Environmental Alternatives, their Selection and Rejection Criteria**

During operational phase of the proposed project liquid waste / wastewater will be produced from washing of chemical pans which require proper treatment through ETP before its disposal. The main environmental issue from the proposed project is to generation of wastewater. So, the proponent of the project will install ETP/WWTP to comply with the prescribed limits of PEQS for industrial wastewaters.

As far as concerned the generation of stack emissions, emissions will be generated from the operations of biomass boiler and standby power generator. Emissions generating from the operations from the biomass boiler will require proper attention to install cyclone and wet scrubber to eliminate or minimize the emissions to an acceptable level as prescribed in PEQS. So, the proponent will install most compatible cyclone and wet scrubber on biomass boiler.

##### **4.4.1 Selection Criteria**

The ETP/WWTP for the treatment of wastewater to be produced from the proposed project is selected on the different factors which are as follows:

##### **Compatible / Treating the Wastewater to desired levels:**

This factor is very much important the ETP/WWTP must be efficient and compatible to treat the process wastewaters to the desired levels as prescribed by PEQS.

**Less Bad Odor:**

Operation of wastewater treatment plants produce bad odor, such type of treatment plants are preferred to select which may produce less bad odor.

**Less Sludge Generation:**

Second factor is sludge production, operations of treatment plants also involve sludge generation, handling and disposal in an environment friendly manner. It also requires to construct drying beds or installation of sludge pressing machines. So that type of treatment plant or facility will be selected which may produce low levels of sludge.

**Low Operation & Maintenance Cost:**

Every treatment facility needs operation and maintenance cost, so low operation & maintenance cost treatment plant will be compatible for the subject proposed project.

**Low labor cost:**

Waste water treatment systems usually have a group of people handling the daily operations. So that type of ETP/WWTP would be preferred which requires low levels of group of people.

**Low foot prints:**

A common problem for the proponents of the projects is to allocate large volume of space for installations of ETP/WWTP and tank requirements so low foot print required treatment plants will be selected.

**Low need of Digesting Enzymes:**

In the biological waste water treatment plants dosing of digesting enzymes and chemicals are involved which may add up the cost of daily operations of ETP/WWTP. So low need of digesting enzymes or chemicals type of effluent treatment plant will be selected.

**4.4.2 Rejection Criteria**

Numbers of factors may play vital role to reject the Waste Water Treatment Plants which are as follows:

**Required Large Space:**

Many types of effluent treatment systems required large foot prints in terms of intensive land use for installation their components specially construction of tanks. So, these types are not compatible the proposed project to install.

**High Capital Acquisition:**

Usually waste water treatment plants require large numbers of electro-mechanical equipment sometimes import from other countries which may not only be high levels of capital acquisition but also required large group of people to handle the daily operations of treatment plant.

**Dosing of Chemicals Requirement:**

Many types of waste water treatment plants have the requirements to add chemicals and digesting enzymes for daily operations which may raise the daily operation cost.

**Bad Odor:**

Many treatment plants operation may produce bad odor those are not compatible with the projects to install.

**Large Volume of Sludge Generation:**

This is also very important factor to consider while selecting the best type of effluent treatment plant which may not produce large quantity of sludge. It will be difficult to handle the large volume of sludge and finally its proper disposal.

**High O & M Costs:**

Those type of treatment plants which may involve large volume of installation of electro-mechanical equipment and dosing of chemicals & digesting enzymes require group of people to handle daily operations having high costs of daily operations. Parallel they also have the high maintenance costs.

**4.4.3 Bio-cleaner Based ETP / WWTP for the Proposed Project**

After thorough research and study of different alternate wastewater treatment technologies the Bio-Cleaner System has been selected due its numbers of advantages and demerits of other alternate technologies.

Bio-Cleaner is a wastewater treatment system. It harnesses the power of nature to successfully treat all forms of wastewater. It is a breakthrough technology which is able to treat all kinds of residential, commercial, industrial and municipal organic waste and it is equally effective for use in natural waterways such as rivers, lakes and bays. Bio-Cleaner aims to provide cost-effective, biological solutions to environmental challenges facing global communities by delivering:

**Convenience:** Scalable to Any Type of Treatment System

**Simple Solutions:** The system is easy to use and operate and portable. Just immerse it and connect to power



**Reduced Operating Costs:** With reduced aeration costs, electricity bills can be lowered by over 75%

**Environmental Safety and Reliability:** Use No Chemicals. No FOG. Awarded the US Green Patent for Environmentally Innovative Technology

- No Bad Odor
- No Sludge Production
- Low Operation Cost
- Treating Wastewater to Desired Level
- Low Cost of Capital Acquisition
- Low Maintenance Cost
- No Labor Cost
- Lower Foot Prints
- No Need of Digesting Enzymes
- Environment Friendly Technology

#### **4.5 Economic Alternatives, their Selection and Rejection Criteria**

Among consideration of alternatives of economic / business, many factors have been considered including investment in hand of owner / proponent, business experience of owner, family / inherited business, etc.

##### **4.5.1 Selection Criteria of Safety Match Manufacturing Industry**

The current business of safety matches production has been selected after consideration of many reasons / factors because safety matches production unit's development required low investment. The owner / proponent has vast experience of said type of business running because his family business. As mentioned earlier, the proponent has been involved in this business since 1971 and already running 03 numbers of safety matches units successfully. So, all these factors have strong weightage to select the subject proposed business as economic alternative.

##### **4.5.2 Rejection Criteria of other Economic Activities**

There are many reasons to reject the other economic activities because of big investment, no experience, etc. the details are as under:

###### **a) Sugar Plant**

The Management of the Company was interested investing in a Sugar Plant. A special team of experts were given the task of conducting a study of Investment prospects in Sugar Industry. The management after studying the pros and cons of the project decided to not invest as there was at least an investment requirement of Three to Five Billion Rupees which far exceeded the Budget of the Company. Besides having huge initial investment there were other hurdles like the Federal Government's policy on issue of License and the Political Hurdles. Environmental pollution load from the sugar industry is also much higher than

Safety Matches Manufacturing Unit. Sugar industry has air emission and wastewater problems.

#### **b) Cement Plant**

Keeping in view of Lucrative Margins in the Cement Sector with ever rising demand in Construction Industry the Management also conducted a study on the prospects of investment in a Cement Plant. The investment required for the same was also not within the range of the Budgeted Amount allocated by the management, there were hurdles in operating the Cement Plant effectively. Like the Market is highly saturated with Big Players that do not let the new entrants operate in the Market. So being a highly risky project management rejected the proposal.

Secondly in cement industry there are significant negative impacts on environment from cement industry operations especially in context of air emissions. Furthermore, mining leases for basic ingredients such as lime stone & clay stone have also a parallel full-time operation/business which is part of cement industry.

#### **c) Car Manufacturing Unit**

The fourth business alternative was in an establishment of car manufacturing unit. A study was conducted by the team and the project was thoroughly discussed and rejected due to requirement of huge investment. Further, renowned manufacturing companies are working in the market so there would be no market for new comer.

#### **d) Textile Industry**

The third alternative was to invest in any particular sector of Textile Industry. A study was conducted by the team. The project was thoroughly discussed and was rejected by the senior management of the Company/firm on the grounds of the adverse Power supply, high Production Cost and depressed foreign demand of Pakistani products. So, considering the high-risk profile of the project it was rejected. Textile industry (dyeing & printing) has lot of environmental problems as compare to Safety Matches such as huge amount of wastewater generation.

## **Section 5: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **5.1 General**

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

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

### **5.2 Existing Regulations and Legal Framework**

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

### **5.3 Relevant Legal / Institutional Framework**

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

#### **5.3.1 National Conservation Strategy, 1992**

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

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

#### **5.3.2 PEPO, 1983 and PEPA, 1997**

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which has now been replaced by the PEPA, 1997, through an Act of Parliament.

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

Under section 12 of the Pakistan Environmental Protection Act (PEPA, 1997), it is mandatory to carry out an IEE / EIA of all development projects causing significant environmental impacts.



### 5.3.3 Punjab Environmental Protection Act, 1997 (As Amended 2012)

On 18<sup>th</sup> April 2012, the Government of Punjab has notified the above mentioned environment act after minor amendments. So, the section 12 of the same act is also for obtaining of Environmental Approval. The section 12 is as under:

*“(1) No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof”.*

### 5.3.4 National Environmental Policy 2005

Government of Pakistan (GOP) has notified National Environmental Policy 2005, for different projects / aspects in which guidelines/priorities have been given to undertake/commence the projects having significant environmental impacts.

### 5.3.5 (Draft) Punjab Environmental Policy, 2015

The Punjab Environment Policy 2015 provides an overarching framework for addressing the environmental issues facing Punjab, particularly pollution of fresh water bodies, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, water logging, natural disasters and climate change. It also gives directions for addressing the cross sectoral issues, underlying causes of environmental degradation to meet national and international obligations. The theme of the Punjab Environment Policy 2015 is sustainable development in the sense of enhancement of human well being.

The Punjab Environment Policy provides broad guidelines to Provincial Governments and Local Governments for addressing environmental concerns related to them and ensuring effective management, restoration, enhancement of environmental resources and ensuring their sustainable use. The Punjab Environment Policy is a guide for actions in regulatory reform, programmes and projects for environmental conservation; and will review and ensure the enactment of legislation, by Provincial and Local Governments. The policy has been approved by the Punjab Environmental Protection Council headed by the Chief Minister Punjab under Section 4 (b) of the Punjab Environmental Protection Act 1997 (amendment Act 2012) and is enforced with immediate effect.

#### **Goal**

The Punjab Environment Policy aims to protect, conserve and restore Punjab environment in order to improve the quality of life of the citizens through sustainable development.

### **Objectives**

The objectives of the Policy are:

- a. Protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development and efficient management and enhancement of environmental resources.
- b. Integration of environmental considerations in policy making and planning processes through environmental governance.
- c. Integration of environmental concerns in Economic and Social Development.
- d. Capacity building of government agencies and other stakeholders at all levels for better environmental management.
- e. Meeting national and international obligations effectively in line with the Provincial aspirations.
- f. Creation of a demand for environmental protection through mass awareness and community mobilization.

#### **5.3.6 Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022**

The Government of Punjab has issued Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022 to review the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Reports.

#### **5.3.7 Guidelines for the Preparation and Review of Environmental Reports, 1997**

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

#### **5.3.8 National Environmental Quality Standards (NEQS)**

According to PEPA, 1997, National Environmental Quality Standards (NEQS) were established for municipal and industrial effluents and air emissions. The latest revision of NEQS carried out in year 2001 is attached as Annexure to this Report.

#### **5.3.9 Punjab Environmental Quality Standards (PEQS), 2016**

Under PEPA, 1997 (as amended 2012), Punjab Environmental Quality Standards including for Municipal & Liquid Industrial Effluents, for Industrial Gaseous Emissions, for Ambient Air, for Drinking Water, for Noise, for Motor Vehicle Exhaust and Noise and for treatment of Liquid & Disposal of Bio-medical Waste have been established since 2016. It is mandatory to comply with these standards.

#### **5.3.10 Guidelines for Sensitive and Critical Areas**

GOP has issued Guidelines for Sensitive and Critical Areas in October,

1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the proposed projects are planned and sited in a way that protects the values of sensitive and critical areas.

#### **5.3.11 Policy and procedures for the Filing, Review and Approval of Environmental Assessments, November-1997**

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

#### **5.3.12 Guidelines for Public Consultation, Pakistan Environmental Protection Agency October, 1997**

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

- ◆ Punjab Environmental Protection Act, 1997 (As Amended 2012)
- ◆ Policy and Procedures for filing, review and approval of environmental assessments
- ◆ Guidelines for the preparation and review of Environmental Reports
- ◆ Guidelines for sensitive and critical areas
- ◆ National Environmental Quality Standards (NEQS)
- ◆ Detailed sectoral guidelines

#### **2.3.13 Factories Act, 1934**

This act was framed in 1934. The Factories Act, 1934 is still the basic charter for the betterment of labour. Chapter III (Health & Safety) of this act provides guidelines for working conditions including occupational health and safety issues in factories.

#### **5.3.14 Punjab Wildlife Protection Act, 1974**

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

#### **5.3.15 Forest Act, 1927**

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

#### **5.3.16 Explosive Act, 1884**

This act deals with explosives in prohibiting either absolutely or subject to conditions, the manufacture, possession or importation of any explosive

which is so dangerous in character that, in the opinion of the appropriate Government, it is expedient for public safety to issue the notification.

### **5.3.17 Pakistan Penal Code, 1860**

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

## Section 6: DESCRIPTION OF THE PROJECT

### 6.1 General

This section of the report depicts the overview of detailed information about proposed project establishment of a safety matches manufacturing unit, objectives of the proposed project, project description, work force, process flow diagram, land use on the site, road access, cost and magnitude of operations, schedule of implementation, restoration and rehabilitation plan, etc.

### 6.2 Proposed Project

M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) (Head Office Address; 4<sup>th</sup> Floor, Chapal Plaza, Hasrat Mohani Road, Off I.I. Chandrigarh Road, Karachi) are in the process to establish a Safety Match Box Manufacturing Unit located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.

### 6.3 Objectives of the Project

The main objectives of the proposed project are as under: -

- To establish a most modern, advanced and latest state of the art technology safety matches manufacturing unit
- To manufacture high quality safety matches without damaging environment
- To fulfill the national demand for these product
- To provide the employment to the people
- To change the social life style of the area
- To uplift the socio-economic conditions of the area
- Revenue generation for the Government
- To earn profit for the business
- To upgrade the socio-economic conditions of the area

### 6.4 Location and Site Layout of the Project

The proposed project site is located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur. There are numbers of industrial units currently located in the subject project area and also working at both sides of Multan Road in the project area. The site layout and building layout plan of the proposed project are provided in the document's file submitted with the report. The physical coordinates of the project site are as under:

<b>Front (West):</b>	Approach Road (Gagga Road)
<b>Back (East):</b>	Sarai Cheemba Road, Nishat Chunian Ltd. Popular Food Unit-II
<b>Right (North):</b>	Vacant Land and TUP Plastic Industry Unit-3
<b>Left (South):</b>	Nishat Mills School & Ghani Motorcycles

Google Earth Map of the project site / area is as under:





Figure 6.1: Google Earth Map

## 6.5 Land use on the Site

Currently the proposed project site is a vacant land and the construction of the proposed project will be started after issuance of Environmental Approval.

## 6.6 Road Access

Approach road (Gagga Road) is metalled road and connected with the Main Multan Road and the site is located at a short distance away from the main Multan Road.

## 6.7 Vegetation features of the site

The proposed project site is a vacant land surrounded by industries and there is no any type of flora including trees, plants, shrubs/herbs and other types of vegetation present at site.

## 6.8 Cost & Magnitude of Operation

The estimated capital cost of the proposed project is PKR. 630 Million. Furthermore, the cost breakup of the proposed project is as under:

**Table: 6.1: Cost Breakup of Proposed Project**

SR.	PARAMETERS	COST BREAKUP (PKR Million)
1.	Land	150.00
2.	Construction	180.00
3.	Machinery / Plant	250.00
4.	Other Installations	50.00
<b>Total:</b>		<b>630</b>

Whereas, far the magnitude of operation is concerned; during construction phase civil work, installation of plant / machinery & other installations will be done. And during operational phase of the proposed project Safety Matches will be produced however details of manufacturing process has been incorporated in this same section on the next paragraphs.

## 6.9 Schedule of Implementation

Currently proponent is seeking Environmental Approval from EPA Punjab and construction work will be started after issuance of Environmental Approval.

The various phases involved in the implementation of the project at different levels are given below:

### a. Preliminary Phase

In this phase land is purchased and ownership transfer is completed like registry

is done and register in the registrar office. The ownership documents will be attached with the file to be submitted with the report.

#### **b. Design Phase**

During this phase, the proposed project has been designed including construction work and installation of plant machinery. A copy of the design in the form of layout plan is attached in the document file provided with the report.

#### **c. Legal Phase**

In order to comply with Punjab Environmental Protection Act, 1997 (amended 2012); the proponent has to obtain Environmental Approval from Environmental Protection Agency (EPA). The proponent hired the services of SES consulting firm to carry out the Environmental Impact Assessment (EIA) Study. Moreover, NOCs from other concerned departments are also being obtained.

#### **d. Construction Phase**

After getting Environmental Approval from EPA, Punjab proper construction work will be started. This phase will get completed in 6 months.

#### **e. Plant Machinery Transportation & Installation Phase**

For purchasing of machinery / equipment, the vendors will be contacted and agreements will be made for machinery / equipment purchasing after developing infrastructure. The machinery will be transported to the project site and installation will be done. The safety equipment shall also be installed as per requirements and standards. Also, the power supply system will be done. After completion of this phase an application for Confirmation of Compliance (Operational Phase Environmental Approval) will be submitted to EPA. This whole process will take almost 2 to 3 months.

#### **f. Commissioning Phase**

After plant machinery installation, commissioning phase will start. During this phase, all machinery and associated sections will be operated on trial basis. The machinery and operational procedures will be evaluated for the purpose of quality and efficiency assurance before entering into regular project operations. This phase will take about 2-4 weeks to complete.

#### **g. Operational Phase**

After obtaining of Confirmation of Compliance (operational phase Environmental Approval) of the project from EPA Punjab, the operational phase of the project will be started. Regular operations of the proposed project will be started. This phase will continue throughout the project life with modifications and enhancements as per requirement.

## 6.10 Description of the Project

Project description is given in some detail in the preceding Sections 1 and 3; additional information is provided as under:

### 6.10.1 Number of Employees

About 40 workers / laborers will be required while construction phase of the proposed project and approximately 300 to 400 workers will be engaged to run the plant during regular operational stage of the proposed project.

### 6.10.2 Electricity Connection & Standby Power Generator(s)

Approximately 630 KW of electricity load / transformer will be required for the operation of the project. LESCO / WAPDA power transmission lines are available in the proposed project area.

Further, 02 numbers of most modern / latest state of the art and advanced technology standby power generators equipped with sound proof canopy, silencer, smoke arrestor and stack with proper height will also be placed with capacity of 300 KVA each.

### 6.10.3 Natural Gas Connection / Load

Natural gas will also be required for operations of boiler. Natural gas connection will be sanctioned by SNGPL. The gas pipelines of SNGPL are available in the project area.

### 6.10.4 Biomass Boiler

One latest state of the art and advanced technology biomass / natural gas fired boiler with capacity of 4 tons/hour will also be placed. The biomass boiler will be equipped with cyclone and wet scrubber at its stack.

### 6.10.5 Machinery / Plant Details

The major machines to be required to install for the proposed project is as under:

- CC Saw
- Peeling Machines
- Chopping Machines
- Impregnation Machine
- Dry Chambers
- Polishing Drum
- Severs (All Type)
- Turnkey Projects (Matches)
- Simplex Machine
- Di-cutting Machine
- Printing Machine
- Screen Printing Machine

- Box Filling Machines
- Inner & Outer Combining Machines
- Wrapping & Packing

#### **6.10.6 Project Basic Raw Material**

The details about raw materials to be used by the proposed project are as under:

- Wood
- Wax
- Sulphur
- Potassium Chlorate
- Phosphorous
- Gum Rosin
- Manganese
- Glass Powder
- Glue / Gelatin
- Packaging Materials

#### **6.10.7 Plant Capacity**

The installed / production capacity of the plant / unit will be 5000 cartons per day.

#### **6.10.8 Finished Product**

Safety Matches of Different Categories; i. Super, ii. Classic, iii. Regular

#### **6.10.9 Manufacturing / Production Process Details**

The manufacturing / production process details for producing of Safety Matches including process flow diagram and process description is as follows;

##### **a. Process Flow Diagram**

Detailed process flow diagram of manufacturing process is as under on the next page.

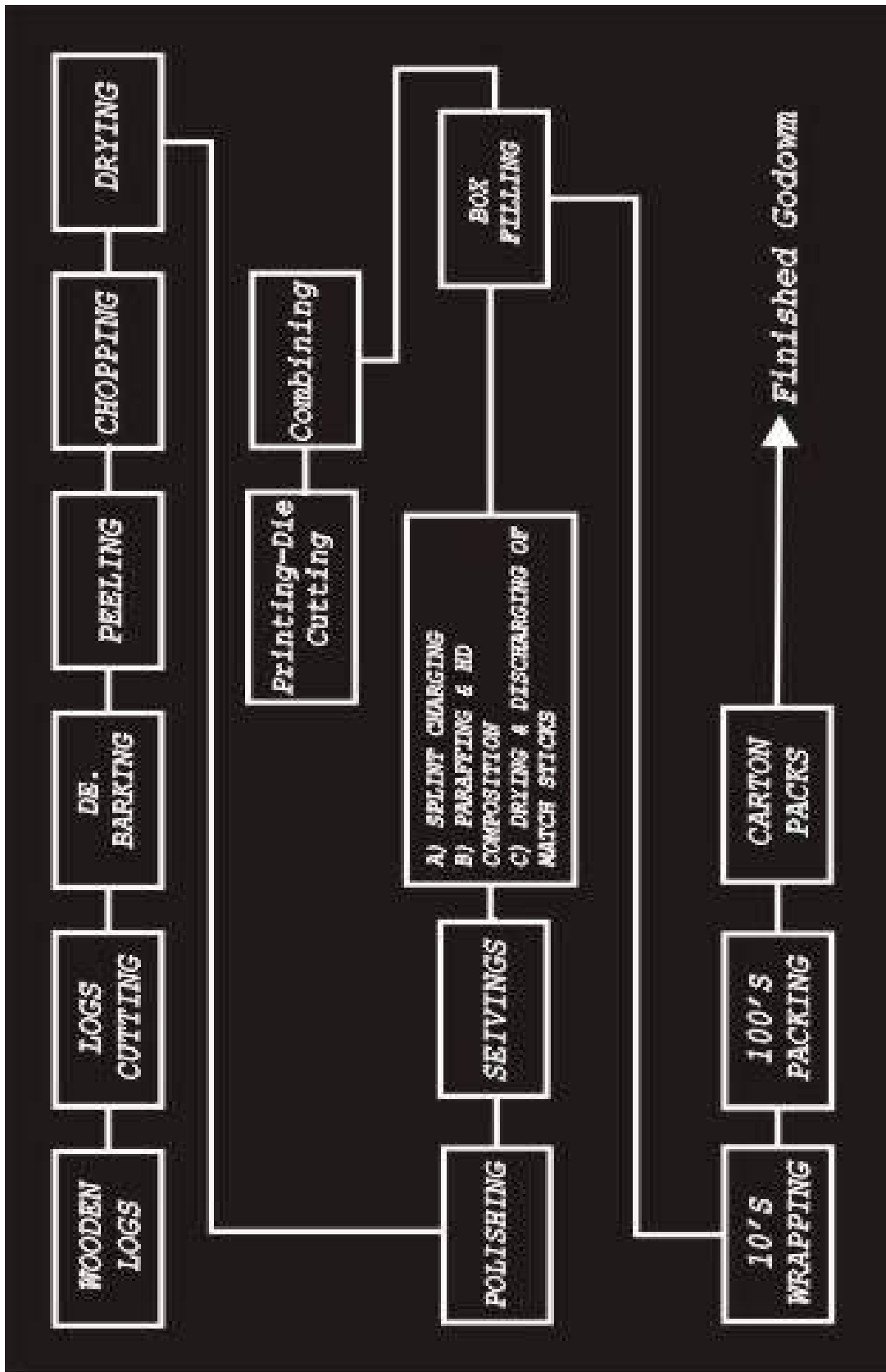


Figure 6.2: Process Flow Diagram



## **b. Manufacturing Process Description**

Matches are manufactured in several stages. In the case of wooden-stick matches, the matchsticks are first cut, prepared, and moved to a storage area. When the matchsticks are needed, they are inserted into holes in a long-perforated belt. The belt carries them through the rest of the process, where they are dipped into several chemical tanks, dried, and packaged in boxes. Cardboard-stick matches used in match books are processed in a similar manner.

Here is a typical sequence of operations for manufacturing wooden-stick matches:

### **Cutting the Matchsticks:**

- Logs of white pine or aspen are clamped in a debarking machine and slowly rotated while spinning blades cut away the outer bark of the tree.
- The stripped logs are then cut into short lengths about 1.6 ft (0.5 m) long. Each length is placed in a peeler and rotated while a sharp, flat blade peels a long, thin sheet of wood from the outer surface of the log. This sheet is about 0.1 in (2.5 mm) thick and is called a veneer. The peeling blade moves inward toward the core of the rotating log until only a small, round post is left. This post is discarded and may be used for fuel or reduced to wood chips for use in making paper or chipboard.
- The sheets of veneer are stacked and fed into a chopper. The chopper has many sharp blades that cut down through the stack to produce as many as 1,000 matchsticks in a single stroke.

### **Treating the Matchsticks:**

- The cut matchsticks are dumped into a large vat filled with a dilute solution of ammonium phosphate.
- After they have soaked for several minutes, the matchsticks are removed from the vat and placed in a large, rotating drum, like a clothes dryer. The tumbling action inside the drum dries the sticks and acts to polish and clean them of any splinters or crystallized chemical.
- The dried sticks are then dumped into a hopper and blown through a metal duct to the storage area. In some operations the sticks are blown directly into the matchmaking facility rather than going to storage.

### **Forming the Match Heads:**

- The sticks are blown from the storage area to a conveyor belt that transfers them to be inserted into holes on a long, continuous, perforated steel belt. The sticks are dumped into several v-shaped feed hoppers that line them up with the holes in the perforated belt. Plungers push the matchsticks into the holes across the width of the slowly moving belt. A typical belt may have 50-100 holes spaced across its width. Any sticks that do not seat firmly into the holes fall to a catch area beneath the belt and are transferred back to the feed hoppers.



