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## **EXECUTIVE SUMMARY**

### **Title and Location of Project**

The title of the project is "Mining Lease for coal over an area of 2937.46 acres of land situated near Makerwal in District Mianwali". Mining Lease was granted by Mines and Minerals Department, Government of the Punjab.

### **Name of the Proponent**

The details of the proponent are given below;

| <b>Details of Proponent</b> |                          |
|-----------------------------|--------------------------|
| Name of the Proponent       | M/s Makerwal Coal Works  |
| Address                     | 39-L, Model town, Lahore |

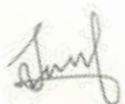
### **Name of Consultant Preparing the Report**

The name of the consultant preparing the report is as given below;

| <b>Contact Details</b> |                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------|
| <b>Consulting Firm</b> | Prime Environmental Consultants                                                             |
| <b>Contact</b>         | (+92) 321-7860915                                                                           |
| <b>Address</b>         | Latif Plaza, Office No. 07-08, 69 Saeed Block<br>Commercial Area, Canal Bank Scheme, Lahore |
| <b>e-Mail</b>          | primeenvironmentalconsultants@gmail.com                                                     |

The team involved in preparing the report is as;

| <b>Sr.</b> | <b>Name</b>     | <b>Qualifications &amp; Brief Experience</b> | <b>Roles Assigned</b>                                                                                                                                                                                                               |
|------------|-----------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.         | Engr. Ali Mehdi | B.Sc. Mining Engineering                     | <ul style="list-style-type: none"><li>• Stakeholder Consultation</li><li>• Preparation of Environmental Management Plan (EMP)</li><li>• Preparation of Environmental Monitoring Plan (EMP)</li><li>• Author of EIA Report</li></ul> |



|    |             |                                                      |                                                                                                                                                                                                  |
|----|-------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. | Zeba Haseeb | Environmental Scientist<br>M.S Environmental Science | <ul style="list-style-type: none"><li>• Preparation of Environmental Management Plan (EMP)</li><li>• Preparation of Environmental Monitoring Plan (EMP)</li><li>• Author of EIA Report</li></ul> |
| 3. | Umer Saeed  | Environmental Scientist<br>M.S Environmental Science | <ul style="list-style-type: none"><li>• Site visits</li></ul>                                                                                                                                    |

### **Brief Outline of the Project**

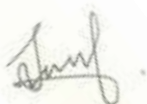
The project area lies over 2937.46 acres and involves mining coal by underground methodology. The project is located near Makerwal in District Mianwali of Punjab.

Pakistan holds 3,377 million tons (MMst) of proven coal reserves as of 2016, ranking 20th in the world and accounting for about 0% of the world's total coal reserves of 1,139,471 million tons (MMst). Pakistan has proven reserves equivalent to 331.1 times its annual consumption.

Punjab, being second largest (area-wise) province of the country, has vast mineral potential like coal, salt, iron ore, limestone, gypsum, silica sand and fire clay etc. The main coalfields of Punjab are in the Salt-Range and at Makarwal. The total coal resources are estimated at 235 million tonnes, of which 33 million tonnes are mineable. Punjab coal is classified as Sub-bituminous, and the heating value ranges from 9,472 to 15,801 Btu/lb. It has low ash and high sulfur, and is considered suitable for power generation.

The main objectives of coal mining are

- To enhance the contribution of mineral sector to GDP through improved production.
- To expand mining sector by focusing on exploration and evaluation of mineral resources.



- To enhance public sector investment on resource mapping, Geo-database development and provision of physical infrastructure, roads and electricity etc. in the potential areas.
- To promote facilitation role of the government for the prospective investor.
- To encourage and support exploration of minerals, particularly through private sector.
- To promote environment friendly mining practices and to take measures for mitigation of environmental hazards for sustainable development of mineral sector.

## **Major Impacts**

Key impacts related to the construction phase include:

- Construction Noise
- Solid Waste
- Soil Contamination
- Air Pollution
- Community and Workers' Safety
- Employment Conflicts

Mitigation measures recommended to be incorporated into the project include running the machines and vehicles on good quality (low-sulfur fuels) in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as mufflers and silencers, etc. Water suppression and covered transportation and storage of the construction materials and slow driving on unpaved roads will control dust emission. Regular testing for leakage detection will also be ensured. Solid waste of construction activities will be used for flooring, while the remaining solid waste will be managed as per practices in the area. For community safety, irrelevant persons will not be allowed inside. Safety of the workers will be ensured by discouraging any careless attitude of workers and providing



the workers with, and encouraging them to use PPEs. Details analysis is given in **chapter 7**.

Key impacts related to the operation phase include:

- Wastewater
- Solid Waste
- Noise
- Impacts on Air Quality
- Acid Mine drainage
- Soil Contamination

Detailed analysis of operational impacts is given in chapter 7.

### Recommendations for Mitigation Measures

The potential environmental impacts resulting during construction and operational phase of the project and their possible mitigation measures are given in table below

#### • Construction Phase:

| Potential Negative Impacts                                       | Recommended Mitigation Measures                                                                                                                                                                                                                                              | Monitoring Responsibility                                              | Parameters for Monitoring                                     |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Dust emissions</li> </ul> | <ul style="list-style-type: none"> <li>On exposed construction surface during windy periods fugitive dust generation will be suppressed by spraying water.</li> <li>The construction material will be covered with polyethylene sheets to prevent dust emissions.</li> </ul> | <ul style="list-style-type: none"> <li>Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>Air quality</li> </ul> |
| <ul style="list-style-type: none"> <li>Soil erosion</li> </ul>   | <ul style="list-style-type: none"> <li>Exposed surface will be resurfaced and stabilized as soon as possible.</li> </ul>                                                                                                                                                     | <ul style="list-style-type: none"> <li>Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>Soil</li> </ul>        |



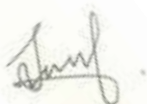
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|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Solid waste generation</li> </ul>          | <ul style="list-style-type: none"> <li>• Solid waste may include waste/unused construction materials, which should be disposed of properly.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>• Solid waste management</li> </ul> |
| <ul style="list-style-type: none"> <li>• Vehicular Traffic and Noise</li> </ul>     | <ul style="list-style-type: none"> <li>• Vehicles and other noisy equipment will be kept in good conditions and their regular maintenance will be done.</li> <li>• Noisy construction activities will be carried out only during normal working hours.</li> </ul>                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>• Noise level</li> </ul>            |
| <ul style="list-style-type: none"> <li>• Health and Safety of Work Force</li> </ul> | <ul style="list-style-type: none"> <li>• The contractor will ensure that the workers are trained in safety procedures for all relevant aspects of construction.</li> <li>• Regular checks will be made 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> | <ul style="list-style-type: none"> <li>• Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>• Health and safety</li> </ul>      |



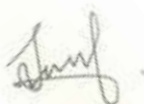
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|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------|
|                                                                           | <ul style="list-style-type: none"> <li>Waste produced during construction phase will be collected by vehicle for dispose of it at a particular dumping site of the industrial estate from it will be reused. Waste segregation units will be provided. Recyclable items will be provided to recycling contractors</li> </ul>                                              |                                                                        |                                                                           |
| <ul style="list-style-type: none"> <li>Water supply</li> </ul>            | <ul style="list-style-type: none"> <li>Water use will be planned depending upon the supply and timing to avoid and inconvenience.</li> <li>Water conservation practices will be adopted.</li> </ul>                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>Water supply</li> </ul>            |
| <ul style="list-style-type: none"> <li>Surface and Groundwater</li> </ul> | <ul style="list-style-type: none"> <li>At project site, the septic tank will be installed the safe disposal of wastewater into the nearby drain. The storage of lubricant materials such as oil and grease will be confined to a specific area so that in case of any leakage or spillage, the lubricant materials do not contaminate the entire project site.</li> </ul> | <ul style="list-style-type: none"> <li>Proponent/contractor</li> </ul> | <ul style="list-style-type: none"> <li>Surface and groundwater</li> </ul> |

• **Operational Phase:**

| Potential Negative Impacts | Recommended Mitigation Measures                                                  | Monitoring Responsibility | Parameters for Monitoring |
|----------------------------|----------------------------------------------------------------------------------|---------------------------|---------------------------|
| Dust emissions             | In operational phase, dust generation by vehicles will be suppressed by spraying | Proponent                 | Air quality               |



|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                       |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
|                    | water.<br>Scrubbers will be used to control dust emissions                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                       |
| Noise              | Use of PPEs (noise suppression equipment-ear mufflers etc.) will be ensured by the workers where noise levels are higher than 85 (dBA).<br>Mining activities will be ensured at daytime when background noise levels are high.<br>Vehicles speed limit will be maintained to avoid excessive vibrations.<br>Regular maintenance of machinery will be ensured.<br>All blasting operations will be carried out in compliance with conditions as specified in Coal Mines Regulations, 1926. | Proponent | Noise                 |
| Waste water        | Water conservation practices will be used.<br>Wastewater will be treated properly by septic tank and will be discharged into nearby drain.<br>Water use will be planned depending upon the supply and timing to avoid and inconvenience                                                                                                                                                                                                                                                  | Proponent | Wastewater management |
| Acid Mine Drainage | water stored on the surface tank is mixed with fine dust of calcium carbonate powder to mitigate its acidic factor                                                                                                                                                                                                                                                                                                                                                                       |           |                       |
| Flora and fauna    | The unit includes a plan of the green yard area which is a positive impact on the flora and fauna. There is no significant fauna in that area. However, it is suggested that maximum number of trees should be planted by the management inside and outside the boundary wall in                                                                                                                                                                                                         | Proponent | Biodiversity          |



|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------|
|                                | order to enhance aesthetics of the area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                 |
| Social impacts                 | During the operation stage, there will be no social issue for the nearby localities. Moreover, the residents may get opportunities to work in the refining unit which is a major positive impact of the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Proponent | Social impacts  |
| Occupational health and safety | <p>There may be occupational health and safety risks associated with different operational activities. Health risks may occur in case of unsafe and/or unfavorable work conditions</p> <p>The mitigation measures include:</p> <ul style="list-style-type: none"> <li>• The workers should get trained in safety procedures for all relevant aspects of processes.</li> <li>• Enforcement of work safety measures.</li> <li>• Formal emergency procedures will be developed for the segregation hall in case of any accident.</li> <li>• First aid kits and other personal protective equipment (safety gloves, goggles, welding shields etc.) Should be kept available.</li> </ul> | Proponent | Health & safety |



## Proposed Monitoring

The EMP is prepared to ensure that the activities are undertaken in a responsible & non detrimental manner with the objectives of:

- Providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance.
- Guiding and controlling the implementation of findings and recommendations of the environmental assessment.
- Detailing specific actions deemed necessary to assist in mitigating the environmental impact.
- Ensuring that safety recommendations.

Furthermore, the detailed EMMP has been given in **chapter 8**.

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## 1. **INTRODUCTION**

### 1.1. **Purpose of the Report**

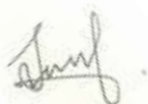
This report has been prepared to conform to the requirements of the Punjab Environmental Protection (Amendment) Act 2012 (PEPA), which states that:

***“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.”***

Environmental Impact Assessment (EIA) report is being submitted to the environmental protection agency (EPA), government of the Punjab, Lahore in compliance with the legal requirements for Punjab Environmental Protection Act-1997 (amended 2012), section-12 for obtaining the environmental approval (EA) at the project site. The other relevant regulations and guidelines considered while preparing this EIA report will include:

- Policy and procedures for filling, review and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Guidelines for sensitive and critical areas.
- Detailed Sectoral guidelines.

Different environmental aspects like social, physical, biological etc and other related features of the project are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers,



EPA Punjab in the present case, before issuing the desired environmental approval.

The main objective of the EIA study is to assess the environmental impacts likely to occur due to the construction of the roads improvement project, and to suggest mitigation measures to minimize the likely negative impacts. For achieving the above objectives, the study was mainly divided into following sectors:

- Identification of all requirements as set forth by Pakistan Environmental Protection Act, 1997 and the Guidelines for preparation of EIA reports, etc.
- Study of existing regulatory framework in Pakistan with reference to the developmental projects;
- Study of Guidelines for the preparation of EIA reports;
- Collection and scrutinizing data related to physical, ecological and socioeconomic, and physical resources of the project area;
- Evaluation of data and identification of significant environmental impacts;
- Identification of necessary mitigation measures to minimize the negative impacts; and
- Preparation of an Environmental Management Plan.

## **1.2. Identification of the Project and Proponent**

### **1.2.1. Details of the Project**

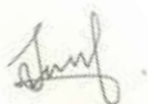
The project title is "Mining Lease for coal over an area of 2937.46 acres of land situated near Makerwal in District Mianwali". Mining Lease was granted by Mines and Minerals Department, Government of the Punjab

### **1.2.2. Details of the Proponent**

The details of the proponent are given in Table 1-1;

**Table 1-1 Details of the Proponent**

| <b>Details of Proponent</b> |                         |
|-----------------------------|-------------------------|
| Name of the Proponent       | M/s Makerwal Coal Works |



|         |                          |
|---------|--------------------------|
| Address | 39-L, Model Town, Lahore |
|---------|--------------------------|

### 1.3. Details of Consultant

The details of the consultant are given in Table 1-2;

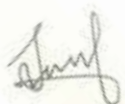
**Table 1-2 Details of the Consultant**

| Contact Details   |                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------|
| <b>Consultant</b> | Prime Environmental Consultants                                                             |
| <b>Contact</b>    | (+92) 321-7860915                                                                           |
| <b>Address</b>    | Latif Plaza, Office No. 07-08, 69 Saeed Block<br>Commercial Area, Canal Bank Scheme, Lahore |
| <b>e-Mail</b>     | primeenvironmentalconsultants@gmail.com                                                     |

The team carrying out the project impact assessment is presented in the Table 1-3.

**Table 1-3 Consultant Team**

| Sr. | Name            | Qualifications & Brief Experience                    | Roles Assigned                                                                                                                                                                                                                   |
|-----|-----------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Engr. Ali Mehdi | B.Sc. Mining Engineering                             | <ul style="list-style-type: none"> <li>Stakeholder Consultation</li> <li>Preparation of Environmental Management Plan (EMP)</li> <li>Preparation of Environmental Monitoring Plan (EMP)</li> <li>Author of EIA Report</li> </ul> |
| 2.  | Zeba Haseeb     | Environmental Scientist<br>M.S Environmental Science | <ul style="list-style-type: none"> <li>Preparation of Environmental Management Plan (EMP)</li> <li>Preparation of Environmental Monitoring Plan (EMP)</li> <li>Author of EIA Report</li> </ul>                                   |
| 3.  | Umer Saeed      | Environmental Scientist<br>M.S Environmental Science | <ul style="list-style-type: none"> <li>Site visits</li> </ul>                                                                                                                                                                    |



#### **1.4. Brief Description of Nature, Size and location of the Project**

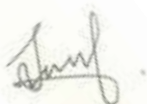
The project is about Mining Lease for coal over an area of 2937.46 acres of land situated near Makerwal in District Mianwali.

Pakistan holds 3,377 million tons (MMst) of proven coal reserves as of 2016, ranking 20th in the world and accounting for about 0% of the world's total coal reserves of 1,139,471 million tons (MMst). Pakistan has proven reserves equivalent to 331.1 times its annual consumption.

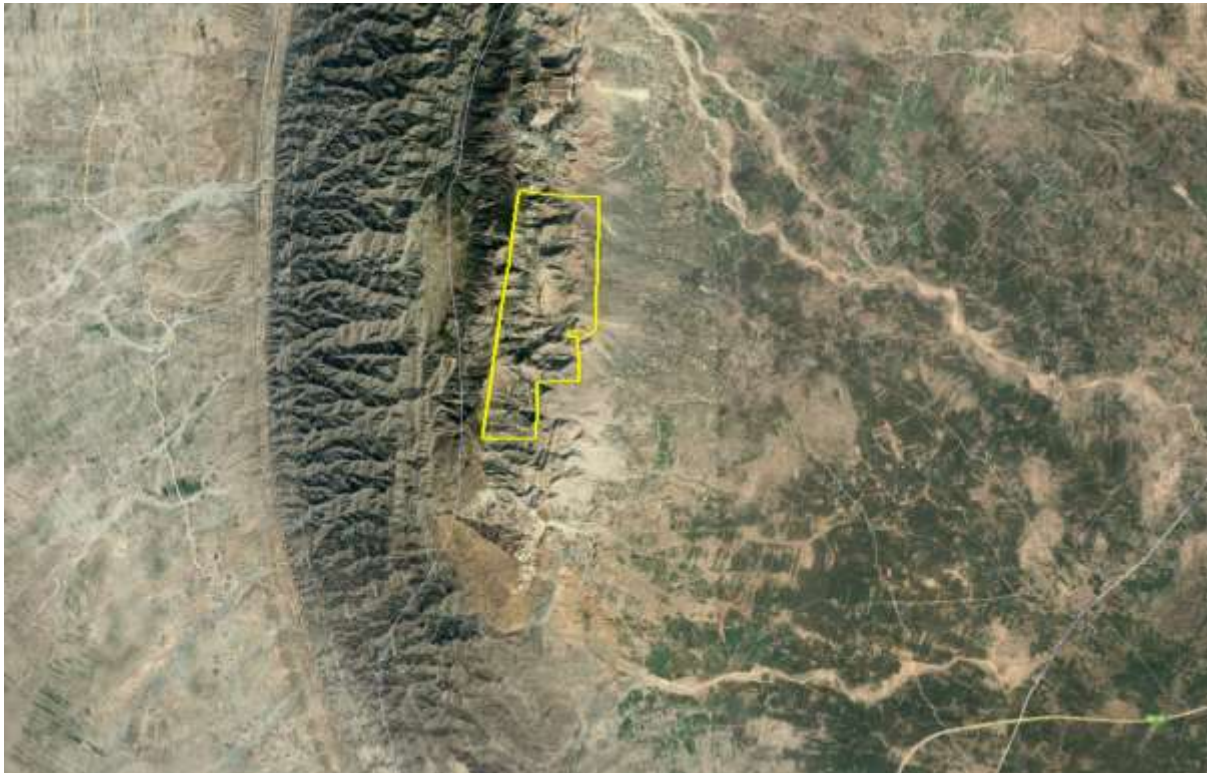
Punjab, being second largest (area-wise) province of the country, has vast mineral potential like coal, salt, iron ore, limestone, gypsum, silica sand and fire clay etc. The main coalfields of Punjab are in the Salt-Range and at Makarwal. The total coal resources are estimated at 235 million tonnes, of which 33 million tonnes are mineable. Punjab coal is classified as Sub-bituminous, and the heating value ranges from 9,472 to 15,801 Btu/lb. It has low ash and high sulfur, and is considered suitable for power generation.

