



**Hi-TECH
ENVIRONMENTAL SERVICES**
Business & Green Future!

EIA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

M/S. AZIZ INAM & COMPANY

**“MINING LEASE FOR COAL OVER AN AREA
OF 697.30 ACRES OF LAND SITUATED
NEAR CHOA SAIDAN SHAH IN DISTRICT
CHAKWAL.”**

**HTES-EIA-COAL-CKL-11623
2023**

HI-TECH ENVIRONMENTAL SERVICES (PVT.) LTD.



Table of Contents

List of Figures	7
List of Tables	8
EXECUTIVE SUMMARY	10
Title and Location of Project.....	10
Name of the Proponent	10
Name of Organization Preparing the Report.....	10
Brief Outline of the Project	11
Major Impacts	12
Environmental Impacts during Construction Stage.....	12
Environmental Impacts during Operational Stage.....	14
Summary of Potential Impacts.....	17
Recommendations for Mitigation Measures.....	20
Proposed Monitoring	24
EMMP for Installation Phase.....	25
EMMP for Operational Phase	28
1 INTRODUCTION.....	33
1.1 Purpose of the Report.....	33
1.2 Identification of the Project and Proponent	33
1.2.1 Details of the Project	33
1.2.2 Details of the Proponent.....	33
13. Brief Description of the Project	34
2 SCREENING AND SCOPING	36
2.1 Details of Consultant.....	36
2.2 Screening.....	37
2.3 Scoping	37



2.3.1	Spatial and Temporal Boundaries of Environmental Assessment	37
2.3.2	Important issues and concern raised during consultation	38
2.3.3	Significant impacts and factors to be determined	38
3	CONSIDERATION OF ALTERNATIVES	39
3.1	Site Alternatives, their Selection and Rejection Criteria	39
3.2	Design/technology alternatives, their selection and rejection criteria	40
3.2.1	Environmental Alternatives, their selection and rejection criteria	40
3.2.2	Economic Alternatives, their selection and rejection criteria	40
4	DESCRIPTION OF THE PROJECT	41
4.1	Objectives of the Project	41
4.2	Location and Site Layout of the Project	41
4.3	Land Use on the Site	43
4.4	Road Access	43
4.5	Vegetation Features of the Site	44
4.6	Cost and the Magnitude of Operation	44
4.7	Schedule of Implementation	44
4.8	Description of the Project	45
4.8.1	Short Wall Coal Mining Method	45
4.8.2	List of Equipment & Machinery for Coal Mining	46
4.8.3	Coal Haulage, Storage, Loading, Transportation & Unloading	47
4.8.4	Manpower	47
4.8.5	Blasting Details	48
4.8.6	Health, Safety & Hygiene	49
4.8.7	Personal Protective Equipment	49
4.8.8	Water Requirements	49
4.8.9	Solid Waste	49



4.8.10	Process Flow Chart.....	50
4.9	Restoration and Rehabilitation Program	52
5	DESCRIPTION OF THE ENVIRONMENT.....	54
5.1	Baseline Physical Environment	54
5.1.1	Topography and Geology	54
5.1.2	Soils	54
5.1.3	Seismicity of the Project Area	55
5.1.4	Climate.....	56
5.1.5	Temperature.....	57
5.1.6	Rainfall.....	58
5.1.7	Humidity.....	58
5.1.8	Geography	58
5.1.9	Water Resources.....	58
5.2	Baseline Ecological Environment	60
5.2.1	Fisheries and Aquatic Biology	60
5.2.2	Forestry.....	60
5.2.3	Flora & Fauna.....	61
5.3	Baseline Socio-economic Environment	61
5.3.1	Quality of Life Values	63
5.3.2	Government's Economic Agenda	64
5.3.3	Institutional.....	64
5.3.4	Human Use	65
5.4	Lab Reports of Environmental Analysis	65
5.5	Site Suitability.....	66
6	IMPACT ASSESSMENT	67
6.1	Methodology for Impact Identification.....	67



6.2	Impacts Analysis and Prediction	67
6.3	Characterization of Impacts	67
6.4	Impact Significance.....	69
7	SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES	71
7.1	Anticipated Environmental Impacts Related to Project Design	71
7.2	Environmental Impacts during Construction Stage	71
7.3	Environmental Impacts during Operational Stage	73
7.4	Identification of Potential Environmental Issues	73
7.5	Other Potential Issues.....	76
7.5.1	Acid Mine Drainage.....	76
7.5.2	Soil and Groundwater Contamination from Coal Piles.....	78
7.5.3	Mine Workers Health and Safety	78
7.5.4	Emergency Response Plan (ERP) for Accidents/Collapse	79
7.5.5	Climate Change.....	79
7.6	Summary of Potential Impacts	79
7.7	Potential Environmental Enhancement Measures	85
7.8	Other Potential Environmental Enhancement Measures	87
8	ENVIRONMENTAL MANAGEMENT & MONITORING PLAN.....	88
8.1	Introduction	88
8.1.1	Objectives	88
8.2	Implementation of EMMP	88
8.3	Environmental Budget	89
8.4	Environment Management Team.....	89
8.4.1	Responsibilities of Functionaries	90
8.5	Proposed Environmental Management and Monitoring Plan (EMMP).....	91
8.5.1	EMMP for Installation Phase.....	91



8.5.2	EMMP for Operational Phase	95
8.6	Environmental Monitoring and Evaluation	99
8.6.1	Aim	99
8.6.2	Environment, Health & Safety Policies	99
8.6.2.1	Environment Policy	99
8.6.2.2	Health & Safety Policy	99
8.7	Equipment Maintenance Details	100
8.7.1	Objectives	100
8.7.2	Measures for Equipment Maintenance	100
8.8	Training Needs	100
8.8.1	Training Schedules	100
9	INVOLVEMENT OF STAKEHOLDER'S / PUBLIC CONSULTATION	102
9.1	Introduction	102
9.2	Benefits and Objectives of Stakeholder's Consultation	102
9.3	Identification and Classification of Stakeholders	102
9.4	Methodology for Consultation	103
9.5	Key Consulted Stakeholders	103
	Responsible Authority	103
	Other departments and agencies	103
	Environmental Practitioners and Experts Team	104
	Affected & Wider Community	104
9.5.1	Summary of Concerns of Consulted Stakeholders	104
10	CONCLUSIONS AND RECOMMENDATIONS	106



APPENDICES.....	109
Appendices-I: Glossary.....	110
Appendices-II: Environmental Map.....	111
Appendices-III: List of Abbreviations.....	113
Appendices-IV: References.....	114
Appendices V: TERMS OF REFERENCE FOR EIA REPORT.....	116
Appendices-VI: Consultant Team.....	118
Appendices-VII: Approvals from other Concerned Departments.....	120
Appendices-VIII: Laboratory Reports of Environmental Analysis.....	124



List of Figures

Figure 1-1 Location of the Project on Google Earth	35
Figure 4-1 Location of The Project.....	42
Figure 4-2 General Layout Plan of a Short wall Mining Method	46
Figure 4-3 Process Flow Chart	51
Figure 5-1 Seismic zoning map of Pakistan.....	55
Figure 5-2: Earthquake Occurrence Frequency	56
Figure 5-3 Climate of Chakwal	57
Figure 5-4 Temperature of the Region	57
Figure 5-5 Average Humidity	58
Figure 5-6 Katas Raj Temple Lake	59
Figure 5-7 Khokhar Zer Dam View.....	60
Figure 5-8 Population of District Chakwal.....	63



List of Tables

Table 1-1 Details of the Proponent.....	34
Table 2-1 Details of the Consultant.....	36
Table 2-2 Team Carrying Out the Study.....	37
Table 4-1 Coordinates of the Coal Lease Area	42
Table 4-2 Distance of the Important Areas from the Active coal Mining Zone.....	43
Table 4-3 Cost of the Coal Mining Project.....	44
Table 4-4 Time Schedule for the Quarry Development	44
Table 4-5 List of Equipment for Coal Mining Operations	46
Table 4-6 List of Manpower for Coal Mining Operations.....	48
Table 4-7 Restoration and Rehabilitation Program.....	53
Table 5-1 Summary of Socio-economic Indicators	61
Table 6-1 Characterization of Impacts	69
Table 6-2 Significance of Environmental Impacts	70
Table 7-1 Environmental Impacts and their Description	73
Table 7-2 Environmental Impacts and their Description	80
Table 7-3 Environmental Impacts and their Mitigation Measures in Operation Phase	82
Table 7-4 Positive Environmental Enhancement Measures	86
Table 8-1 Environmental Budget Breakdown	89
Table 8-2: List of Individuals and their Responsibilities.....	90
Table 8-3: Air Quality Management & Monitoring Plan for Installation Phase	91
Table 8-4: Noise Management & Monitoring Plan for Installation Phase.....	92
Table 8-5: Solid Waste Management & Monitoring Plan for Installation Phase	93
Table 8-6: Health and Safety Management & Monitoring Plan for Installation Phase	94
Table 8-7: Air Quality Management & Monitoring Plan for Operational Phase	95
Table 8-8: Noise Management & Monitoring Plan for Operational Phase.....	96



Table 8-9: Solid Waste Management & Monitoring Plan for Operational Phase	97
Table 8-10: Health and Safety Management & Monitoring Plan for Operational Phase ..	98
Table 8-11: Training Schedules	101
Table 10-1: Conclusions and Recommendations	106



EXECUTIVE SUMMARY

Title and Location of Project

M/s Aziz Inam & Company holds a mining lease for coal over an area of 697.30 Acres of land situated near Choa Saidan Shah in District Chakwal, Punjab, Pakistan. The coal lease area of choice is over 697.30 acres and was granted by Mines and Minerals Department, Government of the Punjab.