- The perforated belt holds the matchsticks upside down and immerses the lower portion of the sticks in a bath of hot paraffin wax. After they emerge from the wax, the sticks are allowed to dry.
- Further down the line, the matchsticks are positioned over a tray filled with a liquid solution of the match head chemicals. The tray is then momentarily raised to immerse the ends of the sticks in the solution. Several thousand sticks are coated at the same time. This cycle repeats itself when the next batch of sticks is in position. If the matches are the strike-anywhere kind, the sticks move on to another tray filled with a solution of the tip chemicals, and the match ends are immersed in that tray, only this time not quite as deeply. This gives strike-anywhere matches their characteristic two-toned appearance.
- After the match heads are coated, the matches must be dried very slowly or they will not light properly. The belt loops up and down several times as the matches dry for 50-60 minutes.

#### **Quality Control:**

- The chemicals for each portion of the match head are weighed and measured exactly to avoid any variation in the match composition that might affect performance.
- Operators constantly monitor the operation and visually inspect the product at all stages of manufacture.
- In addition to visual inspection and other normal quality control procedures, match production requires strict attention to safety.
- Considering that there may be more than one million matches attached to the perforated belt at any time means that the working environment must be kept free of all sources of accidental ignition.

#### **Packaging the Matches:**

- The cardboard inner and outer portions of the match boxes are cut, printed, folded, and glued together in a separate area. If the box is to contain safety matches, the chemicals for the striking strip are mixed with an adhesive and are automatically applied to the outer portion of the box.
- When the matches are dry, the belt moves them to the packaging area, where a multi-toothed wheel pushes the finished matches out of the holes in the belt. The matches fall into hoppers, which measure the proper number of matches for each box. The matches are dumped from the hoppers into the inner portions of the cardboard match boxes, which are moving along a conveyor belt located below the hoppers. Ten or more boxes may be filled at the same time.
- The outer portions of the match boxes move along another conveyor belt running parallel to the first belt. Both conveyors stop momentarily, and the filled inner portions are pushed into the outer portions. This cycle of filling the inner portions and pushing them into the outer portions is repeated at a rate of about once per second.
- The filled match boxes are moved by conveyor belt to a machine, which groups them and places them in a corrugated cardboard box for delivery.

### 6.10.10 Water Balance; Water Consumption & its source

During the operational phase of the proposed project, the water will be used for washing of chemical buckets, in washrooms/toilets, kitchen/mess, etc. approximately in quantity of 4500 to 5500 gallons/day. The source of water will be underground. Utilization of small quantity of water will not exert any negative impact on underground water sources especially on underground water table. Because the overall nature of the area is agricultural in a broad-spectrum; cultivated lands and irrigational channels are present in the project area. Moreover, grassy lawns will be developed within the proposed project premises. Hence these are the sources to recharge the underground water table.

#### Water Conservation Strategies:

- At open places the grassy lawns will be developed to recharge the water table which is help to control the surface runoff during rainy season.
- Moreover, landscaping will also be done at available open place after completions of installation phase.
- The overall nature of the area is agricultural, it is also help to recharge the water table.
- The workers will be given training to avoid wastage of water.
- Regular inspection of water tapes, valves and water lines as per schedule or periodically will be undertaken.

### 6.10.11 Wastewater Generation, its treatment & disposal

During operational phase of the proposed safety matches manufacturing unit, approximately 3900 to 4700 gallons/day of wastewater will be produced from different sources like washing of chemical Buckets, toilets / washrooms & kitchen / mess, etc. The washing wastewater will require proper wastewater treatment facility otherwise it will impose moderate negative impact if not treated properly.

#### Treatment & Disposal:

- Bio-cleaner based technology WWTP / ETP with capacity of 6000 gallons / day will be installed for the treatment of the wastewaters to fulfill the compliance of PEQS.
- After treatment, the treated wastewater will be used for watering of vegetation / landscaping within the project premises.

### 6.10.12 Solid Waste Generation & its disposal

During the operational phase of the subject proposed project, no any type of hazardous nature solid waste will be produced. Recyclable nature (non-hazardous waste) including wood, empty carton, packaging waste, polythene bags, etc. will be produced. Moreover, organic waste will also be produced from kitchen/mess.

**Disposal:**

- The wood will be used in biomass boiler of the proposed project.
- The recyclable waste including empty carton, packaging waste, polythene bags, etc. will be handed over to EPA Approved waste contractor.
- Organic waste to be produced from kitchen / will be handed over to mess contractor who then will dispose off properly as per local Govt. policy like MSW wastes.
- A track record of solid waste will be maintained.

**6.11 Details of Restoration and Rehabilitation Plans at the end to the Project Life**

The estimated life of the first phase of the project is 25 years. Much before the project approaches end of its first life cycle it will be completely renovated, refurbished and even new/latest state of the art machinery will replace the old one. All civil structures and related infrastructures will be extensively renovated. Even during its first life cycle, pre-emptive modifications, replacements and refurbishing will be carried from time to time under the "order of the day principle". This will ensure enhancement of the life of the project at very nominal costs. In this way the project life will be further enhanced for another hundred years or so.

All activities will be carried out in accordance with the prevailing environmental management laws and controls so as to avoid any damage to any segment of environment or human health around the project site.

Rehabilitation would not be required as such or at a significant level at current project site, however, restoration plans to be practiced during different phases of the project at various levels are illustrated hereunder:

**a. Pre-Construction Phase**

The proponent of the project either will take necessary measures regarding restoration plan by himself or shall pay charges to the contractor and / or concerned line departments regarding the restoration of the relevant areas disturbed during clearing of the site and its preparation prior to the construction of building parts and development of infrastructure.

**b. Construction Phase**

The project proponent shall keep eye on the construction activities through its authorized officer, will exercise continuous vigilance and inspection any time during execution of work or any time after completion. Only approved structural designs shall be erected. Moreover, the proponent will provide copy of EIA Report and Environmental Approval to the construction contractor to implement measures and also done working as per EMP and conditions of approval. After completion of the project the proponent / contractor will restore the site especially disturbed areas and develop landscaping at available open places.



## 6.12 Govt. Approvals and Leases Required by the Project

So far as concerned the Government Approvals / NOCs, the Environmental Approval from the EPA, Punjab, Lahore is the major requirement. However, the proponent will also obtain relevant NOCs / approvals / permissions from other concerned Govt. Departments.

Furthermore, the proponent of the project has obtained NOCs / permissions from different relevant departments such as District Council, Inspector Trade of Chemicals and IPWM (Industries, Prices, Weight & Measures) Department, Govt. of the Punjab.

## Section 7: DESCRIPTION OF ENVIRONMENT

### 7.1 General

This section of EIA Study describes the baseline environmental conditions, which cover the existing environment including its dimensions physical, biological/ecological and socio-economic environment of the project site as well as project area & District Kasur. Data was collected by reviewing secondary data from different universities research articles and publications, Governmental department studies, Non-Governmental organization reports and primary data was collected from the field visit and survey at different timed intervals.

### 7.2 Baseline Physical Environment

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

#### 7.2.1 Topography

Pakistan lying in the northwestern part of the Southern Asian Subcontinent, occupies the western end of the Indo-Genetic Plain, which is beyond bounded in the north by mountain wall of the Great Himalayas and their off shoots. Physiology of the earth is description of the behavior of the upper crust. Accordingly, some knowledge of the geology is desirable.

This Plain, where the project site is located, is composed of major tributaries of Indus River - Jehlum, Chenab, Ravi, and Sutlaj. The land between Ravi and old course of Beas River is called Ganjibar while the area of 7.2 million acres and occupies districts of Lahore, Kasur, Okara, Sahiwal, Pakpattan, Vehari, Khanewal, Multan, and Lodhran. The topography of the area is of Cover Flood Plain and scalloped interfluves composed of fertile alkaline soils. The Project Site is almost flat.

#### ***Topography of Project Area:***

The proposed project area is flat agricultural in nature and which has a depression of 2 meter to 3 meter and is at an elevation of 200 meter above the sea level.

#### 7.2.2 Soils

Soils form major part of environment; their fertility and other special characteristics have great relationship with environment. Climate has great influence on the formation of soils; therefore, study of these factors is of great importance. Soil is a dynamic layer in which many complex physical chemical and biological activities are taking place. Therefore, soil is a dynamic changing body.

Soil scientists restrict the word soil or solum to the surface materials, which over the ages have adopted the distinctive layers or horizon. Soils are made up of solids, liquids and gases. The solid part of the soil is made up of both inorganics

and organics. While weathering of rocks make inorganic particles, the organic solids consist of living and decayed plants. In order to classify the entire soils in Pakistan, the Soil Survey of Pakistan has divided the entire country into nine ecological zones.

Soils in the project area (Kasur District) are uniform in texture, formed of old alluvium or Aeolian in origin. There are three basic classifications in the area:

- a) The first soil unit of brown silty clay/lean clay forms the top soil cover at the site at all locations and generally continues to a depth of 1.0 m to 3.5 m below of ground. This stratum contains trace fine sand and trace to little concretions at places. It is present in a soft to a stiff state of consistency and has low to medium plasticity.
- b) The second soil unit of brownish grey sandy silt/silt underlies the upper Silty clay/lean clay stratum. This layer has thickness of 1.0 to 3.0 m and is present in a firm state.
- c) The third soil unit of brownish grey non-plastic fine silty sand underlies the silt/Silty sand stratum. It is present is a loose to medium-dense state.

These soils are often low in nitrogen and phosphorus. The soils are deep but may show marked stratification of sands, clay, and loam. The vegetation carried by these soils is influenced by moisture and aeration.

#### ***Soils of Project Area:***

The soil of the project area is fertile. Maize, rice, sugar cane, wheat, etc. are the major crops. Rice is also sown to reasonable extent where water is available in abundance. However, tobacco, vegetables, pulses legumes and fodder are the other crops.

#### **7.2.3 Seismology**

The area where the proposed project is situated falls in Zone 2A according to Seismic Zoning Map of Pakistan (Seismic Provisions 2007) i.e. minor damage zone corresponding to intensity V and VI of the modified Mercalli Intensity Scale. In this zone distant earthquakes with fundamental periods greater than 1.0 second may cause damage to structures. Figure 4.1 shows the seismic zoning map of Pakistan.

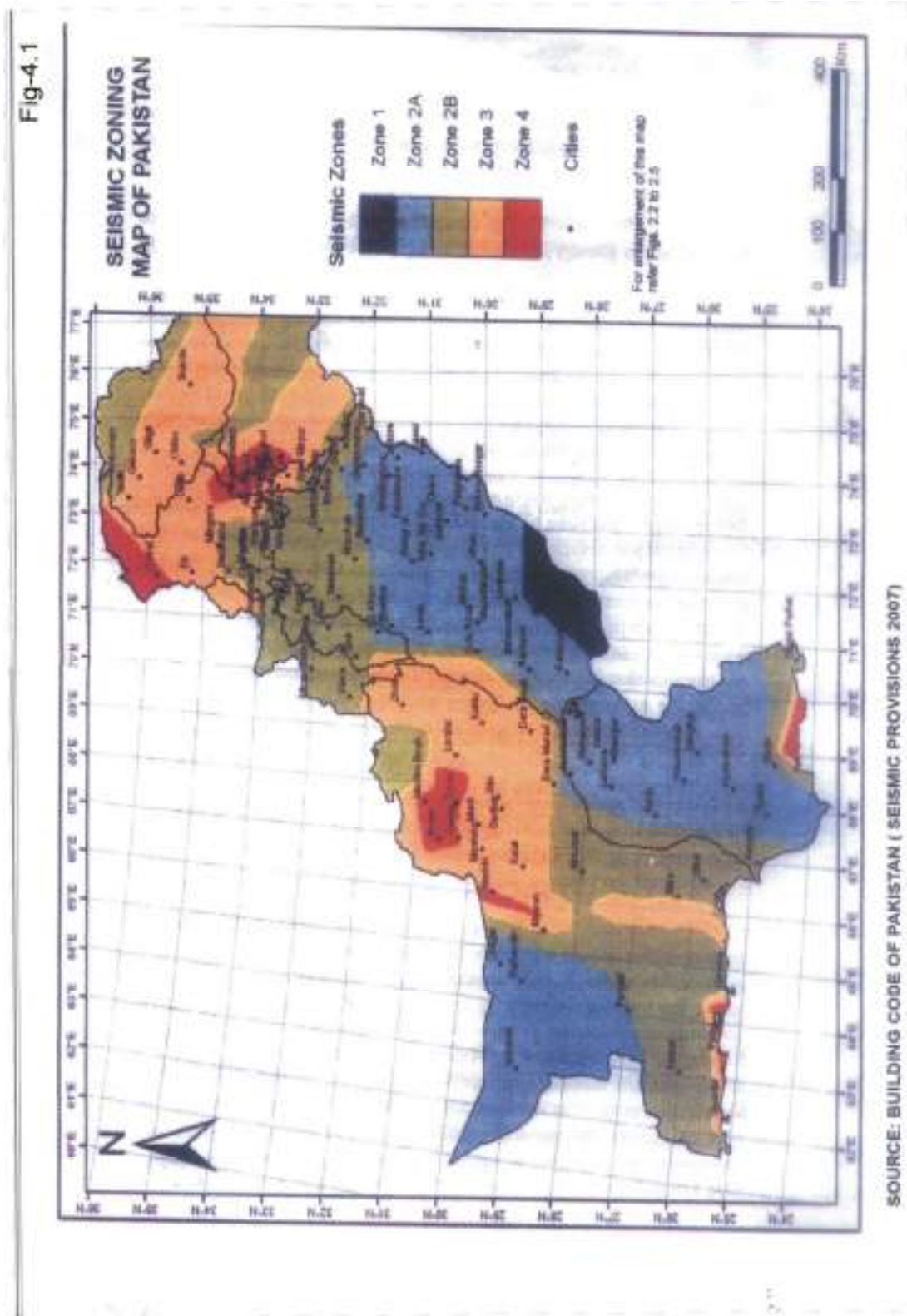


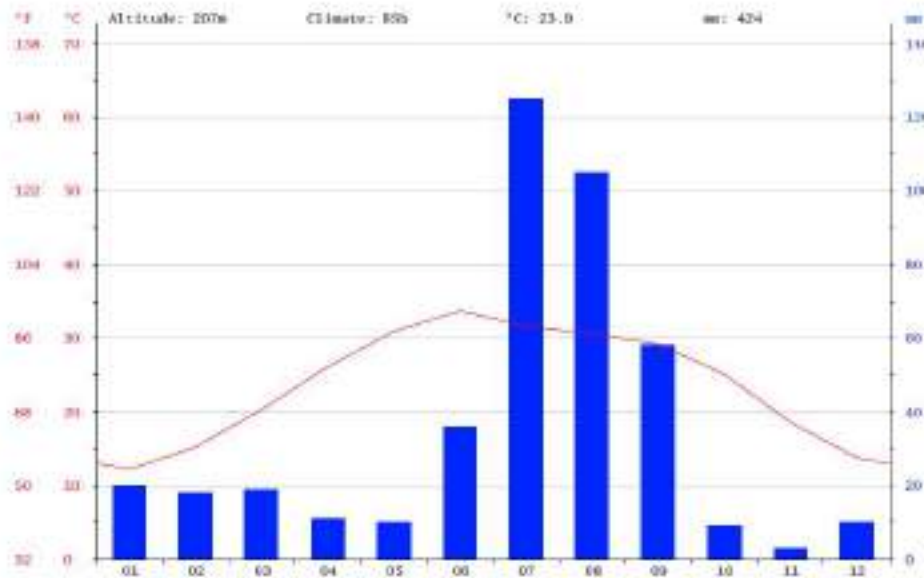
Figure 7.1: Shows the Seismic Zoning Map of Pakistan

## 7.2.4 Climate

Pakistan's latitudinal and longitudinal extents and its northern rim of lofty mountains are the two factors having great bearing not only on temperature and rainfall patterns, but also on general circulation of the atmosphere in South Asia. As per widely-used climate classification system developed by Wladimir Koppen, Pakistan has five types of climate. The first type is tropical semi-arid with dry winter, which prevails in the former Karachi, Hyderabad and Southern Khairpur divisions. Mean annual temperature is above 18°C. tropical arid climate characterized by average annual temperature of about 18°C with dry winters is experienced in southern Kalat and the whole Indus Plain. The Cold Semi-arid with Dry summer climate type prevails over Central Kashmir, Peshawar, Dera Ismail Khan, Quetta and northern half of the former Kalat Division. Snow Forest Climate is characterized by average temperature of coldest month below 3°C. mean temperature of the warmest month is between 9°C and 21°C. this climate covers the northern mountainous areas and parts of Kashmir. Finally, the extreme cold climate, with average temperature of the warmest months between 10°C and 0°C, is experienced in eastern and northern parts of Kashmir, Chitral and Northern Areas.

### ***Climate of Project Area:***

The proposed project area (Phool Nagar, District Kasur) falls under Tropical Arid climate zone where intense summer heat and cold weather are experienced.



**Graph 4.1: Climate Conditions**

### 7.2.5 Seasons

There are four well-marked seasons in the country. The cold season (December to March) is influenced by frequent passing of western disturbances originating over the Mediterranean and Western Europe. The cyclones advance eastward over Saudi Arabia, Iran, Afghanistan and then to Pakistan. The mean monthly temperature is below 4.4°C in the mountainous areas, and varies from about 10°C in the north of the plains to about 18°C in South. Rainfall during this period increases northwards and westwards. The hot season (April to June) sees high temperatures and aridity. The temperature begins to rise and peaks in June from 40°C to 46°C, while temperatures of 50°C and above are not uncommon. Areas along the Sindh-Makran Coast are under the influence of a sea breeze, which keeps the maximum temperature down to about 35°C. Relative humidity is low, and rainfall is meager, between 27 mm and 76 mm in the plains and increasing along the sub-mountain areas.

The monsoon season (July to September) is caused by low pressure over the Indo-Pakistan subcontinent in May and June, attracting winds from the Indian Ocean, which start blowing over the land about middle of June, as the south-west monsoons. Changes in the structure of the upper air during this seasons allow further invasion of moist air from the Bay of Bengal in July. This period experiences periods of heavy rains and storms. The monsoon spreads northwards, generally in a series of pulses. It reaches the Punjab by early of mid – July. Sindh and Balochistan never come under the regular sway of the moist currents, but are affected by occasional monsoon incursions in July and August. The Sub-Himalayan region receives the highest amount of rainfall. The monsoon currents remain steady in July, mostly constant to the middle of August, and begin to recede at the end of August. However, the monsoons continue to be active even in September when some of the highest floods have been recorded in the Indus Basin.

The post monsoon season (October to November) is basically transitory. Maximum temperature in October varies from 33°C to 36°C over much of the country, while nights are fairly cool. The maximum and minimum temperatures fall by about 6°C in November and the weather becomes pleasant. October and November are by far the driest months on account of anti-cyclonic conditions, and are characterized by clear skies, and light and variable winds all over the plains of Pakistan.

#### **Seasons of Project Area:**

The proposed project area experiences extremes of climate. The summer season starts in April and continues till September. The hottest months are May, June and July. The mean maximum and minimum temperatures during these months vary between 41 °C and 27.4 °C. The winter season lasts from November to March. The coldest months are December, January and February with a minimum temperature reaching up to freezing point. The mean maximum and minimum temperatures for this period are 22 °C and 5.9 °C respectively.

Following table (**Table 4.1**) shows minimum and maximum temperature & precipitation:

**Table 7.1: Month wise Temperature, Precipitation and Relative Humidity**

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	12.2	15.2	20.3	26.1	30.9	33.7	31.6	30.6	29.2	25.1	18.6	13.8
Min. Temperature (°C)	5.1	7.7	12.8	17.9	22.7	26.7	26.7	26.1	23.7	17.3	10	6
Max. Temperature (°C)	19.3	22.8	27.9	34.4	39.2	40.8	36.5	35.2	34.8	33	27.3	21.7
Avg. Temperature (°F)	54.0	59.4	68.5	79.0	87.6	92.7	88.9	87.1	84.6	77.2	65.5	56.8
Min. Temperature (°F)	41.2	45.9	55.0	64.2	72.9	80.1	80.1	79.0	74.7	63.1	50.0	42.8
Max. Temperature (°F)	66.7	73.0	82.2	93.9	102.6	105.4	97.7	95.4	94.6	91.4	81.1	71.1
Precipitation / Rainfall (mm)	20	18	19	11	10	36	125	105	58	9	3	10

Between the driest and wettest months, the difference in precipitation is 122 mm. The variation in temperatures throughout the year is 21.5 °C.

## 7.2.6 Temperature

The proposed project area experiences extremes of climate. The summer season starts in April and continues till September. The hottest months are May, June and July. The mean maximum and minimum temperatures during these months vary between 41 °C and 27.4 °C. The winter season lasts from November to March. The coldest months are December, January and February with a minimum temperature reaching up to freezing point. The mean maximum and minimum temperatures for this period are 22 °C and 5.9 °C respectively.

## 7.2.7 Humidity

Relative humidity throughout the day is higher in winter than in summer months. May and June are very hot and dry during which dust storms occur occasionally. Towards the end of June or beginning of July, the monsoon season starts, which is characterized by heavy down pour and humid sultry weather. It practically becomes oppressive in July, August and September.

## 7.2.8 Rainfall

Rainfall varies from year to year also from month to month. Maximum rainfall however, occurs in July and August when the monsoon depression travels westward.

### 7.2.9 Wind Speed and Wind Direction

Winter months are mostly calm with minimum windstorms. Windstorms are more common during the month of April to July with maximum occurrence recorded in June when low air pressures are developed due to high temperature. In winter, the wind mainly blows from North - West while in summer it is from opposite direction i.e. from South - East which brings the Monsoon rains. The predominant wind direction in Kasur is north - West and during Monsoon season it is south - east.

### 7.2.10 Hydrology; Surface and Ground Water

The area is fed with canal water. However, tube wells are also the source of irrigation. At the project site and around, the underground water is sweet and used for irrigation and drinking, among other purposes.

There is no lake and river near the project site. The canal water comes through system under the Sindh Tass Agreement between Pakistan and India.

## 7.3 Baseline Ecological Environment

Ecological resources including fisheries, aquatic biology, wildlife, forests, rare or endangered species of the project area has been discussed in details as follows:

### 7.3.1 Fishery and Aquatic Biology

There is no source of fishery in the project area. Neither there are any fish farms around the proposed project site. There is no river, canal and other water body flowing in the proximity of the project area. So, there is nothing sort of aquatic biology in the context of the project area.

### 7.3.2 Biodiversity

Natural capital of a country mainly includes all of a country's wilderness areas and scenic landscapes, including the associated flora and fauna. Pakistan has a total of nine major ecological zones. The contribution of the "Natural capital" is recognized at three distinct levels: species, genera, and communities (habitat and ecosystem). Both collectively and within each level, the range or variety of the resources is referred to as the Biological Diversity". The term has relevance for each of Pakistan's administrative units-district, province, and particularly country. The more the number of species, genera and habitats and ecosystems present within these units, the greater is said to be the Biodiversity. The biodiversity of the area, with this background, is discussed as under:

### 7.3.3 Forestry

Up to very large distances there is no forest of any nature. The entire area is irrigated and agriculture boom is there.

### 7.3.4 Wildlife

The project site is situated near the agriculture lands. Natural habitat conducive to wildlife to flourish is nowhere up to long distances. Consequently, there is no wildlife in the true sense in the area. However, some common native animals, reptiles and birds (both captive and non-captive) like buffaloes, cows, goats, sheep, camels and donkeys (in very small number), cats, dogs, hare, pigs and jackals (very few), lizards, snakes, wild rats, Goh (iguana), crows, doves, sparrows, quails (seasonal), and pigeons and snakes, rats and lizards are found.

### 7.3.5 Flora

The proposed project area is situated in agricultural zone at project site presently no any type of vegetation or flora is existed.

However, the vegetative resources around the proposed site of the project are cultivated crops as wheat, sugar cane, cotton, rice, maize, tobacco, Legumes and pulses.

The trees surrounding the project area are in the fields Kikar (Acacia Arbica), Shisham (Dalbergia Sissoo), Bohar (Ficus Inclica), Pipal (Ficus Religiosa), Mulberry (Mourusalba), Aam (Mangiferra indica), Siris (Albizzia lebbek), Jamolan (Engenia Jambolana, amaltas (cassia amaltas), lasura (teccoma Unclulata), Kikar and shisham trees. They are the most useful and provide hard wood for construction, agriculture implements manufacturing and for a variety of many other purposes like especially furniture manufacturing. They are sold at very high price.

### 7.3.6 Fauna

In and around the project area domesticated and wild animals and birds include buffaloes, cows, goats, sheep, camels and donkeys (in very small number), cats, dogs, hare, pigs and jackals (very few), snakes, wild rats, Goh (iguana), crows, doves, sparrows, quails (seasonal), pigeons, snakes, rats and lizards.

## 7.4 Baseline Socioeconomic Environment

Detailed description of Socio-economic environment of the proposed project are as under:

### 7.4.1 Socioeconomic Values

The project site is situated in the rural setting. Virtually entire land is under agriculture use. Modern agriculture implements like tractors and Tractor trolleys are in use. These are owned by a few well to do persons and are provided on rent. Majority of the people depend upon agriculture as their main source of life support system.

Most of the people belong to mid economic order. There is a fairly large cross section of poor people. A large proportion of the people are poor. While a small

percentage of the residents are living little above the poverty line. The population of the area is undergoing transformation in almost all walks of life i.e. socioeconomic and cultural. Old traditions are being replaced by new social order under the influence of electronic and print media. Elders are the most respected segment of society. They even now have great say in decision making.

Inspite of transition, old customs and traditions are still surviving in the society. Arranged marriage system is followed and it is quite successful. People are proud of their traditions and customs inspite of a change. Joint family system is intact in most of the cases. Families are quite coherent. People are very hospitable specially to aliens. However, lifelong old traditional enmities are also going side by side. Sometimes a lot of money is wasted on disputes on very minor disputes.

Due to awareness about the importance of education, most of the younger generation, including both sexes, is now enamored of the values of education are struggling to get education. There is a rising trend in the society to change their old traditional socioeconomic pattern of life.