The main objectives of coal mining are

- To enhance the contribution of mineral sector to GDP through improved production.
- To expand mining sector by focusing on exploration and evaluation of mineral resources.
- To enhance public sector investment on resource mapping, Geo-database development and provision of physical infrastructure, roads and electricity etc. in the potential areas.
- To promote facilitation role of the government for the prospective investor.
- To encourage and support exploration of minerals, particularly through private sector.
- To promote environment friendly mining practices and to take measures for mitigation of environmental hazards for sustainable development of mineral sector.



The location of the proposed mining is at given below;



**Figure 1-1 Location of the Project on Google Earth**

A handwritten signature in black ink, enclosed within a light-colored diamond-shaped box. The signature appears to be a stylized name, possibly 'Sarf' or similar, with a horizontal line extending from the end.

## **2. SCREENING AND SCOPING**

### **2.1. Screening**

Section 12 of Punjab Environmental Protection Act (PEPA), 1997 (Amended 2012) states:

***"No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be, or, where the project is likely to cause an adverse environmental effect an Environmental Impact Assessment (EIA), and has obtained from the Government Agency approval in respect thereof."***

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 made under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012), current project (coal mining) falls under Schedule II (List of projects requiring EIA), Category C-I (Mining and processing of coal, gold, copper, sulphur and precious stones).

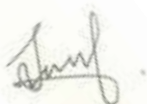
### **2.2. Scoping**

#### **2.2.1. Spatial and Temporal Boundaries of Environmental Assessment**

Project site is open land. After its development with time nature of area will change from open land to project site. Already coal mining activities are being taking place near around. Currently there is no significant population center present in the lease area. The current project site is 1-2 kilometers from population centers and all the parameters are within PEQS. No environmental sensitive area is present that could be impacted due to the current project.

#### **2.2.2. Important issues and concern raised during consultation**

The important issues and concerns raised during consultation were mentioned below while they have been discussed in chapter Stakeholder Consultation.



- Air pollution should be controlled effectively.
- Locals should be preferred for the job opportunities.
- Wastewater should be treated prior to final disposal.
- Solid waste should be managed effectively by adopting the standard practices of the area.
- Cleanliness of the area should be ensured.
- An effective EMMP should be designed and enforced with true spirit.
- Health of the workers should be ensured.
- Workers should be hired from local community.
- Indigenous trees around the facility should be planted to control air pollution.

### **2.2.3. Significant impacts and factors to be determined**

The most significant impacts and factors to be determined are;

- Control of Air Emission
- Solid waste management
- Site restoration
- Environmental Management Plans
- Avoid excessive water consumption
- Energy efficient techniques must be adopted
- Tree plantation at designated green areas
- Emergency preparedness
- Occupational Health and safety
- Site Security
- Traffic Management
- Hygiene management
- Community impacts
- Job opportunities for locals
- Confined noisy activities



### **3. CONSIDERATION OF ALTERNATIVES**

#### **3.1. Site Alternatives, their Selection and Rejection Criteria**

No other site was considered for the Mining Lease for coal as it is located in an area which is geologically rich with coal reserves. Coal existence is subject to geological variations. Among the main considerations for selection of project site include:

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

The availability of good roads facilitates movement of coal at cheaper cost. The other 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.

##### **b. Availability of Labor:**

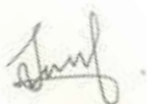
Cheap labor is easily available in the project area in more than desired number. This also makes the site also suitable. All categories of the labor required for the project operation are available conveniently and plentifully at affordable cost at the present site. This factor too supports to select the present site for the said project.

##### **c. Basic infrastructure and facilities:**

Basic infrastructure like water, roads, transport, repair and maintenance workshops and communication facilities like telephone, e-mail are already available virtually at the project site. This factor also goes in favor of selecting the present site.

##### **d. Environment**

And lastly, environmental considerations are extremely important. The land around the project area is entirely open. Settings around the project area do not show any sensitivity of environment. There is no worth mentioning forestry, biodiversity, fishery, flora and fauna, heritage etc. No important religious, archaeological, recreational site, ecologically sensitive, declared protected



area and human settlements exists within close vicinity of the selected site i.e., within 100 m which is considered to be a safe distance.

Following are other some of the additional parameters that favor coal mining in the respective region:

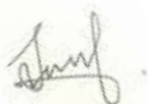
- i. Favorable geology with coal bearing area.
- ii. Easy extraction of the coal by available methodology.
- iii. The project operation doesn't involve human settlements displacement or relocation.
- iv. Mining of the coal in the respective zone has provided job opportunities to local people and improved their socio-economic status.
- v. The coal production has contributed positively in the income stream of the national exchequer as well as contribution in GDP.
- vi. The coal transportation from mine to market road is easily available.
- vii. The project has a sustainable life span.
- viii. The mining operations are undertaken up to the coal bearing strata with a geological depth of around 250-400 feet.
- ix. Moreover, there is no railway line, reservoir, canal or public building within 2 km distance of the mining area.

In view of these facts, it can be concluded that the chosen site per force is fixed. Considering the facts that mine site is at a safe distance from sensitive receptors and has advantage of not only to be environmentally friendly but also potentially sound to enhance sustainable development in the region. Therefore, given site is the most suitable.

### **3.2. Design/technology alternatives, their selection and rejection criteria**

There are two methodologies for the mining which are given below;

- i. Underground Mining



ii. Surface Mining

Under the present conditions and due to geological along with techno-economic parameters,

### **3.3. Environmental Alternatives, their selection and rejection criteria**

The project is about the mining of coal by the environmental friendly means so no environmental alternative can be considered as the project is environmental friendly.

### **3.4. Economic Alternatives, their selection and rejection criteria**

The project activities are environment friendly and the mining technique is economically efficient. As the coal is being mined so there is no alternative mineral is present in the project site. All machinery, equipment and materials procured for the said project will be environmentally friendly and sustainable. So there is no material alternative considered in this case as coal is being mined.

A handwritten signature in black ink, appearing to be 'Sarf', is written on a yellow rectangular stamp.

## **4. DESCRIPTION OF THE PROJECT**

### **4.1. Objectives of the Project**

- a) Accelerate pace of development in the existing mines.
- b) Enhance production, productivity coupled with safety by improvising with the adaptable technology-mechanization.
- c) Undertake aggressive marketing to maximize domestic share.
- d) To provide employment to the locals
- e) Fuels like coal provide an excellent fuel for "base-load" generation because they can be burned on demand, generating electricity when it is needed.
- f) Expand business through added exploration and exploitation by new entries based on techno-economical parameters.

### **4.2. Location and Site Layout of the Project**

The Mining Lease of coal is located in District Mianwali of Punjab. The project location is represented in Figure No. 4-1 and more detailed colored image is present in **Appendix II** on A3 size.



**Figure 4-1 Location of the Project**

*Signature*

The proposed site boundary primarily falls within mainly inhabited and presently unused area. The coordinates of the coal lease area are given in Table No. 4-1.

**Table 4-1 Coordinates of the Coal Lease Area**

| Points                                    | East (Yard) | North (Yard) | East (Meters) | North (Meters) |
|-------------------------------------------|-------------|--------------|---------------|----------------|
| <b>A</b>                                  | 3320412.22  | 1043767.3    | 3036184.934   | 954420.8191    |
| <b>B</b>                                  | 3321823.24  | 1043828.8    | 3037475.171   | 954477.0547    |
| <b>C</b>                                  | 3321825.04  | 1045354.12   | 3037476.817   | 955871.8073    |
| <b>D</b>                                  | 3322931.32  | 1045397.02   | 3038488.399   | 955911.0351    |
| <b>E</b>                                  | 3322868.03  | 1046605.36   | 3038430.527   | 957015.9412    |
| <b>F</b>                                  | 3322585.82  | 1046605.36   | 3038172.474   | 957015.9412    |
| <b>G</b>                                  | 3322585.82  | 1046740      | 3038172.474   | 957139.056     |
| <b>H</b>                                  | 3323340     | 1046760      | 3038862.096   | 957157.344     |
| <b>I</b>                                  | 3323340     | 1050436.6    | 3038862.096   | 960519.227     |
| <b>J</b>                                  | 3321229.1   | 1050401.1    | 3036931.889   | 960486.7658    |
| <b>J TO A FOLLOWS PROVINCIAL BOUNDARY</b> |             |              |               |                |
| <b>Total: 2937.46 Acres</b>               |             |              |               |                |

#### **4.3. Land Use on the Site**

The land is not an agricultural land. However, coal is being extracted by the method of underground mining so change to the surface will occur.

#### **4.4. Road Access**

Access road connecting Angah is close access of the proposed project site.

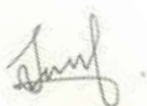
#### **4.5. Vegetation Features of the Site**

There is no vegetation cover on the project site. The area free of any vast tree cover and dense vegetation.

#### **4.6. Cost and the Magnitude of Operation**

The capital cost of the project is Rs. 07 million. The Mining Lease will spread over an area of 2937.46 acres. There will not be any other activity except mining of coal.

#### **4.7. Schedule of Implementation**



The Project plans to be completed within 3 to 6 months after getting requisite approvals and NOCs from authorities. Project development schedule (tentative) is described hereunder:

**Table 4-2 Time Schedule for the Quarry Development**

| Sr. | Description                       | Months |
|-----|-----------------------------------|--------|
| 1   | Cost of exploration work          | 03     |
| 2   | Office and Labor Shed             | 03     |
| 3   | Access road                       | 04     |
| 4   | Mine Development                  | 18     |
| 5   | Machinery & Equipment Procurement | 02     |

#### 4.7.1. Manpower

The man power required for coal mining is described in Table4-3

**Table 4-3 List of Manpower for Coal Mining Operations**

| Sr.   | Category of Staff | Strength |
|-------|-------------------|----------|
| 1.    | Mine Engineer     | 01       |
| 2.    | Mine Surveyor     | 01       |
| 3.    | Mine Sardar       | 01       |
| 4.    | Mine Sardar       | 01       |
| 5.    | Engine Operator   | 01       |
| 6.    | Pump Driver       | 02       |
| 7.    | Electrician       | 01       |
| 8.    | Accountant        | 01       |
| Total |                   | 09       |

#### 4.7.2. Water Requirements

The main water supply requirement is for drinking water and nothing in the mining process. The workers are being provided 2-3 liters of water per capita



per day. For a 50 workers camp, the quantity of water required is about 100-150 liters per day.

#### **4.7.3. Solid Waste**

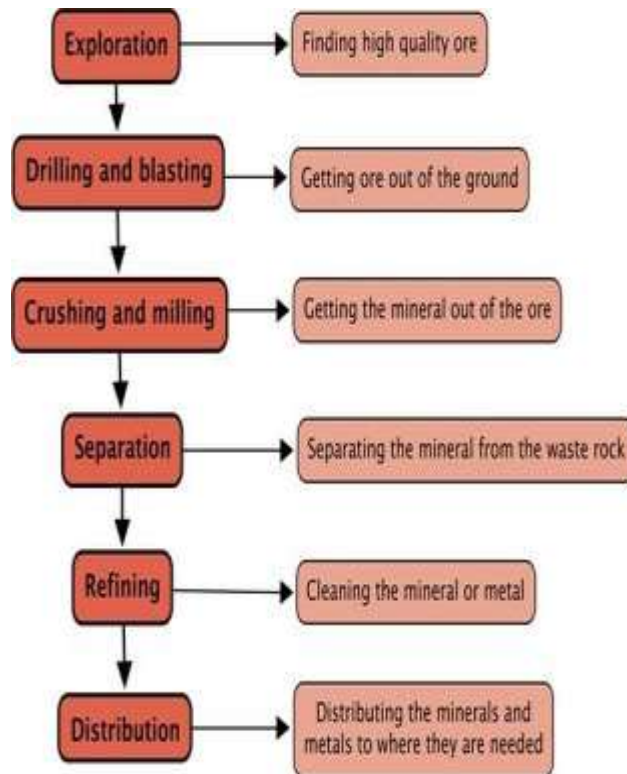
The coal seam in the said license is supposed to be thin. The solid rocks associated with the coal seams are required perforce to be extracted for making the size of galleries within the prescribed limits of comfort. Generally speaking, the size is kept 6x6 feet in the gallery. The cavity created by the coal extraction provides enough space for hosting the solid rock dumping underground up to 40%. The surplus stones are hauled up and dumped on the surface on the hill slope in a way that natural drainage pattern is not blocked if required.

#### **4.7.4. Process Flow Chart**

The mining activities are carried out in a very coordinated way. From the selection of site till the mining and conclusion of project, the mining supervisors and laborer are trained to develop an understanding of complexity and sensitivity of the operations.



**Figure 4-2 Coal Mining Flowsheet**



**Figure 4-3 Flowsheet for the Mining Process**

### **Mode of Excavation**

The mode of excavation is manual. The mining will be carried out either by hand-spades or by hand picks. No machinery is used for extraction of coal from coal face. The coal mining is done at depth of about 400 to 500 feet. The coal deposits are generally present at such depths in the Salt Range.

- **Market of the Coal**

After loading into the trucks, coal will be transported to the market places based on demand. Trucks will be used for the transportation of coal to the market places. Coal may be marketed to Mianwali and nearby areas.

### **4.8. Restoration and Rehabilitation Program**

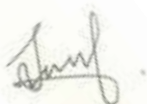
Following steps can be done by guessing the restoration and restoration of the area:

- Waste dumps are contoured to flatten them out, to further stabilize them against erosion.

- Landfills are covered with topsoil, and vegetation is planted to help consolidate the material.
- Dumps are usually fenced off to prevent livestock denuding them of vegetation.
- The open pit is then surrounded with a fence, to prevent access, and it generally eventually fills up with groundwater.
- Tailings dams are left to evaporate, then covered with waste rock, clay if need be, and soil, which is planted to stabilize it.
- No human settlement within the secure area of the selected project area will be removed due to mining. No value building located in the area should be relocated or demolished. The mine has already been handed over to the opponent, therefore, no relocation and renewal is required.
- The leased mining process will be a surface mining process in which there will be minimal disruption to the plant and structural aspects of the project structure.
- The value of the site is due to economic activity, if not. It is like a barren land. The question of renewal therefore does not arise without redistributing the land formed by the excavated local mines
- A single location can be used for geo tours for tourists to perform other economic activities once the depots are depleted.
- The site may be used for reconstruction purposes.
- Trees will be planted in the project area through a dry forest planting process and the entire local environment will be greatly improved.
- This area can be used to reintroduce livestock

**Table 4-4 Restoration and Rehabilitation Program**

| Measures for Land Rehabilitation & Restoration                                                                                                                                                                                                                   | Timeframe | Responsible Party |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|
| There exists no human settlement within safe radius of the selected project site to be displaced owing to the mining operations. No structure of any significance stands at the site to be relocated or dismantled. Mine is already awarded to proponent, hence, | -         | -                 |



|                                                                                                                                                                                                                                                                      |                    |                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|
| no relocation and rehabilitation is required.                                                                                                                                                                                                                        |                    |                           |
| The details of the land leases documents are attached at the end of this EIA Report. The process of mining employed will be underground mining process in which least disturbance to the vegetation features and the infra-structure at the project site will occur. | -                  | -                         |
| The importance of the site is due to economic activity, otherwise. it is a replica of a barren land. The question of rehabilitation therefore doesn't arise except re-coursing the land formed by the cavities of the mined-out area                                 | After Mine Closure | Proponent                 |
| The isolated site can be used for geo-tours to the visitors for generating alternate economic activity once the reserves are exhausted.                                                                                                                              | After Mine Closure | MMD                       |
| The site can be used for re-stocking the livestock.                                                                                                                                                                                                                  | After Mine Closure | MMD/ Livestock Department |
| Trees will be planted at the project area by using dry afforestation technique and the overall ecology of the area will be improved significantly.                                                                                                                   | Till Lease Tenure  | Proponent                 |
| The land will be available for agricultural use.                                                                                                                                                                                                                     | After Mine Closure | MMD/ Concerned Authority  |
| The site can be used for re-creational purposes.                                                                                                                                                                                                                     | After Mine Closure | MMD/ Concerned Authority  |



## **5. DESCRIPTION OF THE ENVIRONMENT**

An environmental baseline study is intended to establish a data base against which potential impacts can be predicted and managed subsequently. The EIA of the proposed project covers a comprehensive description of the project area, including regional resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the operation of the project.