Name of the Proponent

The affairs of the company are controlled by Muhammad Inam who are the proponent of the company.

Name of the Proponent	M/s Aziz Inam & Company
Representative	Muhammad Inam
Address	124-Ferozepur Road, Lahore

Name of Organization Preparing the Report

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 150 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

- Economic Geology
- Determination of geological exploratory techniques and mine design
- Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
- Preparation of Environment Management Plans
- Preparation of reports on HRD /Mines Rescue & Recovery.
- Assessment of Impact of mining on environment and mitigating measures.
- Mine surveying & interpretation of boundary disputes.
- Legal opinion on mine regulatory regime.
- Energy fuels and selection of choice fuels for specific energy
- Drilling and blasting for underground and surface mining techniques.
- Safety measures for mines operation.

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26-B, Zahoor Elahi Road, Gulberg-II, Lahore.
Representative	Advocate Chaudhry Awais Ahmed
Contact	(+92) 3219443210
e-Mail	consultantshtma@gmail.com info@hitechma.com



Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1	M. Hamza Tariq	BS Hon. Environmental Sciences	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
2	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Author of EIA Report • Development of Maps
3	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
4	Engr. Harris Naeem	B.Sc. Mining Engineering	• Review of the Report • Mining Techniques

Brief Outline of the Project

The project area lies over an area of 697.30 acres and involves mining of coal by underground methodology. The project is located near Choa Saidan Shah in District Chakwal, of Punjab.

The huge coal resources of Pakistan can play a significant role in meeting its energy demand for a long time. In this connection it is be necessary to make all out concerted efforts towards:

- Expanding the coal resources base through intensive exploratory efforts in all known fields as well as in new prospective areas;
- Introducing semi-mechanization in coal mining to keep up production as well as its cost at competitive levels;
- Developing Indigenous R&D capabilities for adopting various advanced coal technologies to suit local conditions. Coal briquetting needs especial attention to cope with the energy requirements of villages and remote areas. In these areas, due to fuel shortage, the deforestation has reached at an alarming stage.

The mining industry is capital intensive and has the longest gestation period where success stories are about 40-50%. The minimum time required to reach the coal seam in Punjab is 18-24 months for developing a mine to raise an average production of 25 tons/day with an investment portfolio of 15-20 million Rupees. The investment portfolio and mineability enhancement are appended in the following Dhariaalagraphs. Again success is the function of all favorable factors mentioned above. The mineral managers either intentionally ignore or they are not well versed with the intricacy of the mining system. The decision making in a production mine go side by side with the development as well



because the coal seam once in position may fade away or change in thickness or quality. This phenomenon adversely affects the mineability and marketability.

Major Impacts

The impacts related to design incorporates the impacts resulting from underground shortwall mining method. The steps involved in shortwall mining method have been discussed earlier in above sections. The overall impacts resulting from underground coal mining operation are discussed below.

- **Dust Generation**

Dust may be generated during extraction of coal from coal face either manually or through continuous miner. It may also be generated during haulage of coal to the surface.

- **Higher Noise Levels**

Higher noise levels and vibrations due to operation and movement of carts or continuous miner underground and drilling if being carried out in case of hard rocks.

- **Solid Waste and Wastewater**

No solid waste and wastewater is be generated underground due to mining method. The solid waste generated at mine site underground is partially dumped underground in the extracted coal chambers which may act as packing material and support system for walls stability. The shales associated with coal are generally dumped outside close to the mine mouth. These shales have impregnation of alum. This impregnation mixed with water is supporting mixture for vegetation growth. Hence, this impact is negligible.

- **Loss of Vegetation**

As coal mining method is underground. Therefore, there is be no loss of vegetation due to this neither at surface or underground. This impact is negligible in this case scenario.

- **Preventive Measures**

- Use of PPEs (face masks etc.) is ensured by the mine operators and staff working at coal face.
- Use of PPEs (noise suppression equipment-ear mufflers etc.) is ensured by the workers where noise levels are higher than 85 (dBA).
- Underground working carts/miners speed limit is maintain to avoid excessive vibrations.
- Regular maintenance of underground equipment is be ensured.

Environmental Impacts during 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 is 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 is to be ensured to reduce PM₁₀.
- Maintain appropriate buffers between the site and receptors.
- Use of PPEs (face masks etc.) is to be ensured by the mine operators and staff
- Use of PPEs (noise suppression equipment-ear muffs etc.) is to be ensured by the workers where noise levels are higher than 85 (dBA).



- Construction activities is ensured at daytime when background noise levels are high.
- Vehicles speed limit is maintained to avoid excessive vibrations.
- Regular maintenance of machinery is ensured.
- Cutting of vegetation and trees is be avoided as far as possible.
- Afforestation is carried out as maximum as possible.
- Solid waste is managed efficiently. Solid waste at site is be stored in containers covered with lid.
- Waste water is be disposed of as per the standards of TMA.

Environmental Impacts during Operational Stage

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

Environmental Component	Environmental Issue	Description
Water Resources	Channel Water Quality	Since the Coal does not flow into the channels, quality of water is not affected. Hence, this impact is nil.
	Channel Water Discharge	The mining operation does not interrupt the flow of water into water channels. Hence, the flow of water in the channels remains unchanged. On account of this finding, this causes no impact on the channel water flow.
	Groundwater Quality and Level	Coal mining operation does not affect the quantity/level of GW. Pumping is sometimes needed in rainy season. The quality of GW is remain unchanged as there is no introduction of any contaminant into the GW during coal mining.
	River Degradation	The question of river degradation arises in case if any river is present within the close vicinity of the mine. No river is present within the safe distance from the project area. Hence, no river degradation is take place.
	Surface Run-Off	Because of the coal mining operations underground, the surface topography is not being disturbed and hence no obstruction to the surface run-off. Thus, this impact is be insignificant.
	Drainage	The mining area lies on the natural developed crisscross drainage pattern and doesn't disturb its ecology, pattern and flow. Thus, this impact is nil.
Land Resources	Soil Salinity	The coal mining operations does not add any saline materials into the soil. Thus, there is no effect on the soil salinity.



	Soil Erosion	The coal mining operations do not carry out underground. The type of coal mining is underground coal mining. As all the mining activities is be operated underground, hence, no impact on soil erosion is observed.
	Land Use Change	The areas where the mining is being done is under no use. Most of proposed coal mining sites are abandoned. So, there won't be any loss or degradation of productive land. Moreover, the coal is being extracted underground making no change on surface. Hence, there is be no impact on land use of the site.
	Land Utility / Productivity	The mineral is being worked underground and after the extraction of the mineable reserves the area is be available for the use of geo tours. Hence, this impact is be positive.
Climate	Micro-climate Changes	After mining of the coal, plantation is help in improving local climatic conditions to some extent. This impact is be positive.
Atmosphere	Dust and Air Emissions	Coal mining operations is carried out underground. Small quantity of dust is generated only at underground locations. Dust is not generated during loading of coal in trucks for its transportation to the markets as coal is in lumpy form. Hence, this impact is negligible. Some additional measures is be taken to reduce the dust emissions.
	Noise and Vibrations	The sources of noise generation are generators, vehicular movement and drilling & blasting activities. All these operations is be carried out under controlled environment and do not exceed the threshold limit of 80 dBA. Hence, this impact is nil.
Waste Generation	Wastewater	The mining operations incidentally are carried out through such rock structures which do not provide access to water ingress in the mines. The question of effluents therefore doesn't arise. This impact is nil.
	Solid Waste	The solid waste generated at mine site is partially dumped underground in the extracted coal chambers which may act as packing the support system for walls stability. Hence, this impact is be negative.
Flora	Forests / Trees	The project area is devoid of any forest cover. Scant wild species are found. There are no trees except some small size bushes on the project site not worth mentioning. Therefore, there is no question of tree