#### **7.4.2 Population and communities**

The project site is located at Kot Radha Kishan Road which is linked with main Multan Road at a distance of 1-Km away from the site. Population/communities centers and project site is not located close to one and other.

#### **7.4.3 Industries**

There are number of industrial units are located in the closed vicinity of the unit or in the subject proposed project area such as Abu Bakar Textile Mills, Millat Industrial Products Ltd., Marral Textiles Mills, Liven Pharmaceuticals Pvt. Ltd. National Batteries Industries Pvt. Ltd., Pak Precise Engineering Pvt. Ltd., Kasmy Pack Pvt. Ltd., Vital Agri Nutrients Pvt. Ltd., Nishat Coal Power Plant, Nishat Chunian Power Plant, Saritow Spinning Mills, Quetta Textile Mills, Nishat Chunian Ltd. BBJ Pipe Industries, Pakistan Tiles Pvt. Ltd.

Moreover, there is rapid trend of industrialization in the area especially at both sides of the Multan Road.

#### **7.4.4 Infrastructure**

Electricity from the WAPDA grid station is available in the project area. There is a network of roads in the entire area. Private buses and wagons are available as public transport. Underground water of good quality suitable for drinking and irrigation is available from shallow depth.

#### **7.4.5 Educational Institutions**

In most of the villages primary and high schools are available both for girls and boys. For intermediate and graduate level education, students have to travel mostly to Phool Nagar or Kasur City, the District Head Quarter of the area.

The Government Hospitals at Phool Nagar and Kasur City provide health care to the people under the scheme of the Government of the Punjab.

#### **7.4.6 Transportation: roads, rail, airports, navigable rivers**

There is a vast network of roads connecting the proposed project to market. Virtually most of the villages are connected with each other through these roads. The project is located at Multan Road.

#### **7.4.7 Land use planning**

The project site is situated in the agricultural zone. The entire land use planning is carried out according to the provincial laws. Under the present Government system, the District Government is responsible for all land use planning.

#### **7.4.8 Power sources and transmission**

Water and Power Development Authority (WAPDA) controlled by Lahore Electric Supply Company (LESCO) provides electricity to the propose project area. Transmission of power is through overhead electric transmission lines.

#### **7.4.9 Agricultural and mineral development**

The project area lies in the agricultural zone. Land holdings are very small. Agriculture mainly depends upon canal water. Underground water, where available of irrigation quality, is used for agriculture purpose through tube wells.

#### **7.4.10 Public Health / Health Facilities**

Though some villages have some type and level of medical treatment facility, yet by and large it is quite in adequate as compared to the required level.

#### **7.4.11 Recreational Resources and Development**

There are no recreational resources and activity in the near proximity of the proposed project area.

#### **7.4.12 Cultural and Esthetic Values**

Though cultural and aesthetic values are in the transitional stage towards modern ones, yet old traditional cultural and aesthetic values are over power these changes. Old customs are the integral part of the day-to-day life. It will take very long time to see a tangible change in the old customs, virtues, and rituals.

There is large number of people living life below poverty line. Media is playing some role to bring change in the traditional aesthetic values presently prevailing among a large cross section of the society. A tangible change is appearing among a very small cross section of the society who is trying to pursue the modern aesthetic values of life.

Financial and religious factors influence aesthetic and culture values of the society. People religiously have strong commitment to Islam. This relation contributes to good aesthetic and cultural values among the people.

#### **7.4.13 Archeological and Historic Treasure**

There is no worth mentioning archeological and historic treasures in the vicinity of the project area.

### **7.5 Environmental Conditions**

Environmental conditions of the proposed project area including ambient air quality & noise levels are as under:

#### **7.5.1 Air Quality**

The proposed project site is located in the agricultural area however many industries are also located around the project site. The setup of the entire area is rural so the air quality is good. Whereas, PM<sub>10</sub> & PM<sub>2.5</sub> are slightly high because of overall high in air quality index in Pakistan.

#### **7.5.2 Noise level**

Noise levels at the project site and around the project area is less than within the permissible limits of Punjab Environmental Quality Standards (PEQS). Because of the entire area, where the proposed site is located, is a rural setup and there is no such noisy operation/activity that causes noise pollution.

### **7.6 Lab Reports of Environmental Analyses**

Lab Reports of Environmental Analyses / Lab reports of Environmental Monitoring including ambient air quality, groundwater quality and noise level monitoring from EPA certified lab monitoring are attached at the end of this EIA Study as appendices.

### **7.7 Suitability of the Site**

Site selection is very important because site should not be prohibited, environmentally sensitive, incompatible to surroundings and unsuitable. Following factors have been considered while site selection:

#### **➤ Not Prohibited**

The site is not located in the prohibited area or no any type of notification has been issued by the Government as the area is prohibited for establishment of the industrial setup Moreover, the proposed project site is located in the Self Developed Industrial Area.

➤ **Environmentally Sensitive Areas**

Environmentally sensitive localities don't exist in the project area as mentioned above site is located in self developed industrial area that is situated at Multan Road.

➤ **Incompatible to Surroundings & Unsuitable**

As mentioned earlier, the subject proposed project site is situated in the self-developed industrial area where numbers of industrial units are located in the close vicinity hence the proposed project is not incompatible to surroundings & unsuitable.

➤ **Land use Planning:**

As mentioned already, the site is located at self developed industrial area. The entire land use planning is carried out according to the provincial laws. Under the present Government system, the District Government is responsible for all land use planning.

➤ **Presence of Hazardous Conditions**

The subject proposed project site and its surrounding area is free of any natural and anthropogenic hazardous conditions.

➤ **Availability of Essential Services / Utilities**

Essential services / utilities which are basic requirement to run the project like Electricity Supply, Gas Supply, Water Supply, Sanitation System have been well served in the project area.

➤ **Basic / Communication Infrastructure**

Basic infrastructures like road networks are present near the site and or in and around the project area.

➤ **Availability of Construction Materials**

The contractors provide the construction materials like cement, steel, crush and bricks at the site on as required basis or these are procured by the proponent. All these materials are available locally.

➤ **Skilled and Unskilled Labor**

The people are available at economical rates all the time. The project will provide jobs to the local residents as well as those from suburban areas.

## Section 8: IMPACT ASSESSMENT

### 8.1 Assessment of Impacts

The primary function of an environmental impact assessment study is to predict and quantify the magnitude of potential impacts, assess and evaluate the magnitude. The impact assessment forms the basis for development of Environmental Management Plan. Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible.

### 8.2 Identification of all impacts

All the potential environmental impacts had been identified during literature review, visits of project site and nature / manufacturing process of the proposed project. Various types of environmental issues likely to crop up during life cycle of project are grouped in different phases; project location related impacts, project design related impacts, construction phase impacts and operational phase impacts.

### 8.3 Methodologies for Impacts Identifications

Methodologies for impacts identifications are including checklists, matrices, networks, overlays and GIS & Computer expert system. The details of methodologies for impact identifications are as under:

#### a. Checklist

Project impact evaluation checklist have also been developed to identify the potential environmental impacts while the proposed project's various phases including design phase, construction phase and operational phase. These impacts have been categorized as follows:

- None
- Minor
- Medium
- Major

**Table 8.1: Project Impact Evaluation Checklist**

Potential Impacts	Possible Risk / Damage to Environment	Mitigation Measures	Significance of Impact			
			None	Minor	Medium	Major
<b>A. Potential Environmental Impacts Relating to Design Phase</b>						
<b>a. Physical Environment</b>						
Changes in Land Appearance	No significant change in land appearance	Beautiful landscaping will be done	X			
Seismic Hazard	Damage due to earthquake	To design the building in such a way to moderate large scale earthquake				X

Emergency Response	Damage due to emergency situation fire, earthquake, etc.	To design the building in such a way which incorporates emergency exits				X
<b>b. Ecological Environment</b>						
Impacts on Flora	Construction activity may affect the flora	Site selection and designing of additional structure will be done to avoid tree cutting or other type of flora		X		
Impacts on Fauna	Fauna (wild birds) may be disturbed from project	Planning of construction activities and operation of the project in such a way to avoid disturbance to fauna at design / planning phase		X		
<b>B. Potential Environmental Impacts Relating to Construction Phase</b>						
<b>a. Physical Environment</b>						
Impacts on Air Quality	Negligible change may occur in ambient air quality due to construction activities	Regular ambient air monitoring plan Regular water sprinkling Maintenance of construction machinery		X		
Disposal of Construction Waste	Construction solid waste from construction activities may be haphazard	Utilization of construction solid waste within project site as earth fill work Transportation of muck material in covered loaders		X		
<b>b. Ecological Environment</b>						
Impacts on Flora	Construction activity may not impose some impacts on flora	To avoid any negative impact on flora	X			
Impacts on Fauna	No any type of impact on fauna	To avoid any disturbance to fauna	X			
<b>c. Socio-Economic Environment</b>						
Health & Safety of Workers	Construction activities can impose certain negative impact on health & safety of	Training of workers Regular checks to ensure that contractor is following safety measures			X	

	workers	Provision of PPEs				
<b>C. Potential Environmental Impacts Relating to Operational Phase</b>						
<b>a. Physical Environment</b>						
Impacts on Air Quality	Deterioration of air due to stack emissions	Development of air quality monitoring & improvement plan Installation of safety devices on stacks Maintenance & overhauling of standby power generators		X		
Noise Pollution	Nuisance due to noise pollution	Development of noise level monitoring & improvement plan Construction of proper foundations for machines Maintenance & overhauling of standby power generators and others machines.		X		
Water Consumption	Insignificant impact on water table	Training or workers to conserve the water Regular inspection of water tapes, valves and water supply lines	X			
Wastewater Generation	Damage to the environment due to process wastewater	Treatment through ETP to comply with PEQS before final disposal			X	
Solid waste generation	Indiscriminate disposal may be haphazard and damage to the environment	Proper disposal of solid waste as per requirement and record keeping			X	
Emergency response	Severe damage due to emergency situation	Development of comprehensive Emergency Response Plan Arrangements of firefighting equipments				X
<b>b. Ecological Environment</b>						
Impacts on Flora	Insignificant on Flora	Beautiful landscaping will be done	X			
Impacts on	Operation of	Beautiful		X		

Fauna	project may have minor impact on fauna	landscaping will be done Noise level monitoring				
<b>c. Socio-economic Environment</b>						
Health & safety of workers	Risk of safety & health of workers	Job specific training of workers Regular monitoring & inspection of health & safety measures Provision of PPEs			X	

## b. Matrix

The impact evaluation matrix was developed and different environmental parameters likely to be affected by the proposed project actions grouped into categories i.e. Physical Environment, Ecological Environment and Socio-economic Environment. For the impact assessment, project impact assessment matrix is used by dividing the project action into different phases such as Design Phase, Construction Phase and Operational Phase. Impact evaluation matrix with suitable mitigation measures is attached at the end of this section in Table 8.2.

## 8.4 Impact Analysis and Prediction

In order to give correct categorization to the present project Rapid Environmental Assessment Procedure was followed. It revealed that there some major impacts of the project have identified which will be controlled by adopting proper mitigation measures. These impacts are mainly attributed to the generation of stack emissions, wastewater and solid waste while operational phase of the proposed project but most of the impacts are projected as moderate/minor impacts although project has many positive impacts on local public and economy. M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) will install latest state of the art imported technology and adopt proper standards operating procedures to carry out the operation in environment friendly manner.

### Meetings:

For the impact analysis and predictions detailed meetings were held with the proponent/management of M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) and with other stakeholders. Issues were discussed that may affect the environment and also the implementation of proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan.

### Consultations:

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders, locals / inhabitants of the villages, shopkeepers and workers in the area. The purpose of such consultations is to obtain the feedback from the relevant persons. The environmental issues have

been identified during literature review, consultation with stakeholders, relevant reports and visits to project site.

## 8.5 Characteristics of Impacts

Impacts were assessed on the basis of magnitude, immediacy, likelihood and sustainability. Evaluation criteria are as follows:

➤ **Nature of Impact**

Nature of impact; Direct or Indirect

➤ **Magnitude or degree of impact**

Size or Scale (whether large or small scale)

➤ **Extent and Location of Impact**

Point or degree (local or widespread)  
Location (On-site or Off-site)

➤ **Timing of Impact**

Timing of impact (during construction or after construction/during operational)

➤ **Duration of Impact**

Duration of impact (short-term, mid-term or long-term)

➤ **Likelihood of impact**

Likelihood of impact occurrence (Certain, Likely, Unlikely)

➤ **Reversibility of Impact**

Reversibility of impact (reversible or irreversible)  
Reversibility (Possible or How)

➤ **Sustainability of Impact**

Mitigability (fully, partially)  
Monitoring (fully, partially)

➤ **Impact Consequence Severity**

Impact consequence severity (severe, moderate, mild)

➤ **Signification of Impact**

High, Medium, Low



## 8.6 Impact Significance

Impacts significance has been evaluated on the basis of none, minor, medium and major which are enlisted in project impact evaluation checklist. The impacts have been evaluated so that the nature, magnitude, extent & location, timing, duration, reversibility and risk could be clarified either some are acceptable and other might be mitigated with suitable protection measures so that those would be eliminated or minimized to an acceptable level as prescribed in PEQS.

All the impacts have been studied while different phase of the project design phase, during construction stage and during operational phase thoroughly and suitable mitigation measures have also been suggested.

### a. Ecological Importance:

The impacts relating to the ecological environment such as flora & fauna, concern & importance of these impacts and suggestion of suitable mitigation measures have been done while all three phases of the proposed project including design phase, during construction stage & during operational phase at next pages of this section. However, the impacts relating to ecological environment are acceptable and the significance of these impacts is minor scale.

### b. Social Importance:

The impacts which are linked with socio-economic environment including employment generation, changes in land value, uplift in socio-economic conditions of the area, tax/revenue generation and health & safety of workers and importance of these impacts have also been discussed while various stages of the proposed project including design phase, during construction stage & during operational phase at next pages of this section. The impacts regarding socio-economic environment are vitally important and having positive nature.

### c. Environmental Standards:

Environmental standards such as Punjab Environmental Quality Standards (PEQS) / Pakistan Environmental Quality Standards (NEQS) will be monitored and complied with letter & spirit. Monitoring will be done throughout project lifecycle while both construction phase and operational phase. The monitoring of different parameters including air/stack emissions, noise levels, ground/drinking water quality and wastewater quality will be done as per requirement.

## 8.7 Mitigation and Impact Assessment

Mitigation and impact assessment have been done on the following criteria:

### 8.7.1 Mitigation & Impact Assessment Criteria

#### a. Impact Assessment Criteria:

The impacts were assessed in the light of criteria give as under:-

- Magnitude or degree
- Time and duration of impact
- Likelihood of impact occurrence
- Sensitivity of impact
- Risk related to impact

#### **b. Mitigation Assessment Criteria:**

The Mitigation Hierarchy establishes a structure to guide development and application of measures to mitigate impacts on environmental values and associated components. The term 'mitigation' applies to four steps, or level in the mitigation hierarchy:

- Step 1:** Avoid  
**Step 2:** Minimize  
**Step 3:** Restore On-Site  
**Step 4:** Offsite

#### **c. General Principles:**

1. Maintaining the integrity and natural functions and processes of ecosystems, and the resilience of ecosystems, is prerequisite to sustainable use of natural resources and essential to maintaining ecosystem goods and services over time.
2. The mitigation hierarchy is applied in order of priority as follows:
  - a. Avoid
  - b. Minimize
  - c. Restore On-Site
  - d. Offset (Off-Site or On-Site)
3. Generally, the "higher" the priority of the environmental value and associated component, the more protective the mitigation measures.
4. For an action or measure to be considered "mitigation", a party must accept responsibility for implementation of appropriate mitigation measures, and there must be certainty that the mitigation measures will be carried out.
5. Implementing mitigation measures can help resolve issues that may delay or prevent a proposed project or activity.

### **8.8 Purpose of Mitigation Measures**

Purpose of mitigation measures should include:

#### **What is the problem?**

The proposed project under study is safety matches manufacturing unit. The said project site is located in the self-developed industrial area. The major impacts may arise by the subject project are wastewater and air emissions. Other impacts are of minor importance. These impacts may arise during the operational phase of the proposed project however minor importance impacts will be arisen during construction phase and will be undertaken within the premises of the site so it will

not cause any major harmful impacts on the environment. While operational phase EMMP will be implemented whole heartedly to avoid adverse impacts on environment from the operation of the project in terms of air emissions, wastewater discharge and the management of the solid waste.

#### **When the problem will occur and when it should be addressed?**

The impacts from the project will occur during the operational phase. These issues included; noise generation, air emissions, solid waste management, wastewater disposal, Health and Safety issues and changes in the geographic features of the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

Any impact that would arise due to the subject project activity will be addressed through proper channel and on site by implementing EMMP. Trainings will be conducted regarding HSE, firefighting, best work practices etc. while other precautionary measures are also adopted to make the project safe and environment friendly.

#### **Where the problem should be addressed?**

The problem will be generated from site development and operation of the unit. So, it should be addressed on source i.e. at site within the same timeframe. The problem should be address at the site and immediate response should be provided to address the problem which may arise.

Project proponent will be responsible for the implementation of EMP/EMMP and if required he will appoint an HSE Manager/Environmental Manager along with site manager to assess any impact that could be arisen during construction and operational phases of the project. He is responsible to address the problem and to mitigate it.

#### **How the problem should be addressed?**

Proper mitigations measures will be provided according to the nature of the impacts/problems. The main elements of mitigation in the EIA process is as; Avoidance, Minimization and Compensation. Avoidance aims at avoiding the adverse impacts as far as possible by using preventive measures or by not carrying out the proposed action. Minimization aims at reducing adverse impacts by scaling down the magnitude of a project, or employing technology that reduces the factors generating the undesirable environmental impacts, while compensation aims at remedying unavoidable residual adverse impacts. Compensation is the least desirable approach and should only be considered after the other elements have been completed.

### **8.9 Ways of Achieving Mitigation Measures**

By adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The details of impacts and mitigation measures have been discussed earlier in this section.



Management of M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) shall take appropriate measures to provide pollution free and safe environment during the development and operational stages of proposed project by implementing improved management practices and monitoring techniques suggested in EMP. The land will be restored after completion of the proposed project beautiful landscaping including grown trees, ornamental / flowering plants, grassy lawns / parks, etc. will be done as per plan.

M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) will develop restoration and reclamation plan to restore the natural landscape of the area. As mentioned above beautiful landscaping will be developed to rehabilitate the native plants of the area.

Table 8.2: Impact &amp; Mitigation Matrix

Aspects	Potential Impacts / Risks	Likely Duration	Magnitude if not mitigated	Proposed Mitigation Measures	Responsibility
<b>DESIGN STAGE</b>					
<b>a. Physical Environment</b>					
Air Emissions	Air emissions will be generated from the operations of biomass boiler and standby power generators. So, the mitigations will be suggested at designing stage.	Permanent	Moderate negative	<p>The following mitigatory measures will be suggested at the design level / stage:</p> <ul style="list-style-type: none"> <li>▪ The most modern, advanced and latest state of the art technology will be selected for Biomass Boiler and Standby Power generators.</li> <li>▪ Concrete foundations will be designed where Biomass Boiler and Standby Power generators will be placed.</li> <li>▪ Cyclone and Wet Scrubber will be installed at the stack of Biomass Boiler to eliminate / minimize the smoke parameters to an acceptable level ultimately compliance of PEQS.</li> <li>▪ Standby Power generators will be equipped with sound proof canopy/room, smoke arrestors, proper height of stack, etc.</li> </ul>	Design Consultant / Proponent
Wastewater	Washing wastewater from washing chemical buckets and sewerage from worker's toilets / washrooms will be generated during the regular operation phase of the proposed project. These wastewaters require proper attention to mitigate properly.	Permanent	Moderate negative	<p>The following mitigation measures will be suggested at design level/stage for the treatment and safe disposal of treated wastewater without any damage on the environment:</p> <ul style="list-style-type: none"> <li>▪ Bio-cleaner based technology ETP/WWTP will be get designed to install from a competent firm for the treatment of wastewater/sewerage.</li> <li>▪ The treated wastewater will be used for watering of vegetation / landscaping within</li> </ul>	Design Consultant / Proponent



				<p>project premises.</p> <ul style="list-style-type: none"> <li>And the surplus treated wastewater will be disposed off in to wastewater channel.</li> </ul>	
Emergency Response	Risk of occurrence of emergency situations by natural & anthropogenic means such as earthquakes, floods, heavy rainfall, thunderstorm, fires due to electrical short-circuiting, over heating etc.	Permanent	Major negative	<p>The following mitigation measures will be adopted to minimize or eliminate the emergency situations:</p> <ul style="list-style-type: none"> <li>The design of building will also include emergency exits which can be used during emergency situation emergency routes/pathways will also be well marked.</li> <li>Adequate internal and external water distribution system will be designed, which could also supply adequate quantity of water for firefighting during emergency.</li> <li>Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic &amp; manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.</li> </ul>	Design consultant / proponent
<b>b. Ecological Environment</b>					
Impacts on Flora	Construction and operations activities may not affect the flora.	-	-	<ul style="list-style-type: none"> <li>Construction activities will be done in such a way to avoid any negative impact on flora of the project area and outside the premises present if any.</li> <li>Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of construction phase of the project.</li> </ul>	Design consultant / proponent
Impacts on Fauna	Fauna (wild birds) present in the project area or	-	-	<ul style="list-style-type: none"> <li>As mentioned earlier no nay type of fauna is present at site and the construction /</li> </ul>	Design consultant / proponent



	surrounding the proposed project site may not be disturbed significantly during construction.			<p>installation activities for the development of project will be done in such a way fauna (wild birds) outside the premises / of the project area may not be disturbed.</p> <ul style="list-style-type: none"> <li>▪ The most modern, advanced and latest technology will be selected which have low operational noise and other impacts on environment.</li> <li>▪ Proper foundations will be constructed with rubbers for shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.</li> <li>▪ Trees will be planted around the building as buffer zone and which will act as sound barrier too.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract fauna (wild birds) to nest here.</li> </ul>	
<b>c. Socio-economic Environment</b>					
Economic Growth	Causing of Economic gain	Permanent	Minor positive	▪ This will be minor positive impact and not required any mitigation measure.	-
<b>CONSTRUCTION STAGE</b>					
<b>a. Physical Environment</b>					
Impacts on Air Quality	Air quality may be disturbed during construction stage of the proposed project from generation of dust/PM, emissions from construction machinery which may be risk for deterioration of air.	Temporary	Minor negative	<ul style="list-style-type: none"> <li>▪ Regular water sprinkling will be done on construction material like sand, soil/clay etc. and exposed areas of site for civil construction/excavations.</li> <li>▪ Construction machinery will be maintained or overhauled in time to avoid any negative impact from their smoke especially standby power generator.</li> </ul>	Contractor / Proponent
Disposal of	Construction solid waste	Temporary	Moderate	▪ The construction waste will be carefully	Contractor /



Construction Solid Waste	including debris, soil/clay, wood, other related waste will be produced. The construction waste that are unsuitable for use need to be stored, transported and disposed off appropriately at the designated sites.		negative	<p>examined and disposed off in an environment friendly manner by transporting it in closed containers and filling at appropriate sites.</p> <ul style="list-style-type: none"> <li>It is also desirable to utilize the waste in such a way that it is consumed for the construction of any other structure within the Project Site or in the immediate vicinity.</li> </ul>	Proponent
<b>b. Ecological Environment</b>					
Impacts on Flora	Construction activities may not impose negative impact on flora of the project area surrounding of the site as the construction activities would be confined within the project site limits.	-	-	<ul style="list-style-type: none"> <li>Construction activities will be done in such a way to avoid any negative impact on flora of the surrounding if any present.</li> <li>Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project.</li> </ul>	Contractor / Proponent
Impacts on Fauna	The usual fauna found at the project locality is sparrows, crows, common mainas etc. Construction activities may not impose any negative impacts on fauna (wild birds) of the locality.	-	-	<ul style="list-style-type: none"> <li>Construction activities will be done in such a way to avoid any negative impact on fauna (wild birds) of the surrounding if any present as well as of the project area.</li> <li>Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project.</li> <li>Landscaping may attract the fauna (wild birds) to nest here.</li> </ul>	Contractor / Proponent
<b>c. Socio-economic Environment</b>					
Employment Generation	Employment generation during construction stage will be minor positive change.	-	-	-	-
Health and Safety of Workers	Construction activities impose certain negative impacts on health & safety of construction	Temporary	Moderate negative	Implementation of the following measures will ensure health and safety of the workers during the construction stage:	Contractor / Proponent



	workers and public.			<ul style="list-style-type: none"> <li>▪ The Contractor will ensure that the construction workers / laborers are trained in safety procedures for all relevant aspects of construction;</li> <li>▪ Proponents of the Project will make regular checks to ensure that the contractor is following safety working procedures/safety measures.</li> <li>▪ Formal emergency procedures will be developed for construction site in case of an accident.</li> <li>▪ First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident.</li> </ul>	
<b>OPERATIONAL STAGE</b>					
<b>a. Physical Environment</b>					
Air Quality	Risk of deterioration of ambient air from emissions to be generated from stacks of Biomass boiler and standby power generator.	Permanent	Moderate negative	<p>In order to minimize air pollution, following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>▪ An air quality monitoring and improvement plan will be developed and implemented to keep the air pollution level within the limits of Punjab Environmental Quality Standards (PEQS)</li> <li>▪ Cyclone and wet scrubber will be installed at stack of Biomass Boiler to minimize PM and other flue gases according to the requirements of PEQS.</li> <li>▪ Standby power generators will be placed at concrete foundation equipped with shock absorber rubbers, sound proof canopy, silencer, smoke arrestor and stack with proper height.</li> <li>▪ Maintenance and overhauling schedule will also be developed.</li> </ul>	Factory Management / Proponent