A site visit was conducted to survey the field area for collection of relevant data. Interviews were conducted with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project. The environmental impacts of any activity or process will be assessed on the basis of deviation from the baseline or normal situation. The following components form part of the baseline study.

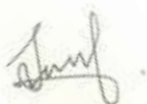
- Physical Environment
- Ecological Environment
- Socio-economic Environment

### **5.1. Baseline Physical Environment**

#### **5.1.1. Physical Features of the Project Area**

District Mianwali bounded by district Attock on North-East, Chakwal and Khushab districts on East and Bhakkar on South and KPK on its West and North-West. River Indus flows across the district from North to South. Three branches of the Thal Canal Emerging from Jinnah Barrage on river Indus near Kalabagh irrigate the vast areas. Another canal called Chashma Link Canal connects river Indus with river Jhelum through Chashma Barrage. District Mianwali is spread over an area of 5,840 square kilometres and comprises the tehsils of: -

- i. Mianwali
- ii. Isakhel
- iii. Piplan

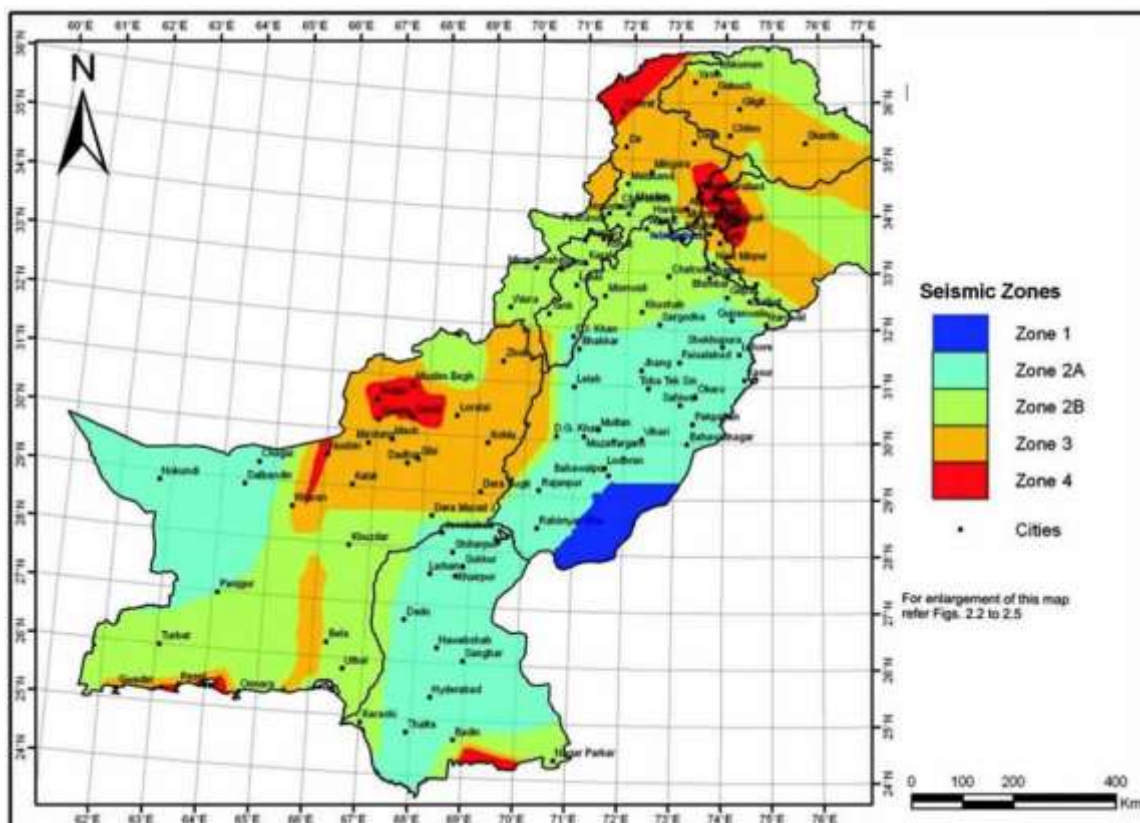


### 5.1.2. Geography

The district is located between 32° 35' 7" N, 71° 32' 37" E. The Mianwali is mainly in Khudri Tract (rough country) or Pakhar running from Kala Bagh to Sakesar. The ground surface slopes gently from North-East to South West. River Indus passes on the western side. Mianwali district covers an area of 5,840 square kilometres (2,250 sq mi). The area in north is a continuation of the Pothohar Plateau and the Kohistan-e-Namak. Southern side of the district is a part of Thal Desert. Indus River flows through the district.

### 5.1.3. Seismic Zone

According to seismic zoning of Pakistan the project area lies in seismic zone 2B and represents minor damage. Seismic zoning map of Pakistan is given in Figure 5-1.

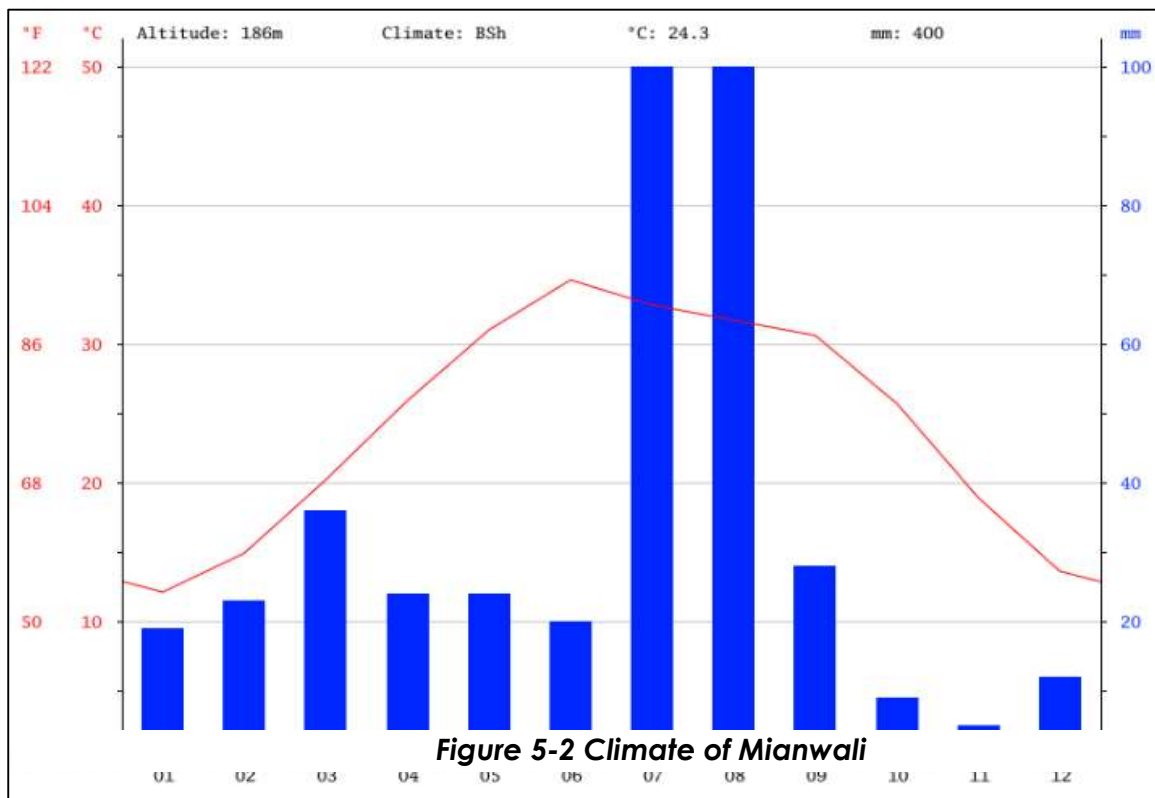


**Figure 5-1 Seismic Zoning Map of Pakistan**

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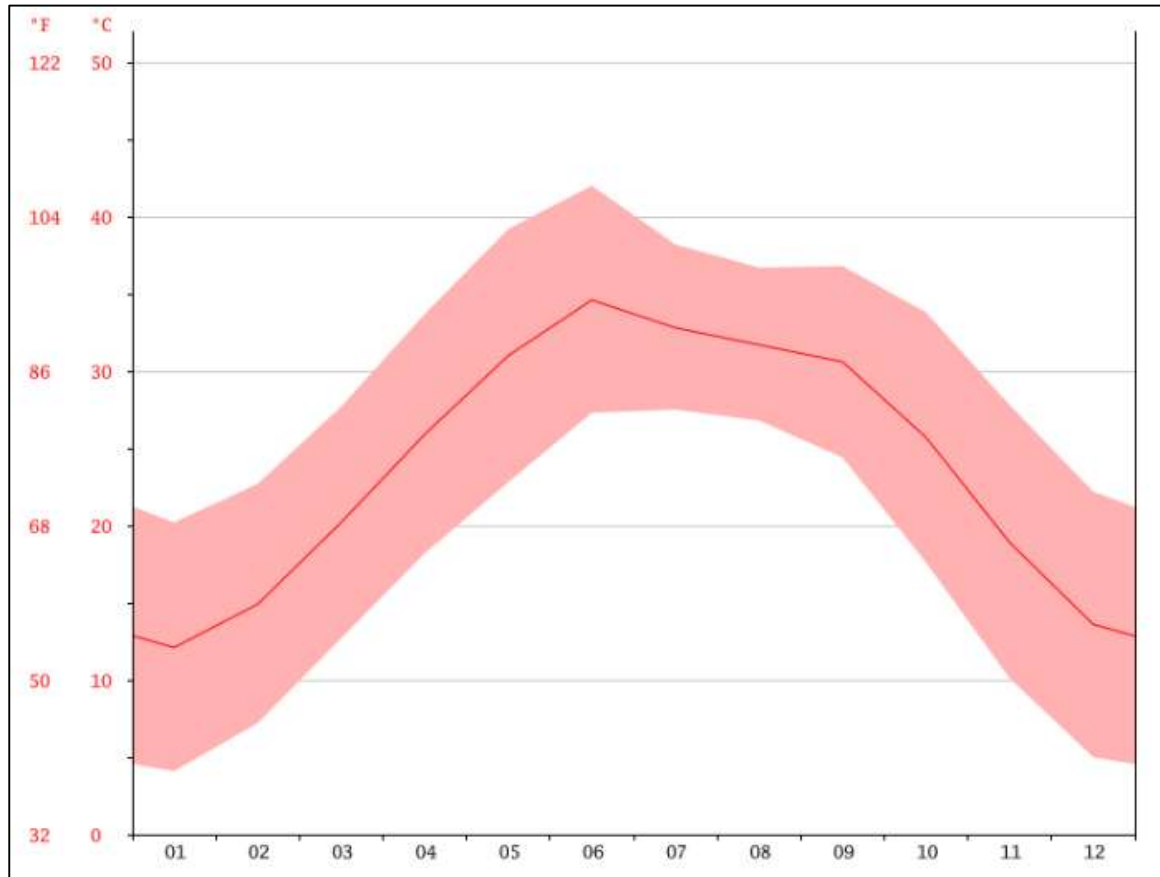
#### 5.1.4. Climate

The climate of the town is hot and dry in summer and dry cold in the winter. The driest month is November. There is 2 mm of precipitation in November. Most of the precipitation here falls in August, averaging 103 mm. The average maximum and minimum temperatures and rainfall in different months of a year has been given in figures 5-2.



#### 5.1.5. Temperature

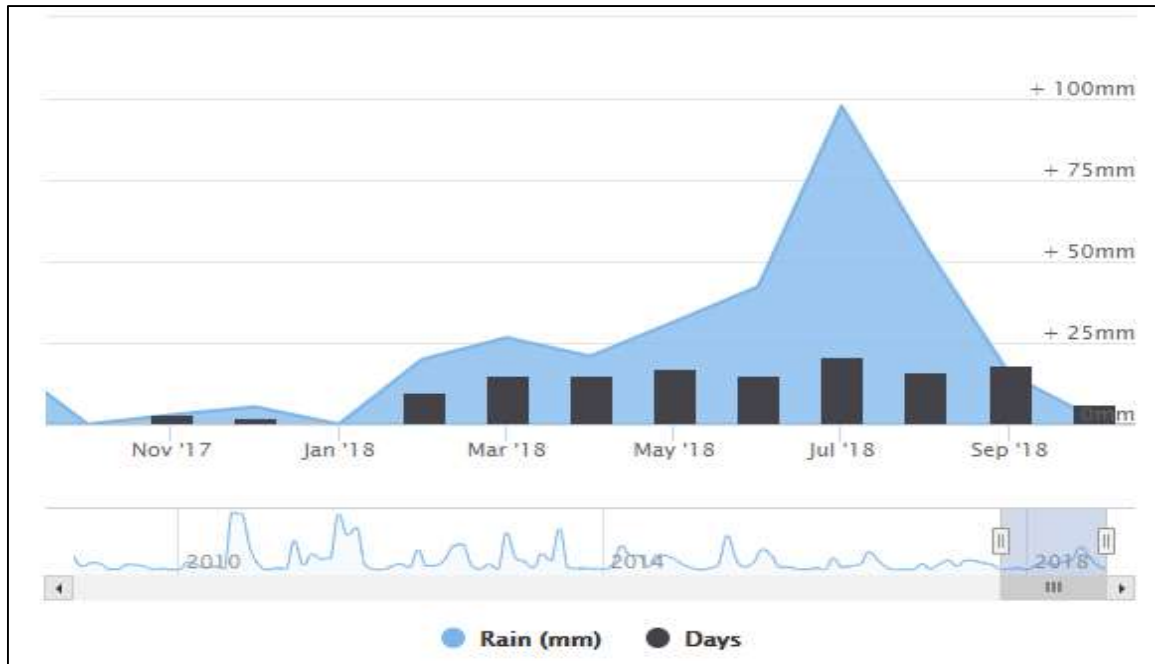
With an average of 34.8 °C, June is the warmest month. January is the coldest month, with temperatures averaging 11.7 °C. The precipitation varies 101 mm between the driest month and the wettest month. Throughout the year, temperatures vary by 23.1 °C.



**Figure 5-3 Average Temperature in Mianwali**

#### **5.1.6. Rainfall**

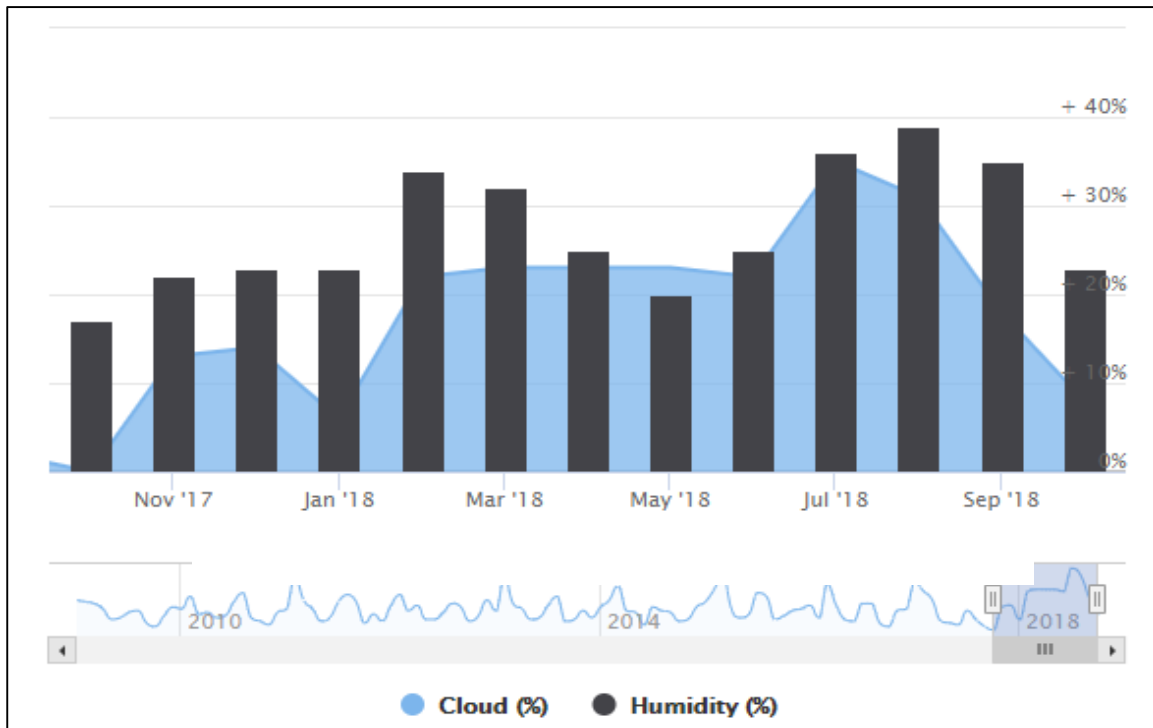
The average amount of precipitation for the year in Mianwali is 15.1"(383.5mm). The month with the most precipitation on average is August with 4.3" (109.2 mm) of precipitation. The month with the least precipitation on average is November with an average of 0.0" (0mm).



**Figure 5-4 Average Rainfall Amount (mm) and Rainy Days in Mianwali**

#### 5.1.7. Humidity

July, August and September are the most humid months in the area, whereas May and June are the least humid months. Average monthly



**Figure 5-5 Average Percentages of Humidity in Mianwali**

relative humidity values at various locations in the project area are 55%.