Fauna	Other Terrestrial Vegetation	cutting during the operation of the project as well as the forest reserves are at a safer distance from the lease area. Hence, no impact is envisaged.
	Mammal Communities / Habitat	Insignificant vegetation is growing in the area. Hence, there is be no impact on this parameter.
	Reptile Communities / Habitat	Only wild mammalian species are found. On extraction of coal underground, these species rarely migrate to nearby areas. Hence, this impact is be temporary and insignificant.
Social	Population	Reptile species is not be migrated and affected due to underground coal mining operations. Hence, these species is remain un-effected. The impact on these species is be negligible.
	Land Ownership	Population is likely to increase by a national growth rate. Hence, positive impact is envisaged.
	Land Lease	On completion of mining, the lease area land is available for geo-tours. Impact is be positive.
	Social Cohesion/ Attitude	As the mineral resources belong to Provincial Government which is enable the mineral exploitation and adding government revenue. Overall impact is positive.
	Food/ Nutrition	The project has added interwoven knitwear awareness. The group of people working from the local area is have more social inter-woven cohesion and inter-dependence for economic survival. The impact is positive.
	Health	There is be positive impact since more resources is be available for the purchase of foodstuff.
	Education	Health of residents of nearby villages and workers is not be affected due to mining operations and activities. This impact is not significant.
Economic	Income Levels	On improvement of income level, people is send their children to educational institutions. Hence, this impact is be positive.
	Employment	The project has positive impact on the income levels of the locals. The people of other parts of the country is also benefit from this project.
	Land Value	The mining operations employ the locals from the nearby villages. Hence, the job avenues is increase for the locals. This impact is positive.
		During the tenure of the mining project life, land value is escalate and may stabilize on post mining operation. Hence this impact is positive.



Institutional	Institutional Activities / Effectiveness	Various governmental and non-governmental offices is become more active due to this activity. There is be positive impact.
Human Use	Cultivation and Livestock	As the area is non-agriculture, hence the livestock is not greasing ground. This impact is nil.
	Afforestation	Different plant species is planted within the vicinity of the project area to enhance the environmental conditions of the project area. Hence, this impact is be positive.
	Domestic Water Supply	The project is located well away from the nearby towns/ villages. The project is not affect the quality and quantity of water supply to communities in the surrounding areas. This impact is nil.
	Community Development	The proponent is already on the supportive grid on community welfare program. Hence, this impact is be positive.
Relocation/ Resettlement	Dislocation of Population	The project does not involve any dislocation of the local people. So, there is be no impact.
	Loss of Property and Infrastructure	No movable or immovable property of public and private sectors is be lost during mining operations. Hence, this impact is be nil.
	Resettlement of Affected Communities	There is no requirement of resettling of even a single individual of the community as there is be no loss of property and relocation. Therefore, this impact is be nil.

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. The impacts have been given magnitude based on the scaling given below.



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 be explained after a short while. The magnitude of positive and negative impacts is given in Table below:

Sr. No.	Component	Environmental Issue	Magnitude	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		River Degradation		0
		Surface Run-Off		0
		Acid Mine Drainage		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Use Change		0
		Land Utility / Productivity	+2	
	Solid Waste	Land Pollution Breeding of flies and rodents Odor		-2



	Wastewater	Land Pollution		-2
		Water Pollution		
	Climate	Micro-climate Changes		0
		Climate Change		0
	Atmosphere	Dust		0
		Noise		-3
	Sub-Total		+2	-5
2	Biological Environment			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		+2	0
3	Socio-economic Environment			
	Social	Population	+1	
		Land Ownership	+2	
		Land Lease	+3	
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health & Safety		-3
		Education	+1	
	Economic	Income Levels	+2	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+1	
	Human Use	Cultivation	+1	



		Livestock	+2	
		Afforestation	+2	
		Infrastructure	+2	0
		Domestic Water Supply		0
		Community Development	+2	
	Relocation/ Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total		+25	-2	
Grand Total		+29	-7	

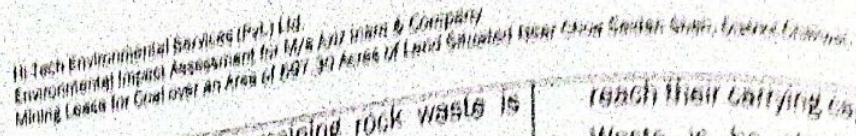
Recommendations for Mitigation Measures

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

Environmental Component	Sources & Potential Impacts	Mitigation Measures
Physical Environment		
Noise	- Increased noise levels due to use of heavy machinery such as tractors for transportation of extracted coal. - Disturbance to workers and residents. - Drilling and Blasting	For Drilling and Blasting - All blasting operations is be carried out in compliance with conditions as specified in Coal Mines Regulations, 1926. - The area where blasting is being carried out is be fenced properly. - To avoid noise problems and disturbance to the community, blasting is be carried out at specified days and between specified timings. - Proper monitoring of blasting operations is be carried out by manager or concerned persons. For Noise - Use of PPEs (noise suppression



		equipment-ear mufflers etc.) is be ensured by the workers where noise levels are higher than 85 (dBA). • Mining activities is be ensured at daytime when background noise levels are high. • Vehicles speed limit is be maintained to avoid excessive vibrations. • Regular maintenance of machinery is be ensured.
Air Quality	• Dust generation due to movement of trucks and vehicles • Drilling and Blasting	• Maintenance of buffers between the site and receptors. • Controlled water sprinkling is be ensured to reduce PM₁₀. • Use of PPEs (face masks etc.) is be ensured by the mine operators and staff. • To prevent air quality, blasting may not be carried out in extreme weather conditions, if practical/ possible.
Wastewater	• The mining operations incidentally are carried out through such rock structures which do not provide access to water ingress in the mines. The question of effluents therefore doesn't arise. • The domestic wastewater is be generated from camp offices and labor activities.	• The domestic wastewater generated from camp offices should be disposed of as per standards of TMA if applicable.
Solid Waste	• The solid waste generated at mine site is partially dumped underground in the extracted coal chambers as well as packing the support system for walls stability while the	• Proper waste management plan is be developed. • The vegetation of the coal waste dumps happens to be a mitigation measure for the coal waste dumps already developed • Littering is prohibited at the site. • Containers is emptied before they



HTES-EIA-COAL-CKL-14123

24 August 2013



	- may be harmful for some people, for example, with some experiencing respiratory conditions. - Noise associated with coal mining activities and traffic.	- Maintain appropriate buffers between the site and receptors. - If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.
Mine Workers Health and Safety	- Health and safety risks to workers due to explosion underground, formation of sink holes etc. - Damage to worker's health and can cause fatal injuries as well.	- Provision of first aid facility. - Provision of safety trainings to mine workers and staff. - Prohibition for use of drugs and narcotics at coal face underground. - Provision of Personal Protective Equipment to workers and staff working underground near coal face.

Responsibilities of the relevant stakeholders for implementation of the environmental enhanced measures are delineated in the table below. These measures are subject to the tenure of the lease holder.

Positive Impacts	Enhancement Measures	Implementing Agencies
Improving Land Utility	- Optimize use of recovered land. - Consolidation of land - After conclusion of mining activities, geo-tours can be arranged. - Forest Cultivation can also be taken.	- Agricultural Department - Revenue Department - Proponent
Improvement of land activity	- Education of farmers on modern techniques of agriculture. - Use timely inputs for suitable soil conditioners.	- Agricultural Department - Formers
Improvement of Economic Conditions	Provision of more jobs to locals with efforts on integration of project products.	- Lease Owner - NGOs
Improvement of institutional performance	Arrangements of credit facilities for agro based business encourage	Agricultural Development Bank/ Schedule



	establishment of NGOs for improvement of socio environmental and literacy condition. Persuade schools, banks and other departments to be effective and provide facilities to locals.	Bank/ NGO/ Education Department
Improvement of agriculture and forestry	- Adopt modern techniques for agro productivity to use optimal inputs. - Plant trees and crops with lesser water requirement	- Agricultural Department - Forest Department - Farmers
Community Development	- Educate and train resident of villages on improvement of local conditions through NGO. - Encourage local participation in social education and health activities and programs.	- NGOs - Locals

Proposed Monitoring

The Environmental Management and Monitoring Plan (EMMP) is be used as a management and monitoring tool for implementation of the mitigation measures identified in the EIA report. The EMMP matrix lists down:

- The required mitigation measures recommended in the EIA report.
- The person/organization directly responsible for adhering to or executing the required mitigation measures and monitoring adherence to the mitigation measures.
- The parameters, which is be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.
- Budget allocated for management practices (cost of EMMP).
- Project Proponent is hold primary and overall responsibility for ensuring full implementation of the EMMP.