				<ul style="list-style-type: none"> <li>▪ Standby power generator and boiler will be maintained or over hauled well within time according to schedule and periodically checked or inspected to avoid any excessive smoke.</li> <li>▪ No leak system by proper maintenance of valves, seals &amp; flanges</li> <li>▪ Well capped containers</li> <li>▪ Good housekeeping,</li> </ul>	
Noise	Noise pollution may be generated from operations of plant machinery, boiler and standby power generators. This noise pollution may affect the health of workers & ecological environment i.e. fauna.	Permanent	Moderate negative	<ul style="list-style-type: none"> <li>▪ Proper foundation of the plant machinery, standby power generator &amp; boiler will be designed and constructed to cope with the problem of tremor / vibration which will consequently abate the noise problem.</li> <li>▪ Noise level monitoring and improvement plan will be developed and implemented with letter &amp; spirit.</li> <li>▪ The standby power generators and boilers will be over hauled and well-tuned according to the schedule to avoid excessive noise.</li> <li>▪ Proper set back will be provided from the boundary wall which will also help to minimize / eliminate the noise pollution.</li> <li>▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber.</li> </ul>	Factory Management / Proponent
Water Consumption	Very little quantity of water will be utilized by the proposed project during its operational phase which shall not exert any negative change on water table.	-	-	<ul style="list-style-type: none"> <li>▪ At open places the grassy lawns will be developed to recharge the water table which is help to control the surface runoff during rainy season.</li> <li>▪ More landscaping will also be done at available open place after completions of project</li> <li>▪ The overall nature of the area is agricultural it is also help to recharge the water table.</li> </ul>	Factory Management / Proponent



				<ul style="list-style-type: none"> <li>▪ The workers will be given training to avoid wastage of water.</li> <li>▪ Regular inspection of water tapes, valves and water lines as per schedule or periodically will be undertaken.</li> </ul>	
Wastewater Generation	Wastewater to be generated from the proposed project while its operational phase would require proper treatment, if not done so, it will affect the environment negatively.	Permanent	Major negative	<ul style="list-style-type: none"> <li>▪ Bio-cleaner based technology WWTP / ETP with capacity of 6000 gallons / day will be installed for the treatment of the wastewaters to fulfill the compliance of PEQS.</li> <li>▪ After treatment, the treated wastewater will be used for watering of vegetation / landscaping within the project premises.</li> </ul>	Factory Management / Proponent
Solid Waste Generation	Non-hazardous / recyclable nature solid wastes and organic wastes will be produced .	Permanent	Moderate negative	<ul style="list-style-type: none"> <li>▪ The wood will be used in biomass boiler of the proposed project.</li> <li>▪ The recyclable waste including empty carton, packaging waste, polythene bags, etc. will be handed over to EPA Approved waste contractor.</li> <li>▪ Organic waste to be produced from kitchen / will be handed over to mess contractor who then will dispose off properly as per local Govt. policy like MSW wastes.</li> <li>▪ A track record of solid waste will be maintained.</li> </ul>	Factory Management / Proponent
Emergency Response	The operation of the proposed project will involve workers and visitors who may become ill or have work related accidents. In addition, disasters including natural & anthropogenic such as earthquakes, floods, heavy rainfall / thunder storm & fires due to electrical short circuiting, overheating, etc.	Permanent	Major negative	<ul style="list-style-type: none"> <li>▪ A comprehensive Emergency Response Plan (ERP) for emergency / fire conditions and disastrous situations will be developed and implemented whole heartedly during the operational phase of the project.</li> <li>▪ Adequate internal and external water distribution system / fire hydrant system will be designed, which could also supply adequate quantity of water for firefighting during emergency.</li> <li>▪ Firefighting arrangements have been</li> </ul>	Factory Management / Proponent



	may occur which have to be considered for minimizing their impacts.			<p>undertaken according to the requirements of Civil Defense Department and international standards.</p> <ul style="list-style-type: none"> <li>▪ Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic &amp; manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.</li> <li>▪ Emergency assembly points will be marked and factory workers will be trained to cope with any emergency situation.</li> <li>▪ Regular training workshops &amp; emergency / fire drills of workers will be scheduled to be held regularly.</li> <li>▪ All firefighting, emergency and safety equipment shall be frequently checked and properly maintained.</li> <li>▪ Safety signs, emergency exits, emergency routs will be displayed &amp; mentioned at many / appropriate places.</li> <li>▪ Emergency exits and routs will be kept clear from obstacles to avoid any hurdle / panic while emergency condition.</li> </ul>	
<b>b. Ecological Environment</b>					
Impacts on Flora	Operation of the proposed project will not exert significant negative impact overall on flora of the site and also flora of local /surrounding area.	Permanent	Minor negative	<ul style="list-style-type: none"> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be developed at available open places in the proposed unit.</li> <li>▪ To avoid any negative impact on flora of the site and flora of project area / outside area, air emissions and wastewater quality will be monitored and kept controlled within PEQS</li> </ul>	Factory Management / Proponent



				limits.	
Impacts on Fauna	The usual fauna such as wild birds may be affected from noisy operation of different components of the project.	Permanent	Minor negative	<ul style="list-style-type: none"> <li>▪ Best and latest technology will be selected which have low operational noise and emissions.</li> <li>▪ Proper foundations will be constructed with shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.</li> <li>▪ Trees will be planted around the building as buffer zone and play as sound barrier.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract the fauna (wild birds) to nest here.</li> <li>▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.</li> </ul>	Factory Management / Proponent
<b>c. Socio-economic Environment</b>					
Employment Generation	Employment generation during operation phase of the proposed project will be positive change	Permanent	Major positive	-	-
Generation of Revenue	Generation of revenue and taxes for government will also be positive impact	Permanent	Major positive	-	-
Health and Safety of Workers	The workers especially working in the production hall / production area may be at health risk, because there are always chances of accident, incident, near miss, dangerous occurrence, work related ill-health while working	permanent	Major negative	<p>To mitigate the hazards of health and safety of workers the following mitigations measures will be undertaken:</p> <ul style="list-style-type: none"> <li>▪ No worker aged below 18 years or over 60 years shall be employed for any job involving physical handling of hazardous substances.</li> <li>▪ The workers will be given information, instruction, training and supervision specific</li> </ul>	Factory Management / Proponent



	<p>at workplace. The workers may face ill-health, disease and temporary &amp; permanent disability in case of severe injury and may face fatality in case of severe accident. If they do not properly trained and provided with Personal Protective Equipment (PPEs) this will be major negative impact if not mitigated properly.</p>			<p>to their job and / or nature / requirement of their work, in safety precautions and procedures.</p> <ul style="list-style-type: none"> <li>▪ Protective clothing and equipment comprising helmet of cloth cap, safety spectacles or goggles, respirators or masks, rubber or plastic gloves and safety shoes shall be available for all workers who may be exposed to any hazardous substance, and no worker shall be permitted on job unless and until he is wearing such protective clothing and equipment.</li> <li>▪ To avoid any potential environmental hazards the workers would be trained properly so that they know the potential hazard of chemical.</li> <li>▪ Proper cross ventilation shall be undertaken to avoid from any bad smell/odor.</li> <li>▪ There will be proper arrangement to handle accidental / disastrous situation.</li> <li>▪ The instructions for the workers, safety signs and precautionary / preventive measures for the costumers / visitors would be displayed at suitable / prominent places.</li> <li>▪ Adequate supply of water shall be made available to the workers for personal washing as well as for washing their protective equipment.</li> <li>▪ Protective clothing and equipment of the workers shall be washed and cleaned as often as required to ensure their efficiency.</li> <li>▪ No worker shall be permitted to eat, drink or smoke till he has removed his protective clothing and equipment, washed his hands and face and left the place of work.</li> </ul>	
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				<ul style="list-style-type: none"><li>▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff.</li><li>▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.</li></ul>	
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## **Section 9: SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

### **9.1 General**

This section identifies the potential impacts due to implementation of the proposed project activities on the physical, ecological and social environment of the project surroundings / project area. The potential environmental impacts related to the proposed project have been studied related to location, design, construction and operational stages of the Project. This section also identifies mitigation measures that will help to mitigate the project's adverse environmental effects or to reduce them to an acceptable level within the prevailing legislative and regulatory framework.

### **9.2 Screening of Impacts & Mitigation Measures**

The subject project impacts and mitigation measures have been studied keeping in view of following parameters while its different phases:

- Project location related impacts & mitigation measures
- Design related impacts & mitigation measures
- Construction stage impacts & mitigation measures
- Operational stage impacts & mitigation measures

### **9.3 Project Location Related Impact & Mitigation Measures**

So far as concerned the proposed project location related impacts and mitigation measures, it is already mentioned in the preceding sections/paragraphs of this study, the project site is located at self-developed industrial area where numbers of industrial units / entities of different nature are currently in working condition. Further the area connected with Main Multan Road; at both sides of the said National Highway lot of industrial entities are present. Moreover, industrial activities are being carried out in the entire proposed project area. Hence the subject proposed project will not contradict to the status / nature of the immediate surrounding and eventually to the status / nature of the project area.

Additionally, the entire basic infrastructure is available at the site and in the project area which are necessary to run the business. So, due to the proposed project construction and operations no any impacts are seen related to project location related scenario.

### **9.4 Design Related Impacts & Mitigation Measures**

The negative impacts related to design of the proposed project will not be significant as the proposed project area has many industrial units. The buildings/structure of the proposed project have been designed according to the industrial standards having emergency exits. The plant / machinery for safety matches manufacturing will have been according to PEQS Punjab, so compliance of PEQS will automatically be done. Moreover, ETP will also be installed for the treatment of wastewater for compliance of PEQS. Cyclone and

wet scrubber will be installed on stack of Biomass Boiler to eliminate or minimize the emissions parameters to an acceptable level as prescribed by PEQS.

In view of these considerations no environmental problems are foreseen in the context of design of the proposed project. However, the possible impacts of propose project regarding physical environment, ecological environment and socio-economic environment have been considered and their mitigation measures proposed as under:

#### **9.4.1 Impacts**

Anticipated impacts relating to design of the proposed project regarding physical environment, ecological environment & socio-economic environment are as under:

##### **a. Physical Environment**

Impacts on physical environment during design stage are as under:

###### **➤ Air Emissions**

Air emissions will be generated from the operations of biomass boiler and standby power generators. So, the mitigations will be suggested at designing stage.

###### **➤ Wastewater Generation**

Washing wastewater from washing chemical buckets and sewerage from worker's toilets / washrooms will be generated during the regular operation phase of the proposed project. These wastewaters require proper attention to mitigate properly.

###### **➤ Emergency response**

There are always chances of occurrence of emergency situations by natural & anthropogenic means such as earthquakes, floods, heavy rainfall, thunderstorm, fires due to electrical short-circuiting; overheating etc. it will be major negative impact.

##### **b. Ecological Environment**

###### **➤ Impacts on Flora**

As the site is a vacant plot where no any type of flora including tree, plant, herb & shrub, etc. present. So, the establishment of the proposed project will not affect the flora.

###### **➤ Impacts on Fauna**

Construction / installation activities will not affect the fauna. Further during operational phase noise from industrial activity may not affect the fauna. As the area is self-developed industrial area however agricultural nature on a large scale. No any wildlife or endangered species are present in the area, only wild birds are existed in the project area.

### **c. Socio-economic Environment**

#### **➤ Economic growth**

After the development of proposed project economic growth will be gained by different dimensions e.g. employment generation, will ultimately help to uplift the local & national economy eventually.

## **9.4.2 Mitigation Measures**

Suitable mitigation measures for above mentioned anticipated impacts are as under:

### **a. Physical Environment**

#### **➤ Air Emissions**

The following mitigatory measures will be suggested at the design level / stage:

- The most modern, advanced and latest state of the art technology will be selected for Biomass Boiler and Standby Power generators.
- Concrete foundations will be designed where Biomass Boiler and Standby Power generators will be placed.
- Cyclone and Wet Scrubber will be installed at the stack of Biomass Boiler to eliminate / minimize the smoke parameters to an acceptable level ultimately compliance of PEQS.
- Standby Power generators will be equipped with sound proof canopy/room, smoke arrestors, proper height of stack, etc.

#### **➤ Wastewater Generation**

The following mitigation measures will be suggested at design level/stage for the treatment and safe disposal of treated wastewater without any damage on the environment:

- Bio-cleaner based technology ETP/WWTP will be get designed to install from a competent firm for the treatment of wastewater/sewerage.
- The treated wastewater will be used for watering of vegetation / landscaping within project premises.
- And the surplus treated wastewater will be disposed off in to wastewater channel.

### ➤ **Emergency response**

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

- The design of buildings/halls will also include emergency exits which can be used during emergency situation emergency routes/pathways will also be well marked.
- Adequate internal and external water distribution system / fire hydrant system will be designed, which could also supply adequate quantity of water for firefighting during emergency.
- Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic & manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.

### **b. Ecological Environment**

#### ➤ **Impacts on Flora**

- Construction activities will be done in such a way to avoid any negative impact on flora of the project area and outside the premises present if any.
- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of construction phase of the project.

#### ➤ **Impacts on Fauna**

- As mentioned earlier no nay type of fauna is present at site and the construction / installation activities for the development of project will be done in such a way fauna (wild birds) outside the premises / of the project area may not be disturbed.
- The most modern, advanced and latest technology will be selected which have low operational noise and other impacts on environment.
- Proper foundations will be constructed with rubbers for shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.
- Trees will be planted around the building as buffer zone and which will act as sound barrier too.
- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract fauna (wild birds) to nest here.

### **c. Socio-economic Environment**

#### ➤ **Economic Growth**

- Employment generation & economic gain will be positive impact and not required any mitigation measure.

## 9.5 Construction Phase Impacts & Mitigation Measures

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

### 9.5.1 Impacts

Anticipated impacts during construction stage of the proposed project have been discussed in context of physical environment, ecological environment & socio-economic environment as below:

#### a. Physical Environment

Anticipated impacts during construction phase on physical environment are as follows:

##### ➤ Impacts on Air Quality

During construction phase civil work, construction of all the infrastructure including buildings, halls and installation will be undertaken. Excavation of earth for construction of structure/building will inevitably be done. So, dust/particulate matter will be generated from construction activities specially exposed areas of earth's surface and air emissions from construction machinery.

##### ➤ Disposal of Construction Solid Waste

Construction solid waste including debris, soil/clay, wood, other related waste from construction / installation activities will be produced. Proper landscaping will, therefore, be given due consideration along with re-establishment of the local/indigenous vegetation. The construction waste that are unsuitable for use need to be stored, transported and disposed off appropriately at the designated sites.

#### b. Ecological Environment

##### ➤ Impacts on Flora

Construction activities may not impose negative impact on flora of the project area surrounding of the site as the construction activities would be confined within the project site limits.

##### ➤ Impacts on Fauna

The usual fauna found at the project locality is sparrows, crows, common mainas etc. Construction activities may not impose any negative impacts on fauna (wild birds) of the locality.

### **c. Socio-economic Environment**

#### **➤ Employment Generation**

During construction stage of the proposed project, employment generation for workers / laborers will be positive change.

#### **➤ Health and Safety of Workers**

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

### **9.5.2 Mitigation Measures**

Following mitigation measures are suggested to eliminate or minimize above mentioned potential negative impacts to an acceptable level during construction phase of the proposed project:

#### **a. Physical Environment**

##### **➤ Impacts on Air Quality**

- Regular water sprinkling will be done on construction material like sand, soil/clay etc. and exposed areas of site for civil construction/excavations.
- Construction machinery will be maintained or overhauled in time to avoid any negative impact from their smoke especially standby power generator.

##### **➤ Disposal of Construction Solid Waste**

- The construction waste will be carefully examined and disposed off in an environment friendly manner by transporting it in closed containers and filling at appropriate sites.
- It is also desirable to utilize the waste in such a way that it is consumed for the construction of any other structure within the Project Site or in the immediate vicinity.

#### **b. Ecological Environment**

##### **➤ Impacts on Flora**

- Construction activities will be done in such a way to avoid any negative impact on flora of the surrounding if any present.
- Beautiful landscaping including grown trees, ornamental / flowering plants

& grassy lawns will be done on available open spaces in and outside/around the project site after completion of project.

➤ **Impacts on Fauna**

- Construction activities will be done in such a way to avoid any negative impact on fauna (wild birds) of the surrounding if any present as well as of the project area.
- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project.
- Landscaping may attract the fauna (wild birds) to nest here.

**c. Socio-economic Environment**

➤ **Employment Generation**

- Employment generation will be positive change.

➤ **Health and Safety of Workers**

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

- The Contractor will ensure that the construction workers / laborers are trained in safety procedures for all relevant aspects of construction;
- Proponents of the Project will make regular checks to ensure that the contractor is following safety working procedures/safety measures.
- Formal emergency procedures will be developed for construction site in case of an accident.
- First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident.

## **9.6 Operational Phase Impacts & Mitigation Measures**

The anticipated environmental impacts and their suitable mitigation measures related to the proposed project during its operational phase have been studied and listed as below: -

### **9.6.1 Impacts**

Anticipated impacts from operational phase of the proposed project regarding physical environment, ecological environment & socio-economic environment have been discussed as follows:

**a. Physical Environment**

➤ **Air Quality**

During regular operations of the proposed project, air emissions will mainly be generated from operations of biomass boiler and standby power generator, which may require proper safety & precautionary measures in place to avoid any degradation of ambient air of the area.

➤ **Noise**

During the operational stage of the subject proposed project, the noise will be produced from operations of manufacturing plant / machinery, biomass boiler & standby power generator. Noise levels will be increased at some negligible level near the production hall, boiler and standby power generators but it will be mitigated properly if not, may have moderate negative impact.

➤ **Water Consumption**

During the operational phase of the proposed project, the water will be used for washing of chemical buckets, in washrooms/toilets, kitchen/mess, etc. approximately in quantity of 4500 to 5500 gallons/day. The source of water will be underground. Utilization of small quantity of water will not exert any negative impact on underground water sources especially on underground water table. Because the overall nature of the area is agricultural in a broad-spectrum; cultivated lands and irrigational channels are present in the project area. Moreover, grassy lawns will be developed within the proposed project premises. Hence these are the sources to recharge the underground water table.

➤ **Wastewater Generation**

During operational phase of the proposed safety matches manufacturing unit, approximately 3900 to 4700 gallons/day of wastewater will be produced from different sources like washing of chemical Buckets, toilets / washrooms & kitchen / mess, etc. The washing wastewater will require proper wastewater treatment facility otherwise it will impose moderate negative impact if not treated properly.

➤ **Solid Waste Generation**

During the operational phase of the subject proposed project, no any type of hazardous nature solid waste will be produced. Recyclable nature (non-hazardous waste) including wood, empty carton, packaging waste, polythene bags, etc. will be produced. Moreover, organic waste will also be produced from kitchen/mess.

➤ **Emergency Response**

The operation of the proposed project will involve workers and visitors who may become ill or have work related accidents. In addition, disasters including natural & anthropogenic such as earthquakes, floods, heavy rainfall / thunder

storm & fires due to electrical short circuiting, overheating, etc. may occur which have to be considered for minimizing their impacts.

## **b. Ecological Environment**

### **➤ Impacts on Flora**

Operation of the proposed project will not exert significant negative impact overall on flora of the site and also flora of local /surrounding area. However, emissions from operations of biomass boiler & standby power generators will be generated. Furthermore, wastewater will be produced from the proposed project and needs proper treatment, if not treated, may have negative impacts on flora as well as overall environment.

### **➤ Impacts on Fauna**

Noisy operation of machines, boiler, standby power generators will have some negligible impact on fauna (wild birds). It will be minor negative impact if not mitigated properly.

## **c. Socio-economic Environment**

### **➤ Employment Generation**

When project will be in full operation, it will generate employment for the people of about 300 -400 workers. This will be a major positive impact.

### **➤ Generation of Revenue**

The proposed project will generate revenue for the Government. This will be a major positive impact.

### **➤ Health and Safety of Workers**

The workers especially working in the production hall / production area may be at health risk, because there are always chances of accident, incident, near miss, dangerous occurrence, work related ill-health during working at workplace. The workers may face ill-health, disease and temporary & permanent disability in case of severe injury and may face fatality in case of severe accident. If they do not properly trained and provided with Personal Protective Equipments (PPEs) this will be major negative impact if not mitigated properly.

## **9.6.2 Mitigation Measures**

Mitigation measures for operation stage of the proposed project as mentioned above are listed below:

## a. Physical Environment

### ➤ Air Quality

In order to eliminate or minimize air pollution to an acceptable level as prescribed by PEQS, following mitigation measures are recommended:

- An air quality monitoring and improvement plan will be developed and implemented to keep the air pollution level within the limits of Punjab Environmental Quality Standards (PEQS)
- Cyclone and wet scrubber will be installed at stack of Biomass Boiler to minimize PM and other flue gases according to the requirements of PEQS.
- Standby power generators will be placed at concrete foundation equipped with shock absorber rubbers, sound proof canopy, silencer, smoke arrestor and stack with proper height.
- Maintenance and overhauling schedule will also be developed.
- Standby power generator and boiler will be maintained or over hauled well within time according to schedule and periodically checked or inspected to avoid any excessive smoke.
- No leak system by proper maintenance of valves, seals & flanges
- Well capped containers
- Good housekeeping,

### ➤ Noise

- Proper foundation of the plant machinery, standby power generator & boiler will be designed and constructed to cope with the problem of tremor / vibration which will consequently abate the noise problem.
- Noise level monitoring and improvement plan will be developed and implemented with letter & spirit.
- The standby power generators and boilers will be over hauled and well-tuned according to the schedule to avoid excessive noise.
- Proper set back will be provided from the boundary wall which will also help to minimize / eliminate the noise pollution.
- Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber.

### ➤ Water Consumption

- At open places the grassy lawns will be developed to recharge the water table which is help to control the surface runoff during rainy season.
- More landscaping will also be done at available open place after completions of project
- The overall nature of the area is agricultural it is also help to recharge the water table.
- The workers will be given training to avoid wastage of water.
- Regular inspection of water tapes, valves and water lines as per schedule or periodically will be undertaken.

### ➤ Wastewater Generation

- Bio-cleaner based technology WWTP / ETP with capacity of 6000 gallons / day will be installed for the treatment of the wastewaters to fulfill the compliance of PEQS.
- After treatment, the treated wastewater will be used for watering of vegetation / landscaping within the project premises.

➤ **Solid Waste Generation**

- The wood will be used in biomass boiler of the proposed project.
- The recyclable waste including empty carton, packaging waste, polythene bags, etc. will be handed over to EPA Approved waste contractor.
- Organic waste to be produced from kitchen / will be handed over to mess contractor who then will dispose off properly as per local Govt. policy like MSW wastes.
- A track record of solid waste will be maintained.

➤ **Emergency Response**

- A comprehensive Emergency Response Plan (ERP) for emergency / fire conditions and disastrous situations will be developed and implemented whole heartedly during the operational phase of the project.
- Adequate internal and external water distribution system / fire hydrant system will be designed, which could also supply adequate quantity of water for firefighting during emergency.
- Firefighting arrangements have been undertaken according to the requirements of Civil Defense Department and international standards.
- Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic & manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.
- Emergency assembly points will be marked and factory workers will be trained to cope with any emergency situation.
- Regular training workshops & emergency / fire drills of workers will be scheduled to be held regularly.
- All firefighting, emergency and safety equipment shall be frequently checked and properly maintained.
- Safety signs, emergency exits, emergency routs will be displayed & mentioned at many / appropriate places.
- Emergency exits and routs will be kept clear from obstacles to avoid any hurdle / panic while emergency condition.

**b. Ecological Environment**

➤ **Impacts on Flora**

- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be developed at available open places in the proposed unit.

- To avoid any negative impact on flora of the site and flora of project area / outside area, air emissions and wastewater quality will be monitored and kept controlled within PEQS limits.

➤ **Impacts on Fauna**

- Best and latest technology will be selected which have low operational noise and emissions.
- Proper foundations will be constructed with shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.
- Trees will be planted around the building as buffer zone and play as sound barrier.
- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract the fauna (wild birds) to nest here.
- Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.

**c. Socio-economic Environment**

➤ **Employment Generation**

- Employment generation will be positive impact.

➤ **Generation of Revenue**

- Generation of revenue or taxes which will be paid to Government, will be positive impact.

➤ **Health and Safety of Workers**

To mitigate the hazards of health and safety of workers the following mitigations measures will be undertaken:

- No worker aged below 18 years or over 60 years shall be employed for any job involving physical handling of hazardous substances.
- The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures.
- Protective clothing and equipment comprising helmet of cloth cap, safety spectacles or goggles, respirators or masks, rubber or plastic gloves and safety shoes shall be available for all workers who may be exposed to any hazardous substance, and no worker shall be permitted on job unless and until he is wearing such protective clothing and equipment.
- To avoid any potential environmental hazards the workers would be trained properly so that they know the potential hazard of chemical.
- Proper cross ventilation shall be undertaken to avoid from any bad smell/odor.
- There will be proper arrangement to handle accidental / disastrous

situation.

- The instructions for the workers, safety signs and precautionary / preventive measures for the costumers / visitors would be displayed at suitable / prominent places.
- Adequate supply of water shall be made available to the workers for personal washing as well as for washing their protective equipments.
- Protective clothing and equipment of the workers shall be washed and cleaned as often as required to ensure their efficiency.
- No worker shall be permitted to eat, drink or smoke till he has removed his protective clothing and equipment, washed his hands and face and left the place of work.
- First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff.
- Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.