#### **5.1.8. Water Resources**

Water constitutes an important section of the physical environment of an EIA study to define its magnitude, quality and occurrence throughout the entire project corridor. Water resources of the area are discussed under two broad headings, surface water resources and groundwater resources.

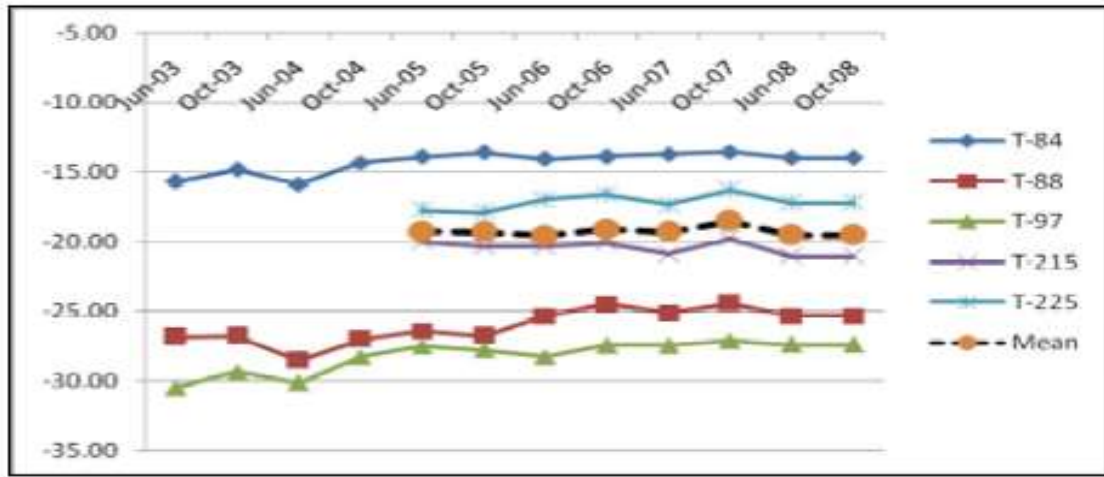
- **Surface Water**

Surface waters resources are usually exposed to the surface of earth in the form of mobile and immobile situation which includes snow-clad mountains, rivers, non-river streams, rain, sleet, wetlands and oceans. Surface resourced waters are highly susceptible to natural and anthropogenic derived contamination in terms of Chemical and Biological contamination and thus are not used for sensitive applications such as drinking directly, unless it is pre-treated.

- **Ground Water**

Ground water resources are found hidden and camouflaged into the surface of earth in the form of mobile and immobile state and exist as shallow and deep wells, confined and un-confined aquifers, springs and watersheds. Ground resourced waters are not easily susceptible to natural and anthropogenic derived contamination caused by Chemical/Biological pollution and thus is directly used for sensitive applications such as drinking even it is un-treated. Groundwater water levels generally range from 15 feet to more than 30 feet below the GLS.





**Figure 5-6 Mianwali District – Water Table Trends (Feet below GLS)**

## 5.2. Baseline Ecological Environment

Ecological Environment includes:

- Flora
- Fauna
- Endangered species

### 5.2.1. Flora

The flora of the area is very unique due to diverse habitat, soil, topography etc. The forest range include the Kalabagh, Kunidan and Kachha forest near Indus river. There are various preserved areas. All the large landowners make their own rakhs, in which they carefully preserve the grasses and wood species and allow no one to trespass. Everywhere the most common tree is the *Acacia modesta* (Phulai).

The more graceful *Acacia nilotica* (Kiker) is found along roads. *Dalbergia sissoo* (Tali) is fairly common in the richest parts of the area. The other commonest hill wood is *Olea ferruginea* (Kao) and *Prosopis juliflora* (Velatikiker). *Melia azedarach* (Dherak) grows wild as well as planted on well's fields and houses. The *Morus alba* (Chitta Toot), *Morus nigra* (Kala Toot), *Eucalyptus* sp (Lachi) are found among road sides trees in the area. By far the common hill shrubs are *Adhatoda vasica* (Bekkar), *Dodonaea viscosa* (Sanatha), *Rhazya stricta* (Sawa veirana), *Withania coagulans* (Panir

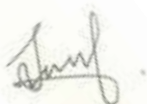
*[Signature]*

dodi) etc. The grasses of the area are of considerable importance as in many places where there is very little fodder to be had for the cattle. Similarly, there is a great diversity of herbs in various tracts of the area. The common herbs are, *Amaranthus* sp, (Chauli) *Boerhaavia procumbens*, (Gulabi Itsit), *Asphodelus tenuifolius* (Bokat), *Carthamus oxyacantha* (Poli), *Chenopodium* sp, (Bathua), *Silybum marianum* (Kandari), *Peganum harmala* (Harmal), *Trianthema portulacastrum* (Itsit) etc. Adjoining to the area croplands are the dry rugged low hills or mountain ranges with poor soils. They are generally represented by sparsely distributed scrubs of *Adhatoda*, *Dodonaea*, *Periploca* and *Orostegia* species with a large variety of grasses and a few trees of *Acacia modesta*, olive, *Melia* or oaks.

These are as generally serve as rangelands for livestock grazing. Unchecked grazing and extensive fuelwood collection during the last few centuries have changed it into scrubs.

### **5.2.2. Fauna**

Variety of the wild animals are found in different tracts of the area and are of considerable importance. The mountain sheep or Urial affords the best large game in the Kalabagh range and outlying spurs. The Ravine deer or Chinkara (Indiangazelle) generally called Hiran, occurs in the arid region of tehsil Essa Khel. The Jackal is occasionally seen and constantly heard in all parts of the tract. The blue rock pigeon is common especially in the Kalabagh hills. Domestic camels are also abundant in this area (Plate 10 & 44). The grey partridge (tittar) is fairly common everywhere but black partridge is found very rarely. Although there is a large variety to choose from sport in the area is not good but game hunting would probably be more plentiful. If there were not such a large number of guns always ready to shoot it where verity is to be found, and if netting and snaring were not such prevalent practices with the natives of the area.



### 5.2.3. Endangered Species

There are no floral or faunal species inhabiting in the project area that are included in RED Data Book of IUCN.

### 5.3. Baseline Socio-economic Environment

Socio-economic and other relevant information revealed from Multiple Indicator Cluster Survey (MICS) 2007-08. One of the main objectives of Multiple Indicator Cluster Survey (MICS) was to establish credible baseline for socio-economic status at each District and Tehsil Level.

**Table 5-1 Summary of Socio-economic Indicators**

| <b>Socio-economic Indicators</b>                                   | <b>District Mianwali</b> |
|--------------------------------------------------------------------|--------------------------|
| Number of households                                               | 992                      |
| Number of under-5 children                                         | 704                      |
| Improved source of drinking water                                  | 96.7%                    |
| Water treatment used in the household                              | 1.2%                     |
| Percentage of population using sanitary means of excreta disposal. | 65.3%                    |
| Proper disposal of solid waste                                     | 3.0%                     |
| Literacy rate                                                      | 57.5%                    |
| Percentage of children for primary school entry                    | 26.7%                    |
| Total child labor                                                  | 3.2%                     |
| Had cough for more than last three weeks                           | 0.5%                     |
| Diagnosed with Tuberculosis during last one year                   | 0.3%                     |
| Diagnosed with Hepatitis during last one year                      | 0.6%                     |
| Employed                                                           | 87.9%                    |
| Unemployed and seeking job                                         | 12.1%                    |
| <b>Household Utilities</b>                                         |                          |
| Electricity                                                        | 91.7%                    |

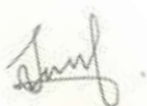
|                                   |       |
|-----------------------------------|-------|
| Natural Gas                       | 7.7%  |
| Radio                             | 38.2% |
| TV                                | 59.6% |
| Cable TV                          | 6.2%  |
| Telephone                         | 10.9% |
| Mobile                            | 72.7% |
| <b>Socio-economic Development</b> |       |
| Livestock                         | 59.3% |
| Mean household size               | 6.7%  |

## 5.4. Quality of Life Values

### 5.4.1. Settlement Patterns

The settlement patterns in the district are influenced by its geography and agro-ecological setting. Hence, relatively large and nucleated villages have been possible in the fertile and irrigated areas, mainly in tracks where agriculture has been developed extensively. In 'Kacha' or low-lying trans-Indus areas, inundated occasionally by the Indus River, relatively smaller, scattered and rather temporary or semi-permanent human settlements have been possible. The same trend is found in the sandy-desert and also in the hilly areas of the district with smaller, scattered and humble habitations of nomadic and seminomadic population groups are located. This is in coherence with the local ecology, which cannot support large human concentrations at any given place in such areas. However, with the population increase as well as the 'modern development' initiatives in the mining, industry and 'green revolution' such balance is fast disappearing.

The urban settlements, representing about one-fifth of the total population of the district Mianwali resemble any other urban concentration in the southern district of the Punjab. The Mianwali city is the district capital and a hub of economic and commercial activities. However, Kalabagh is the most



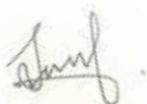
important city with the biggest business and industrial centre of the district. Other urban centres include: Kundian, Esakhel, Ahmed Wala, Piplan, Mocch, Daudkhel, and Rokhri.

#### **5.4.2. Indigenous People**

The major 'social groups' of real or fictive uni-lineal descent, may be identified as Qoum or tribe and/or Zat also known as caste (similar to Jati among the Hindus), but also Biraderi. However, it is difficult to distinguish the tribe and caste as such since the people use the terms 'Qoum' and 'Zat' inter-changeably (e.g., the 'Jats' may identify themselves as 'Qoum' as well as 'Zat' or yet as 'Biraderi'). Some Qoums and Zats many claim superior descent compared to some others, they are not always and not as clearly classifiable as the castes and 'Vernas' of the caste system among the Hindus.

The Mianwali district has been settled by a triple immigration from opposite directions: Awans also known as Rajputs from the north-east, Pakhtuns, including the Khattaks from the north-west and Jats and the Baloch from the south of the Indus valley. The Jats might be the oldest/indigenous inhabitants of the area while the Baloch, one of the oldest, followed by the Rajputs. While the Jats were made into the tenants by the latter settlers or/and pushed into further south or in vulnerable desert and Kacha areas.

The principal quoms of the district today are the Pathan, Jat, Rajpout, Awan, Baloch, Syed, Qureshi, Khwaja and Sheikh. Many others include the professional/artisanal groups classified as 'menials' by the British rulers, after the large landowners own groupings for the Sepi-castes or for those in hereditary service of the landowners and paid annually by the latter in kind (a share in harvest) against their services known as 'Thal'. They include: the Tarkhans (carpenters), Mochis (shoe-makers and leather workers), potters, blacksmiths, Pawlis, etc. Most of these groups are now concentrated in urban areas and mostly practicing their professional skills as independent business.



The Pathans include mainly the Niazis and the Khattaks. Coming from the north-west, the Niazis settled mainly along the high banks of the Indus in Mianwali and Esakhel Tehsils. There are three main sub-groups of Niazi Pathans which are each, further subdivided into smaller lineages and clans: Esakhel, Farhang and Mushani.

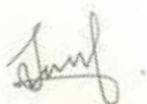
Khattaks preceded Niazis in the north of Isakhel Tehsil and remained in the hills. Two sections of Khattaks are known in the district: Bhangi Khels and the Bani-Afghans. They were classified by the colonial rulers as "hardy and tenacious, vigorous workers" (District Census-1998). They were encouraged to join the British army as they were supposed to "make good soldiers" and thus, enjoyed a "special place in the army" (ibid).

The Baloch are relatively few and settled in Piplan and in the surrounding villages.

Awans, although claim Arab descent from Qutub Shah are probably one sub-group of Rajput quom who settled mostly in the upper table land beyond the Salt Range except two villages: Kalabagh and Jalalpur which are located in west of the Indus river. They have important landownership and many of them have reached high ranks in the armed forces. They also enjoy considerable control over the electoral politics of the district.

The Pathans, Awans, Baloch, Jats, etc., practiced Quom endogamy and clan exogamy traditionally for marriages of their off-springs. With the increasing influence of 'Islamization' and the pressure on lands owned by a clan or a Biraderi, the clan exogamy seems to be disappearing as such and resulting in marriages within close relatives.

The Syeds, claiming a direct descent from the Prophet Mohammed, are another important group in the district in terms of socio-economic and political influence. They are generally, rich, large and usually absentee landlords and 'spiritual-feudals'. The Syeds have been traditionally the 'Peer' (spiritual leaders) of a large number of the local inhabitants. According to the



District Census 1998 (opp-cit), the Syeds in the District Mianwali are “care-takers of shrines and tombs” which provides them an opportunity to remain among the key-players in local politics.

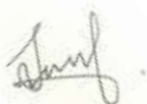
The Sheikhs are important business and trading community in the urban areas of Mianwali district. They are non-agriculturists and enjoy sufficient hold on the local business: also Arhtis and money-lenders, they are described as the “successors of Hindus” in this field (District Census 1998).

The Qureshis are mostly known as keepers of shrines in the district.

It is understandable that with the Indus river all along the north-west to the south-west of the district, a number of nomadic/semi-nomadic fishing groups must be inhabiting this district. It is most unfortunate, however, that there is no record available on such communities in the district. The numerical strength of each of these groups/sub-groups is not available from any existing source.

#### **5.4.3. Religious & Ethnic Groups and Caste Patterns**

The Muslim population is by far the largest religious group (99.1%, according to the District Census-1998), followed by Christians who are concentrated mostly in the urban centres (hardly 1% of all). A small minority of Ahmadiis inhabit the rural and urban areas of the district. Before the 1947 Partition, according to the 1941 Census, more than one-fifth of the district population was Hindu and about one percent was Sikh. They were mostly rich merchants and settled in urban centres. Presently, only a few Hindus (Jati), ‘Scheduled Castes’ also inhabit the district. It is feared that the census data may not be completely reliable in this respect as due to socio-political influences from the local elite, the real demographic strength of religious minorities is not revealed. The district had an important Ahmadi concentration, e.g., before they were declared non-Muslims in the early 70s. Most members of this community left the district after taking asylum in Europe and North America but those still in the district keep a low profile. The Ahmadies face continuous socio-political persecution, often victim of the



Blasphemy law i.e., unjust application of this law to target members of this community (2003 Annual Report on International Religious Freedom in Pakistan).

#### **5.4.4. Social Infrastructure and Facilities**

All the major line departments of related provincial ministries (20 in all), have their offices and staff at the District Headquarter in Mianwali and at Tehsil headquarters of the three Tehsils of the district.

A brief account of the education, health, infrastructure and markets of the area is as follows:

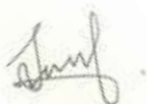
#### **5.4.5. Health facilities**

The district has few health facilities available to its population. There are 3 government hospitals in Mianwali Tehsil, 2 in Isa Khel and 3 in Piplan Tehsils. The District Headquarters Hospital in Mianwali city has 250 beds, surgical and medical specialists and eye surgeons, gynecologist, pathologist, and dental surgeon. A round the clock ambulance service is available on principle. There are also 15 Medical Officers, three Women Medical Officers assisted by a number of nurses, dispensers and technicians.

#### **5.4.6. Economy of the Area**

Most people of the district prefer to join armed forces like Pakistan Army, Pakistan Navy and Pakistan Air Force. Mianwali has the highest proportion of its population serving in the Armed forces of Pakistan. A handsome percentage of the population is employed in the mining, industrial and trading sector with a very small fraction employed in technical fields like health, education, banking and engineering.

Mianwali is generating a large number of employment opportunities for its locals and outsiders. Industrial areas are using manpower, while nearby towns are providing business opportunities to the residents. In this semi urban area, people are involved in daily wages jobs, while some are involved in small business. They normally travel to adjacent areas for work. Some work in the



industrial area and in the surrounding universities and colleges. People are also involved in agriculture. Area having access to irrigation water is another source of income.

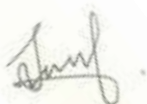
Similarly, livestock is a secondary source of income. It is safe to assume that livestock farming is practiced uniformly in both types of areas. Economy of the project area is dependent primarily on two occupations i.e., agriculture (maximum) and livestock (limited extent), while some locals are also involved in manual labor.

#### **5.4.7. Agriculture**

The total land for agriculture in the district is 1,426,000 acres, of which slightly less than half is cultivated (Census-1998). The highest cultivation, in proportion to the total land, is in the Piplan Tehsil where almost two-thirds of the land is cultivated however, irrigation is not available for more than half of the lands. The cultivated area is smallest in Isakhel as most land here is un-cultivable.

#### **5.4.8. Livestock**

The importance of livestock is great for landless and marginal farmers, livestock farming is a parallel activity to crop farming (2003; PPLPI-IFCN, FAO, opp.cit). According to the same source, a landless farmer in irrigated areas with one buffalo, utilizes crop residues acquired from other farmers fields (landlords'), consumes 73% of the milk produced while the surplus (27%) is sold to the local milk-man (ibid). In comparison, a farmer with 60 hectors of land, with 10 buffaloes, sells about 90% of milk twice daily to the milk collection point (ibid). According to the findings of another recent study, Mianwali district is classified as a district of 'sufficient' livestock-based food production zone, with a 'food availability' at 0.996 to 1.49 Kcal/capita production (WFP-SDPI-2004). Similarly, in terms of milk and dairy production in the rural district, as well as in 'meat, fish and poultry' production, the district falls in the category of 'surplus production' (ibid). This is despite the fact that the number of livestock per capita in the district is recognized as 'low' or just between 0.5



to below 1.0 animal/person by the same source (ibid). This is partly because larger flocks of high-quality animals are kept by large landowners who have sufficient fodder/feed produced from their own lands while most poor people have none or few animals.