The Environmental Management and Monitoring Plan have been provided for both installation and operational phases of the project below:



EMMP for Installation Phase

The EMMP for installation phase of the project includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at project site.	Throughout installation period	Proponent	0/-
		Avoid installation activities in extremely dry weathers.	Throughout installation period	Proponent	0/-
		Sprinkle water at site when necessary, to reduce dust spread.	Throughout installation period	Proponent & Contractor	5,000/-
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout installation period	Proponent & Contractor	5,000/-
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout installation period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout installation period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout installation period	Contractor	0/-



26

Sub-Total

Noise Management & Monitoring Plan for Installation Phase

10,000/-

Management Plan

Monitoring Plan

Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	Estimated Cost (PKR)
---------	-------------------	----------------------------------	-----------	-------------------	----------------------

Minimization of Noise and Vibrations

1

Noise and Vibrations

Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.

During installation period

Proponent & Contractor

0/-

Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.

Throughout installation period

Proponent & Contractor

0/-

Ensure that machinery is kept in good condition to reduce noise generation.

Throughout installation period

Proponent & Contractor

5,000/-

The noisy installation works is entirely be planned during day time when most of the neighbors is be at work.

Throughout installation period

Proponent & Contractor

0/-

Sub-Total

Solid Waste Management & Monitoring Plan for Installation Phase

5,000/-

Solid Waste Management & Monitoring Plan for Installation Phase					
Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During installation period	Proponent	0/-



	Proper waste management plan must be developed.	During installation period	Proponent	0/-
	Waste must be stored at site in covered containers.	During installation period	Proponent	10,000/-
	Containers must be emptied before they reach their carrying capacity.	During installation period	Proponent	0/-
	Littering must be prohibited at the site.	During installation period	Proponent	0/-
	Awareness is be given to the staff and workers about handling of solid waste at site.	During installation period	Proponent	0/-
	Use of an integrated solid waste management system i.e. through a hierarchy of options: • Source reduction • Reuse • Recycling	Throughout installation period	Proponent & Contractor	0/-
	Use of durable, long-lasting materials that is not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total				10,000/-

Health and Safety Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of occupational health and safety risks					
1	Health and	Implement all necessary measures to ensure health and safety of workers and the general	Throughout installation period	Proponent	0/-



	Safety Impacts	public during installation of the project. Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	5,000/-
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	5,000/-
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the project area.	One-off/as per required	Proponent	5,000/-
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	5,000/-
Sub-Total					20,000/-
Grand-Total					45,000/-

EMMP for Operational Phase

The EMMP for operational phase includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Air Quality Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at mining site.	Throughout operational period	Proponent	0/-
		Avoid operational activities in extremely dry weathers.	Throughout project lifecycle	Proponent	0/-
		Sprinkle water at site when necessary, to reduce dust spread.	Throughout operational period	Proponent & Contractor	5,000/-
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout operational period	Proponent& Contractor	5,000/-
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout operational period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout operational period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout operational period	Contractor	0/-
Sub-Total					10,000/-



Hi-Tech Environmental Services (Pvt.) Ltd.
Environmental Impact Assessment for M/s Aziz Inam & Company
Mining Lease for Coal over an Area of 697.30 Acres of Land Situated Near Choa Saidan Shah, District Chakwal.

Noise Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(Per Annum)
Minimization of Noise and Vibrations					
1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During operational period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.	Throughout operational period	Proponent & Contractor	0/-
		Ensure that machinery is kept in good condition to reduce noise generation.	Throughout operational period	Proponent & Contractor	5,000/-
		The noisy production works is entirely be planned during day time when most of the neighbors is be at work.	Throughout project life	Proponent & Contractor	0/-
Sub-Total					5,000/-



Solid Waste Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During operational period	Proponent	0/-
		Proper waste management plan must be developed.	During operational period	Proponent	0/-
		Waste must be stored at site in covered containers.	During operational period	Proponent	5,000/-
		Containers must be emptied before they reach their carrying capacity.	During operational period	Proponent	0/-
		Littering must be prohibited at the site.	During operational period	Proponent	0/-
		Awareness is be given to the staff and workers about handling of solid waste at site.	During operational period	Proponent	0/-
		Use of an integrated solid waste management system i.e. through a hierarchy of options: • Source reduction • Reuse • Recycling	Throughout operational period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that is not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout operational period	Proponent & Contractor	0/-
Sub-Total					5,000/-



Health and Safety Management & Monitoring Plan for Operational Phase

Health and Safety Management Plan			Monitoring Plan		Estimated Cost (PKR)
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	
Minimization of occupational health and safety risks					
1	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during operation of the project.	Continuous	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	10,000/-
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	5,000/-
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the lease area.	One-off/as per required	Proponent	5,000/-
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	10,000/-
Sub-Total					30,000/-
Grand-Total					50,000/-



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."

It is of utter importance to examine the environmental impacts, both beneficial and adverse, of the proposed project, and to recommend and propose mitigating measures to prevent, minimize or mitigate such impacts. The EIA study of the proposed project is necessary to assess the environmental consequences of the extraction at the proposed sites and to suggest appropriate, practical and site-specific mitigation as well as enhancement measures.

Furthermore, Environmental Impact Assessment (EIA) of mining concession has been made mandatory and has also been demanded by the Mines and Minerals Department, Government of the Punjab, Pakistan.

The objectives of EIA study are to:

- Assess the environmental settings, including the identification of environmental sensitive areas and social baseline conditions of the project area.
- Assess the coal mining activities and their potential environmental impacts.
- Identify the environmental impacts in terms of both quality and quantity.
- To develop an appropriate Environmental Management Plan (EMP), including mitigation and monitoring measures for adverse environmental impacts to enhance the capacity building.
- To propose rehabilitation development plan for the project site.

1.2 Identification of the Project and Proponent

1.2.1 Details of the Project

M/s Aziz Inam & Company holds a mining lease for coal over an area of 697.30 acres of land located near Choa Saidan Shah in District Chakwal, Punjab, Pakistan. The coal lease area of choice was granted by Mines and Minerals Department, Government of the Punjab.

1.2.2 Details of the Proponent

The affairs of company are controlled by Muhammad Inam who is the CEO of the company.



Table 1-1 Details of the Proponent

Name of the Proponent	M/s Aziz Inam & Co.
Representative	Muhammad Inam
Address	124-Ferozepur Road, Lahore

1.3 Brief Description of the Project

The project area of choice lies over an area of 6 acres and involves mining of coal using underground methodology. The project is located near Choa Saidan Shah in District Chakwal of Punjab.

The huge coal resources of Pakistan can play a significant role in meeting its energy demand for a long time. In this connection it is necessary to make all out concerted efforts towards:

- Expanding the coal resources base through intensive exploratory efforts in known fields as well as in new prospective areas;
- Introducing semi-mechanization in coal mining to keep up production as well as cost at competitive levels;
- Developing indigenous R&D capabilities for adopting various advanced technologies to suit local conditions. Coal briquetting needs especial attention to cope with the energy requirements of villages and remote areas. In these areas due to fuel shortage, the deforestation has reached at an alarming stage.

The mining industry is capital intensive and has the longest gestation period. The success stories are about 40-50%. The minimum time required to reach the coal seam in Punjab is 18-24 months for developing a mine to raise an average production of 100 tons/day with an investment portfolio of 15-20 million Rupees. The investment portfolio and mineability enhancement are appended in the following paragraphs. The success is the function of all favorable factors mentioned above. The mineral managers either intentionally ignore or they are not well versed with the intricacy of the mining system. The decision making in a production mine goes side by side with the development as well because the coal seam once in position may fade away or change in thickness and quality. This phenomenon adversely affects the mineability and marketability.

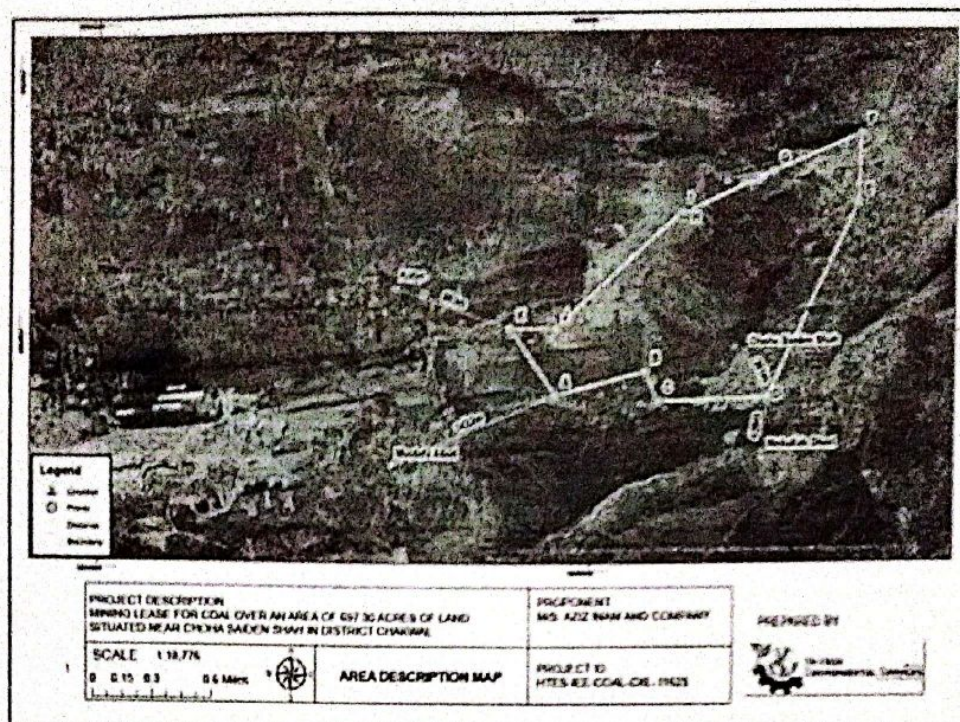


Figure 1-1 Location of the Project on Google Earth



2 SCREENING AND SCOPING

2.1 Details of Consultant

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 150 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