### 9.7 Potential Environmental Enhancement Measures

Following potential environmental enhancement measures including environment, safety & health enhancement measures will be implemented during construction & operational stages of the proposed project:

- Environmental Management and Monitoring Plan (EMMP) suggested in this EIA Report will be strictly followed and operational throughout the project life. All monitored data shall be reported to the EPA Punjab, Lahore for scrutiny at their end.
- Effluent Treatment Plant / Waste Water Treatment Plant shall be installed for the treatment of wastewater producing from the proposed project for compliance of PEQS ultimately for the safeguard of environment.
- Cyclone and Wet Scrubber will be installed on the stack of Biomass Boiler, so the concentrations of emissions may be eliminated or minimized as prescribed values of PEQS.
- Solid waste management plan including safe storage, segregation (on site or off site by contractor), transportation and safe disposal shall be developed and track record will be maintained.
- Environmental Monitoring plan including air quality monitoring, wastewater analysis and noise level will be developed and implemented to keep all the parameters within the limits of Punjab Environmental Quality Standards (PEQS) and specially to evaluate the performance of mitigation measures and control devices such as ETP, Cyclone, Wet Scrubber, Firefighting arrangements, PPEs, etc.
- Emergency Response Plan (ERP) will be developed and implemented with letter & spirit.
- ERP will be reviewed and update as necessary, periodically or annually.
- Sufficient / appropriate firefighting arrangements according to the requirements of Civil Defense Department and international standards will be undertaken.
- Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic & manual), smoke detectors, heat



detectors, gas detectors, etc. will be provided at many locations where necessary.

- Above mentioned firefighting arrangements will be inspected periodically as per schedule and maintained.
- Safety signs, emergency exits, emergency routs will be displayed & mentioned at many / appropriate places.
- Emergency exits and routs will be kept clear from obstacles to avoid any hurdle / panic while emergency condition.
- The workers will be provided with complete PPEs according to the nature or requirement of their jobs including Protective clothing / apparel and others comprising face masks, rubber or plastic gloves and safety shoes and no worker shall be permitted to perform their job unless and until he is wearing such protective clothing and PPEs.
- All workers will be thoroughly trained in environment, health & safety precautions.
- Adequate supply of water will be made available to the workers for personal washing as well as for washing their protective equipments.
- Protective clothing and equipment of the workers will be washed and cleaned as often as required to ensure their efficiency.
- No worker will be permitted to eat or drink at work place & till he has removed his protective clothing and equipment, washed his hands and face and left the place of work.
- First aid boxes equipped with required antidotes will be available in the premises, supervised by trained staff.
- Medical checkup of all workers will be carried out at the time of employment and at least once a year thereafter.

## Section 10: ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

### 10.1 Environmental Management

To implement the recommendations and suggestions for environmental protection included in the preceding Section 9 “Screening of Potential Environmental Impacts & Mitigations Measures” of this study, a comprehensive Environmental Management Plan is needed.

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

For effective environmental management, client will assign the necessary responsibilities to an Environmental Management Team headed by a well-trained person in the field of environment, which will be responsible for the environmental monitoring of the project.

The contractor will be responsible for the execution of the project under supervision of the client. The contractor will be bound to follow the provisions of the contract documents especially about the environmental protection measures and apply good construction techniques and methodology without damaging the existing environment. Obligation(s) of the contractor, to safeguard and mitigate adverse impacts and rehabilitate the environment will be addressed through environmental provisions in the contract document(s) as already highlighted in this EIA Study through adequate implementation at site.

### 10.2 Description of Proposed Mitigation Actions

Description of impacts & proposes mitigation measures have been discussed in the following table:

**Table 10.1: Description of Impacts & Proposed Mitigation Measures**

IMPACTS	MITIGATION MEASURES
<p><b>Impacts on Air Quality</b> During regular operations of the proposed project, air emissions will mainly be generated from operations of biomass boiler and standby power</p>	<p>In order to minimize air pollution, following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>▪ An air quality monitoring and improvement plan will be developed and implemented to keep the air pollution level within the limits</li> </ul>

<p>generator, which may require proper safety &amp; precautionary measures in place to avoid any degradation of ambient air of the area.</p>	<p>of Punjab Environmental Quality Standards (PEQS)</p> <ul style="list-style-type: none"> <li>▪ Cyclone and wet scrubber will be installed at stack of Biomass Boiler to minimize PM and other flue gases according to the requirements of PEQS.</li> <li>▪ Standby power generators will be placed at concrete foundation equipped with shock absorber rubbers, sound proof canopy, silencer, smoke arrestor and stack with proper height.</li> <li>▪ Maintenance and overhauling schedule will also be developed.</li> <li>▪ Standby power generator and boiler will be maintained or over hauled well within time according to schedule and periodically checked or inspected to avoid any excessive smoke.</li> <li>▪ No leak system by proper maintenance of valves, seals &amp; flanges</li> <li>▪ Well capped containers</li> <li>▪ Good housekeeping,</li> </ul>
<p><b>Noise</b> During the operational stage of the subject proposed project, the noise will be produced from operations of manufacturing plant / machinery, biomass boiler &amp; standby power generator. Noise levels will be increased at some negligible level near the production hall, boiler and standby power generators but it will be mitigated properly if not, may have moderate negative impact.</p>	<ul style="list-style-type: none"> <li>▪ Proper foundation of the plant machinery, standby power generator &amp; boiler will be designed and constructed to cope with the problem of tremor / vibration which will consequently abate the noise problem.</li> <li>▪ Noise level monitoring and improvement plan will be developed and implemented with letter &amp; spirit.</li> <li>▪ The standby power generators and boilers will be over hauled and well-tuned according to the schedule to avoid excessive noise.</li> <li>▪ Proper set back will be provided from the boundary wall which will also help to minimize / eliminate the noise pollution.</li> <li>▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber.</li> </ul>
<p><b>Water Consumption</b> During regular operational phase of the proposed project water will mainly be used in washing of chemical buckets, toilets/washrooms, kitchen, etc.</p>	<ul style="list-style-type: none"> <li>▪ At open places the grassy lawns will be developed to recharge the water table which is help to control the surface runoff during rainy season.</li> <li>▪ More landscaping will also be done at available open place after completions of project</li> <li>▪ The overall nature of the area is agricultural it is also help to recharge the water table.</li> <li>▪ The workers will be given training to avoid wastage of water.</li> <li>▪ Regular inspection of water tapes, valves and water lines as per schedule or</li> </ul>

<p><b>Wastewater Generation</b> The wastewater will be produced from different sources like washing of chemical Buckets, toilets / washrooms &amp; kitchen / mess, etc.</p>	<p>periodically will be undertaken.</p> <ul style="list-style-type: none"> <li>▪ Bio-cleaner based technology WWTP / ETP with capacity of 6000 gallons / day will be installed for the treatment of the wastewaters to fulfill the compliance of PEQS.</li> <li>▪ After treatment, the treated wastewater will be used for watering of vegetation / landscaping within the project premises.</li> </ul>
<p><b>Solid Waste Generation</b> During the operational phase of the subject proposed project, no any type of hazardous nature solid waste will be produced. Recyclable nature (non-hazardous waste) including wood, empty carton, packaging waste, polythene bags, etc. will be produced. Moreover, organic waste will also be produced from kitchen/mess.</p>	<ul style="list-style-type: none"> <li>▪ The wood will be used in biomass boiler of the proposed project.</li> <li>▪ The recyclable waste including empty carton, packaging waste, polythene bags, etc. will be handed over to EPA Approved waste contractor.</li> <li>▪ Organic waste to be produced from kitchen / will be handed over to mess contractor who then will dispose off properly as per local Govt. policy like MSW wastes.</li> <li>▪ A track record of solid waste will be maintained.</li> </ul>
<p><b>Emergency Response</b> The operation of the proposed project will involve workers and visitors who may become ill or have work related accidents. In addition, disasters including natural &amp; anthropogenic such as earthquakes, floods, heavy rainfall / thunder storm &amp; fires due to electrical short circuiting, overheating, etc. may occur which have to be considered for minimizing their impacts.</p>	<ul style="list-style-type: none"> <li>▪ A comprehensive Emergency Response Plan (ERP) for emergency / fire conditions and disastrous situations will be developed and implemented whole heartedly during the operational phase of the project.</li> <li>▪ Adequate internal and external water distribution system / fire hydrant system will be designed, which could also supply adequate quantity of water for firefighting during emergency.</li> <li>▪ Firefighting arrangements have been undertaken according to the requirements of Civil Defense Department and international standards.</li> <li>▪ Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic &amp; manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.</li> <li>▪ Emergency assembly points will be marked and factory workers will be trained to cope with any emergency situation.</li> <li>▪ Regular training workshops &amp; emergency / fire drills of workers will be scheduled to be held regularly.</li> <li>▪ All firefighting, emergency and safety equipment shall be frequently checked and properly maintained.</li> <li>▪ Safety signs, emergency exits, emergency routs will be displayed &amp; mentioned at</li> </ul>

	<p>many / appropriate places.</p> <ul style="list-style-type: none"> <li>▪ Emergency exits and routs will be kept clear from obstacles to avoid any hurdle / panic while emergency condition.</li> </ul>
<p><b>Impacts on Flora</b> Operation of the proposed project will not exert significant negative impact overall on flora of the site and also flora of local /surrounding area.</p>	<ul style="list-style-type: none"> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be developed at available open places in the proposed unit.</li> <li>▪ To avoid any negative impact on flora of the site and flora of project area / outside area, air emissions and wastewater quality will be monitored and kept controlled within PEQS limits.</li> </ul>
<p><b>Impacts on Fauna</b> Noisy operation of machines, boiler, standby power generators will have some negligible impact on fauna (wild birds). It will be minor negative impact if not mitigated properly.</p>	<ul style="list-style-type: none"> <li>▪ Best and latest technology will be selected which have low operational noise and emissions.</li> <li>▪ Proper foundations will be constructed with shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.</li> <li>▪ Trees will be planted around the building as buffer zone and play as sound barrier.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract the fauna (wild birds) to nest here.</li> <li>▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.</li> </ul>
<p><b>Health &amp; Safety of Workers</b> The workers especially working in the production hall / production area may be at health risk, because there are always chances of accident, incident, near miss, dangerous occurrence, work related ill-health while working at workplace. The workers may face ill-health, disease and temporary &amp; permanent disability in case of severe injury and may face fatality in case of severe accident. If they do not properly train and provided with Personal Protective Equipments (PPEs) this will be major negative impact if not mitigated properly.</p>	<p>To mitigate the hazards of health and safety of workers the following mitigations measures will be undertaken:</p> <ul style="list-style-type: none"> <li>▪ No worker aged below 18 years or over 60 years shall be employed for any job involving physical handling of hazardous substances.</li> <li>▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures.</li> <li>▪ Protective clothing and equipment comprising helmet of cloth cap, safety spectacles or goggles, respirators or masks, rubber or plastic gloves and safety shoes shall be available for all workers who may be exposed to any hazardous substance, and no worker shall be permitted on job unless and until he is wearing such protective clothing and</li> </ul>

	<p>equipment.</p> <ul style="list-style-type: none"> <li>▪ To avoid any potential environmental hazards the workers would be trained properly so that they know the potential hazard of chemical.</li> <li>▪ Proper cross ventilation shall be undertaken to avoid from any bad smell/odor.</li> <li>▪ There will be proper arrangement to handle accidental / disastrous situation.</li> <li>▪ The instructions for the workers, safety signs and precautionary / preventive measures for the costumers / visitors would be displayed at suitable / prominent places.</li> <li>▪ Adequate supply of water shall be made available to the workers for personal washing as well as for washing their protective equipment.</li> <li>▪ Protective clothing and equipment of the workers shall be washed and cleaned as often as required to ensure their efficiency.</li> <li>▪ No worker shall be permitted to eat, drink or smoke till he has removed his protective clothing and equipment, washed his hands and face and left the place of work.</li> <li>▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff.</li> <li>▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.</li> </ul>
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### 10.3 Schedule for Implementation and Environmental Budget

Currently the proponent is seeking Environmental Approval from EPA, Punjab and after obtaining of said approval construction will be started. The environmental budget will be implemented while in construction phase once in project life and during operational phase environmental budget will be allocated annually and it will be implemented throughout the project life.

The cost required to effectively implement the mitigation measures suggested in this EIA Report is important for the sustainability of the Project. The proponent of the subject industrial unit has allocated the Environmental budget as per requirements for construction phase and operational phase of the project for recover any damages done by the project activities to environment which will include Environment, Health & Safety, for restoration, rehabilitation & landscaping of the area, for installing any pollution abating technology or equipment such as ETP, for any maintenance and repair of safety devices, for the implementation of Environmental Management Plan and other environment related aspects.

Environmental Budget and its breakup with Schedule for implementation is as under:

Table 10.2: Environmental Budget with Implementation Schedule

Environmental Component	Amount PKR	Schedule of Implementation
<b>Construction Phase</b>		
Landscaping	1,000,000	Once in project life
Environmental Monitoring	150,000	Quarterly
<b>Operational Phase</b>		
Environmental Monitoring	150,000	Quarterly
O & M Cost of ETP / WWTP	500,000	Monthly
Firefighting Arrangements	1,200,000	Yearly
PPEs	1,000,000	Yearly
Tree Plantation & O & M of Landscaping	400,000	Yearly

#### 10.4 Environmental Management Team (EMT)

Environmental Management Team (EMT) will be made responsible for overseeing the environmental performance in the industry and develop, implement and monitor environmental strategies that promote sustainable production. The EMT will comprise Environmental Manager, Assistant Managers, inspectors; their responsibilities are as follows in the following table;

Table 10.3: Environmental Management Team their Roles &amp; Responsibilities

Position of Team Member	Roles and Responsibilities
Environmental Manager	<ul style="list-style-type: none"> <li>▪ Implementing environmental policies and practices</li> <li>▪ Devising strategies to meet targets and to encourage best practice</li> <li>▪ Devising the best tools and systems to monitor performance and to implement strategies</li> <li>▪ Ensuring compliance with environmental legislation</li> <li>▪ Assessing, analyzing and collating environmental performance data and reporting information to internal staff, clients and regulatory bodies</li> <li>▪ Confirming that materials, ingredients and so on are ethically or environmentally sourced</li> <li>▪ Managing environmental strategy budgets</li> <li>▪ Liaising with internal staff including senior managers and directors</li> <li>▪ Acting as a champion or cheerleader for environmental issues within your organization</li> <li>▪ Providing environmental training to staff at all levels</li> <li>▪ Writing plans and reports</li> <li>▪ Keeping up to date with relevant changes in environmental legislation and initiatives including international legislation where applicable</li> <li>▪ Producing educational or information resources for internal staff, clients or the general public</li> <li>▪ Liaising with regulatory bodies such as the Environment Agency</li> </ul>

Assistant Manager Compliance	<ul style="list-style-type: none"> <li>▪ Develop and oversee control systems to prevent or deal with violations of legal guidelines and internal policies</li> <li>▪ Evaluate the efficiency of controls and improve them continuously</li> <li>▪ Revise procedures, reports etc. periodically to identify hidden risks or non-conformity issues</li> <li>▪ Draft, modify and implement company policies</li> <li>▪ Collaborate with corporate counsels and HR departments to monitor enforcement of standards and regulations</li> <li>▪ Assess the business's future ventures to identify possible compliance risks</li> <li>▪ Review the work of colleagues when necessary to identify compliance issues and provide advice or training</li> <li>▪ Keep abreast of regulatory developments within or outside of the company as well as evolving best practices in compliance control</li> <li>▪ Prepare reports for senior management and external regulatory bodies as appropriate</li> </ul>
Assistant Manager EHS	<ul style="list-style-type: none"> <li>▪ Research health and safety regulations, such as OSHA laws, and create company safety protocols.</li> <li>▪ Supervise safety and security staff.</li> <li>▪ Look into accident and injury claims company-wide, ensuring results consistent with company goals.</li> <li>▪ Educate all personnel on health and safety policies and company safety goals</li> </ul>

#### 10.4.1 Institutional Capacity for effective Environment Management

To maintain or enhance the institutional capacity for effective Environment Management through implementation of Environmental Management & Monitoring Plan (EMMP), implementation of mitigation measures suggested in EIA Report, etc. proponent will form Environmental Management Committee (EMC) & Horticulture Committee (HC).

#### 10.4.2 Horticulture Committee (HC) & its Responsibilities

A team will be formed named as "Horticulture Committee" (HC) to attend the issues relating to cleanliness, up keeping, aesthetic beauty of the project site, general environment enhancement, tree plantation, vegetation's promotion, planting of flowering and ornamental plants/trees in and outside of project site.

- To attend the issues relating to cleanliness
- To upkeep, aesthetic beauty of the project site
- To look after general environment enhancement
- Tree plantation, vegetation's promotion, plantation of flowering and ornamental plants/trees in and outside of project site.

#### 10.5 Proposed Monitoring Program to Assess Performance or output of EMP

Environmental monitoring is normally undertaken during both construction and operational stages to ensure the effectiveness of the proposed mitigation

measures. In order to respond to unexpected environmental concerns at an early stage and to determine the accuracy of impact, predictions are also required. Specific monitoring programs are outlined below as well as responsibilities for the collection and analysis of data and the reporting requirements.

The various objectives of the environmental monitoring plan are:

- a. To evaluate the effectiveness of mitigation measures,
- b. To respond to the unanticipated environmental impacts when the project is under implementation.

### **10.5.1 Construction stage**

While construction stag of the proposed project environmental monitoring including air quality, noise level, ground water & wastewater will be done and detail is as follows:

#### **a. Air Quality:**

An ambient air quality monitoring will be done on monthly basis or as prescribed by the EMC, in the construction stage at the representative locations.

1. CO
2. NO
3. NO<sub>2</sub>
4. NO<sub>x</sub>
5. SO<sub>2</sub>
6. PM<sub>10</sub>

#### **b. Noise Level**

Noise level monitoring will be done on monthly basis or as prescribed by the EMC, in the construction stage at the representative points.

#### **c. Ground Water Quality:**

Ground water quality monitoring will be done on monthly basis, in the construction stage at the representative locations. The following parameters will be monitored.

1. pH
2. Total Dissolved Solids
3. Turbidity
4. Taste
5. Odor
6. Total Hardness
7. Chloride
8. Sulphate
9. Sodium

10. Calcium
11. Magnesium
12. Potassium
13. Nitrate
14. E-coli

**d. Wastewater Quality:**

Wastewater quality will be monitored on monthly basis in the construction stage. The following parameters will be monitored.

1. Temperature
2. pH
3. DO
4. BOD<sub>5</sub>
5. COD
6. TDS
7. TSS
8. Grease & Oil
9. Copper
10. Iron
11. Sulphate
12. Chloride

**10.5.2 Operational Phase**

During operational phase of the proposed project environmental monitoring including stack emissions, noise level, ground water & wastewater will be done and detail is as under:

**a. Stack Emissions Monitoring:**

Stack emissions (from standby power generator(s) and Boiler(s) monitoring will be done on quarterly basis in the operational phase. The parameters of stack emissions prescribed in National Environment Quality Standards (NEQS) approved by the Government of Pakistan will be monitored as follows:

1. O<sub>2</sub>
2. CO<sub>2</sub>
3. CO
4. NO
5. NO<sub>2</sub>
6. NO<sub>x</sub>
7. SO<sub>x</sub>
8. Temperature

**b. Noise Levels:**

Noise levels monitoring will be done on quarterly basis while operational phase of the project at different points of / near boundary wall, outside production halls & at other representative points.

**c. Groundwater Quality:**

Groundwater quality will be monitored on annual basis while operational phase of the project. The following parameters will be monitored:

1. pH
2. Total Dissolved Solids
3. Turbidity
4. Taste
5. Odor
6. Total Hardness
7. Chloride
8. Sulphate
9. Sodium
10. Calcium
11. Magnesium
12. Potassium
13. Nitrate
14. E-coli

**d. Wastewater Quality:**

Monitoring of wastewater analysis will be done on quarterly basis during the operational stage for the parameters given below or as prescribed by the NEQS:

1. Temperature
2. pH
3. DO
4. BOD5
5. COD
6. TDS
7. TSS
8. Grease & Oil
9. Copper
10. Iron
11. Sulphate
12. Chloride

**10.6 Proposed EMP Reporting and Reviewing Procedure**

The Environment Management Team will be responsible for environmental monitoring and reporting to the EPA Punjab throughout the construction and operational stages and for the implementation of Environmental Management Plan in the unit.

EMP Reporting & Reviewing Procedures emphasize that the EMP should set forth in sufficient detail all the design measures, monitoring programs, best management practices, and emergency and contingency plans to assure best that all the potential impacts are methodically controlled and suitably mitigated. In addition to reviewing the EIA report recommendations, the management of the industry should compare these documents and plans to the guidelines for such

Industrial units in its evaluation of what is applicable or otherwise should be included in the EMP. Employee educational and training materials to be submitted to best for their review 3 weeks prior to the beginning of staff training.

## 10.7 Training Needs

Proper training will be provided to the construction workers on health and safety practices and conservation of resources by the contractor. During the operational stage, the project staff will be trained about the requirements of Environmental Management System, including but not limited to the environmental health and safety efficient use of resources, emergency response, fire protection and safety / security issues etc.

### 10.7.1 Technical Training Programs

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

Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the contractor(s) to implement effective environmental protection measures. A domestic training program is proposed to train the staff that will be involved in the construction and operational stage on environmental protection and management.

### 10.7.2 Training Schedule

One of the most important mechanisms for the enhancement of the project's overall environmental performance is to organize environmental trainings for the project personnel and the Contractor's team. Environmental training will form part of the ongoing environmental management of the project. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. Adoption of these measures will help Proponent and the Contractor to achieve a high level of environmental awareness in the project team, which should, in turn, promote sound environmental management during project lifespan.

A training schedule will be developed by the Health & Safety manager and organized and maintained by the management of the project and contractors. Following is the comprehensive form of the training schedule;

Table 10.4: Training Schedule

Provided by	Trainee	Contents	Duration	Responsible Authority
Environmental Manager & Training Assistant	All Working Personnel	<ul style="list-style-type: none"> <li>▪ Environmental laws and regulations, daily monitoring and supervision</li> <li>▪ Introduction to project EIA and EMMP</li> <li>▪ Importance of safety practices and usage of PPEs</li> <li>▪ Environmental sensitivities of the project area</li> <li>▪ Communication of environmental problems to corresponding officials</li> <li>▪ Waste disposal</li> </ul>	Monthly	Project Management & Contractor
Consultants / specializing in social management	Staff dealing in social matters	<ul style="list-style-type: none"> <li>▪ Short seminars and courses on social awareness</li> <li>▪ Effective public speaking / dealing</li> </ul>	Monthly	Project Manager
Drivers	As specified	<ul style="list-style-type: none"> <li>▪ Follow speed limits</li> <li>▪ Road safety</li> <li>▪ Road restrictions</li> <li>▪ Vehicle / driving restrictions</li> <li>▪ Applicable rules &amp; regulations</li> <li>▪ Defensive driving</li> </ul>	Twice a month	Project Management & Contractor
Consultants / organizations specializing in occupational, health and safety issue	As specified	<ul style="list-style-type: none"> <li>▪ Short lectures relating to occupational safety and health</li> </ul>	Twice a year	Project CEO

## 10.8 Equipment and Instruments maintenance details

The project proponent will create their own system, i.e. equipment for monitoring of air, water and noise or hire the services of a private laboratory for the monitoring and analysis. The company management will maintain the records of Environment, Health & Safety and look after the EHS issues. The company management shall maintain PPEs, firefighting arrangements, conduct trainings as mentioned above and medical / first aid.

## 10.9 Environmental Management Plan

The Environmental Management Plan (EMP) provides the framework for the implementation of mitigating measures and environmental management and monitoring during the construction and operational stages of the project. This document contains all commitments made in the EIA Report and can be used as a reference document to ensure that all environmental protection measures are

implemented. This annotated outline presents information, which is included in the proposed Environmental Management Plan.

The detailed Environmental Management Plan having statement of impacts, setting of targets to achieve goals to protect environment, suggestion of mitigation measures and assigning of responsibilities in the Table 10.5 at the end of this section.