#### **5.4.9. Archeological and Cultural Sites**

There were no archaeological sites found near the project area, although, nearest chaks do have mosques, graveyards and darbars.

### **5.5. Lab Reports of Environmental Analysis**

To assess the baseline conditions of the project area, following environmental components were monitored.

- Ambient air quality
- Noise levels and
- Drinking water quality

### **5.6. Suitability of the Site**

The site does not fall in environmental sensitive area and all commodities are at a suitable distance from project site as they will not have impacted by the construction activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation are required for the development of proposed project.



## **6. IMPACT ASSESSMENT**

This section discusses the potential environmental impact for coal mining, methodologies for impact identifications and characteristics of impacts including nature, magnitude, extent and location, timing, duration, reversibility, risk. The assessment carried out in this Section is based on potential impacts on overall environmental receptors within the project area.

### **6.1. Methodology for Impact Identification**

The potential impacts due to coal mining can be both positive (beneficial) and negative (adverse) depending on the resources and receptors involved along with other parameters such as geographical scope (magnitude and extent), temporal scope (duration) and reversibility.

It is anticipated that this project will have positive impacts on sectors such as the economy, employment and foreign exchange earnings among others. Moreover, the project is expected to result in negative impacts of short-term duration and transient in nature.

Environmental sensitivity of the project area is described through a thorough review of the project activities and the evaluation of significance of impacts is carried out through Environmental Checklists and GIS and computer expert system. In checklists, the impacts have been given magnitude based on their severity. A detailed map of the project area is developed on GIS to study the impacts on nearby environmental settings. This chapter then suggests effective mitigation strategies to help combat the adverse nature of these impacts and delivers a monitoring scheme to manage them.

### **6.2. Characterization of Impacts**

Impacts were characterized on the basis of following parameters:

- Nature
- Magnitude
- Extent
- Duration
- Spatial Boundaries
- Reversibility

The impacts characterization for the project has been given in Table 6-1.



**Table 6-1 Characterization of Impacts**

| Categories               | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nature                   | Direct: The environmental parameter is directly changed by the project.<br>Indirect: The environmental parameter changes as a result of a change in another parameter.                                                                                                                                                                                                                                                                                                                                                                             |
| Duration of impact       | Short-term: Lasting only for the duration of the project such as noise from the construction activities. Medium-term: Lasting for a period of few months to a year the project before naturally reverting to the original condition such as loss of vegetation due to the clearing of the construction site, contamination of soil or water by fuels or oil. Long-term: Lasting for a period much greater than medium-term impact before naturally reverting to the original condition such as loss of soil due to soil erosion and air emissions. |
| Geographical extent      | Local, regional (spatial dimension)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Reversibility of impact  | Reversible: When a receptor resumes its pre-project condition. Irreversible: When a receptor does not or cannot resume its pre-project condition.                                                                                                                                                                                                                                                                                                                                                                                                  |
| Likelihood of the impact | High: Impact expected to occur under most circumstances Moderate: Impact will probably occur under most circumstances. Low: Impact could rarely occur at some time.                                                                                                                                                                                                                                                                                                                                                                                |



|                        |                                                                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Significance of impact | Categorized as Positive or Negative.<br>Based on the consequence, likelihood, reversibility, geographical extent, and duration; the level of public concern; and conformance with legislative of statutory requirements. |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

A handwritten signature in black ink, appearing to be 'Sarf', is written on a yellow rectangular background.

**Table 6-2 Characterization of Impacts**

| Environmental Component | Impacts  |          | Nature of Impact |          | Duration   |              |           | Spatial Boundaries |          |        | Likelihood |          |      | Reversibility |              |
|-------------------------|----------|----------|------------------|----------|------------|--------------|-----------|--------------------|----------|--------|------------|----------|------|---------------|--------------|
|                         | Positive | Negative | Direct           | Indirect | Short Term | Intermediate | Long term | Local              | National | Global | Low        | Moderate | High | Reversible    | Irreversible |
| Water Resources         | Nil      |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Acid Mine Drainage      | Nil      |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Land Resources          |          |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Air Quality             |          |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Climate Change          | Nil      |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Noise                   |          |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Solid waste             |          |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Wastewater              |          |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |
| Flora & Fauna           |          |          |                  |          |            |              |           |                    |          |        |            |          |      |               |              |

|                                                              |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Community<br>Amenity                                         |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Afforestation                                                |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Local Economy,<br>Community<br>Development and<br>Employment |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Resettlement                                                 | Nil |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Health & Safety                                              |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

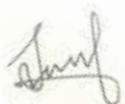


### 6.3. Impact Significance

After the evaluation of all the potential impacts, the impacts significance is being given using Impact matrix. The impacts significance of Physical importance, Ecological importance, Social importance is given using the matrix approach. The impacts significance is given based on the characterization of impacts. From the Table 6-1 which is showing the characterization of each impact the following significance is given to each physical, biological and socio-economic impact.

**Table 6-3 Significance of Environmental Impacts**

| Environmental Parameters                            | Significance       |
|-----------------------------------------------------|--------------------|
| Water Resources                                     | None               |
| Land Resources                                      | None               |
| Air Quality                                         | Require mitigation |
| Climate Change                                      | None               |
| Acid Mine Drainage                                  | None               |
| Noise                                               | Require mitigation |
| Solid waste                                         | Require mitigation |
| Wastewater                                          | Require mitigation |
| Flora & Fauna                                       | Acceptable         |
| Community Amenity                                   | Acceptable         |
| Afforestation                                       | Acceptable         |
| Local Economy, Community Development and Employment | Acceptable         |
| Health & Safety                                     | Require mitigation |



## **7. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES**

Anticipated environmental impacts are discussed as

### **7.1. Project location**

The surrounding area is hilly and mostly barren land. The selected site is present on the belt which has abundant reserves of deposits of our concerned raw material. Moreover, there is no human settlement within the radius of the selected site and has good road infrastructure. Man power is available in the area. After environmental assessment of the study area the subject project site is most suitable to execute the project regarding the location environmental impacts.

### **7.2. Project Design**

Mining activity will be done with proper fencing and specific area would be extracted or mined once in one time. Grazing and harvesting would be allowed on the remaining portion of the mining area other than the specific extracted area. There is no proper structure for this project only surface mining will be done that will exert no such impacts on the environment.

Following are the possible Environmental impacts due to the design

- Impacts Soil structure and soil bearing capacity
- Road infrastructure design
- Rain water harvesting capacity of the drainage system

Impact significance: low

Nature of impact: direct

Duration: NA

Timing: NA

Reversibility: NA



Likelihood: Low to Medium

Consequences: Low to Medium

Mitigation measures and recommendations

Following are the mitigation measures and recommendation to minimize the anticipated impacts.

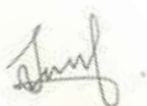
- Proper design of fencing
- Proper Mining activity design
- Mining activity will not be done in scattered manner.
- One specific portion will be mined in one time.
- Road infrastructure should be according to the laws and regulations
- Waste water drainage should be design vast to bear the rain water capacity of the society.

### **7.3. Construction Stage**

The impacts in relation to construction of mine includes the impacts resulting from; construction of access roads, establishment of workers camps at safe sites and distances, land clearing and leveling, drilling, and surveying etc. The impacts resulting from these activities mainly include:

- **Dust Generation**

Dust may be generated due to movement of machinery and vehicles at site for construction purposes. Dust may be generated during access roads development, land clearing and leveling etc. The mines are located in far flung areas away from population. Mining concedes with mountainous region void of population. Any access to the mineral deposit is done through jeep-able road which is improved by placing the shingle on top to avoid muddy and slippery situation. The movement of the truck on these "Katcha Roads" provides a phenomenal dust fanning which is rarely visible or seen. Hence the impact is almost nil.



- **Exhaust Emissions**

These emissions may result from the exhaust of vehicles and machinery operation at site. No exhaust emissions are generated due to operation of generators used for power generation as these generators operate on electricity rather than diesel.

- **Higher Noise Levels**

Higher noise levels and vibrations may be caused due to operation and movement of heavy machinery and vehicles at site and drilling if being carried out in case of hard rocks.

- **Loss of Vegetation**

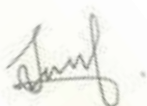
Vegetation may be lost due to land clearing and leveling if comes in direct way of construction activities.

- **Solid Waste and Wastewater Generation**

Solid waste and wastewater may be generated from construction camps and offices. It will be disposed of as per the standards of TMA.

- **Community Amenity**

Disturbance to nearby community may be occurred due to dust and noise generation. Noise is associated with project operations. Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions. The paving of the road in the mountainous region is done through backhoe machine and not through drilling and blasting. The labor huts are placed in a contiguous block close to the mines keeping in view the safety, vigilance of the workers encamped. The Mining Leases/license are granted by Mines and Minerals Department while access to the lease to surface is left to the lessee and surface land owner for settlement. These local people, they blackmail the lessees to the last extent and are the biggest stumbling block.



## Preventive Measures

- Controlled water sprinkling will be ensured to reduce PM<sub>10</sub>.
- Maintain appropriate buffers between the site and receptors.
- Use of PPEs (face masks etc.) will be ensured by the mine operators and staff
- Use of PPEs (noise suppression equipment-ear mufflers etc.) will be ensured by the workers where noise levels are higher than 85 (dBA).
- Construction activities will be ensured at daytime when background noise levels are high.
- Vehicles speed limit will be maintained to avoid excessive vibrations.
- Regular maintenance of machinery will be ensured.
- Cutting of vegetation and trees will be avoided as far as possible.
- Afforestation will be carried out as maximum as possible.
- Solid waste will be managed efficiently. Solid waste at site will be stored in containers covered with lid.
- Waste water will be disposed of as per the standards of TMA.

## 7.4. Operational Stage

The potential environmental impacts resulting during operational phase of the project and their possible mitigation measures are given below.

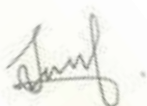
### 7.4.1. Topographic/Soil

Land under consideration is mainly planed area with less undulating patches. Some area falls in the mountainous patches/topography.

### Mitigation Measure

Based on the discussion above, the following measures are proposed:

- The mining activities will be very slow and spread over an estimated time period of more than 150 years.
- Restoration and reclamation plan will be developed to restore the natural landscape of the area.



- Plant nursery, garden will be developed to rehabilitate the native plants of the area.
- Mining site will be fenced in a way that the exit route for reptiles will be towards the natural habitat but not towards the any human settlements. Technique of controlled and time specific blasting will be ensured for "safe habitat of the animals".
- Project proponent will make any possible efforts to limit the impact on flora and fauna.

### **Residual Impact:**

If the mitigation measures are effectively implemented and keeping in view the length of time to bring about the change in topography, the overall average impact may not be considered significant.

Impact significance: mild to high

Nature of impact: Direct

Duration: Short-to medium-term

Timing: Construction & Operation phase

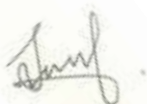
Reversibility: Possible

Likelihood: Low (unlikely), as the mitigation measures will ensure that vegetation clearing is minimized

Consequences: Mild or may be positive

### **7.4.2. Water Resources**

There are no streams and canals available near the proposed site. Water requirement for the proposed mining project will be fulfilled by underground water by tub well and will be used during mining activity for the purpose of sprinkling on road and for drilling. In the mining area drinking water requirement is fulfilled by underground water by springs and by wells. Local people of the area extract ground water from Rocket motor (in their local



language) and by submersible pumps or motor pumps. Depth of ground water table is 450- 500 ft from the project site. There are no proper water channels within the radius of our study area. Rain water in the area flows down the hills or evaporate. There is no storm water or rain water storage facility in the area.

### **Mitigation Measures**

- There is no storm water or rain water storage facility in the area. The subject project will construct check dams to harvest the rain water or storm water in the area that will be used for vegetation or for agricultural purposes.
- The other purpose of check dam is to store the percolated water to stable the disturbed water table.
- Water will be extracted only from the deep confined aquifer.
- Given that water is to be extracted from a confined aquifer whose recharge rate, (just as the actual volume of water available or its rate of depletion) is not known, the extraction will be monitored to ensure that it does not lead to irreversible environmental damage.

### **Residual Impact:**

Post-mitigation residual impact on groundwater has been deemed acceptable if it meets the following criteria:

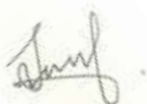
Nature of impact: Direct

Timing: Operation phase

Duration: Long-term; depends on the rainfall pattern and recharge regime of the deep aquifer

Reversibility: Yes

Likelihood: Moderate



Consequences: Low, as monitoring and corrective action will ensure that there is no adverse impact.

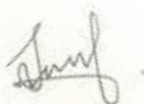
Impact significance: Low to moderate

### **Contamination of Soil and Water**

Due to the machinery used during mining activity, raw material transportation vehicles, stored oil tanks, fuels, and other substances are the potential sources of soil contamination.

### **Mitigation Measures**

- Mitigation measures to reduce the impact of waste effluents produced during project activities are listed below.
- Deep holes will not be located in the vicinity of proposed site.
- Tarpaulin sheets will be placed under generators, compressors, and oil tanks.
- Vehicles and other equipment will not be serviced outside of the designated areas. Vehicles and other equipment will not be repaired outside of the designated areas.
- No contaminated effluents will be released into the environment without having been treated.
- Sewage and other waste effluents will be handled to avoid contaminating surface and groundwater.
- Water from domestic and project related sources will be released into septic tanks.
- An appropriately designed septic tank will be used to treat sewage and outlets will release treated effluent into drain. The integrity of the entire system will be maintained and monitored.
- Septic tanks will be built at a safe distance from any water hole, stream, or dry streambed, to prevent the entry of surface water.
- Solid waste will be segregated and disposed of properly.



### **Residual Impact:**

The residual impact of project activities on the soil and water quality of the area is expected to be insignificant once the suggested mitigation measures are put into effect. The residual effects are summarized below:

Nature of impact: Indirect

Timing: Construction & Operation Phase

Duration: Medium to long term

Reversibility: Yes

Likelihood: Low, as the proposed mitigation measures will ensure that soil and water are not contaminated.

Consequences: Mild to moderate, as the effluents released into the environment will have been adequately treated

Impact significance: Low to medium, based upon low likelihood and mild to moderate consequence

### **Air Emissions:**

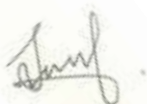
Air emissions from project-related activities are likely to include:

- Dust due to proposed mining activity, construction and operation of the proposed project.
- Dust raised on dirt tracks by project-related vehicles.
- Dust from drilling of deep holes.
- Dust due to drilling and blasting of the rocks
- Combustion products from vehicles used for project-related activities

### **Gaseous Emissions:**

Exhaust Fumes from Vehicles and Construction Machinery:

Emissions produced by vehicles and equipment will be similar to those produced by diesel generators in terms of the resulting pollutants (SO<sub>2</sub>, NO<sub>x</sub>,



PM, etc.). However, the extent to which they are produced will be considerably lower, since much smaller diesel engines are used in vehicles and construction machinery.

### **Mitigation Measures**

None of the potential effects discussed above are expected to exceed acceptable limits. The mitigation measures given below will further reduce their impact, and ensure that they remain within acceptable limits.

- Water sprinkling on the site will minimize the dust pollution.
- All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.
- Vehicle speed will be reduced on track passing through or close to settlements.
- Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic.
- Water will be sprinkled where necessary to contain dust emissions.
- All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.

### **Residual Impact:**

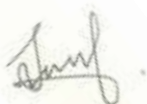
After implementing the mitigation measures listed above, the residual impact of the proposed activities on ambient air quality is expected to be insignificant, as shown below:

Nature of impact: Direct

Duration: Short term

Timing: construction & operation

Reversibility: Not applicable



Likelihood: Low (unlikely) as mitigation measures will ensure that air pollution remains within acceptable limits.

Consequences: Moderate to High (Moderate in case of mechanical extraction and high in case of blasting)

Impact significance: Low, based upon low likelihood and mild to moderate consequence.

#### **7.4.3. Acid Mine Drainage**

Acid mine drainage, acid and metalliferous drainage (AMD), or acid rock drainage (ARD) is the outflow of acidic water from coal mines. Acid mine drainage (AMD) has been a detrimental by-product of coal mining for many years. At present, acid mine drainage continues to pose a potential problem in some areas, despite improved prediction and prevention techniques. Acid drainage is most susceptible to dissolve heavy metals particularly Iron, Zinc, Copper, Lead Mercury etc. due to its low pH value.

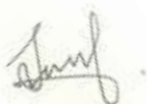
Acid mine drainage only occurs when there is water ingress into coal mines. In present case, there are no chances of water ingress into coal mines and hence no chances for acid mine drainage. Additionally, potential impacts of acid mine drainage are discussed with appropriate mitigation measures below. Noted, that these mitigation measures are not applicable for present case as there are no chances for acid mine drainage.

- **Potential Impacts**

Following are some of the impacts caused due to acid mine drainage.

#### **Surface and Groundwater Quality Contamination**

Acid mine drainage may have detrimental effects on surface and groundwater qualities. The heavy metals dissolved in acid mine drainage may leach into the groundwater and make it toxic. Similarly, it can also have adverse impacts on surface water qualities if mixed with it. If acid mine drainage mixed with surface water body, it can lead to severe Ph changes.



Additionally, heightened acidity reduces the ability of streams to buffer against further chemical changes.