- l) Economic Geology
- m) Determination of geological exploratory techniques and mine design
- n) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes, Prospecting Scheme.
- o) Preparation of Environment Management Plans
- p) Preparation of reports on HRD /Mines Rescue & Recovery.
- q) Assessment of Impact of mining on environment and mitigating measures.
- r) Mine surveying & interpretation of boundary disputes.
- s) Legal opinion on mine regulatory regime.
- t) Energy fuels and selection of choice fuels for specific energy
- u) Drilling and blasting for underground and surface mining techniques.
- v) Safety measures for mines operation.

Table 2-1 Details of the Consultant

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26-B, Zahoor Elahi Road, Gulberg-II, Lahore.
Representative	Advocate Chaudhry Awais Ahmed
Contact	(+92) 3219443210
e-Mail	consultantshtma@gmail.com info@hitechma.com



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

Table 2-2 Team Carrying Out the Study

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1	M. Hamza Tariq	BS Hon. Environmental Sciences	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
2	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Author of EIA Report • Development of Maps
3	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
4	Engr. Harris Naeem	B.Sc. Mining Engineering	• Review of the Report • Mining Techniques

2.2 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).

2.3 Scoping

2.3.1 Spatial and Temporal Boundaries of Environmental Assessment

Project site is open land. After its development with time nature of area is 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.



2.3.2 Important issues and concern raised during consultation

During consultation it was observed that maximum of people was in favor of project and following issues and concerns were raised which have also been discussed in length in Chapter 9 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.

2.3.3 Significant impacts and factors to be determined

Main impacts and factors to be determined are;

- Occupational Health and safety
- Site Security
- Traffic Management
- Hygiene management
- Community impacts
- Control Air emissions
- Job opportunities for locals
- Confined noisy activities
- Resource conservation
- Avoid excessive water consumption
- Energy efficient techniques must be adopted
- Proper site restoration after construction
- Tree plantation at designated green areas
- Emergency preparedness

3 CONSIDERATION OF ALTERNATIVES

3.1 Site Alternatives, their Selection and Rejection Criteria

Unlike industrial establishment the coal mining projects are pegged with the favorable geology in the given/ granted area. There are proven coal reserves in the area. Coal existence is subject to geological variations.

The projects involving mining of minerals are located in the areas which geological favor the presence of coal or other minerals. The site selection needs very careful, well thought out and wise decision. The most important factors for such a site selection include availability of raw material and land, seismic stability of site, existence of basic infrastructure including roads, water, manpower, proximity to electric transmission system, project economic viability with reference to specific site, land use policies, further expansion possibilities etc.

From the standpoint of environmental sustainability, the site selection is based on numerous factors including proximity from residential areas, protected areas, surface water bodies, wild life reserves etc. No site alternative was considered because site was already selected by the proponent and it lies within coal bearing formation. Site was not rejected because the geological formations support the existence of coal subject to exploration.

The project site is located in the area where geology favors the coal mining activities as enough reserves of coal are available. Coal mining operations cannot be carried out at a site where reserves are not enough. Hence, there is no alternative location available in this case.

Following are 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.



- x. 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.
- xi. The lease granted concedes with the fixed geology. The lease held in the past has been renewed for the same location based on satisfactory performance of the lessee. There is no alternative to the fixed geology at site. The grant of lease is specific to the lessee and coal discoveries in the leased area. The sequence of rocks being the same in salt range with small variations of thickness due to depositional environment. The working for coal in the Patala Shale remains an unchanged phenomenon.

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

The coal can be mined out majorly by two methodologies namely:

- i. Underground Mining
- ii. Surface Mining

Under the present conditions and due to geological along with techno-economic parameters, only underground methodology.

3.2.1 Environmental Alternatives, their selection and rejection criteria

The project simply involves the mining of coal from the Patala Formation and transporting it to the required sites. The extraction of coal often involves extraction of other insignificant minerals such as limestone and shales. The lessee is committed to utilize limestone extracted for the foundation of infrastructure to be built while the shales is be levelled off and covered with additional layer of soils leading to plantation activities.

3.2.2 Economic Alternatives, their selection and rejection criteria

The current selected methodology, designing and mining technique is economically efficient and provides extensive job creation avenues. It refers to the shift of materials used in the proposed project towards environmentally friendly and sustainable materials. In present case, the material that is being mined is coal and there is no alternative mineral present. All machinery, equipment and materials procured for the said project is be environmentally friendly and sustainable. Hence, there is no material alternative considered in this case as coal is being mined.

4 DESCRIPTION OF THE PROJECT

4.1 Objectives of the Project

The objectives of the project are:

- a) To meet coal-based energy demands through environmentally friendly coal mining at national level.
- b) Expand business through added exploration and exploitation by new entries based on techno-economical parameters.
- c) Accelerate pace of development in the existing mines.
- d) Enhance production, productivity coupled with safety by improvising with the adaptable technology-mechanization.
- e) Add matching infra-structure, machinery and equipment along with other inputs needed as a factor of production to keep pace with the envisaged programs.
- f) Undertake aggressive marketing to maximize domestic share.
- g) Expand community development program and social fabrics
- h) Consider feasible options to utilize mine effluents if possible as a raw material for compatible industrial use and minimize the adverse impact of mining on environment (Use of shale in cement plants)
- i) Supporting government's economic agenda by creating job avenues.

4.2 Location and Site Layout of the Project

To define the boundaries of the EIA study, location and site layout map is prepared. The lease of coal is located near Choa Saidan Shahin District Chakwal of Punjab. The project location is represented in Figure No. 4-1 and more detailed colored image is present in Appendice II on A3 size.

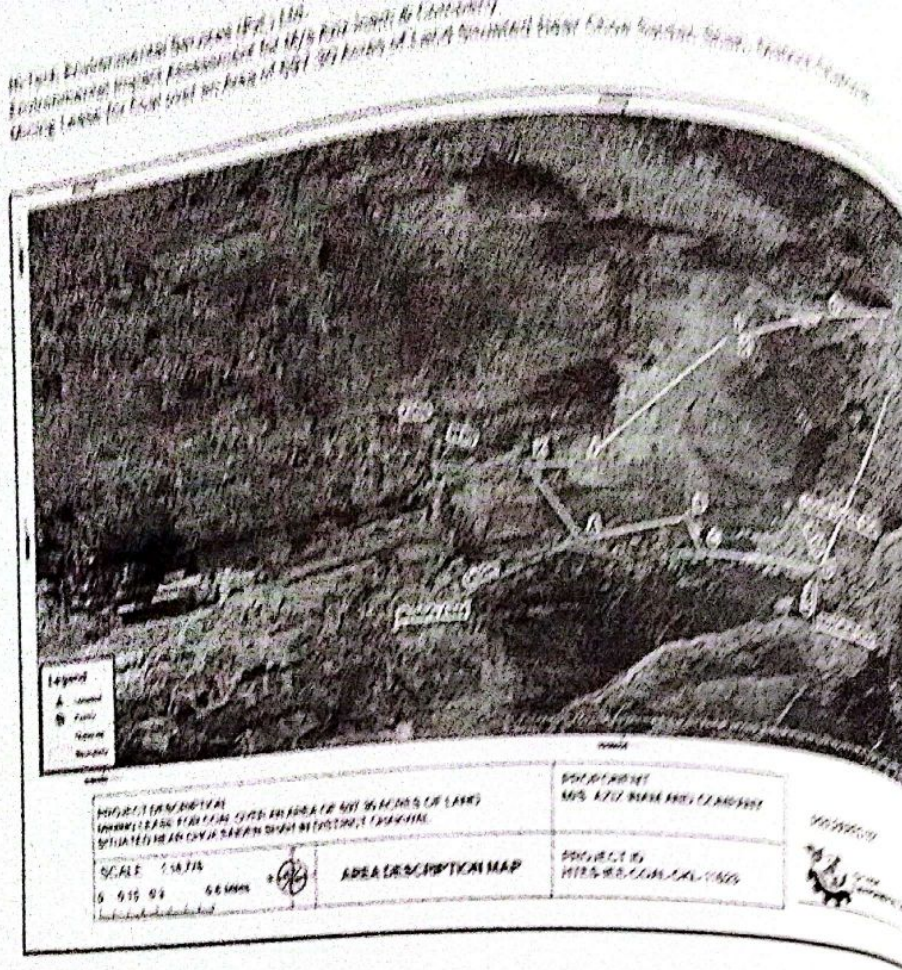


Figure 4-1 Location of The Project

The proposed plant site boundary primarily falls within mainly 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_(Y)	North_(Y)
A	3308000	1038460
B	3308789.15	1038642.57
C	3308903.13	1038405.29
D	3309864	1038420
E	3310640	1040000
F	3310660	1040572
G	3309900	1040270
H	339130.46	1039943.35

I	3309100	1039950
J	3308000	1039000
K	3307600	1039000
Total Area = 697.30 Acres		

The distances of major locations from project site are shown in Table No. 4-2.