Table 10.5: Environmental Management Plan (EMP)

Sr. No.	Project Component or Impact	Target	Action	Responsibility
<b>DESIGN STAGE</b>				
<b>d. Physical Environment</b>				
	Air Emissions	To avoid any deterioration of air quality	<p>The following mitigatory measures will be suggested at the design level / stage:</p> <ul style="list-style-type: none"> <li>▪ The most modern, advanced and latest state of the art technology will be selected for Biomass Boiler and Standby Power generators.</li> <li>▪ Concrete foundations will be designed where Biomass Boiler and Standby Power generators will be placed.</li> <li>▪ Cyclone and Wet Scrubber will be installed at the stack of Biomass Boiler to eliminate / minimize the smoke parameters to an acceptable level ultimately compliance of PEQS.</li> <li>▪ Standby Power generators will be equipped with sound proof canopy/room, smoke arrestors, proper height of stack, etc.</li> </ul>	Design Consultant / Proponent
	Wastewater	To comply with PEQS by treating wastewater affectively through ETP	<p>The following mitigation measures will be suggested at design level/stage for the treatment and safe disposal of treated wastewater without any damage on the environment:</p> <ul style="list-style-type: none"> <li>▪ Bio-cleaner based technology ETP/WWTP will be get designed to install from a competent firm for the treatment of wastewater/sewerage.</li> <li>▪ The treated wastewater will be used for watering of vegetation / landscaping within project premises.</li> <li>▪ And the surplus treated wastewater will be disposed off in to wastewater channel.</li> </ul>	Design Consultant / Proponent
1.	Emergency Response	Incorporate in design of building emergency exits and routes and to mitigate emergency	<p>The following mitigation measures will be adopted to minimize or eliminate the emergency situations:</p> <ul style="list-style-type: none"> <li>▪ The design of building will also include emergency exits which can be used during emergency situation emergency routes/pathways will also be well marked.</li> </ul>	Design Consultant / Proponent

		conditions	<ul style="list-style-type: none"> <li>▪ Adequate internal and external water distribution system will be designed, which could also supply adequate quantity of water for firefighting during emergency.</li> </ul> <p>Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic &amp; manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.</p>	
<b>e. Ecological Environment</b>				
2.	Impacts on Flora	To avoid negative impact and undertake beautiful landscaping after construction	<ul style="list-style-type: none"> <li>▪ Construction activities will be done in such a way to avoid any negative impact on flora of the project area and outside the premises present if any.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of construction phase of the project.</li> </ul>	Design Consultant / Proponent
3.	Impacts on Fauna	To ensure that fauna may be affected at minimum level	<ul style="list-style-type: none"> <li>▪ As mentioned earlier no nay type of fauna is present at site and the construction / installation activities for the development of project will be done in such a way fauna (wild birds) outside the premises / of the project area may not be disturbed.</li> <li>▪ The most modern, advanced and latest technology will be selected which have low operational noise and other impacts on environment.</li> <li>▪ Proper foundations will be constructed with rubbers for shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.</li> <li>▪ Trees will be planted around the building as buffer zone and which will act as sound barrier too.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract fauna (wild birds) to nest here.</li> </ul>	Design Consultant / Proponent

<b>f. Socio-economic Environment</b>				
6.	Changes in Land value	Not required	<ul style="list-style-type: none"> <li>This will be minor positive impact and not required any mitigation measure.</li> </ul>	Design Consultant / Proponent
<b>CONSTRUCTION STAGE</b>				
<b>d. Physical Environment</b>				
1.	Impacts on Air Quality	To implement mitigatory measures to avoid any negative impact on ambient air	<ul style="list-style-type: none"> <li>Regular water sprinkling will be done on construction material like sand, soil/clay etc. and exposed areas of site for civil construction/excavations.</li> <li>Construction machinery will be maintained or overhauled in time to avoid any negative impact from their smoke especially standby power generator.</li> </ul>	Contractor / Proponent
2.	Disposal of Construction Solid Waste	To avoid degradation of soil	<ul style="list-style-type: none"> <li>The construction waste will be carefully examined and disposed off in an environment friendly manner by transporting it in closed containers and filling at appropriate sites.</li> <li>It is also desirable to utilize the waste in such a way that it is consumed for the construction of any other structure within the Project Site or in the immediate vicinity.</li> </ul>	Contractor / Proponent
<b>e. Ecological Environment</b>				
3.	Impacts on Flora	To avoid negative impact on flora of surroundings	<ul style="list-style-type: none"> <li>Construction activities will be done in such a way to avoid any negative impact on flora of the surrounding if any present.</li> <li>Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project.</li> </ul>	Contractor / Proponent
4.	Impacts on Fauna	To ensure that fauna may not be disturbed	<ul style="list-style-type: none"> <li>Construction activities will be done in such a way to avoid any negative impact on fauna (wild birds) of the surrounding if any present as well as of the project area.</li> <li>Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project.</li> <li>Landscaping may attract the fauna (wild birds) to nest here.</li> </ul>	Contractor / Proponent
<b>f. Socio-economic Environment</b>				



5.	Employment Generation	Not required	<ul style="list-style-type: none"> <li>▪ Employment generation will be positive change.</li> </ul>	Contractor / Proponent
6.	Health and Safety of Workers	To ensure health & safety of construction workers, visitors and member of public	<p>Implementation of the following measures will ensure health and safety of the workers during the construction stage:</p> <ul style="list-style-type: none"> <li>▪ The Contractor will ensure that the construction workers / laborers are trained in safety procedures for all relevant aspects of construction;</li> <li>▪ Proponents of the Project will make regular checks to ensure that the contractor is following safety working procedures/safety measures.</li> <li>▪ Formal emergency procedures will be developed for construction site in case of an accident.</li> <li>▪ First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident.</li> <li>▪</li> </ul>	Contractor / Proponent
<b>OPERATIONAL STAGE</b>				
<b>d. Physical Environment</b>				
1.	Air Quality	To avoid degradation of air and to comply with PEQS	<p>In order to minimize air pollution, following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>▪ An air quality monitoring and improvement plan will be developed and implemented to keep the air pollution level within the limits of Punjab Environmental Quality Standards (PEQS)</li> <li>▪ Cyclone and wet scrubber will be installed at stack of Biomass Boiler to minimize PM and other flue gases according to the requirements of PEQS.</li> <li>▪ Standby power generators will be placed at concrete foundation equipped with shock absorber rubbers, sound proof canopy, silencer, smoke arrestor and stack with proper height.</li> <li>▪ Maintenance and overhauling schedule will also be developed.</li> <li>▪ Standby power generator and boiler will be maintained or</li> </ul>	Factory Management / Proponent



			<p>over hauled well within time according to schedule and periodically checked or inspected to avoid any excessive smoke.</p> <ul style="list-style-type: none"> <li>▪ No leak system by proper maintenance of valves, seals &amp; flanges</li> <li>▪ Well capped containers</li> <li>▪ Good housekeeping,</li> </ul>	
2.	Noise	To mitigate the noise problem	<ul style="list-style-type: none"> <li>▪ Proper foundation of the plant machinery, standby power generator &amp; boiler will be designed and constructed to cope with the problem of tremor / vibration which will consequently abate the noise problem.</li> <li>▪ Noise level monitoring and improvement plan will be developed and implemented with letter &amp; spirit.</li> <li>▪ The standby power generators and boilers will be over hauled and well-tuned according to the schedule to avoid excessive noise.</li> <li>▪ Proper set back will be provided from the boundary wall which will also help to minimize / eliminate the noise pollution.</li> <li>▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber.</li> </ul>	Factory Management / Proponent
3.	Water Consumption	To ensure that project operation may not exert any negative change on water table	<ul style="list-style-type: none"> <li>▪ At open places the grassy lawns will be developed to recharge the water table which is help to control the surface runoff during rainy season.</li> <li>▪ More landscaping will also be done at available open place after completions of project</li> <li>▪ The overall nature of the area is agricultural it is also help to recharge the water table.</li> <li>▪ The workers will be given training to avoid wastage of water.</li> </ul>	Factory Management / Proponent
4.	Wastewater Generation	To ensure to comply with NEQS	<ul style="list-style-type: none"> <li>▪ Bio-cleaner based technology WWTP / ETP with capacity of 6000 gallons / day will be installed for the treatment of the wastewaters to fulfill the compliance of PEQS.</li> </ul>	Factory Management / Proponent

			<ul style="list-style-type: none"> <li>▪ After treatment, the treated wastewater will be used for watering of vegetation / landscaping within the project premises.</li> </ul>	
5.	Solid Waste Generation	To establish proper management plan for safe disposal of solid waste	<ul style="list-style-type: none"> <li>▪ The wood will be used in biomass boiler of the proposed project.</li> <li>▪ The recyclable waste including empty carton, packaging waste, polythene bags, etc. will be handed over to EPA Approved waste contractor.</li> <li>▪ Organic waste to be produced from kitchen / will be handed over to mess contractor who then will dispose off properly as per local Govt. policy like MSW wastes.</li> <li>▪ A track record of solid waste will be maintained.</li> </ul>	Factory Management / Proponent
6.	Emergency Response	To prepare emergency plan and proper procedures to cope with emergency conditions	<ul style="list-style-type: none"> <li>▪ A comprehensive Emergency Response Plan (ERP) for emergency / fire conditions and disastrous situations will be developed and implemented whole heartedly during the operational phase of the project.</li> <li>▪ Adequate internal and external water distribution system / fire hydrant system will be designed, which could also supply adequate quantity of water for firefighting during emergency.</li> <li>▪ Firefighting arrangements have been undertaken according to the requirements of Civil Defense Department and international standards.</li> <li>▪ Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic &amp; manual), smoke detectors, heat detectors, gas detectors, etc. will be provided at many locations where necessary.</li> <li>▪ Emergency assembly points will be marked and factory workers will be trained to cope with any emergency situation.</li> <li>▪ Regular training workshops &amp; emergency / fire drills of workers will be scheduled to be held regularly.</li> </ul>	Factory Management / Proponent

			<ul style="list-style-type: none"> <li>▪ All firefighting, emergency and safety equipment shall be frequently checked and properly maintained.</li> <li>▪ Safety signs, emergency exits, emergency routs will be displayed &amp; mentioned at many / appropriate places.</li> <li>▪ Emergency exits and routs will be kept clear from obstacles to avoid any hurdle / panic while emergency condition.</li> </ul>	
<b>e. Ecological Environment</b>				
7.	Impacts on Flora	To avoid negative impact and undertake beautiful landscaping after construction	<ul style="list-style-type: none"> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be developed at available open places in the proposed unit.</li> <li>▪ To avoid any negative impact on flora of the site and flora of project area / outside area, air emissions and wastewater quality will be monitored and kept controlled within PEQS limits.</li> </ul>	Factory Management / Proponent
8.	Impacts on Fauna	To ensure that fauna may not be affected	<ul style="list-style-type: none"> <li>▪ Best and latest technology will be selected which have low operational noise and emissions.</li> <li>▪ Proper foundations will be constructed with shock / vibration absorbers to avoid tremor / vibration which may increase the noise level.</li> <li>▪ Trees will be planted around the building as buffer zone and play as sound barrier.</li> <li>▪ Beautiful landscaping including grown trees, ornamental / flowering plants &amp; grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which may attract the fauna (wild birds) to nest here.</li> <li>▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.</li> </ul>	Factory Management / Proponent
<b>f. Socio-economic Environment</b>				
9.	Employment Generation	Not required	<ul style="list-style-type: none"> <li>▪ Employment generation will be positive impact.</li> </ul>	Factory Management / Proponent
10.	Generation of Revenue	Not required	<ul style="list-style-type: none"> <li>▪ Generation of revenue or taxes which will be paid to Govt., will be positive impact.</li> </ul>	Factory Management /



11.	Health and Safety of Workers	To ensure health & safety of workers by giving them proper information, instructions, training, supervision and provision of complete PPEs according to the nature or requirement of their jobs	<p>To mitigate the hazards of health and safety of workers the following mitigations measures will be undertaken:</p> <ul style="list-style-type: none"> <li>▪ No worker aged below 18 years or over 60 years shall be employed for any job involving physical handling of hazardous substances.</li> <li>▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures.</li> <li>▪ Protective clothing and equipment comprising helmet of cloth cap, safety spectacles or goggles, respirators or masks, rubber or plastic gloves and safety shoes shall be available for all workers who may be exposed to any hazardous substance, and no worker shall be permitted on job unless and until he is wearing such protective clothing and equipment.</li> <li>▪ To avoid any potential environmental hazards the workers would be trained properly so that they know the potential hazard of chemical.</li> <li>▪ Proper cross ventilation shall be undertaken to avoid from any bad smell/odor.</li> <li>▪ There will be proper arrangement to handle accidental / disastrous situation.</li> <li>▪ The instructions for the workers, safety signs and precautionary / preventive measures for the costumers / visitors would be displayed at suitable / prominent places.</li> <li>▪ Adequate supply of water shall be made available to the workers for personal washing as well as for washing their protective equipment.</li> <li>▪ Protective clothing and equipment of the workers shall be washed and cleaned as often as required to ensure their efficiency.</li> <li>▪ No worker shall be permitted to eat, drink or smoke till he has removed his protective clothing and equipment, washed</li> </ul>	<p>Proponent</p> <p>Factory Management / Proponent</p>
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			<p>his hands and face and left the place of work.</p> <ul style="list-style-type: none"><li>▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff.</li><li>▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.</li></ul>	
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## Section 11: STAKEHOLDERS CONSULTATION

### 11.1 General

Consultation with the stakeholders is a tool for managing two-way communication between the project sponsor and the affected public. Its goal is to improve decision-making and build understanding by actively involving individuals, groups and organizations, which have a stake in the project. This involvement increases project's long-term viability and enhances its benefits to locally affected people and other stakeholders.

In order to evaluate the socioeconomic and environmental impacts, field surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. To identify the different types of stakeholders and ascertain their perceptions about the establishment of the proposed project (safety matches manufacturing unit) located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur, an Impact assessment survey was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following pages.

### 11.2 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the Project on the stakeholders and in the successful implementation and execution of the proposed projects. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision-making. The objective of the consultation with stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the construction of the proposed project.

Public Consultation is a mandatory part of the EIA process for development projects. It is a tool used for communication with a diverse group of stakeholders having multifarious aims such as information dissemination, exchanging views, soliciting feedback and suggestions on issues pertaining to the project, plan future actions. The adequacy of the public consultation and information disclosure is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

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

- Inform the public about what is proposed project
- Identify and involve all stakeholders, especially local residents, in the consultative and participation process
- Share information with stakeholders on the design and construction of the proposed project and anticipated impacts on the physical, biological and socioeconomic environment of the project area

- Understand stakeholders' concerns regarding various aspects of the project, including the existing available facilities and problems, construction of the project and the likely impacts (positive & negative) of construction and operation related activities
- Understand the perceptions, assessment of social impacts and concerns of the communities in the vicinity of the proposed project
- Provide an opportunity to the public in the public consultation session to provide valuable suggestions for the project design in a positive manner
- Reduce the chances of conflict through the early identification of controversial issues, and consult them to find acceptable solutions.
- This section describes the outcome of the public consultation sessions held with different stakeholders that may be directly or indirectly affected by the proposed project.
- Information dissemination, education, and liaison;
- Identification of problems and needs;
- Collaborative problem solving;
- Reaction, comment and feedback on proposed project;
- Documenting mitigation measures proposed by the stakeholders;

### 11.3 Methodology

The EIA Team carried out public consultations at various locations around the proposed project Site. For ascertaining the perceptions of different stakeholders about the project (during construction/operation) consultation meetings were held with them in the vicinity of the proposed project. Consultation was carried out in order to establish stakeholder's opinion regarding project implementation. The methods used for public consultation with project stakeholders include Scoping Sessions, Formal Meetings, Informal Meetings and Individual Interview. All the stakeholders were briefed about the project verbally. Their feedback was noted, and all the concerns voiced in the discussion were relayed to the management team of the project.

The stakeholders' consultation during this phase of the work targeted the project area, administrative and private offices, Government offices, shops, etc. near the Project area:

- Selection of the stakeholders for consultation, reconnaissance of the proposed project site and initial discussions with the neighboring factory workers, villagers, shopkeepers, drivers etc.
- Appraising the targeted stakeholders initially for the purpose of consultation and working out a schedule for holding regular consultation meetings;
- Meetings with the stakeholders through the participation of environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

### 11.4 Categories of Stakeholders Consulted

The stakeholders contacted during the survey belonged to different categories of people are as under:

#### 11.4.1 Proponent's Environment Management Team

Possible potential impacts and mitigation measures related to the proposed project while its construction / developmental and operational phases were discussed in detail with the project proponent / company management. They assured to undertake all suggested mitigation measures to control or eliminate or minimize to an acceptable level any anticipated potential impact generated by the proposed project and to make the subject project environment friendly. The environmental management team of the proponent was made aware of their responsibilities which include;

- Oversee daily activities of team members to maintain environmental management system (EMS)
- Ensure that industrial operations are in compliance with local, state and federal environmental regulations
- Follow and enforce environmental policies and procedures.

#### 11.4.2 The Responsible Authority

The proponent or its management is the responsible authority to take all mitigation measures to safe guard the environment before or prior to commence the project.

#### 11.4.3 Other Departments and Agencies

For the analysis of anticipated potential impacts detailed meetings were held with the company management, local community surrounding of the site at Multan Road, etc. Issues were discussed that might affect the environment and also the implementation of proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan (EMP) provided in this EIA Report.

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. The purpose of such consultation is to obtain feedback from relevant person.

#### 11.4.4 Environmental Practitioners and Experts

Environmental expert's team of M/s Sustainable Environmental Solutions (SES) visited the proposed project site / area, had discussions with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own business, doctors, lawyers, some in abroad, government employees, teachers, in agriculture, etc. People provide the massive information about the project and have positive remarks regarding the project development.

### 11.4.5 Affected & Wider Community

There is no affected community present in the radius of the study area. SES team has consulted the people of surrounding the project site especially at Multan Road. The people provided positive remarks regarding the proposed project. Stakeholders participation Performa's / socio-economic questionnaire were get filled by the people to evaluate the project impacts especially socio-economic impacts. Stakeholders Performa / socio-economic questionnaire attached as appendices with this EIA Study.

### 11.5 Consultation Meetings and Formal & Informal Group Discussions

Among all stakeholders some major stakeholders were identified in the proposed project area. Consultation meetings regarding project impacts, their magnitude and mitigation measures were held with the Management of company, environmental practitioners, local residents around the project or in close vicinity of the project site or project area, pedestrians, general public, customers and pedestrians to know their concerns regarding proposed project. Scoping sessions and meeting were conducted with these stakeholders. Generally, it was found that people were already aware of the proposed project because the project is to be located in the area where various industries are being established there time to time. Majority of the stakeholders showed their full support for the proposed project.

Following are the other concerns/ suggestions of the stakeholders;

- Exposure of noise and dust pollution will cause disturbance and health & safety issues to the local residents and other stakeholders throughout the construction stage due to the movement of construction machinery and transportation of construction materials. The effects of noise and dust pollution on the local residents should be minimized by making necessary arrangements. Dust pollution should be controlled by water sprinkling on regular basis.
- Due to the movement of loaded trucks during the construction period of proposed project, congestion on the access road will increase. Proper diversion route rather than access road should be clearly defined to avoid traffic blockage during the entire construction period.
- Local residents should be given priority for jobs during construction as well as operational phase of the project
- Public utilities should not be disturbed. Arrangements should be made to minimize the disruption of public utilities or should be rehabilitated on priority basis to reduce the impacts.
- A detailed health and safety plan must be developed to mitigate the construction and operational risks of the proposed project
- Solid waste and wastewater produced during construction and operational phases should be disposed of timely and appropriately.
- Overall activities of the project;
- Possible impacts on natural vegetation, land and properties;
- Possible mitigation measures;
- Benefits of the project specifically for the local people.

Mitigation measures proposed by EIA consultants for addressing the stakeholder's concerns are as follows;

- Significant efforts including change in design should be adopted to minimize the physical and economical disturbance of the local residents.
- Local residents should be given priority while hiring manpower during construction and operational phases of the proposed project.
- Construction machinery should be placed at adequate locations away from the sensitive areas to minimize the impacts related to the noise.
- Project facilities should be located outside the existing residential areas. In order to avoid restricting the daily movement of the local stakeholders; construction vehicles should remain confined within their designated areas of movement
- The utilities to be shifted due to the implementation of the proposed project should be rehabilitated on priority basis to minimize the impacts on the stakeholders. Landscaping must be done.
- Solid waste and wastewater generated during construction at site should be disposed of safely and in an appropriate manner to not impact the environment
- All necessary measures should be taken to ensure the safety of traffic during construction, including barricades (including signs boards, pavement markings, flags, and lights).
- Dust and noise levels should be kept to minimum employing the best suitable and effective mitigation measure
- The construction activities must be confined within the project site boundary

### 11.6 Findings of the Overall Discussion

- After the completion of the proposed project the site will be used for industrial activities.
- The proposed project will help to fulfill the increasing demand of ingots and billets.
- It will enhance the socioeconomic conditions/values of the area
- Project will increase revenue generation for the Government
- It will create employment opportunities
- Local people should be given preference for employment in the proposed project
- Construction of the proposed project should be completed in the designated timeframe to limit adverse impacts of construction.
- It will provide the employment to the people
- It will give a lift to national economy in due course

Majority of people favored the proposed project in a sense that the construction of the proposed project will fulfill the vital need of ingots and billets, generate employment opportunities and revenue for the government and enhance the socioeconomic conditions of the area.

## SECTION 12: CONCLUSION AND RECOMMENDATIONS

### 12.1 Conclusion

There are many concerns i.e. legal, social, economic, cultural and environmental on the proposed safety matches manufacturing unit namely M/s Popular Match Industries (Pvt.) Ltd. (Unit-4) located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.

The impacts during all of three stages design, construction and operation of the proposed project such as impacts on physical environments including changes in land use/appearance, seismic hazard, soils/geology, impacts on topography, impacts on air quality, noise pollution, impacts on groundwater, water consumption, wastewater generation, solid wastes, emergency conditions; ecological environment including impacts on flora & fauna and socio-economic environment including health and safety of workers, etc. have been considered and estimated/assessed in the light of nature of project, production process, visit of project site & area and stakeholders / public consultation including interviews, comments & feedback.

Baseline environmental and socio-economic information has been collected from a variety of sources including survey of the project area, private offices, government departments and published literature. Collected information has been used to compose the environmental profile likely to be affected by the project. Details of these impacts have been discussed in the preceding section of this study.

The impact of the planned activities in the project area will be insignificant. Necessary mitigation measures proposed in the report have been made part of the project activities.

After the:

- Survey of the project site area;
- Collection of baseline data,
- Study of impacts during design, construction and operational phases and their mitigations.
- The intellectual expertise and experiences have been incorporated in preparation and suggesting mitigation measures by the EIA Study preparation team.
- The mitigation measures suggested in the EIA Report is sufficient to complete and run the project in an environment friendly manner.
- Sustainability has also been ensured by recommending extensive plantation / landscaping after the completion of project.

It has been concluded that the proposed project is feasible at the proposed site from physical, ecological & socio-economic environmental point of view after implementation of mitigation measures suggested in Section 6 & EMP of this EIA Study. The mitigation measures are sufficient to ensure the sustainable development.

### 12.2 Recommendations

Following recommendations are suggested to protect the environment and for the safe development and operation of the proposed project while its construction & operational phase as well as for existing unit:

- Environmental Management and Monitoring Plan (EMMP) suggested in this EIA Report should be strictly followed and operational throughout the project life. All monitored data should be reported to the EPA Punjab, Lahore for scrutiny at their end.
- Effluent Treatment Plant / Waste Water Treatment Plant must be installed for the treatment of wastewater producing from the proposed project for compliance of PEQS ultimately for the safeguard of environment.
- Cyclone and Wet Scrubber must be installed on the stack of Biomass Boiler, so the concentrations of emissions may be eliminated or minimized as prescribed values of PEQS.
- Solid waste management plan including safe storage, segregation (on site or off site by contractor), transportation and safe disposal should be developed and track record will be maintained.
- Environmental Monitoring plan including air quality monitoring, wastewater analysis and noise level should be developed and implemented to keep all the parameters within the limits of Punjab Environmental Quality Standards (PEQS) and specially to evaluate the performance of mitigation measures and control devices such as ETP, Cyclone, Wet Scrubber, Firefighting arrangements, PPEs, etc.
- Emergency Response Plan (ERP) should be developed and implemented with letter & spirit.
- ERP should be reviewed and update as necessary, periodically or annually.
- Sufficient / appropriate firefighting arrangements according to the requirements of Civil Defense Department and international standards should be undertaken.
- Firefighting arrangements including fire hydrant system connected with adequate water reservoir, fire extinguishers (DCP, AFFF, CO<sub>2</sub>, etc.), Sand Buckets, fire alarm system (automatic & manual), smoke detectors, heat detectors, gas detectors, etc. should be provided at many locations where necessary.
- Above mentioned firefighting arrangements should be inspected periodically as per schedule and maintained.
- Safety signs, emergency exits, emergency routs should be displayed & mentioned at many / appropriate places.
- Emergency exits and routs should be kept clear from obstacles to avoid any hurdle / panic while emergency condition.
- The workers should be provided with complete PPEs according to the nature or requirement of their jobs including Protective clothing / apparel and others comprising face masks, rubber or plastic gloves and safety shoes and no worker should be permitted to perform their job unless and until he is wearing such protective clothing and PPEs.
- All workers should be thoroughly trained in environment, health & safety precautions.
- Adequate supply of water should be made available to the workers for



- personal washing as well as for washing their protective equipment.
- Protective clothing and equipment of the workers should be washed and cleaned as often as required to ensure their efficiency.
  - No worker should be permitted to eat or drink at work place & till he has removed his protective clothing and equipment, washed his hands and face and left the place of work.
  - First aid boxes equipped with required antidotes should be available in the premises, supervised by trained staff.
  - Medical checkup of all workers should be carried out at the time of employment and at least once a year thereafter.

# **APPENDICES**

**GLOSSARY**

## GLOSSARY

### A

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**Approach** - a way of dealing with a situation or problem. "we need a whole new approach to the job", synonyms: attitude, slant, perspective, point of view, view point, outlook, line of attack, line of action

**Analysis** - detailed examination of the elements or structure of something. "statistical analysis"; synonyms: examination, investigation, inspection, survey, scanning, study, scrutiny, perusal

**Accident** – unplanned event results in injury or ill-health of people or damage or loss to property, plant, materials or the environment or a loss of business opportunity

**Accommodate** – cater, ply, provide, supply; "give what is desired or needed, especially support, food or sustenance"

*Other:* (of a building or other area) provide lodging or sufficient space for. "the cottages accommodate up to six people"

**Associated** – (of a person or thing) connected with something else. "two associated events"

**Accordingly** – in a way that is appropriate to the particular circumstances. "we have to discover what his plans are and act accordingly"

**Accordance** – in a manner conforming with "the ballot was held in accordance with trade union rules"

**Assessment** – the action of assessing someone or something "the assessment of potential environmental impacts of the project activity"

**Aid** – help, typically of a practical nature. "he saw the pilot slumped in his cockpit and **went to his aid**"

**Aforesaid** – Another term for aforementioned. **synonyms:** above, above-stated, foregoing, preceding, precedent, earlier, previous, same, selfsame "the insurer undertakes to insure the aforesaid items against all risks"

**Adverse** – Preventing success or development; harmful; unfavorable. "taxes are having an adverse effect on production"

**Arise** – (of a problem, opportunity, or situation) emerge; become apparent. "new difficulties had arisen"

**Authorized** – having official permission or approval. "an authorized dealer"

**Administrative** – relating to the running of a business, organization, etc. "administrative problems"

**Assembly** – a group of people gathered together in one place for a common purpose. "an assembly of dockers and laborers"

**Amendment** – a minor change or addition designed to improve a text, piece of legislation, etc. "an **amendment to** existing bail laws"

**Alternative** – (of one or more things) available as another possibility or choice. "the various alternative methods for resolving disputes"

**Anticipated** – regard as probable; expect or predict. "she anticipated scorn on her return to the theatre"

**Ambient Air** – **Ambient air** quality refers to the quality of outdoor **air** in our surrounding environment. It is typically measured near ground level, away from direct sources of pollution.