### **Soil Contamination**

Soil can be contaminated if it is exposed to acid mine drainage. The toxic elements present in the acid may dissolved in the soil and change its characteristics. If it passes from an agricultural land, it can reduce its fertility and disturb nutrients level in it. Acid mine drainage may also cause soil erosion which may increase turbidity levels in streams.

### **Human Health**

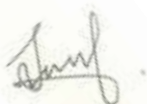
Acid mine drainage causes serious threat to human health and ecological systems as it contains heavy metal contaminants. The heavy metals are not degradable and accumulate in living organisms causing various diseases and disorders.

### **Aquatic Life**

Low Ph of acid mine drainage results in solubility of heavy metals in water and its high concentration causes toxicological effects on aquatic life. Acute exposures of high concentration of metals can kill organisms directly while long term exposure can cause mortality and other effects. Long term exposures can cause stunted growth, lower reproduction rates, deformities and lesions. The accumulation of heavy metals in fish may be transferred to human beings through food chain.

- **Preventive Mitigation Measures**

The coal mining is generally done through underground mining method and as such there is no emission of Sulphur dioxide or other acidic fumes or smoke which may lead to the emergence of acid rain phenomena. The impact of acid rain and its possibility relating to underground coal mining is nil. The water percolating in the mines is through limestone beds which are non-acidic. The metalliferous mines having sulfide ores can have the chances of



acidity. In such cases the pumps used are specially galvanized for rotors or screw type pumps are used having impregnation of rubber. In case of muddy mines pulsatory pumps are used which are non-rotating and take care of acidity factor if available. Once the pumping is done, the water stored on the surface tank is mixed with fine dust of calcium carbonate powder to mitigate its acidic factor.

#### **7.4.4. Soil and Groundwater Contamination from Coal Piles**

As discussed earlier that coal is not stored at site in the form of coal piles or in some other form. Hence, soil and groundwater will not get contaminated due to coal piles. The shales extracted during the coal extraction will be filled in the goaf area underground while rest if brought up will be covered with a layer of impermeable mud.

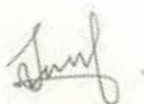
#### **7.4.5. Mine Workers Health and Safety**

Coal mining deep underground involves a higher safety risk than coal mined in opencast pits due to problems associated with mine ventilation and the potential for mine collapse. However, there are safety risks associated with all forms of coal mining. Mining explosions are a safety risk in underground mining. Methane released from the coal seam and surrounding rock strata during the process of mining can present a high risk of explosion at concentrations in air of 5-15%.

The proponent has not been deemed to have methane gas.

- **Preventive Measures**

The employment of worker is regulated through Labor Laws. The safety and health are regulated through the enactments of Mines Act 1923 and its subordinate laws. The mines are under the control of qualified mining engineers who conducted the mining operations as per legal requirement and SOPs.



The super-inspection is carried out by the Regulatory Staff appointed under the Chief Inspectorate of Mines. The medical staff appointed under the Chief Inspectorate monitor sanitation, hygiene conditions as well as health protection of mine workers at mines.

#### *7.4.5.1. Provision of First Aid Facility*

At workplace workers and employers have enough information, knowledge and training regarding first aid treatment in case of any emergency. The Inspectorate of Mines in collaboration with Halal e Ahmed and local medical staff arrange refresher courses for First Aid. The employees of the company take due advantage of such opportunities along with other companies.

#### *7.4.5.2. Safety Trainings*

Workers and all the staff is provided with proper training about the work and safety practices. Regular training courses are being organized by the training wing of Inspectorate of Mines Punjab and Pakistan Mine Owners Association. The lessee sends its trainees for such courses subject to available seats.

#### *7.4.5.3. Use of Drugs and Narcotics*

Drugs and narcotics are strictly prohibited. Smoking will be only allowed in rest timings at properly isolated places.

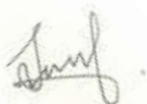
#### *7.4.5.4. Provision of Personal Protective Equipment*

To control any health and safety risk and to reduce the magnitude of any adverse impact, the workers are required by law to have the PPEs such as safety helmet, safety goggles, rubber gloves, long shoes, safety lamps/torches etc. The company will provide the requisite PPE to its employees where required.

#### **7.4.6. Emergency Response Plan (ERP) for Accidents/Collapse**

ERP is prepared for underground coal mines to act in emergency situations. Following are some of the objectives to ERP:

- To provide an effective response to emergency situations.



- To develop responsibility levels and support coordination.
- To minimize the effect of emergencies on personnel, on the surrounding communities, and on the public.
- To minimize injury; damage to environment; property damage; damage to equipment; and losses to process that result from emergencies.
- To ensure timely communication and cooperation with government and outside agencies.
- To provide suitable information to be conveyed to the public.
- To define the Emergency Response Team as the combination of: site personnel in the area of the emergency, personnel from other areas, Mine Rescue Team, and other off site emergency personnel as needed.

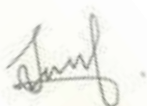
Chief Inspectorate of Mines (CIM) is responsible for mines safety. Rescue stations are established by CIM at the mining areas. Emergency situations are responded through these rescue stations. Mines Labour Hospitals are also established in mining areas. All health and safety measures are made in compliance with Mines Act, 1923.

#### **7.4.7. Climate Change**

Coal mining activities doesn't directly contribute in climate change. The mining is done underground and as such no climatic change is expected of it. Mining activities underground, do not release any greenhouse gas into atmosphere which have potential of climate change/global warming.

### **7.5. Summary of Potential Impacts**

The summary of the positive and the negative impacts observed on the environment by the mining of coal on the project area has been summarized in Table 7-1. The impacts have been given magnitude based on the scaling given below.



**Table 7-1 Scale Range**

| Scale Range  | 0 to 5 |
|--------------|--------|
| Major Impact | 5      |
| Moderate     | 4      |
| Intermediate | 3      |
| Minor        | 2      |
| Low          | 1      |
| No Impact    | 0      |

Positive impacts are given (+) sign while (-) sign is used for negative impacts. The mitigation measures will be explained after a short while. The magnitude of positive and negative impacts is given in Table 7-2.



**Table 7-2 Environmental Screening Matrix**

| Description                     | Physical           |             |               | Biological |       | Socioeconomic |                                          |                              |
|---------------------------------|--------------------|-------------|---------------|------------|-------|---------------|------------------------------------------|------------------------------|
|                                 | Soil Contamination | Air Quality | Water Quality | Flora      | Fauna | Noise         | Land Acquisition and Compensation Issues | Safety Hazard, Public Health |
| Land Acquisition                | N                  | N           | N             | N          | N     | N             | N                                        | N                            |
| Contractor Mobilization         | 0                  | -1          | 0             | N          | 0     | -1            | N                                        | -1                           |
| Construction Camp Establishment | -1                 | -1          | -1            | -1         | -1    | -2            | N                                        | -1                           |
| Construction Camp Operation     | -1                 | -1          | -1            | -1         | -1    | -1            | N                                        | -1                           |
| Site Preparation                | -2                 | -1          | -1            | -1         | -1    | -1            | N                                        | -1                           |
| Exploration                     | -2                 | -2          | -1            | -1         | -1    | -2            | N                                        | -2                           |
| Laying of Services              | -1                 | -1          | -1            | -1         | -1    | -1            | N                                        | -2                           |
| Exploration Materials Supply    | -1                 | -1          | N             | 0          | 0     | -1            | N                                        | -1                           |

|                         |    |    |    |    |    |    |   |    |
|-------------------------|----|----|----|----|----|----|---|----|
| Transportation          | 0  | -1 | N  | 0  | 0  | -1 | N | -1 |
| Solid Waste Disposal    | -2 | -1 | -2 | -1 | -1 | -1 | N | -1 |
| Waste Effluent Disposal | -1 | -1 | -1 | -1 | -1 | 0  | N | -1 |
| Mining Activity         | -1 | -2 | -1 | -1 | -1 | -2 | N | -2 |

**Key:** -2: High negative impact; -1: Low negative impact; 0: insignificant/negligible negative; +1: low positive impact; +2: High positive impact, N: no Impact



## **7.6. Potential Environmental Enhancement Measures**

- All vehicles used in the coal mining will be regularly inspected and maintained.
- Extracted coal will be transported to the market places according to proper management practices.
- Vegetative buffers will be maintained regularly to keep them in good condition.
- The labor force will be trained to use personal protective equipment to avoid any accident/ near miss at site.
- The vehicles used for transportation of coal will be properly designed, covered and cleaned to avoid any risk while departing to and from the project site.
- Extensive plantation will be done in and around the project site to enhance the environmental quality.
- Environmental Management and Monitoring Plan (EMMP) will be strictly operational throughout the project life. All monitored data will be reported to the EPA Punjab, Lahore for scrutiny at their end.

A handwritten signature in black ink, appearing to be 'Shafiq', is written on a yellow rectangular background.

## **8. ENVIRONMENTAL MANAGEMENT & MONITORING PROGRAM**

### **8.1. Introduction**

This section presents the environmental management plan (EMP) for the proposed project. The EMP specifies the mitigation and management measures which the Proponent will undertake and shows how the Project will mobilize organizational capacity and resources to implement these measures.

The EMP covers information on the management and mitigation measures that will be taken into consideration to address impacts in respect of the operational phase of project.

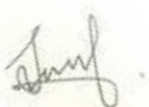
### **8.2. Objectives**

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define the responsibilities of the HSE manager of proposed project.
- Define a monitoring mechanism and identify monitoring parameters in order to:
- Ensure the complete implementation of all mitigation measures.
- Ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

### **8.3. Schedule of Implementation of EMMP**

The implementation of EMMP should be carefully coordinated with the design and operational program of the project. This will ensure the implementation of relevant mitigation measures at the appropriate project stages. It will also ensure that adequate resources are properly allocated to achieve the desired results.



A handwritten signature in black ink, appearing to be 'Shafiq', is written over a yellow rectangular stamp. The stamp is partially obscured by the signature and is located in the bottom left corner of the page.

This EMMP has been prepared to satisfy the requirement of "IEE and EIA Regulations, 2000".

#### **8.4. Environmental Management Team along with their roles and Responsibilities**

The overall responsibility for compliance with the environmental management plan rests with the project proponent.

##### **Roles and Responsibilities:**

Environmental Management should become an integral part of policy of proposed project. Therefore, committing to reduce the environmental impacts will reflect the management approach and believe that good performance in this area is synonymous with running well managed efficient proposed project operation. During the construction main responsibility of environmental performance will be followed by the EHS Officer on daily basis.

In case of normal operational phase, main responsibility for environmental performance will be supervised by the site manager while daily management will be performed under the site officer who in turn charges of environmental matters. Under their surveillance, environmental management during operations will be performed as per mitigation and monitoring plans outlined in this EIA. A brief role and responsibilities is given below;

- Top Management

Environmental management plan will regulate by the top management of proposed incinerator plant; therefore, they will play an important role. Some of the key roles and responsibilities are given below;

- To cooperate and consult with relevant environmental agency in order to perform in better way.



- To evaluate the progress of development and implementation of this management plan.
- To approve any change in decision making with the consultation of respective managers, if appropriate.

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- HSE/Project Manager
- In-Charge Administration
- Supervisor of project
- Environmental Engineer
- **Project Manager**

The role of project manager is very important. The success of an EMP will mainly depend upon effective management of the EMP by project manager. Some of the key roles and responsibilities given to project manager are given below;

- Ensure that contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment.
- Ensure that all stipulations within the EMP are communicated and adhered to by the contractor.
- Monitor the implementation of EMP throughout the project by means of site inspections and meetings.
- Be fully aware of the environmental assessment of the project, the conditions of approval of EIA and all relevant legislations.
- To monitor the progress of development and implementation of this management plan.
- To improve coordination and exchange of communication between higher management and staff.



- **Contractor for Construction and Operation**

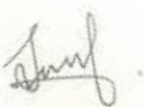
On behalf of contractor, the main responsibilities of all matters pertaining to environment will be that of chief of the assigned contractor. Following are the roles and responsibilities of contractor.

- To carry out constructional and operational activities in an environment friendly manner.
- Shall propose measures to minimize environmental impacts during constructional and operational phase and submit to environmental officer.
- In case of having impacts on the environment, the contractor will inform to project manager in time to get instructions and to take next step.
- Comply with the environmental management specifications.
- Maintain a public complaint register.
- Submitting a report at each site meeting which will document incidents that have occurred during the period before the site meeting.

### **8.5. Proposed Monitoring Program to assess performance or output of EMP**

Following aspects need to be monitored regarding the subject project during pre-construction, during construction and post construction.

- Air quality
- Water quality
- Noise level
- Management of utility services including water supply, sewerage disposal, electric supply and solid wastes.



**Table 8-1 Environmental Monitoring Plan**

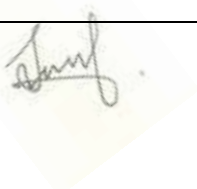
| Environmental Component   | Frequency       | Responsibility |
|---------------------------|-----------------|----------------|
| <b>Construction Phase</b> |                 |                |
| Air Quality               | Quarterly basis | Proponent      |
| Noise Levels              | Quarterly basis | Proponent      |
| Water Quality             | Quarterly basis | Proponent      |
| <b>Operational Phase</b>  |                 |                |
| Air Quality               | Quarterly basis | Proponent      |
| Noise Quality             | Quarterly basis | Proponent      |
| Wastewater Quality        | Bi-annually     | Proponent      |
| Drinking water Quality    | Quarterly       | Proponent      |

## 8.6. Environmental Budget

The environmental budget of the project has been given in Table 8-2.

**Table 8-2 Environmental Budget Breakdown**

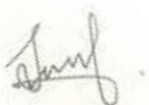
| Sr. No.                                        | Item/Activity            |                                   | Quantity (No.) | Budget (PKR) | Description                                            |
|------------------------------------------------|--------------------------|-----------------------------------|----------------|--------------|--------------------------------------------------------|
| 1.                                             | Plantation Campaign      |                                   | 100            | 20,000/-     | Cost includes plantation and maintenance up to 5 years |
| 2.                                             | Cost of EMMP             |                                   | -              | 95,000/-     | Installation + Operational Phases                      |
| 3.                                             | Environmental Monitoring | Air Quality Monitoring            | 01             | 10,000       | 01 sample @ 10,000/- per sample                        |
|                                                |                          | Noise Level Monitoring            | 02             | 15,000       | 02 samples @ 7,500/- per sample                        |
|                                                |                          | Drinking Water Quality Monitoring | 01             | 10,000/-     | 01 sample @ 10,000/- per sample                        |
| 4.                                             | Miscellaneous            |                                   |                | 50,000/-     | Lump sum                                               |
| Total Environmental and Social Management Cost |                          |                                   |                | 200,000/-    |                                                        |



## 8.7. Environmental Management Plan

**Table 8-3 EMP for Construction Phase**

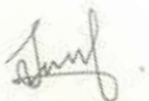
| Potential Negative Impacts      | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                            | Monitoring responsibility | Parameters For Monitoring |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| Dust emissions                  | On exposed construction surface during windy periods fugitive dust generation will be suppressed by spraying water.<br>The construction material will be covered with polyethylene sheets to prevent dust emissions.                                                                                                                       | Proponent/contractor      | Air quality               |
| Soil Erosion                    | Exposed surface will be resurfaced and stabilized as soon as possible.                                                                                                                                                                                                                                                                     | Proponent/contractor      | Soil                      |
| Solid Waste Generation          | Solid waste may include waste/unused construction materials, which should be disposed of properly.                                                                                                                                                                                                                                         | Proponent/contractor      | Solid waste management    |
| Vehicular Traffic And Noise     | Vehicles and other noisy equipment will be kept in good conditions and their regular maintenance will be done.<br>Noisy construction activities will be carried out only during normal working hours.                                                                                                                                      | Proponent/contractor      | Noise level               |
| Health And Safety of Work Force | The contractor will ensure that the workers are trained in safety procedures for all relevant aspects of construction.<br>Regular checks will be made to ensure that the contractor is following safety working procedures/safety measures.<br>Formal emergency procedures will be developed for construction site in case of an accident. | Proponent/contractor      | Health and safety         |



|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                         |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|
|                         | <p>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.</p> <p>Produced during construction phase will be collected by vehicle for dispose of it at a particular dumping site of the industrial estate from it will be reused. Waste segregation units will be provided. Recyclable items will be provided to recycling contractors</p> |                          |                         |
| Water Supply            | <p>Water use will be planned depending upon the supply and timing to avoid and inconvenience.</p> <p>Water conservation practices will be adopted.</p>                                                                                                                                                                                                                                                                                                 | Proponent/<br>contractor | Water supply            |
| Surface and Groundwater | At project site, the septic tank will be installed the safe disposal of wastewater into the nearby drain. The storage of lubricant materials such as oil and grease will be confined to a specific area so that in case of any leakage or spillage, the lubricant materials do not contaminate the entire project site.                                                                                                                                | Proponent/<br>contractor | Surface and groundwater |