Table 4-2 Distance of the Important Areas from the Active coal Mining Zone

Location	Approximate Distance (KM)
POPULATION CENTERS	
Mustafabad	1.18
Katas	0.90
Dheri Saiyidan	6.30
Dhariaia	8.73
Khokhar Bala	14.57
Arar	7.45
INDUSTRIAL & MINING PROJECTS	
Haseeb Habib Industries	9.95
Layaan Chemical Industries	27.17
WATER BODIES	
Kalar Kahar Lake	24.22
Swaik Lake	23.68
FOREST AREAS	
Sarla Forest	14.71
Sarla Unclassed Forest	21.67

4.3 Land Use on the Site

The areas where the mining is to be done is under no use. Most of proposed coal mining sites are abandoned. So, there won't be any loss or degradation of productive land. Moreover, the coal is being extracted underground making no change on surface.

4.4 Road Access

The lease site is easily accessible through Chakwal Road, another accessible route for the proposed project site is be Kalar Khar Road.



4.5 Vegetation Features of the Site

On the proposed mining areas, the land has no vegetation cover. The area is devoid of any vast tree cover.

4.6 Cost and the Magnitude of Operation

The mining of coal can be done over an area of 599.39 acres subject to favorable reserves and coal quality. The details the coal mining project costing is presented in Table 4-3.

Table 4-3 Cost of the Coal Mining Project

Sr.	Description	Amount
1	Land Cost	6,000,000
2	Infrastructure Cost	5,000,000
3	Machinery Cost	5,000,000
Total Development Cost		16,000,000

The magnitude of operation includes:

- Detailed site survey, planning and demarcation of the various regions in the project area
- Site suitability assessment
- Process of mine designing
- Purchase and delivery of equipment
- Mine development
- Testing and commissioning
- Plantation of various ecologically important species on the designated green space

4.7 Schedule of Implementation

The mining operations are conducted with due care and vigilance not to pollute the environment or inflicting any kind of danger/threat to environments downstream. The impact of mining is being analyzed in the subsequent chapters. In case of any adverse impact the mitigating measures is be suggested for implementation and its schedule shown at respective chapter. The time schedule for the development of the quarry is shown in Table 4-4.

Table 4-4 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



4.8 Description of the Project

The mining activities are carried out by considering all the environmental parameters. No mining activity is pose any threat and danger to the environment. The mining operations is carried with due care and vigilance. All the impacts are assessed in detail on every environmental setting. The corresponding mitigation measures is suggested for every impact resulting from the project activities.

The method of mining is a function of mineral deposition, its environment, geological surrounding, seam thickness, its dip and nature of coal whether gassy or non-gassy, or fire prom or not. The Punjab coal seams are thin less than 2 feet which is a world record on coal extraction for such a thin coal seam.

The access to coal seam either through adits or shaft is made as the permanent access road ways to the coal seam. These openings are used for the passage of miners, machinery and for the passage of mined coal. There are three choices for making access roadways to the mineral deposit for underground mining i.e. shafts, tunnels and adits.

The shaft is opted where the strata is nearly horizontal in bedded deposit. The tunnels are opted for an almost vertical or nearly vertical stratum in a bedded deposit. The adits are artesian way of making access to the mineral deposit and are in practice since time in memorial. Worldwide the fastest means of mineral transportation from underground to surface are shaft and tunnel. The adits are compromise in-between.

Shafts are sunk by using conventional drilling and blasting by artesian method which is not cost effective and takes 12-15 months with shaft diameter of 2.5 meter and average depth of 150 meters. The existing mine which have gone deeper and have expanded laterally are confronted with ventilation problem. Bore-raising from the last workstation to the surface is improve the ventilation. In nutshell, the shaft sinking and bore-raising technology must be adopted with imported machines with government support.

With the exception of Makarwal, tunneling has been rarely adopted in private sector. There are a few locations like in Dandot, Kamliar where an effort has been made for tunneling. Rest of Punjab coal mining is on adit.

The coal extraction is done generally on room and pillar method. Makarwal area claims to have adopted longwall advancing and retreating both. In most of the mines a combination of advancing is improvised by Surakhi System.

There are different underground Coal mining methods which are as follows:

1. Room and Pillar Mining
2. Long wall Mining
3. Short wall Mining

4.8.1 Short Wall Coal Mining Method

In the short wall mining method, mine development is carried out in such a manner that large block of coal, usually less than 100 meters wide is available for complete extraction.



A block of coal is extracted in slices, the dimensions of which are fixed by the height of coal extracted, the width of the short wall face, and the thickness of the slice. This method is adopted to extract coal while advancing towards boundary depth or strike. This is adopted in a coal seam which are non-gassy and non-firy. If the size of the working face from where the coal is to be extracted is 100 meter or more it can be taken as long wall and any dimension less than that can be taken as short wall.

The ventilation system in the mines are through mechanical exhaust fans installed at a return airway. The water problem is tackled through constant pumping from grade depth of 100-150 meters. The coal dust is suppressed underground by water sprinkling or as per legal requirement of limestone dust sprays. The temperature is controlled through the ventilation current underground. The strata are controlled through coal pillars and timber provided in the shape of doors erected at 2.5 to 3 feet apart. The timber used is Kikar.

The general layout plan of short-wall mining is given in Figure 4-2.

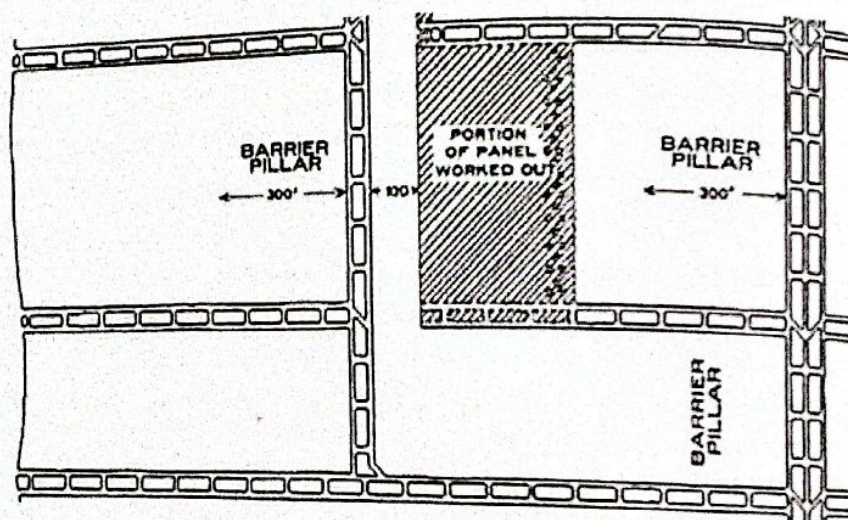


Figure 4-2 General Layout Plan of a Short wall Mining Method

4.8.2 List of Equipment & Machinery for Coal Mining

The list of equipment proposed to be used for coal mining operations is given in Table 4-5.

Table 4-5 List of Equipment for Coal Mining Operations

Sr. No.	Nomenclature	Purpose
1.	Engine Generator	Power Generation
2.	Compressor	Development
3.	Fan blower	Ventilation
4.	Haulage	Development
5.	Water tank	Sprinkling
6.	Pick Machine	Development
7.	Cables (2600 ft)	Development

The mode of coal extraction is manual. The mining is be carried out either by hand-spades or by hand picks. No machinery is used for extraxction of coal from coal face.

4.8.3 Coal Haulage, Storage, Loading, Transportation & Unloading

The details of coal haulage, storage, loading, transportation & unloading are given below:

- **Coal Haulage**

The development incline or shaft are generally track mining. In this case the rail track is used to facilitate the mining cars which are hauled up through a haulage installed at top. Rarely, the trackless system is adopted for underground mining in mining due to the low volume and high grade as well as absence of electricity from national grid. The loading and unloading is done through improvised method of mechanical levers. In certain cases, for low production or low volume it is opted as manual operation. Underground transportation is generally through hand-trimming of mining cars carrying about one ton of coal.