**Air quality:** A measure of the health-related and visual characteristics of the air often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

**Alternative:** Any one of a number of options for a project.

**Ambient:** Of the environment surrounding a body, encompassing on all sides. Most commonly applied to air quality and noise.

**Amphibians** – a cold-blooded vertebrate animal of a class that comprises the frogs, toads, newts, salamanders, and caecilians. They are distinguished by having an aquatic gill-breathing larval stage followed (typically) by a terrestrial lung-breathing adult stage.

**Archaeological** – the scientific study of material remains (as fossil relics, artifacts, and monuments) of past human life and activities.

## **B**

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**Baseline:** The existing conditions against which impacts of the proposed action and its alternatives can be compared.

**Biological** – relating to biology or living organisms. **Synonyms:** biotic, biologic, organic, living; More **2.** (of a member of a person's family) genetically related; related by blood. "His biological mother"

**Bio-medical Waste** - Biomedical waste, also known as infectious waste or medical waste, is defined as solid waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Biomedical waste includes syringes, live vaccines, laboratory samples, body parts, bodily fluids and waste, sharp needles, cultures and lancets.

**Building Materials** – **Building material** is any **material** which is used for construction purposes. Many naturally occurring substances, such as clay, rocks, sand, and wood, even twigs and leaves, have been used to construct **buildings**.

**Bricks** – a small rectangular block typically made of fired or sun-dried clay, used in building.

## **C**

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**Capacity** – the maximum amount that something can contain.

**Characteristics** – a feature of quality belonging to a person, place, or thing and serving to identify “qualities or features that belongs to someone or something and make it recognizable”

**Concrete** – existing in a material or physical form; not abstract. "concrete objects like stones"

**Cater** – provide people with food and drink at a social event or other gathering. "my mother helped to **cater for** the party"

**Categories** – a class or division of people or things regarded as having particular shared characteristics. "The various categories of research"

**Construction Waste** – Construction waste consists of unwanted material produced directly or incidentally by the construction or industries.

**Community** - a group of people living in the same place or having a particular characteristic in common. Synonyms: group, section, company, set, circle, clique, coterie, ring, band, faction

**Conveyor** - An apparatus for moving material from one point to another in a continuous fashion. This is accomplished with an endless (that is, looped) procession of hooks, buckets, wide rubber belt, etc.

**Cultivation** – the action of cultivating land, or the state of being cultivated. "the cultivation of certain of certain crops"

## **D**

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**Dangerous Occurrence** – a near miss which could have led to serious injury or loss of life

**Database** - a database is a collection of information that is organized so that it can be easily accessed, managed and updated.

**Deposition** – the action of depositing someone, especially a monarch.

**Disposal** – the action or process of getting rid of something.

**Dimensions** – an aspect or feature of a situation, object

**Determined** – having made a firm decision and being resolved not to change it.

## **E**

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**Ecological** – Relating to or concerned with the relation of living organisms to one another and to their physical surroundings. "pollution is posing a serious threat to the ecological balance of the oceans"

**Emission** – Effluent discharged into the atmosphere, usually specified by mass per unit time, and considered when analyzing air quality.

**Environmental impact** – Any change to the environment either positive or negative, fully or partially from an organization's activity

**Emission** – the production and discharge of something, especially gas, or radiation." The effects of lead emission on health"

**Evaluate** – form an idea of the amount, number, or value of; assess. "The study will assist in evaluating the impact of recent changes"

## **F**

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**Fill** - Any material that is put back in place of the extracted ore to provide ground support.

**Ferrous** – (chiefly of metals) containing or consisting of iron

**Flora** – the plants of a particular region, habitat, or geological period.

**Fauna** – the animals of a particular region, habitat, or geological period. "the flora and fauna of Siberia"

## **G**

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**Groundwater:** Subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

**Guidelines** – Any guide or indication of a future course of action:

**Generation** – the production or creation of something

## **H**

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**Hazardous** – Risky; dangerous. "we work in hazardous conditions"

## **I**

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**ill-Health** – a disease or medical condition that is directly attributed to work

**Incident** – work related events in which injury or ill-health could have occurred

**Infrastructure:** The facilities, services, and equipment needed for a community or facility to function, such as and including roads, sewers, water lines, and electric lines.

**Indiscriminate** – Done at random or without careful judgment.

**Implementation** – The process of putting a decision or plan into effect; execution.

## **L**

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**Layout** - The design or pattern of the main roadways and workings. The proper layout of mine workings is the responsibility of the manager aided by the planning department.

**Land use plan:** A plan or document developed by a government entity, which outlines specific functions, uses, or management-related activities of an area, and may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use.

## **M**

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**Magnitude** – the great size or extent of something, a number characteristic of a quantity and forming a basis for comparison with similar quantities, as length  
*Synonyms:* immensity, vastness, hugeness, enormity, enormousness, expanse

**Mechanisms** – Machinery or mechanical appliances in general.

**Manufacturing** – The thing or material manufactured; product:

**Mitigation Measures** – the arrangements to cover the organization's activities which can affect the environment "effluent treatment plant is necessary for the treatment of process wastewater"

**Monitoring** – An instrument for detecting dangerous gases, radiation, etc.

## **N**

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**Near-miss** – any incident that could have resulted in an accident

**Noise** – Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities.

**Nuisance** – activity, conduct, or situation (such as loud noise, offensive odor, obstruction of traffic) that cause annoyance, inconvenience, or interference with the use or enjoyment of land or building (private nuisance), or with the comfort, health, or safety of the public (public nuisance)

## **O**

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**Organic** – A substance, especially a fertilizer or pesticide, of animal or vegetable origin.

**Occur** – happen; take place.

**Operational** – Fit for proper functioning; ready for use:

## **P**

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**Potential** – having or showing the capacity to develop into something in the future; Synonyms: possible, likely, prospective, probable, budding, in the making, etc.

**Prediction** - a thing predicted; a forecast, the action of predicting something, "the prediction of future behaviour"

*Synonyms:* forecast, prophecy, divination, prognosis, prognostication, augury;

**Prevailing** – having superior power or influence.

**Prevent** – To anticipate or counter in advance.

**Prior** – Proceeding in importance or privilege.

**Proximity** – nearness in space, time, or relationship. *Synonyms:* closeness, nearness, presence, juxtaposition, propinquity, adjacency

## **R**

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**Resources** - assets that can be drawn on by a person or organization in order to function effectively. *Synonyms:* assets, funds, wealth, riches, capital

**Restoration** - the action of returning something to a former owner, place, or condition *Synonyms:* repair, fixing, mending, refurbishment, reconditioning, rebuilding, reconstruction, remodeling, redecoration, revamping, makeover, overhaul

**Rehabilitation** - the action of restoring something that has been damaged to its former condition. "the rehabilitation of the mangrove forests"

**Representative** – Typical of a class, group, or body of opinion.

**Renovation** – the action of renovating a building.

**Regulations** – A rule or directive made and maintained by an authority.

**Rapid** – happening in a short time or at a great rate. "the country's rapid economic decline"

**Risk** – any object of situation that has potential to cause harm

## **S**

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**Significant** – Sufficiently great or important to be worthy of attention; noteworthy, "a significant increase in sales"

**Sanitary** – relating to the conditions that affect hygiene and health, especially the supply of sewage facilities and clean drinking water

**Socioeconomic – Socioeconomics** (also known as **socio-economics** or social economics) is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how societies progress, stagnate, or regress because of their local or regional economy, or the global economy.

**Scope** – the extent of the area or subject matter that something deals with or to which it is relevant "We widened the scope of our investigation"

**Surroundings** – the things and conditions around a person or thing "I took up the time admiring my surroundings"

**Sustainable** – Able to be maintained at a certain rate or level. "Sustainable economic growth"

**Stakeholders** – a person with an interest or concern in something, especially a business.

## **T**

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**Ton** – A short or net ton is equal to 2,000 pounds; a long or British ton is 2,240 pounds; a metric ton is approximately 2 to 205 pounds.

**Topography** – The shape and features of the surface of the earth It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

This handy word is a Greek-rooted combo of topos **meaning** "place" and graphein "to write."

**Transportation** – the action of transporting someone or something or the process of being transported "the era of global mass transportation"

## **U**

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**Ultimately** – Being or happening at the end of a process; final "their ultimate aim was to force his resignation"

## **V**

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**Ventilation** - Portion of main ventilating current directed to face of dead end entry by means of an auxiliary fan and tubing.

**LIST OF ABBREVIATIONS**

## LIST OF ABBREVIATION

BOD <sub>5</sub>	<b><i>Biochemical Oxygen Demand</i></b>
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
COD	Chemical Oxygen Demand
CSW	Construction Solid Waste
DO	Dissolved Oxygen
EA	Environmental Approval
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMMP	Environmental Management & Monitoring Plan
EMS	Environmental Management System
EMT	Environmental Management Team
EPA	Environmental Protection Agency
ETP	Effluent Treatment Plant
GOP	Government of Pakistan
HC	Horticulture Committee
IEE	Initial Environmental Examination
LESCO	Lahore Electric Supply Company
LSA	Local Study Area
MSW	Municipal Solid Waste
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
NO	Nitric Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxide
NSL	Normal Surface Level
O <sub>2</sub>	Oxygen
PEPA- 97 (amended-12)	Punjab Environmental Protection Act, 1997 (As Amended 2012)
PEPA -97	Pakistan Environmental Protection Act, 1997
PEPO-83	Pakistan Environmental Protection Ordinance, 1983
PEQS	Punjab Environmental Quality Standards

PM <sub>2.5</sub>	Particulate Matter size of 2.5 micron
PM <sub>10</sub>	Particulate Matter size of 10 micron
PPEs	Personal Protective Equipment
RSA	Regional Study Area
SFT	Square Feet
SIA	Social Impact Assessment
SNGPL	Sui Northern Gas Pipelines Limited
SO <sub>2</sub>	Sulphur Dioxide
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
VECC	Valued Environmental & Cultural Component
WAPDA	Water and Power Development Authority
WWTP	Waste Water Treatment Plant

**LIST OF INDIVIDUALS AND ORGANIZATIONS  
CONSULTED ALONG WITH THEIR FEEDBACK  
& PICTORIAL PROFILE**

### List of Individuals and Organizations Consulted and their Feedback

Sr.	Name of Individuals / Organizations	Qualification / Designation	Location	Feedback
1	Abdul Haq	GM Operation	Proponent Representative	<ul style="list-style-type: none"> <li>• This manufacturing unit will meet the growing / increasing demand of Safety Matches</li> <li>• The industry will contribute towards national GDP, which is a major requirement</li> <li>• EMMP will be implemented to make the project environment friendly</li> <li>• Sewerage / Wastewater to be produced from proposed unit will be treated through ETP/WWTP and disposed off properly</li> <li>• The company will install state of the art, most modern and advanced technology ETP/WWTP for the treatment of wastewater to comply with PEQS</li> <li>• Sufficient firefighting arrangements as per requirements and international standards will be done and Emergency Response Plan will be developed.</li> <li>• Complete PPEs will be provided to the workers as per nature / requirements of their job / work.</li> <li>• The workers will be given training specific to their jobs.</li> </ul>
2	Muhammad Rehan	Manager Finance		
3.	Suleman Iqbal	Manager Civil		
4.	Arslan Ahmad	IT Incharge		
5	Muhammad Qasim	Primary	Local Residents & Pedestrians	<ul style="list-style-type: none"> <li>• Exposure of noise and dust particles will cause disturbance and health issues to the working staff during construction</li> <li>• People will get employment due to industrial development and thus socioeconomic condition of the area will get better</li> <li>• The locals will be given preference for non-skilled jobs</li> <li>• The industry will contribute towards availability of good billets.</li> </ul>
6	Muhammad Zeshan	Primary		
7	Muhammad Hashif	Middle		
8	Muhammad Hanif	Illiterate		
9	Karamat Ali	Illiterate		
10	Qurban Ali	Middle		
11	Zafar Iqbal	Middle		

				<ul style="list-style-type: none"> <li>• Area will get developed and socioeconomic condition of the area will get even better</li> <li>• This industrial unit will be reason for industrialization in the project area</li> <li>• Economy of the area will get a boost</li> <li>• The company management should implement safety measure for the safety of environment as well as health &amp; safety of workers.</li> </ul>
12	Rana Adnan Ishaq	MBA	Working Personnel in nearby Industries	<ul style="list-style-type: none"> <li>• Industrial development will contribute positive change towards economy of the area</li> <li>• Mitigatory measures like installation of ETP / WWTP must be implemented for the safe guard of environment.</li> <li>• Health &amp; safety risks should be minimized and the workers should be provided with complete PPEs.</li> <li>• Employment opportunities are very low in the country and establishment of this industry will surely employ skilled and unskilled staff which will contribute towards country's GDP.</li> </ul>
13	Ehlaq Ahmad	Matric		
14	Muhammad Usman	FA		
15	Abdul Qadir	Matric		
16	Muhammad Sarfraz	Matric		
17	Salamat Ali	Matric		
18	Abdul Rasheed	Inspector	EPA Field Office Phool Nagar	<ul style="list-style-type: none"> <li>• EMMP should be implemented whole heartedly so that the construction and operations of the unit may not affect the environment negatively.</li> <li>• ETP / WWTP must be installed to comply with PEQS</li> <li>• Environmental Monitoring should be done during the construction and operational phases of the project.</li> <li>• Environmental enhancement measures such as tree plantation, monitoring and safety should be ensured.</li> <li>• Firefighting arrangement should be done as per international standards and Emergency Response Plan should be developed.</li> </ul>





**REFERENCES**

## REFERENCES

Government of Punjab, **Punjab Environmental Protection Act, 1997** (As Amended 2012)

Government of Pakistan, **Guidelines for the Preparation of & Review of Environmental Reports, Government of Pakistan** (1997) Heading 2

Source: **Allama Iqbal International Airport (Lahore, Pakistan) weather station**  
(<https://weatherspark.com/averages/32865/Lahore-Punjab-Pakistan>)

Source: **UNEP Environment Assessment Program for Asian and the Pacific**  
(<http://www.rrcap.unep.org>)

Source: **Building Code of Pakistan (Seismic Provisions 2007)**

Source: **District Census Report Kasur**

Government of Punjab, **Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022**

Government of Punjab, **Punjab Environmental Quality Standards (PEQS), 2016**

Government of Punjab, (Draft) **Punjab Environmental Policy, 2015**

Government of Pakistan, **National Environmental Quality Standards (NEQS), 2000 & 2010**

Government of Pakistan, **National Environmental Policy, 2005**

**Management of Health & Safety at Workplace Regulations, 1999**

Government of Pakistan, **Pakistan National Conservation Strategy, 1992**

Government of Pakistan, **Guidelines for Public Consultation, Pakistan Environmental Protection Agency October, 1997**

Government of Pakistan, **Guidelines for Sensitive and Critical Areas**, 1997

Government of Punjab, **Punjab Wildlife Protection Act**, 1974

Government of Pakistan, **Factories Act**, 1934

**TERMS OF REFERENCES**

## TERMS OF REFERENCES FOR EIA REPORT

The Agreement (hereinafter called Agreement) is made between M/s Sustainable Environmental Solutions (Consultancy Firm / Consultant) and M/s Popular Match Industries Private Limited Unit-4 (the Client) to prepare Environmental Impact Assessment (EIA) Report for obtaining of Construction Phase Environmental Approval under section 12 of Punjab Environment Protection Act, 1997 (Amended 2012) from EPA, Punjab for the project (establishment of a Safety Matches Manufacturing Unit) located at 49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur.

Client has requested the consultancy firm to provide consultancy services for preparation of EIA Report and so that the client may obtain Construction Phase Environmental Approval from EPA, Punjab under section 12 of Punjab Environment Protection Act, 1997 (Amended 2012); so, mutually agreed terms and conditions are as under:

NOW THEREFORE the parties hereto hereby agree as follows:

- The client shall provide assistance and access to the requisite information / data and documents for preparation of EIA Study and for submission to EPA Punjab including feasibility study, layout plans and other project relevant documents as and when required by the consultancy firm / consultant for performance of his obligations.
- The client shall provide all available data, maps, reports, etc. about the project including but not limited to layout plan of the project. Client will provide document / information demanded by the EPA, Punjab through the Review Letter as and when required.
- The client will provide to the consultancy firm with the letter of introduction and authorization and other documents as may be necessary to enable the consultancy firm / consultant to perform the services.
- The consultancy firm / consultant shall carry out the services in accordance with the provisions of the agreement including;
- The consultancy firm / consultant shall prepare EIA Report and other file documents with due diligence, necessary / required for obtaining its Construction Phase Environmental Approval from EPA Punjab under statutory requirements of the PEPA, 1997 (amended 2012).
- The consultancy firm / consultant shall give the consultancy for the preparation of the detailed Environmental Management & Monitoring Plan (EMMP) for enhancing the environmental conditions during construction & operational phases such as mitigation measures for wastewater, solid waste, stack emissions, plantation, management of the surface runoff, mitigation of socially adverse impact if any.
- The consultancy firm / consultant will evaluate all the activities during construction & operational phases and recommend suggestions / mitigation measures to comply with PEQS.
- Consultancy firm / consultant will prepare the EIA Report and file documents in the light of information / documents provided by the client.



- The consultancy firm / consultant shall examine the entire activities and list of the details of activities likely to cause adverse impacts during and after construction phase. Consultant shall suggest mitigation measures for all such activities which may cause adverse impacts.
- The client shall be entirely liable for correctness and validity of information, data and any type of documents supplied to Consultancy Firm / Consultant and supplied to EPA, Punjab directly or through Consultancy Firm / Consultant.



For and behalf of the '**client**'  
Authorized Representative



For and behalf of the '**consultancy firm / consultant**'  
Authorized Representative

**LIST OF NAMES, QUALIFICATIONS AND ROLE  
OF TEAM MEMBERS CARRYING OUT THE IEE /  
EIA STUDY**

## List of Names, Qualification and Role of IEE Team Members

Team Members	Qualification	Role / Responsibilities
<p><b>Waheed Ahmad</b> Team Leader / Coordinator</p>	<p style="text-align: center;"><b>C. Qualification</b></p> <ul style="list-style-type: none"> <li>• M. Phil Environmental Sciences (PU)</li> <li>• M.Sc. Applied Environmental Sciences (PU)</li> <li>• Post Graduate Diploma in Environmental Laws (PU)</li> <li>• NEBOSH IGC “Occupational Safety &amp; Health”</li> <li>• IOSH “Managing Safely”</li> <li>• One Year Diploma in Environmental Management (MIIM)</li> <li>• HABC Level 2 in Fire Safety (QCF)</li> <li>• International Workplace Health &amp; Safety (British Safety Council)</li> <li>• Occupational Health &amp; Safety Management Training (OHSAS 18001)</li> <li>• Environmental Audit Training; ISO 14001 – Lead Auditor Course</li> </ul> <p style="text-align: center;"><b>D. Experience</b></p> <p>10 years of experience as Environmentalist for carrying out EIA Studies, IEE Studies, EMPs, Environmental Compliance Status Reports for various projects.</p>	<p>The responsibilities include meeting with the client, site visit, and collection of baseline data, identification of impacts, addressing mitigation of adverse impacts, preparation of environmental management plan and preparation of EIA report as per EPA guidelines. Over all supervision and technical guidance to team and preparation of IEE/EIA reports</p>
<p><b>Yahya Aslam Bambal</b> Team Member</p>	<p style="text-align: center;"><b>C. Qualification</b></p> <ul style="list-style-type: none"> <li>• M. Phil Environmental Sciences (PU)</li> <li>• M.Sc. Applied Environmental Sciences (PU)</li> <li>• Post Graduate Diploma in Environmental Laws (PU)</li> <li>• NEBOSH IGC “Occupational Safety &amp; Health”</li> <li>• IOSH “Managing Safely”</li> <li>• HABC Level 2 in Fire Safety (QCF)</li> <li>• International Workplace Health &amp; Safety (British Safety Council)</li> <li>• Occupational Health &amp; Safety Management Training (OHSAS 18001)</li> <li>• Environmental Audit Training; ISO 14001 – Lead Auditor Course</li> </ul>	<p>The responsibilities include meeting with the client, site visit, and collection of baseline data, identification of impacts, addressing mitigation of adverse impacts, preparation of environmental management plan and preparation of Impact Assessment reports</p> <p>Responsibilities are to provide assistance in arranging meetings with the stakeholders and client, conduct public consultation meetings, data collection of the social impact analysis survey and its report writing, define the baseline socioeconomic conditions of the</p>

	<ul style="list-style-type: none"> <li>• Training in “<i>Skills in Administration</i>” (Pakistan Institute of Management)</li> <li>• “<i>Value Based Management</i>” (Pakistan Institute of Human Development)</li> </ul> <p style="text-align: center;"><b>D. Experience</b></p> <p>09 years of experience as Environmentalist for carrying out EIA Studies, IEE Studies, EMPs, Environmental Compliance Status Reports for various projects.</p>	<p>project area, quantification of the infrastructure to be relocated.</p>
<p><b>Zia-Ud-Din Kasuri</b>  <b>Advocate Supreme Court</b>  (Member Legal)</p>	<ul style="list-style-type: none"> <li>• M.A</li> <li>• LLM, M. Phil</li> <li>• LLB (Shariah &amp; Law)</li> <li>• Post Graduate Diploma in Environmental Laws (PU)</li> </ul>	<p>The responsibilities include look into the matters of legal aspects of Environmental Report. Preparation of terms of references and other legal matters.</p>

**APPROVALS FROM OTHER CONCERNED  
DEPARTMENTS**



**OFFICE OF THE DISTRICT COUNCIL, KASUR.**

DISTRICT OFFICER (PLANNING)  
DISTRICT COUNCIL, KASUR

No. DO(P)/DCK/.../... DATED... 06/08/2024

Subject:

**SANCTION LETTER FOR POPULAR MATCH INDUSTRIES (PVT) LIMITED UNIT NO 4,**

(Under the provision of Section 206 in General & Clause 21 of the 7<sup>th</sup> Schedule of the PLGO 2022 in particulars and the requirement of building District Council building bye-laws in force).

Building Application submitted by Popular Match Industries (Pvt) Limited Unit No 4 through Mr. Abdul Haq S/O Ronaq Ali, At Mouza Kamogil 49Km Sarfraz Nager Bhai Pheru (Pholnager) , Tehsil Pattoki District Kasur.

For Construction of Popular Match Industries (Pvt) Limited Unit No 4 Total Land Area 78K-0M having Total Covered Area 63288 Sft located at Khsara No.2842/2,2899,2840,2841,2847,2848,2854,2855,2858,2859,2603 Khavot No.28/27,99/95 Khatoni No. 83,200 At Mouza Kamogil 49Km Sarfraz Nager Bhai Pheru (Pholnager) , Tehsil Pattoki District Kasur.

**Following Condition / Directions:-**

1. The sanctioned plan is adhered to absolutely every particulars.
2. The work will be completed within twelve months from the date of approval.
3. Privacy of adjoining building will not be disturbed.
4. The sanctioned plan shall be kept at site and presented to the authorized building officials / officers of District council Kasur on demand.
5. The date of commencement and completion must be notified to the officer concerned of District Council, Kasur.
6. In pursuance of clause 21 of seventh schedule of PLGO 2022, the VALIDITY of sanctioned building plan shall be for a period of ONE YEAR starting from the date of sanction. After the expiry of period this sanction shall have no effect whatsoever.
7. There of the ramp will be made lower than the Mattled Road. A drain will be provided in the ramp so that the waste water of this building may not come on the road to cause damage to it.
8. This building plan is sanctioned on the basis of documents submitted by the owner / builder. However this sanction shall be considered as cancelled, if anything found contrary to these documents and as result if concealments of facts of fraud at any stage if coddle formalities are not followed.
9. Responsibility regarding the STRUCTURE STABILITY of the building will lie with the owner / builder. Entire LIABILITY FOR ANY DAMAGE TO BUILDING OR LIFE shall lie with the owner / builder in this regard. It shall be the responsibility of the

- owner / builder to use sound building material good quality and property put together so as ensure safety of the building.
10. The road side berm will not be made higher than the road running in front of the plot and a Katcha drain will be provided in the berm all along the width of the plot for free passage of rain water.
  11. This plan is permissible for construction only which is to be carried out **STRICTLY IN ACCORDANCE** with approval. However **IN NO CASE** this approval shall be treated as a proof of title / ownership. **NO RESPONSIBILITY** shall lie with the DC Kasur in the event of any dispute regarding the title of the property reference.
  12. The owner / builder, in pursuance of clause 29 of the seventh schedule PLGA 2021 / bye-laws within 30 days of the completion of the building shall report to the competent authority. The building shall not be put to use before completion certificate has been obtained from the DC.
  13. The owner / builder, **WILL PAY** all charges, balance amount etc., (if any) notified by the department itself in the course of routine scrutiny or on the observation / objection of audit or made applicable at any subsequent stage.
  14. During the course of construction and in case of any **DAMAGE CAUSED** to the adjoining public utility service / roads and private property **THE DAMAGE COST SHALL BE RECOVERED FROM THE OWNER / BUILDER.**
  15. Proper drainage facility shall be provided for the disposal of rain water, sewerage connection with trunk sewer.
  16. The construction / building work shall be supervised by **REGISTERED ARCHITECT** who has been employed by the owner / builder and has affixed his seal on the in charge of building works before the same is completed. Further execution of the works shall forthwith be suspended until a fresh appointment is made as required under bye-laws 4 (i). A **CERTIFICATE** duly signed by the registered architect employed shall be obtained in token of the work or part of the work having satisfactory done under his supervision.
  17. In addition to the special conditions mentioned above, the owner / builder shall be bound to observe the **GENERAL CONDITIONS** of building bye-laws.
  18. The above Sanction of building plan is subject to No Objection Certificate from Environmental Protection Agency (EPA).