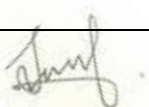
**Table 8-4 EMP for Operational Phase Impacts**

| Potential Negative Impacts | Recommended Mitigation Measures                                                                                                 | Monitoring Responsibility | Parameters for Monitoring |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| Dust emissions             | <p>In operational phase, dust generation by vehicles will be suppressed by spraying water.</p> <p>Scrubbers will be used to</p> | Proponent                 | Air quality               |



|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                       |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
|                    | control dust emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                       |
| Noise              | <p>Use of PPEs (noise suppression equipment-ear muffers etc.) will be ensured by the workers where noise levels are higher than 85 (dBA).</p> <p>Mining activities will be ensured at daytime when background noise levels are high.</p> <p>Vehicles speed limit will be maintained to avoid excessive vibrations.</p> <p>Regular maintenance of machinery will be ensured.</p> <p>All blasting operations will be carried out in compliance with conditions as specified in Coal Mines Regulations, 1926.</p> | Proponent | Noise                 |
| Waste water        | <p>Water conservation practices will be used.</p> <p>Wastewater will be treated properly by septic tank and will be discharged into nearby drain.</p> <p>Water use will be planned depending upon the supply and timing to avoid and inconvenience</p>                                                                                                                                                                                                                                                         | Proponent | Wastewater management |
| Acid Mine Drainage | water stored on the surface tank is mixed with fine dust of calcium carbonate powder to mitigate its acidic factor                                                                                                                                                                                                                                                                                                                                                                                             |           |                       |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                 |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------|
| Flora and fauna                | The unit includes a plan of the green yard area which is a positive impact on the flora and fauna. There is no significant fauna in that area. However, it is suggested that maximum number of trees should be planted by the management inside and outside the boundary wall in order to enhance aesthetics of the area.                                                                                                                                                                                                                | Proponent | Biodiversity    |
| Social impacts                 | During the operation stage, there will be no social issue for the nearby localities. Moreover, the residents may get opportunities to work in the refining unit which is a major positive impact of the project.                                                                                                                                                                                                                                                                                                                         | Proponent | Social impacts  |
| Occupational health and safety | <p>There may be occupational health and safety risks associated with different operational activities. Health risks may occur in case of unsafe and/or unfavorable work conditions</p> <p>The mitigation measures include:</p> <ul style="list-style-type: none"> <li>• The workers should get trained in safety procedures for all relevant aspects of processes.</li> <li>• Enforcement of work safety measures.</li> <li>• Formal emergency procedures will be developed for the segregation hall in case of any accident.</li> </ul> | Proponent | Health & safety |



|  |                                                                                                                                                                                 |  |  |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  | <ul style="list-style-type: none"><li>First aid kits and other personal protective equipment (safety gloves, goggles, welding shields etc.) Should be kept available.</li></ul> |  |  |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

## 8.8. Proposed EMP Reporting and Reviewing Procedures

### 8.8.1. Aim

In the context of coal mining, the monitoring and evaluation is carried out to achieve following objectives:

- To access whether the project site is being managed in a sustainable manner as planned or certain bottlenecks are experienced both qualitatively and quantitatively.
- To ensure compliance of environmental parameters (i.e. ambient air and noise) with PEQS.
- To ensure the implementation of mitigation measures for overall conservation of environment at the project site.
- To undertake effective environmental surveillance of the site.
- To assess effectiveness of mitigation measures and potential environmental enhanced measures.
- To ensure compliance with national environmental obligations.
- To monitor rehabilitation of recovered land including afforestation.

### 8.8.2. Environment, Health & Safety Policies

#### 8.8.2.1. Environment Policy

The environment policy right from initiation of project installation to its proper operations will be based on:



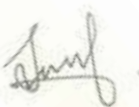
- Compliance of applicable regulatory requirements;
- Conservation of natural resources;
- Assurance of sustainable development;
- Maintaining a safe working environment;
- Providing high environmental expertise and know-how; and
- Regular training and refresher courses to achieve continuous improvement of environment.

#### *8.8.2.2. Health & Safety Policy*

The proponent identifies safety and health of the personnel as integral part of every work aspect at every level. In addition to compliance with the statutory rules and regulations as the minimum acceptable, the proponent will set nationally acceptable standards for practice and will intend to achieve the above by the following:

- Provide adequate and continuous training to all personnel;
- Prepare an over-all safety & health manual giving general requirements of leadership, planned inspections, job analysis & procedures, emergency preparedness, organizational rules, necessity and use of protective equipment, health control, etc.;
- Systematic evaluation & measurement of system performance at all operational levels and continuously update the over-all safety & health manual;
- Carrying out regular publicity campaigns effective personnel safety and health conscious; and
- To employ a person as in-charge for planning, training & safety and make him responsible for implementation of safety and health policy.

### **8.9. Training Needs**



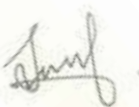
Training for the management/contractors/engineers and workers on environmental aspects of the project will be arranged. It will be imparted by a team of experienced trainers.

- **Training of mining staff:**

Training of mining staff & workers will be the part of the TORs regarding the subject project. The provisions given in EIA Report Chapter Screening of Potential Environmental Impacts & Their Mitigation Measures will be followed.

TORs will be including the training and submission of reports in the following area:

- Handling of Machineries in a safe way.
- Proper fencing design.
- Proper blasting training and schedules
- Use of PPEs
- Maintenance of vehicles and submission of Environmental Monitoring Reports Maintenance of Water Consumption records
- Testing of water and waste water and submission of Environmental Monitoring Reports
- Placement of safety signs/boards during construction
- Sprinkling of water on the roads and dusty tracks
- Monitoring of generator emissions Training regarding all other aspects of HSE will be ensured by the contractor during the mining activity



## **9. INVOLVEMENT OF STAKEHOLDER'S / PUBLIC CONSULTATION**

### **9.1. Introduction**

Stakeholder's consultation 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. This practice initiates a need assessment and identifies areas of concern for all the parties that maybe affected by the project activities.

Stakeholders by definition are all those people and institutions who have an interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project.

### **9.2. Benefits and Objectives of Stakeholder's Consultation**

Consultation with stakeholders leads to an overall better understanding of the project on the part of the communities and gives the Proponent a clearer understanding of the stakeholders' perspective. Effective public consultation can add substantial value to the EIA study process. The information gained through public consultation on the stakeholders' concerns, interests, and their ability to influence decision-making helps identify key cause of environmental problems.

This can be used to evaluate direct and indirect environmental impacts and assess short term and long-term resource use implications. The input from local communities and NGOs can help evaluate alternatives and strengthen the management planning by incorporating local input and know-how.

An informed public will better understand the tradeoffs between project benefits and disadvantages; be able to contribute meaningfully to the project design; and have greater trust with the project Proponent and support for the



project, says the Asian Development Bank. These factors contribute towards improved project implementation sensitized to the human environment of the area. The objectives of stakeholders' consultation are to:

- Promote better understanding of the proposed operation through explaining its objectives and its potential positive and negative impacts.
- Identify and address concerns of all interested and affected stakeholders.
- Provide a mechanism to resolve issues identified by communities, before project plans are finalized and development begins, thereby, avoiding public outcry and resentment.
- Instill trust between various stakeholders and the Proponent to promote cooperation.

### **9.3. Identification and Classification of Stakeholders**

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Identification of stakeholders is important for the sustainability of a developmental project and helps to evaluate and envisage the role of stakeholders. The influence or impact of the project on stakeholders can be elaborated in the form of a matrix and the mitigation measures are proposed accordingly. All the stakeholders had different types of stakes according to their professions.

### **9.4. Methodology for Consultation**

Stakeholder consultation is a two-way flow of information and dialogue between the project Proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities.

Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits. A series of scoping sessions



and formal focus group discussions were carried out with environmental experts and individuals. The meetings were held at various locations.

## **9.5. Key Consulted Stakeholders**

The stakeholders consulted in this case are public as well as environmental experts and individuals working in profession of environment. The list of stakeholders consulted and their feedback is given below.

The organizations consulted are as under:

- Chief Inspectorate of Mines Punjab its related field office
- DG Mines and Minerals Punjab, its related field office
- Representative of the Forest Department of the area
- Surface Landowners
- Nearby Village Numberdar
- Mines Labor Welfare Commissioner
- Civil Defence Officer

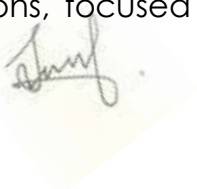
Each department was contacted to seek wisdom during an interaction of 4-6 man-hours each.

### **9.5.1. Responsible Authority**

The proponent is the responsible authority to take all measures prior to the mining activity.

### **9.5.2. Other departments and agencies**

For the impact analysis detailed meetings of local community, education institutes, health institutes, hospital and NGOs were held with the management. 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. Scoping sessions, focused group discussion and way side consultations were held with



the relevant stakeholders in the area. The purpose of such consultations is to obtain the feedback from the relevant persons.

### **9.5.3. Environmental Practitioners and Experts Team**

Experts visited the project site, 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 businesses, doctors, some in abroad, in Army, teaching, in agriculture, etc. Women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

### **9.5.4. Affected & Wider Community**

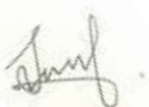
There is no affected community present in the radius of our study area. The team has consulted with the inhabitants of the different villages. They provided positive remarks regarding the subject project and in the favor of the subject mining activity for the proposed project.

### **List of Individuals Consulted Along with their Written Feedback**

### **9.5.5. Summary of Concerns of Consulted Stakeholders**

The summary of stakes of consulted stakeholders is given below.

- The activities of the project must be studied in detail to assess all the impacts resulting from the project.
- All the environmental parameters i.e. ambient air quality, noise levels and water quality must be kept within permissible limits of PEQS.



- Project specific mitigation measures must be implemented during project's lifecycle.
- A proper Environmental Management and Monitoring Plan should be prepared to reduce adverse environmental impacts.
- Waste management must be taken into consideration (if generated during project activities).
- Management practices suggested in EMMP for solid waste should be implemented during operation of the project.
- The findings of the EIA report must be incorporated into the design and planning phase of the project.
- The EIA report should be compiled appropriately according to reporting style as suggested in Guidelines/Checklist.
- The project holds a good economic circulation. The advantages of the project seem more than its disadvantages. Therefore, the project should be operational as soon as possible.

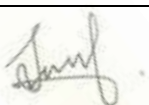
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## 10. CONCLUSIONS AND RECOMMENDATIONS

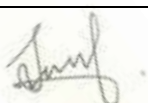
At the end of this EIA study, following conclusions are drawn and recommendations have been given accordingly.

**Table 10-1 Conclusions and Recommendations**

| <b>Conclusions</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General</b>              | <ul style="list-style-type: none"> <li>• The coal extraction is very crucial for meeting increased energy demands on national as well as international level.</li> <li>• All the positive and negative impacts resulting from the coal mining operations have been studied in due detail on environmental settings. All the negative impacts have been given magnitude based on the defined criteria and scoring.</li> <li>• Mitigation measures have been suggested for each negative impact resulting from the coal mining activities.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Physical Environment</b> | <ul style="list-style-type: none"> <li>• No wastewater will be generated during project activities. The water, if exposed during underground coal mining will be used for drinking purposes.</li> <li>• The type of solid waste produced at the surface will be food waste only. The solid waste produced underground will consist of material excavated for mine space widening.</li> <li>• The food waste at the surface will be disposed of in covered containers to avoid any waste littering. The solid waste underground will be used to fill up the cavities formed due to coal extraction. This will save the transportation cost of solid waste to dispose of at the surface. It will also provide additional support to the mine against subsidence.</li> <li>• Proper mitigations may be adopted in the preliminary design including safe and environmentally friendly disposal of solid waste.</li> <li>• Physical impacts like soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature. However, during the operational stage by adopting abatement technologies and development of buffer zones and green areas intensity of negative impacts can be minimized.</li> <li>• All the baseline environmental parameters including ambient</li> </ul> |



|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | <p>air and noise are well within the permissible limits of PEQS.</p> <ul style="list-style-type: none"> <li>There are no human settlements present within the vicinity of the project site. The settlements are away from the coal mines at safer distances. All the sensitive receptors are at a safer distance from the project area.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Biological Environment</b>     | <ul style="list-style-type: none"> <li>No forest area or wildlife sanctuary exists within the vicinity of the Project Area, which may be affected by the Project. Few reptiles like lizards and snakes will be disturbed by the Project activities and may have to move into nearby areas. This will be a temporary insignificant impact. Anyhow the outskirts blank area is to be covered with green trees so project site will not give barren look.</li> </ul>                                                                                                                                                                                                                                                   |
| <b>Socio-economic Environment</b> | <ul style="list-style-type: none"> <li>The other social issues like safety of public and workers, security problems, community accessibility issue, women accessibility to fields for their daily routine life etc. will be of temporary nature.</li> <li>The mining activities will provide additional job opportunities to the community of the area. The project will raise the income levels of the population of the area.</li> <li>Social cohesion is optimal.</li> <li>The environmental cost is negligible.</li> <li>The proponent is committed to ensure eco-friendly, sustainable, safe and sound environment.</li> </ul>                                                                                 |
| <b>Recommendations</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>General</b>                    | <ul style="list-style-type: none"> <li>All measures as suggested in EMP should be adopted to minimize adverse impacts.</li> <li>All appropriate environmental management &amp; monitoring measures detailed in this report, together with any other environment management commitments should be implemented throughout out the entire life of the project.</li> <li>Environmental Management and Monitoring Plan proposed will be implemented in the true spirit throughout the lifespan of the project.</li> <li>Regular monitoring and auditing will be taken by the management to ensure the compliance of all the mitigation measures.</li> <li>Environmental monitoring will be carried out by the</li> </ul> |



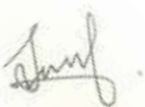
|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | company as suggested and communicated by EPA, Punjab.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Physical Environment</b>       | <ul style="list-style-type: none"> <li>• The mining site and the road links should adopt such measures and select such machinery and their operations to minimize the dust spread.</li> <li>• Dust suppression machine should be available on each site for wetting of all the materials to avoid effects of dust such as respiratory diseases.</li> <li>• Water contamination, air pollution and high noise levels will be controlled with the use of good engineering practices.</li> <li>• Proper measures will be taken to control the air emission or high noise levels.</li> <li>• Transportation vehicles and equipment must be properly maintained and tuned well.</li> </ul>                                                                                                                                                                                                                            |
| <b>Biological Environment</b>     | <ul style="list-style-type: none"> <li>• Extensive plantation must be carried out throughout the tenure of lease as an environmental enhancement measure.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Socio-economic Environment</b> | <ul style="list-style-type: none"> <li>• Periodic monitoring on occupational health and safety must be conducted to avoid workplace hazards.</li> <li>• Proponent will take due care of the local community and its sensitivity towards local customs and traditions.</li> <li>• Safety signs or boards will be placed wherever needed within the premises of the Project site.</li> <li>• Personal Protective Equipment (PPEs) will be provided and ensured that they are used by the workers during working hours. The workers working near the noise generating machines will be strictly required to use ear muffs/ plugs.</li> <li>• Fire extinguishers or firefighting equipment will be provided at well notified points to cope with fire events.</li> <li>• Good housekeeping will be ensured by the management.</li> <li>• First aid medical facility will be provided at the project site.</li> </ul> |



**M/s Makerwal Coal Works**  
036 EIA-MLI-COAL-22  
ML-MLI-COAL (36)

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
Mining Lease for Coal Over an Area of 2937.46  
acres near Makerwal in District Mianwali

## **APPENDIX**

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## **APPENDIX-I: GLOSSARY**

**Act** means the Pakistan Environmental Protection Act, 1997.

**Air pollution:** The condition in which air is contaminated by foreign substances, or the substances themselves. Air pollution consists of gaseous, liquid, or solid substances that, when present in sufficient concentration, for a sufficient time, and under certain conditions, tend to interfere with human comfort, health or welfare, and cause environmental damage. Air pollution causes acid rain, ozone depletion, photochemical smog, and other such phenomena.

**EIA (Environmental Impact Assessment):** It is the process of identifying, predicting, evaluating and mitigating of effects of biophysical, social and other relevant proposed projects and physical activities prior to major decisions and commitments being made.

**EMP (Environmental Management Plan):** An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

**Environmental Impact:** Possible adverse effects caused by a development, industrial, or infrastructural project or by the release of a substance in the environment.

**Topography:** Physical features of any area including soil, water and air are called topography.

**Fauna:** Word used for combination of all the species of animals.

**Flora:** Word used for combination of all the species of plants.

**IEE (Initial Environment Examination):** Initial examination of projects for identification of hazards of project.



**NOC (No Objection Certificate):** It is a kind of clearance issued by EPA necessary for any project to be constructed.

**Particulate Matter:** Minute airborne liquid or solid particles (such as dust, fume, mist, smog, smoke) that cause air pollution. Particulate matter may vary greatly in color, density, size, shape, and electrical charge, from place to place and from time to time.

**PEPA (Punjab Environmental Protection Act 1997) Amended 2012:** An act to provide the protection, conservation, rehabilitation and improvement of environment, for the prevention and control of pollution and promotion of sustainable development.

A handwritten signature in black ink, appearing to be 'Sharf', is written on a light yellow rectangular background.