Most of the mines being worked on conventional system using donkeys do not need hand trimming underground. The cutting of coal and stone at the face is done by hand pick where the output per man per shift at the face is 0.75 tons and on overall basis 0.33 tons.

Coal haulage is the transport of mined coal from working faces to the surface, is a major factor in underground mine efficiency. In present case, the coal is be loaded into tubs/ carts using shovels and picks and then hauled from working faces to the surface.

- **Coal Storage**

Coal is not being stored at site in the form of coal piles after extraction from coal face and haulage at the surface. Coal is being loaded onto trucks for transportation to market places/ consumer end after haulage at surface.

- **Loading**

After haulage at the surface, coal is loaded onto trucks from carts to be supplied to consumer end. Coal is loaded from carts into trucks either using hand spades or shovels.

- **Transportation**

Coal is transported to the consumer end/ market places using trucks. Coal extracted from this area is transported to various cities in Punjab province.

- **Unloading**

The unloading of coal is done by consumer or truck/ tractor trolley owner/ agency at the consumer area which is concern of consumer.

4.8.4 Manpower

Coal mining industry is labor intensive and hence carries potential for employment generation in remote locations. The supervisory staff is non-local and hired on monthly wages. The engineering and executive staff follows the suit. The employment expected is given in Table 4-6.



Table 4-6 List of Manpower for Coal Mining Operations

Sr. No.	Category of Staff
1.	Mining Engineer
2.	Surveyor
3.	Mines Sardar
4.	Permit Manager
5.	Haulage Driver
6.	Compressor/Generator Operator
7.	Electrician
8.	Mechanic
9.	Accountant
10.	Chowkidar

4.8.5 Blasting Details

The hard rocks may be during developing or associated with rocks are fragmented by the use of appropriate explosive with different drilling and blasting pattern which is purely need based. The coal is manually cut and excavated while hard-stone in the development galleries or chapper are excavated by adopting conventional drilling and blasting using high explosive coupled with safety fuse and detonator. The amount of explosive to be used is procured on daily basis and utilized as per Rules and Regulations of Mines Act 1923.

- **Blasting Frequency**

The blasting frequency is almost once a day at each workstation requiring the support for use of explosive to the extent of its licensed limits i.e. 5 kg/day. Whenever, there are hard rocks exposed in development galleries or chapper, drilling and blasting has to be carried out.

- **Method used for Blasting**

Conventional blasting method is used with high explosive coupled with safety fuse and detonator.

- **Location Designated for the Storage of Explosives**

The Explosive is stored on the surface in an approved manner as per provision of Mines Act 1923. The amount of explosive to be used is procured on daily basis and utilized as per Rules and Regulations of Mines Act 1923.

- **Mitigation Measures to Control Environmental Impacts during Blasting**

Following are the preventive measures adopted for environmentally friendly and safe blasting operation:



- All blasting operations is be carried out in compliance with conditions as specified in Coal Mines Regulations, 1926.
- The area where blasting is being carried out is be fenced properly.
- To avoid noise problems and disturbance to the community, blasting is be carried out at specified days and between specified timings.
- To prevent air quality, blasting may not be carried out in extreme weather conditions, if practical/ possible.
- Proper monitoring of blasting operations is be carried out by manager or concerned persons.

4.8.6 Health, Safety & Hygiene

Health, Safety & Hygiene includes the following:

- **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.

- **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.

- **Use of Drugs and Narcotics**

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

4.8.7 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 PPE such as safety helmet, safety goggles, rubber gloves, long shoes, safety lamps/ torches etc. The company is provide the requisite PPEs to its employees where required.

4.8.8 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. Drinking water is being supplied from nearby village through rented water tanker.

4.8.9 Solid Waste

The coal seam is not very thick. 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 dumps underground up to 40%. The surplus stones are hauled up and dumped on the surface of the hill slope in a way that natural drainage pattern is not blocked if required.

4.8.10 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.

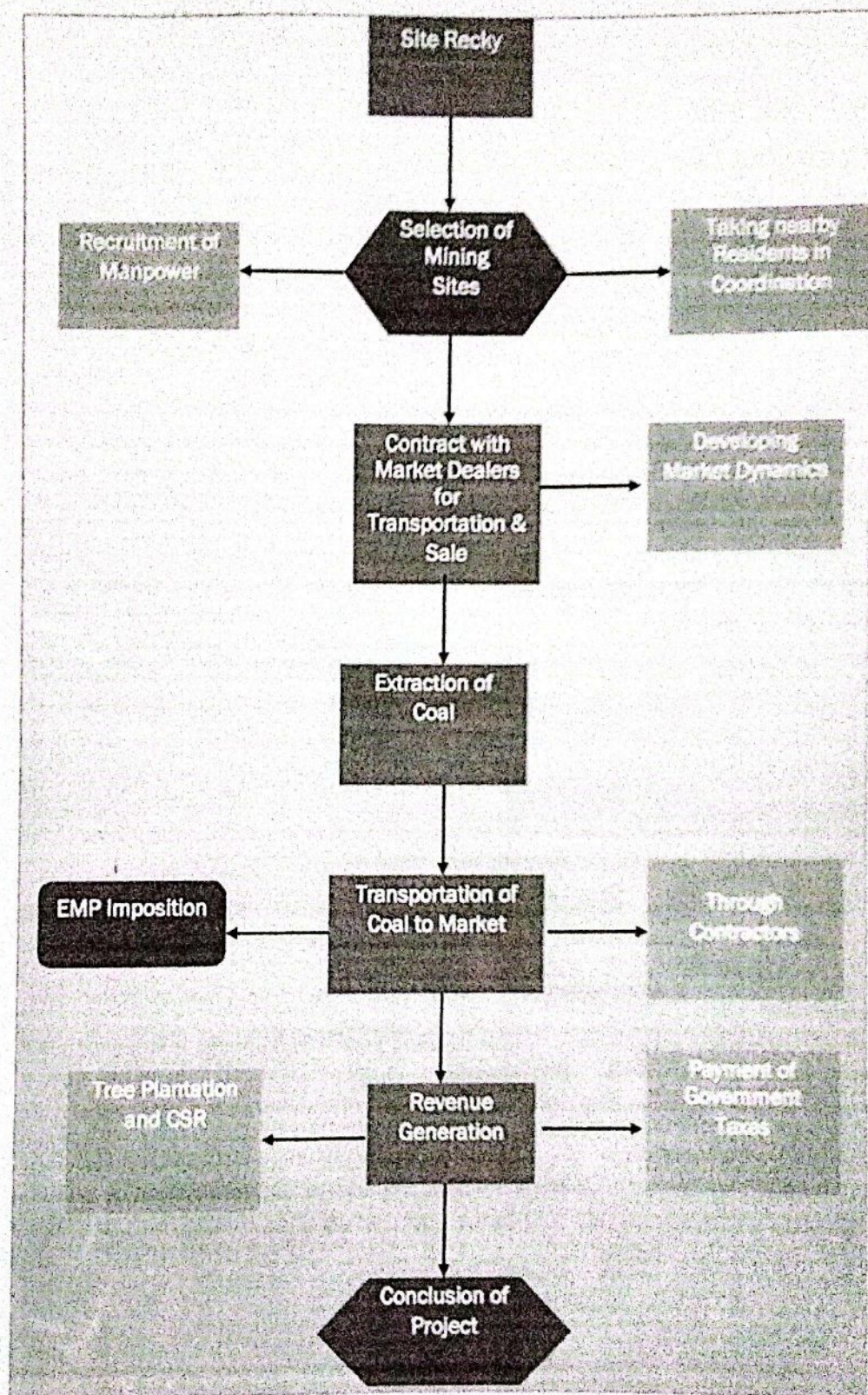


Figure 4-3 Process Flow Chart



Mode of Excavation

The mode of excavation is manual. The mining is to 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 is to be transported to the market places based on demand. Trucks are to be used for the transportation of coal to the market places. Coal may be marketed to Chakwal and nearby areas.

4.9 Restoration and Rehabilitation Program

Following measures can be adopted hypothetically to restore and rehabilitate the site:

- There exists no human settlement within safe radius of the selected project site. No structure of any significance stands at the site to be relocated or dismantled. Mine is already awarded to the proponent, hence, no relocation and rehabilitation is required.
- The process of mining employed is the surface mining process in which least disturbance to the vegetation features and the infra-structure at the project site occurs.
- The importance of the site is due to economic activity, otherwise. It is a replica of barren land. The question of rehabilitation therefore doesn't arise except in restoring the land formed by the cavities of the mined-out area.
- The isolated site can be used for geo-tours to the visitors for generating alternate economic activity once the reserves are exhausted.
- The site can be used for the re-creational purposes.
- Trees are to be planted at the project area by using dry afforestation technique and the overall ecology of the area is to be improved significantly.
- The site can be used for re-stocking the livestock.