  
**DISTRICT OFFICER (PLANNING)**  
DISTRICT COUNCIL, KASUR

Copy for information:-

1. The Administrator, District Council, Kasur.
2. The Chief Officer, District Council, Kasur.

**GOVERNMENT OF THE PUNJAB**



**FORM "II"**  
[Bye-Law 4(4)]

To

Mr. Kamran Ali Roshan S/O Muhammad Suleman  
House No. 122/1, St No. 34 Khibane Muhafiz Phase 6  
DHA Karachi Southern.

**SUBJECT:** LICENSE /NOC FOR CARRING ON THE TRADE OF CHEMICALS, POSSESSION AND USE OF CHEMICALS FOR MANUFACTURING OF SAFETY MATCH BOXES

With reference to your application dated 07.11.2023 for granting License regarding Trade of chemicals i.e. possession and use of chemicals for manufacturing of safety match boxes in the territorial jurisdiction of district Kasur alongwith prescribed lisencc Fee. You are hereby granted a Lisencc for possession and use of chemicals for manufacturing of safety match boxes of the following allowed chemicals in the territorial jurisdiction of district Kasur and Licensee may be retained a copy of trade, possession and use of chemicals for manufacturing of safety match boxes as per Bye Law [See Bye-Law 7 (3)].

2. During the term of License you will abide by all prescribed terms and conditions and by-laws on the subject matter as may be directed or conveyed by Government of the Punjab from time to time.

The Lisencc is granted to you as per following particulars.

Name: Kamran Ali Roshan S/O Muhammad Suleman  
 CNIC No. 42201-4005327-7  
 Term of License: 01<sup>st</sup> July 2024 to 30th June 2025.  
 Description of the premises: M/s. Popular Match Industries (Pvt) Ltd Unit No. 04, 49 Km Multan Road Sarfraz Nagar Bhai Pheru Tehsil Pattoki District Kasur.

Maximum Quantity of each Chemical allowed retaining:

Sr. No	Name of Chemical	Maximum quantity to be retained at a time
1	Potassium Chlorate	50 Tons
2	Sulphur	20 Tons
3	Phosphorus	10 Tons



DISTRICT OFFICER (IWM) /  
INSPECTOR TRADE OF CHEMICALS  
For DEPUTY COMMISSIONER

*[Handwritten Signature]*  
KASUR 20/9/24



ipwmkasur@yahoo.com  
Phone:049-2724682

Office of the  
**DY. DIRECTOR / DISTRICT OFFICER**  
(Industries, Prices, Weights & Measures)  
**KASUR**

No. DO(IPWM)/KSR/873

Dated:20-12-2023

**TO,**

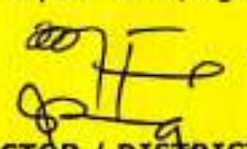
**Mr. KAMRAN HUSSAIN MUGHAL**

Director Coordination, M/s Popular Match Industries  
49-Km Main Multan Road Tehsil Pattoki District Kasur

**Sub.: ISSUANCE OF NOC / PERMISSION TO OPERATE FACTORY NAMELY M/S  
POPULAR MATCH INDUSTRIES**

Reference is your application vide diary No. 150 dated 23-11-2023 regarding the subject as cited above.

It is to inform you that according to the existing location policy notified by Government of the Punjab Industries, Commerce, Investment & Skill Development Department Lahore vide Notification No. AEA-III-3-9/91 dated 17-09-2002, this office has No Objection regarding establishment / operation of your factory namely "M/s Popular Match Industries, 49-Km Main Multan Road Pattoki, District Kasur installed at Khewat No. 95/99 Khatooni No. 200 & Khewat No. 27/28 & Khatooni No. 83 of Moaza Kamogill, as this factory does not fall in the negative area notified by District Government, Kasur vide Notification No. Kasur / Negative Area / 196-219 dated 17.01.2009 subject to the fulfillment of all other legal & codal formalities and clearance by all other relevant departments / agencies.

  
**DEPUTY DIRECTOR / DISTRICT OFFICER**  
(Industries, Prices, Weights & Measures)

**KASUR** 20/12/2023

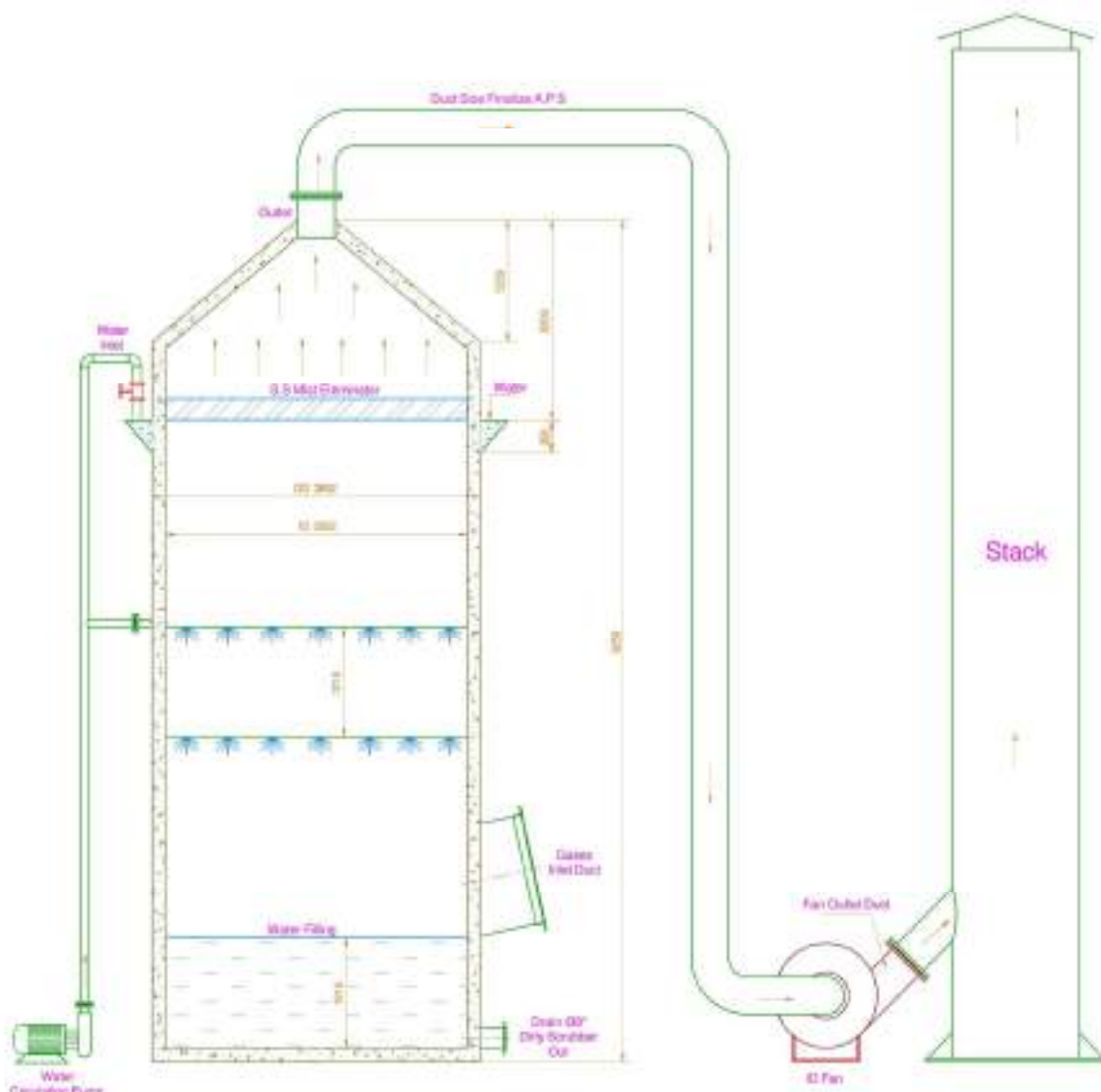
**APPROVED LAYOUT PLAN**



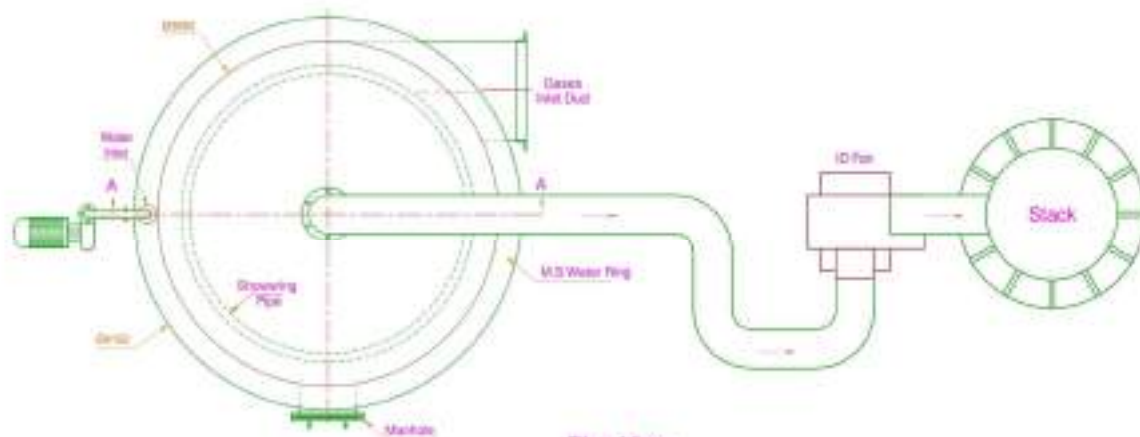
**MACHINERY PLANT LAYOUT**



**LAYOUT PLAN OF WET SCRUBBERS  
& CYCLONE**



Typical Section View A-A



Plan View

**Lyallpur  
Engineers**

MOBILE: 0300-8659297

**ASME**  
INTERNATIONAL  
MEMBERSHIP

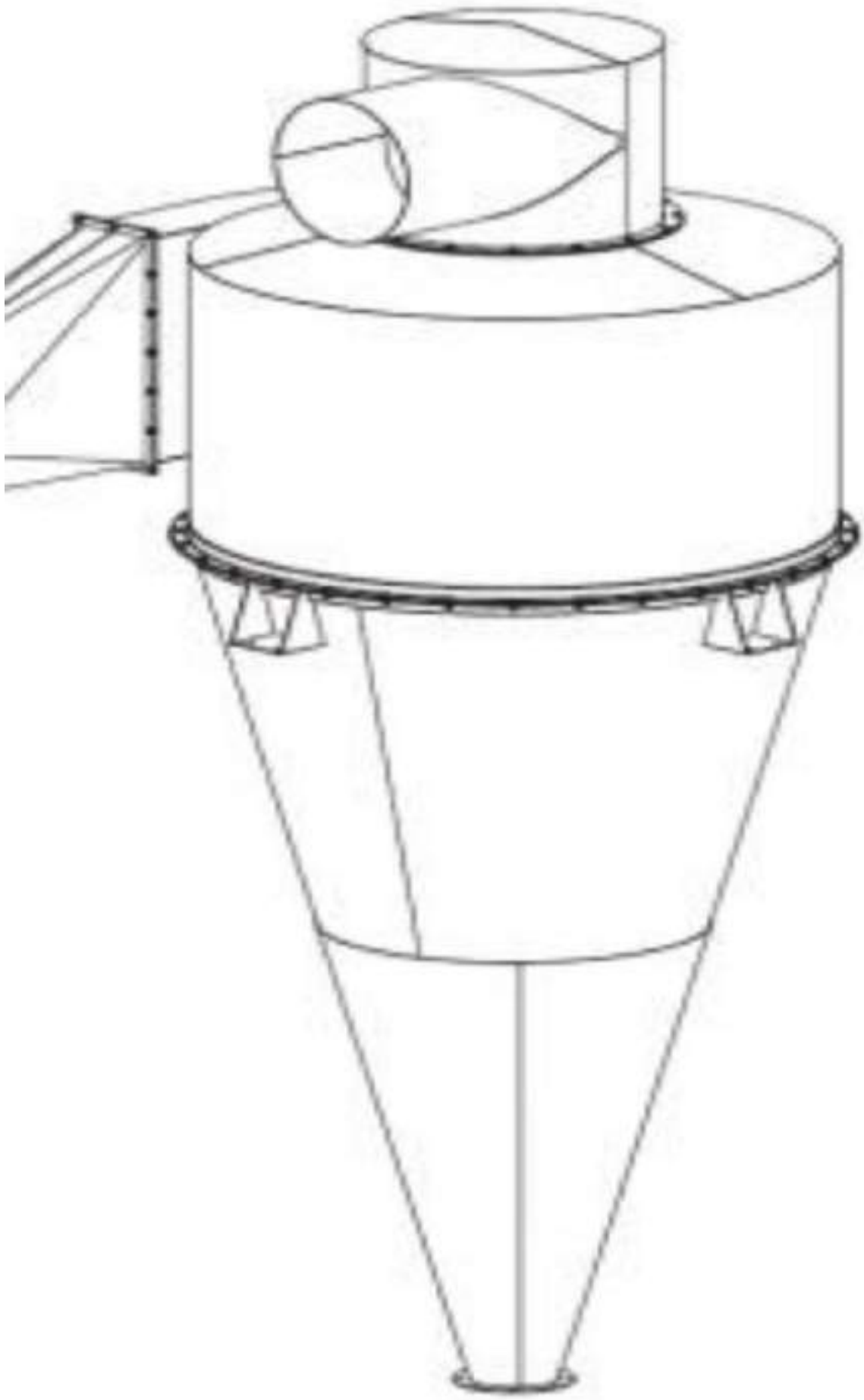


POPULAR MATCHES  
PVT LTD

TITLE:

Wet  
Scrubber

CHECKED		SIGN	DATE	DRAWN BY
APPROVED	Akram Kamal CEO		01-01-25	WAGAS ELYAS
PROJECT:			SHEET A4	SCALE N.T.S



**LAB REPORTS OF ENVIRONMENTAL ANALYSES /  
BASELINE ENVIRONMENTAL MONITORING REPORTS**



# PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

(Environmental Laboratories Division)

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444 Cell: 0303-4442334

PGG/IMS/FF/063 Rev.#02 Rev date: 04-09-23

EPA Certified

## TEST REPORT

Ref #: PGG/LAB/2025-361/NL

Issue date: 04-Feb-25

<b>Name of Industry/Client:</b>	Poplar match Box Industries (Pvt.) Ltd.
<b>Site Location:</b>	49-Km Multan Road, Sarfraz Nagar, Tehsil Pattoki, District, Kasur
<b>Nature of Monitoring:</b>	Noise Level
<b>Monitoring By:</b>	Pak Green Laboratories
<b>Monitoring Time:</b>	Real Time
<b>Monitoring Instrument:</b>	Land TEK SL 5868-P
<b>Monitoring Date:</b>	24-Jan-25
<b>Validated by EPA Representative:</b>	Muhammad Nadeem, RO EPA (Lab), Lahore

### Results:

Sr. No.	Locations	Equivalent Noise Level dB (A)
1.	Point-01: East Side	58.2
2.	Point-02: West Side	56.4
3.	Point-03: North Side	51.5
4.	Point-04: South Side	53.8
PEQ5 (Day Time Industrial Area)		75 dB(A)

End of Report

PEQS: Punjab Environmental Quality Standards

Remarks: Noise level at all points are in compliance with PEQs Limit.

### Terms & Conditions:

- Analysis was conducted on the request of project proponent for IEE/EIA Baseline study.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The left-over sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.

Field Analyst	Chief Analyst	Laboratory Incharge





# PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

(Environmental Laboratories Division)

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444 Cell: 0303-4442334

EPA Certified

PGG/IMS/FF/159 Rev.#00 Rev.date:04-09-23

## TEST REPORT

Ref #: PGL/LAB/2025-360/GW

Issue date:04-Feb-25

Name of Industry/Client:  
Site Location:

Poplar match Box Industries (Pvt.) Ltd.  
49-Km Multan Road, Sarfraz Nagar, Tehsil Pattoki, District  
Kasur

Nature of Sample:

Ground Water

Sampling By:

Pak Green Laboratories

Sample Source:

Motor Pump

Date of sampling:

24-Jan-25

Sample Receiving Date:

24-Jan-25

Testing Facility:

Pak Green Laboratories

Testing Date:

24-Jan-24 to 30-Jan-25

Validated by EPA Representative:

Muhammad Nadeem, RO EPA (Lab), Lahore

### Results

Sr. No.	Parameters	Unit	WHO	PEQS	Method/ Technique	Results
1.	Taste	-	Non- Objectionable / Acceptable	Non- Objectionable / Acceptable	APHA-2160 C	Non- Objectionable
2.	Odor	-	Non- Objectionable / Acceptable	Non- Objectionable / Acceptable	APHA-2150 B	Non- Objectionable
3.	Color	TCU	≤ 15	≤ 15	APHA-2120 C	0.000
4.	Turbidity	NTU	< 5	< 5	APHA-2130 B	0.30
5.	Total Hardness <sup>^</sup>	mg/L	-	< 500	APHA-2540 C	210
6.	Total Dissolved Solids <sup>^</sup>	mg/L	< 1000	< 1000	APHA-2540 C	440
7.	pH <sup>^</sup>	-	6.5-8.5	6.5-8.5	APHA-4500-H <sup>+</sup> B	7.274 at 25.8°C
8.	Chloride (Cl <sup>-</sup> ) <sup>^</sup>	mg/L	250	< 250	APHA-4500-Cl <sup>-</sup> B	105
9.	Electrical Conductivity (EC) <sup>^</sup>	µS/cm	-	-	APHA-2510 B	662
10.	Sodium (Na) <sup>^</sup>	mg/L	-	-	APHA-3111 B	53.8098

End of Report

PEQS: Punjab Environmental Quality Standards WHO: World Health Organization <sup>^</sup> PNAC Accredited

Remarks: All Parameters are in compliance with the PEQS Limit.

### Terms & Conditions:

- Analysis was conducted on the request of project proponent for IEE/EIA Baseline study.
- Report cannot be used to comply with any complaint, EPC, or other court case.
- This report should be reproduced as a whole and not in parts.
- The values represent the sample conditions when sampling/monitoring was carried out.
- The Environmental Conditions while performing testing activities are (Temp=23.0-24.2°C) and (RH=47.8-56.8%)
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring and testing activities.

Lab. Analyst	Chief Analyst	Laboratory





# PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

(Environmental Laboratories Division)

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

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EPA Certified

PGG/IMS/FF/063 Rev.#02 Rev date: 04-09-23

## TEST REPORT

Ref #: PGG/LAB/2025-339/AA

Issue date: 04-Feb-25

Name of Industry/Client:	Poplar match Box Industries (Pvt.) Ltd.
Site Location:	49-Km Multan Road, Sarfraz Nagar, Tehsil Pattoki, District Kasur
Nature of Monitoring:	Ambient Air
Monitoring By:	Pak Green Laboratories
Monitoring Instrument:	AQMS
Monitoring Date:	24-Jan-25 to 26-Jan-25
Validated by EPA Representative:	Muhammad Nadeem, RO EPA (Lab), Lahore

### Results:

Parameters	CO	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>
Methodology	Non-Dispersive Infrared Absorption (NDIR)	Chemiluminescence (CLD)	Chemiluminescence (CLD)	UV fluorescence (UVF)	β Ray Absorption method	β Ray Absorption method
Results	1.95	9.02	26.76	38.67	161.7*	58.3*
PEQS for Ambient Air	05 8-Hrs	40 24-Hrs	80 24-Hrs	120 24-Hrs	150 24-Hrs	35 24-Hrs

End of Report

PEQS: Punjab Environmental Quality Standards

Remarks: Parameters with \* are not in compliance with the PEQS Limit.

### Terms & Conditions:

- Analysis was conducted on the request of project proponent for EIA Baseline study.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
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- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The left-over sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations

Field Analyst	Chief Analyst	Laboratory Incharge





ENVIRONMENTAL PROTECTION AGENCY  
GOVERNMENT OF THE PUNJAB  
National Hockey Stadium, Gate No. 08  
Gaddafi Stadium Complex, Lahore



Validation No: A-4182

Date: 31-01-2025

Validation for Stack & Ambient Monitoring / Sampling

Emission Monitoring under CTM-34 or OTM-39			
Facility Name & Address	Popular Match Industries (Pvt.) Ltd. (Unit-4)	Ambient Air, Boundry Wall Noise	
Phone	49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur		
Industry Category:			
Analyzer Model & Make :			
Average stack emission Values of CO, NOx (in mg/nM3)			
Excess Air / Excess Oxygen (%age):-			
Analyzer exposed for Ramp-Up phase to the sample gas for 5 minutes	Yes	NO	NA✓
Analyzer flow rate and EC temperature monitored during calibration and testing	Yes	No	NA✓
Test Data Phase of sample gas recorded with 15 second interval	Yes	No	NA✓
All key requirements to ensure QA/QC complied for said EPA approved Method	Yes	No	NA✓
<b>Particulate Matter (PM) Monitoring / Sampling under USEPA Method 5 / 17</b>			
Model & Make of Iso-kinetic PM Assembly			
The PM-sampling train is complete as per Method 5 & 17	Yes	No	NA✓
Leak Test performed prior to sampling	Yes	No	NA✓
Field data Sheet for PM Sampling filled during PM sampling	Yes	No	NA✓
Data for determining of "K" factor & DGM "Y" Factor filled during sampling	Yes	No	NA✓
All method key requirements during sampling were compiled to ensure QA/QC	Yes	No	NA✓
Filter of Particulate matter is suitable for metal Testing	Yes	No	NA✓
<b>SOx sampling as per Method 8 (Thorin Indicator Method)</b>			
The right absorbent solution are available for SOx Sampling	Yes	No	NA✓
The equipment is capable to maintain flow rate @ 2.0LPM or as per method 8 requirement	Yes	No	NA✓
Sampling for SOx is performed as per method	Yes	No	NA✓
Analyzer Model & Make of AQMS			
<b>Ambient Air Quality Monitoring by Automatic Monitors for CO, O3, SO2, NOx, PM2.5 &amp; PM10</b>			
In case of continuous monitoring at a site, One Point QC Check Single analyzer & Zero/span check is performed every 14 days.	Yes	No✓	NA
The CE of NOx analyzer is ensured to be maintained within 96% - 104.1%	Yes	No✓	NA
Zero/span check is performed prior to starting ambient monitoring	Yes	No✓	NA
All key requirements for Critical & Operational Criteria for ambient air monitoring by automatic monitors were compiled during monitoring	Yes✓	No	NA
The measuring techniques of monitors comply PEQS	Yes✓	No	NA
<b>Ambient Air Sampling of SPM, PM10, Pb by High Volume Sampler</b>			
In case of Sampling for SPM through samplers, the flow rate of sampler comply PEQS (1.1m3/min).	Yes✓	No	NA
Calibration of Sampler performed prior to sampling	Yes	No	NA
<b>Vehicular Emissions &amp; Noise Measurement</b>			
Sampling of Vehicle emissions and noise measurement have been performed as per method and SOPs	Yes✓	No	NA

Remarks (if Any) :-

  
Promotion Officer  
Environmental Protection Agency  
Punjab Lahore

M-Waseem - Pak Green Lab

Dated: 24-01-2025

Signature:





**ENVIRONMENTAL PROTECTION AGENCY  
GOVERNMENT OF THE PUNJAB  
National Hockey Stadium, Gate No. 08  
Gaddafi Stadium Complex, Lahore**



Validation No: B-4132  
Date: 31-01-2025

**Validation for Wastewater & Drinking Water**

Facility /Project Name & Address Phone	Popular Match Industries (Pvt.) Ltd. (Unit-4)		Sampling Point Ground Water					
	49-Km Multan Road, Sarfraz Nagar, Phool Nagar, Tehsil Pattoki, District Kasur							
Waste Water (WW) Treatment facility Primary Secondary Tertiary NA		Drinking Water (W) Treatment Facility						
Total WW collected Sample..... NA		Total Collected Drinking water samples.....01						
Sample Tag for testing parameter is assigned on sample container		Yes✓	NO	NA				
Sample is preserved properly for each testing parameter		Yes✓	NO	NA				
Sample size is adequate for testing the target parameters		Yes✓	NO	NA				
Wastewater Flow Measurement performed to ensure sample representativeness		Yes	NO✓	NA				
No. of Waste Water outlets	Waste Water Flow m <sup>3</sup> /hr from each outlet (Optional)	Water intake m <sup>3</sup> /hr (Optional)	Water Mass balance complied during sampling (Optional)	Sample Type				
	NA	NA	Yes No	Grab✓ Composite				
Parameter	Matrix		Container	Sample Size	Preservation	Yes	NO	NA
	W	WW						
Coliform, Total or Fecal	✓		Sterile Container	100 mL	Refrigerate 6 C	✓		
Coliform, Total or Fecal, Chlorinated Water	✓		Sterile Container	100 mL	0.008% Thiosulphate & cooled 6 C	✓		
Color, Turbidity	✓		P,G	500 mL	Cool 6 C	✓		
Hardness, Total	✓		P,G	500ml	HNO3 to pH<2	✓		
Nitrogen, Nitrate + Nitrite, Phenolic Compounds, Oil & Grease, COD, NH3			P,G	2000 mL	H2SO4 to pH < 2, Cool 6C			
Metals, General	✓		P,G Rinsed 1:1 HNO3	500 mL	HNO3 to pH < 2	✓		
Cyanide, Total			P,G	500 mL	NaOH to pH > 12, Cool 6C			
Pesticides, General			Glass	1 Liter	Cool 6 C			
<b>Field Parameters*</b>								
Field parameter			pH meter, Model Make	Measurement Method	Calibrated in Field	Measured value		
pH			AS 218	APHA 4500 B	Yes✓ NO			
Temp								
Cl								

Remarks (if Any): -

*(Signature)*  
 Director  
 Environmental Protection Agency  
 Punjab Lahore

M-Waseem - Pak Green Lab  
 Dated: 24-01-2025  
 Signature:



**PHOTOLOG**



**View of Approach Road (Gagga Road) and Commercial Entities**



**View of Industrial Entities and Agricultural Lands in the Project Area**