## **APPENDIX-II: LIST OF ABBREVIATIONS**

|         |                                           |
|---------|-------------------------------------------|
| NOC     | No Objection Certificate                  |
| EA      | Environmental Approval                    |
| OHS     | Occupational Health and Safety            |
| MICS    | Multiple Indicator Cluster Survey         |
| mm      | Millimeters                               |
| EPA     | Environmental Protection Agency           |
| IEE     | Initial Environmental Examination         |
| NEQS    | National Environmental Quality Standards  |
| EMP     | Environmental Management Plan             |
| EMP     | Environmental Monitoring Plan             |
| GOP     | Government of Pakistan                    |
| km      | Kilometer                                 |
| m       | Meters                                    |
| NGO     | Non-Governmental Organization             |
| BDL     | Below Detection Limit                     |
| SWM     | Solid Waste Management                    |
| TMA     | Tehsil Municipal Authority                |
| PPC     | Pakistan Penal Code                       |
| PEPA    | Pakistan Environmental Protection Act     |
| NDWQS   | National Drinking Water Quality Standards |
| LAA     | Land Acquisition Act                      |
| sq mi   | Square Miles                              |
| PPE     | Personal Protective Equipment             |
| MMD     | Mines and Minerals Department             |
| CSR     | Corporate Social Responsibility           |
| M. Tons | Metric Tons                               |
| in      | Inches                                    |
| GLS     | Ground Level Surface                      |
| MTa     | Metric Tons Annually                      |
| TPD     | Tons Per Day                              |
| HSE     | Health Safety and Environment             |



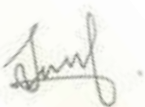
### **APPENDIX-III: SOURCE OF THE DATA (REFERENCES)**

- <http://www.pakinformation.com/population/Mianwali.html>
- <http://www.findpk.com/cities/html/Mianwali.html>
- <https://en.wikipedia.org/wiki/Mianwali#Economy>
- <https://agrihunt.com/articles/pak-agri-outlook/agricultural-profile-of-district-Mianwali/>
- <http://www.phsrp.punjab.gov.pk/downloads/distance-hq/MIANWALI.pdf>
- [https://en.wikipedia.org/wiki/List\\_of\\_educational\\_institutions\\_in\\_Mianwali](https://en.wikipedia.org/wiki/List_of_educational_institutions_in_Mianwali)
- <https://simplicable.com/new/cosmopolitan-city>
- <https://en.wikipedia.org/wiki/Mianwali>
- [https://en.wikipedia.org/wiki/Geography\\_of\\_Mianwali](https://en.wikipedia.org/wiki/Geography_of_Mianwali)
- <https://en.climate-data.org/asia/pakistan/punjab/Mianwali-33/>
- [https://en.wikipedia.org/wiki/Wildlife\\_of\\_Mianwali\\_District](https://en.wikipedia.org/wiki/Wildlife_of_Mianwali_District)
- [http://bos.gop.pk/system/files/MICS\\_2007-08\\_LHR.pdf#overlay-context=mics20072008](http://bos.gop.pk/system/files/MICS_2007-08_LHR.pdf#overlay-context=mics20072008)
- Building Code of Pakistan (Seismic Provisions 2007)
- <https://www.waterinfo.net.pk/sites/default/files/knowledge/Time-Rate%20changes%20in%20Groundwater%20Levels%20and%20Quality%2C%20Punjab%2C%202009.pdf>
- Multiple Indicator Cluster Survey (MICS) 2007-08
- The IUCN Red List-A Key Conservation Tool
- Punjab Development Statistics 2005
- International Journal of Science, Environment and Technology, Vol. 1, No 3, 2012, 125 – 134
- Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Initial Environmental Examination Regulations. 2000.
- Guidelines for the preparation and review of Environmental Reports, Pakistan Environmental Protection Agency, Government of Pakistan, October 1997.
- Notification for IEE projects by EPA.
- Pollution Prevention and Abatement Handbook, The World Bank, 1998.
- The Pakistan National Conservation Strategy, Environment and Urban Affairs 'Division (Presently-Ministry of Environment, Urban Affairs and Wild



Life), Government of Pakistan, Islamabad.

- Punjab Environmental Quality Standards for Drinking Water.
- Punjab Environmental Quality Standards for Motor Vehicle Exhaust and Noise.
- Punjab Environmental Quality Standards for Ambient Air.
- Topographical Maps of Punjab.
- Punjab Environmental Quality Standards for Noise.
- The Punjab Plantation and Maintenance of Trees Act, 1974.
- The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act and Rules, 1974.
- [https://mnem.punjab.gov.pk/important\\_minerals\\_occurring\\_in\\_punjab#14](https://mnem.punjab.gov.pk/important_minerals_occurring_in_punjab#14)



## **APPENDIX V: TERMS OF REFERENCE OF ENVIRONMENTAL REPORT**

### **TERMS OF REFERENCE FOR EIA REPORT**

The agreement hereinafter called Agreement, is made between M/s Prime Environmental Consultants (Consultant) and M/s Makerwal Coal Works (Client) to prepare and carry out follow up of Environmental Study Report for obtaining Environmental approval under Section 12 of Punjab Environment Protection Act 1997 (Amended 2012) for proposed project of "Mining Lease for coal Over An Area Of 2937.46 Acres Of Land Situated Near Makerwal In District Mianwali"

The client has requested the consultancy firm to provide consultancy service to prepare and follow up of EIA Report and so that client may obtain Environmental Approval from EPA, Punjab under the Section 12 of PEPA 1997 (As Amended 2012) so mutually agreed terms and conditions are as under:

NOW THEREFORE, the parties here to hereby agree as follow:

- The client shall provide assistance and access to the information contained in the feasibility study, layout plan 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 Lab Test Reports from EPA certified lab including noise level monitoring, wastewater analysis and stack emissions report or any report/document/information demanded by the EPA.
- The client will provide to the consultancy firm with the letter of introduction and authorization and other documents as may be needed to enable consultancy firm consultant to perform the service.
- Responsible to pay all the dues of the consultants as per the agreed terms and conditions.



- The consultancy firm/consultant shall carry out the services in accordance with the provisions of the agreement including:
- Shall follow up the EIA Report and other file required with due diligence necessary/required for obtaining its approval from EPA Punjab under the statutory requirements of PEPA 1997 (amended in 2012).
- Shall give the consultancy for the preparation of the detailed Environmental Management & Monitoring Plan for enhancing the environmental conditions during installation and operational phases such as mitigation measures for wastewater, solid waste, air emissions, plantation, management of surface runoff, mitigation of socially adverse impact, if any.
- Will follow up the EIA Report and file documents considering information/documents provided by the client.
- Shall examine the entire activities and list of the details of activities likely to cause adverse impacts during and after installation phase.
- Shall suggest mitigation measures for all such activities which may cause adverse impacts.
- Will evaluate all the activities during the installation and operational phases and recommend suggestions/actions to comply with PEQS.

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For and Behalf of  
M/s Prime Environmental Consultants  
(Consultants)

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For and Behalf of  
M/s Makerwal Coal Works  
(Proponent)



## **APPENDIX-VI: CONSULTANT TEAM**

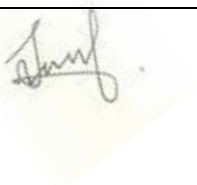
Prime Environmental Consultant has the expertise of highly diversified experience and has completed a total of more than 75 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

- a) Preparation of reports, IEE report, EIA reports.
- b) Preparation of Environment Management Plans
- c) Assessment of Impact of mining on environment and mitigating measures.
- d) Stake Holder Consultations.

| <b>Contact Details</b> |                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------|
| <b>Consultant</b>      | Prime Environmental Consultants                                                             |
| <b>Contact</b>         | (+92) 321-7860915                                                                           |
| <b>Address</b>         | Latif Plaza, Office No. 07-08, 69 Saeed Block<br>Commercial Area, Canal Bank Scheme, Lahore |
| <b>e-Mail</b>          | primeenvironmentalconsultants@gmail.com                                                     |

The team carrying out the research project is presented in the Table:

| <b>Sr.</b> | <b>Name</b>     | <b>Qualifications &amp; Brief Experience</b>         | <b>Roles Assigned</b>                                                                                                                                                                                                            |
|------------|-----------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.         | Engr. Ali Mehdi | B.Sc. Mining Engineering                             | <ul style="list-style-type: none"> <li>Stakeholder Consultation</li> <li>Preparation of Environmental Management Plan (EMP)</li> <li>Preparation of Environmental Monitoring Plan (EMP)</li> <li>Author of EIA Report</li> </ul> |
| 5.         | Zeba Haseeb     | Environmental Scientist<br>M.S Environmental Science | <ul style="list-style-type: none"> <li>Preparation of Environmental Management Plan (EMP)</li> <li>Preparation of Environmental</li> </ul>                                                                                       |



|    |            |                                                      |                                                                                              |
|----|------------|------------------------------------------------------|----------------------------------------------------------------------------------------------|
|    |            |                                                      | Monitoring Plan (EMP) <ul style="list-style-type: none"><li>• Author of EIA Report</li></ul> |
| 6. | Umer Saeed | Environmental Scientist<br>M.S Environmental Science | <ul style="list-style-type: none"><li>• Site visits</li></ul>                                |



## **PPENDIX-VII: APPROVALS FROM OTHER CONCERNED DEPARTMENTS**

A handwritten signature in black ink, appearing to be 'Shaf', is written on a yellow rectangular background. The signature is slanted and includes a small dot at the end.

**REGISTERED**  
No. DGM&M/ML.MLI.COAL(36)/2021/ 274  
DIRECTORATE GENERAL OF MINES & MINERALS,  
PUNJAB, POONCH HOUSE, MULTAN ROAD, LAHORE.

Dated Lahore the 14th October, 2021.

To,

✓ M/s Makerwal Coal Works,  
39-L Model Town, Lahore.

**SUBJECT:- MINING LEASE FOR COAL OVER AN AREA OF 5670.01 ACRES  
NEAR MAKERWALL, DISTRICT MIANWALI.**

Reference to the decision passed by the Licensing Authority in remanded writ petition No. 32296/2021 vide which your application dated 06.10.2021 for assignment-cum-division of the mining lease cited in the subject above has been accepted.

It is to inform you that the Licensing Authority has been pleased to approve the assignment-cum-division of subject mining lease by transferring an area of 2937.46 acres of land out of the total area measuring 5670.01 acres with all rights and liabilities thereof in your favor under rule 108 of the Punjab Mining Concession Rules, 2002 with immediate effect as per detail given below:

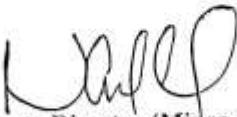
Survey Sheet No.38P/1  
Scale : 1:50000

| POINTS                             | EASTING (Yards) | NORTHINGS (Yards) |
|------------------------------------|-----------------|-------------------|
| A                                  | 3320412.22      | 1043767.30        |
| B                                  | 3321823.24      | 1043828.80        |
| C                                  | 3321825.04      | 1045354.12        |
| D                                  | 3322931.32      | 1045397.02        |
| E                                  | 3322868.03      | 1046605.36        |
| F                                  | 3322585.82      | 1046605.36        |
| G                                  | 3322585.82      | 1046740.00        |
| H                                  | 3323340.00      | 1046760.00        |
| I                                  | 3323340.00      | 1050436.60        |
| J                                  | 3321229.10      | 1050401.10        |
| J TO A FOLLOWS PROVINCIAL BOUNDARY |                 |                   |
| TOTAL AREA:                        |                 | 2937.46 ACRES     |

You are therefore advised to work in accordance with the terms and conditions laid down in the original allotment letter of even number dated 26.08.1987 followed by the renewal letter

dated 03.05.2005 as well as in accordance with the Punjab Mining Concession Rules, 2002 and submit Phase Program of Development within a period of (03) months for taking approval of the Licensing Authority. You are further advised to submit proof of submission of requisite IEE Report at EPA, Punjab within a period of one month positively, failing which this letter may be revoked.

The lease is valid up to 29.02.2024.

  
**Deputy Director (Mines & Minerals)**  
**Director Small Mines Assistance/Titles,**  
**Punjab, Lahore.**

Endst. No. & date even. C.C. to:

2. The Deputy Director (Small Scale Mining), Opposite Beruli Railway Station Kalabagh Road, Mianwali for ensuring compliance of the above instructions to the new lease holder.
2. Misc. file.

  
**Deputy Director (Mines & Minerals)**  
**Director Small Mines Assistance/Titles,**  
**Punjab, Lahore.**

**REGISTERED**

**DIRECTORATE GENERAL MINES & MINERALS  
PUNJAB, POONCH HOUSE, MULTAN ROAD, LAHORE.**

Dated Lahore the 14<sup>th</sup> October, 2021.

**NOTIFICATION**

**No. DGM&M/ML.MLI.COAL ( 36 )/2021<sup>276</sup>**:- In pursuance of Rule-112 of the Punjab Mining Concession Rules, 2002, it is hereby notified that the Licensing Authority has been pleased to transfer an area of 2937.46 acres of land out of the total area of the mining lease for coal over an area of 5670.01 acres as a result of assignment cum division of the mining lease situated near Makerwal, District Mianwali previously granted to M/s Makerwal Collieries Post Office Makerwal, District Mianwali vide allotment letter of even number dated 26.08.1987; in favor of M/s Makerwal Coal Works, 39-L Model Town, Lahore on the terms and conditions already contained in the original allotment letter of even numbers dated 26.08.1987 as well as the renewal letter dated 03.05.2005. The lease stands valid up to 29.02.2024.

**Director Small Mines Assistance/Titles  
Punjab, Lahore.**

To  
The Manager (Works), Government of the Punjab, Printing Press, Lahore with  
the request to publish this notification in the Punjab Gazette.

**Deputy Director (Mines & Minerals)  
for Director Small Mines Assistance/Titles,  
Punjab, Lahore.**

Endst.No.& date even.

C.c.to:

1. M/s Makerwal Collieries Ltd, PO Makerwal, District, Mianwali.
2. ✓ M/s Makerwal Coal Works, 39-L, Model Town, Lahore.
3. The Chief Inspector of Mines, 153-Shah Jamal Colony, Lahore.
4. The Deputy Commissioner, Mianwali.
5. The Chief Statistical Officer, Federal Bureau of Statistics Energy & Mining  
Statistics Section, S.L.I.C. Building No. 5-F/6/4, Blue Area, Islamabad.
6. The Director GIS Division, Headquarters' Office, Lahore.
7. Accounts Branch, Headquarter's Office, Lahore.
8. The Deputy Director (Small Scale Mining), Opposite Beruli Railway Station  
Kalabagh Road, Mianwali
09. Survey & Drawing Officer, Drawing Branch, Headquarter's Office, Lahore.

**Deputy Director (Mines & Minerals)  
for Director Small Mines Assistance/Titles,  
Punjab, Lahore.**

**REGISTERED**

**DIRECTORATE GENERAL MINES & MINERALS  
PUNJAB, POONCH HOUSE, MULTAN ROAD, LAHORE.**

Dated Lahore the 14<sup>th</sup> October, 2021.

**NOTIFICATION**

**No. DGM&M/ML.MLI.COAL (01)/2021** :- In pursuance of Rule-112 of the Punjab Mining Concession Rules, 2002, it is hereby notified that the Licensing Authority has been pleased to reduce the area of mining lease for coal situated near Makerwal, District Mianwali previously granted to M/s Makerwal Collieries Post Office Makerwal, District Mianwali vide allotment letter of even number dated 26.08.1987; from 5670.01 acres to 2615.41 acres as a result of assignment cum division of the mining lease on the terms and conditions already contained in the original allotment letter of even numbers dated 26.08.1987 as well as the renewal letter dated 03.05.2005. The lease stands valid up to 29.02.2024.

**Director Small Mines Assistance/Titles  
Punjab, Lahore.**

To

The Manager (Works), Government of the Punjab, Printing Press, Lahore with the request to publish this notification in the Punjab Gazette.

**Deputy Director (Mines & Minerals)  
for Director Small Mines Assistance/Titles,  
Punjab, Lahore.**

Endst.No.& date even.

C.c.to:

1. M/s Makerwal Collieries Ltd, PO Makerwal, District, Mianwali.
2. ✓ M/s Makerwal Coal Works, 39-L, Model Town, Lahore.
3. The Chief Inspector of Mines, 153-Shah Jamal Colony, Lahore.
4. The Deputy Commissioner, Mianwali.
5. The Chief Statistical Officer, Federal Bureau of Statistics Energy & Mining Statistics Section, S.L.I.C. Building No. 5-F/6/4, Blue Area, Islamabad.
6. The Director GIS Division, Headquarters' Office, Lahore.
7. Accounts Branch, Headquarter's Office, Lahore.
8. The Deputy Director (Small Scale Mining), Opposite Beruli Railway Station Kalabagh Road, Mianwali
09. Survey & Drawing Officer, Drawing Branch, Headquarter's Office, Lahore.

**Deputy Director (Mines & Minerals)  
for Director Small Mines Assistance/Titles,  
Punjab, Lahore.**

**SHOWING THE 52.90% PART OF THE AREA TO BE  
ASSIGNED TO M/S. MAKERWAL COAL WORKS OUT OF THE  
MINING LEASE NO.ML-MLI-COAL(1), NEAR MAKERWAL  
DISTRICT MIANWALI.**

**ANNEX-B1**

**NO.ML-MLI-COAL (1)**

**NO.ML-MLI-COAL (36)**

| POINTS                             | EASTING (yards) | NORTHING (yards) |
|------------------------------------|-----------------|------------------|
| A.                                 | 3320412.22      | 1043767.30       |
| B.                                 | 3321823.24      | 1043828.80       |
| C.                                 | 3321825.04      | 1045354.12       |
| D.                                 | 3322931.32      | 1045397.02       |
| E.                                 | 3322868.03      | 1046605.36       |
| F.                                 | 3322585.82      | 1046605.36       |
| G.                                 | 3322585.82      | 1046740.00       |
| H.                                 | 3323340.00      | 1046760.00       |
| I.                                 | 3323340.00      | 1050436.60       |
| J.                                 | 3321229.10      | 1050401.10       |
| J TO A FOLLOWS PROVINCIAL BOUNDARY |                 |                  |
| TOTAL AREA = 2937.46 ACRES         |                 |                  |

**SHEET NO 38 P/1**

**SCALE 1:50000**



## **APPENDIX VIII: ENVIRONMENT & LAYOUT MAP**