Reclamation practice varies widely, depending on the type of mine, its location and applicable legal requirements. The proponent is strictly to follow the provisions of the Environmental Protection Act, 1997 and the Punjab Mining Concession Rules, 2002.

Considering its importance, the proponent is operating to the highest environmental standards of environmental management within the context of sustainable development. Each mine requires a particular solution depending on the region where it is situated, the type of mine and the mining methods applied.

Table 4-7 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 is be underground mining process in which least disturbance to the vegetation features and the infra-structure at the project site is 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 have planted at the project area by using dry afforestation technique and the overall ecology of the area is being improved significantly.	Till Lease Tenure	Proponent
The land is 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

This section describes the baseline conditions, which shows the clear-cut picture of existing environmental resources; physical, ecological, and socio-economic environment of the Project Area. Information on these aspects has been derived from field visits to the project area as well as information obtained through visits to the Government departments and other relevant agencies. The primary data was collected by surveying the project area and its nearby vicinity. The secondary data regarding physical parameters (topography, geology, seismology, hydrology and climatology) was obtained by visiting relevant departments and their official websites. The biological parameters (flora and fauna) were also studied in the project area. The vegetation of project area was studied by preparing a floristic list based on visual observation. The species were recorded with reference to their historical existence in the project area. Information on wildlife fauna species (mammals, amphibians, reptiles, birds, etc.) in the assessment area was compiled based on opportunistic observation, gathering the existing information and consultation with local experts, community members and government departments. The socio-economic aspects were studied and analyzed by conducting detailed socio-economic surveys.

5.1 Baseline Physical Environment

Chakwal District is in Pothohar Plateau of Punjab, Pakistan. It is located in the north of the Punjab province, Chakwal district is bordered by Khushab to its south, Rawalpindi to its north east, Jhelum to its east, Mianwali to its west and Attock to its north west. The district was created out of parts of Jhelum and Attock in 1985. Based on geography, topography and geology, the project area is briefly described below:

5.1.1 Topography and Geology

The land comprises mainly hills, plateaus, plains and deserts with river Jhelum flowing on its East. Chakwal district borders the districts of Rawalpindi and Attock in the north, Jhelum in the east, Khushab in the south and Mianwali in the west.

The southern portion runs up into the Salt Range, and includes the Chail peak, 3,701 feet (1,128 m) above the sea and the highest point in the District. Between this and the Sohan river, which follows more or less the northern boundary, the country consists of what was once a fairly level plain, sloping down from 2,000 feet (610 m) at the foot of the hills to 1,400 feet (430 m) in the neighborhood of the Sohan; but the surface is now much cut up by ravines and is very difficult to travel over.

Lying at the beginning of the Pothohar plateau and the Salt Range, Chakwal is a district on the terrain is mainly hilly, covered with scrub forest in the southwest, and leveled plain interspaced with dry rocky patches in the north and northeast.

5.1.2 Soils

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



Soils are made up of solids, liquids and gases. The solid part of the soil is made up of both inorganic and organics. While weathering of rocks make inorganic particles, the organic solids consist of living and decayed plants. To classify the entire soils in Pakistan, the Soil Survey of Pakistan has divided the entire country into nine ecological zones.

5.1.3 Seismicity of the Project Area

According to seismic zoning of Pakistan the project area lies in seismic zone 2B and represents minor damage. Earthquake with high intensity for a fundamental period of more than 1 second may cause damage to infrastructure. Seismic zoning map of Pakistan is given in figure 5-1.

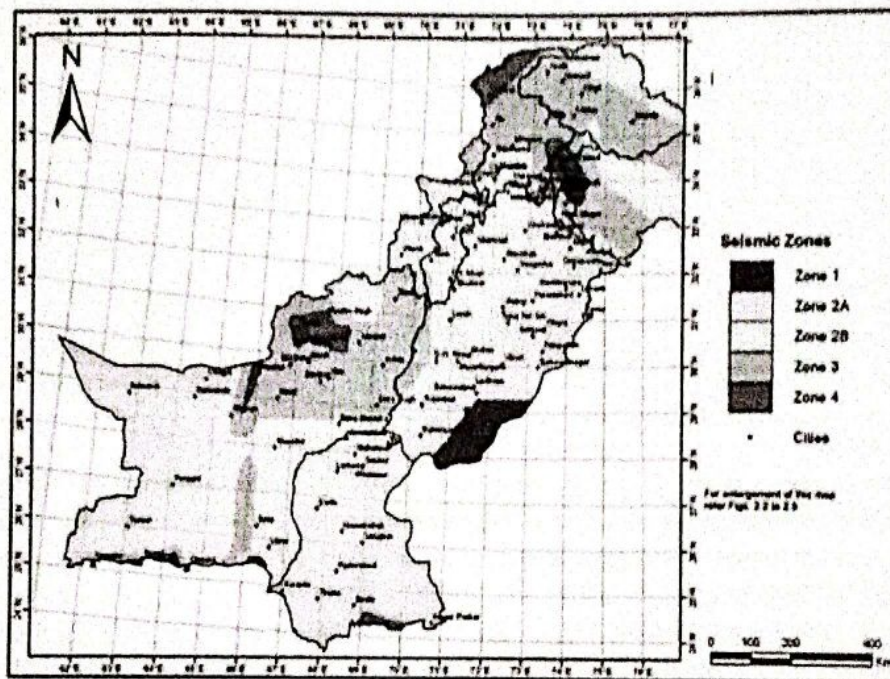


Figure 5-1 Seismic zoning map of Pakistan

There are three main faults in the Salt Range:

- Kalabagh Fault (North South)
- Jhelum Fault (North South)
- Salt range thrust fault (East-West)



In the Region of Salt Range over all earthquake occurrence frequency trend is same area representing the moderate seismicity.

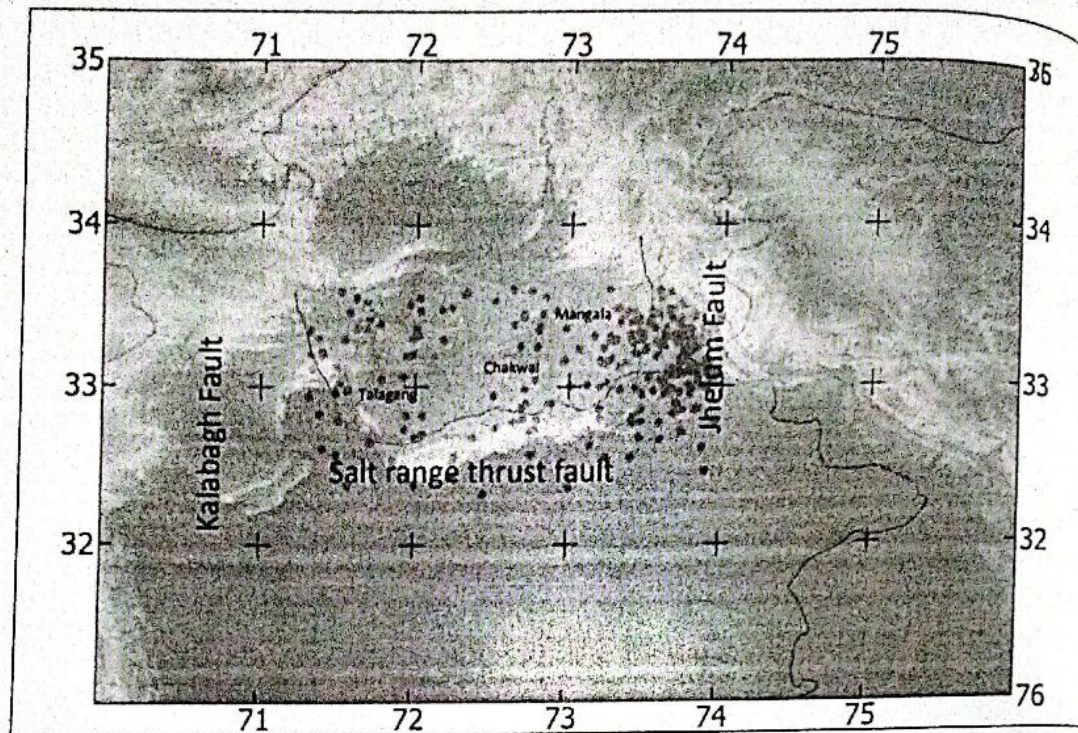


Figure 5-2: Earthquake Occurrence Frequency

5.1.4 Climate

Like in other major parts of the province of Punjab, the site observes four season summer, winter, spring and autumn during twelve months of the year. The climate of Chakwal is considered to be a local steppe climate. During the year there is little rainfall. This climate is considered to be BSh according to the Köppen-Geiger climate classification. The temperature here averages 22.3 °C. About 519 mm of precipitation falls annually. The driest month is November, with 7 mm of rain. Most of the precipitation here falls in August, averaging 133 mm.

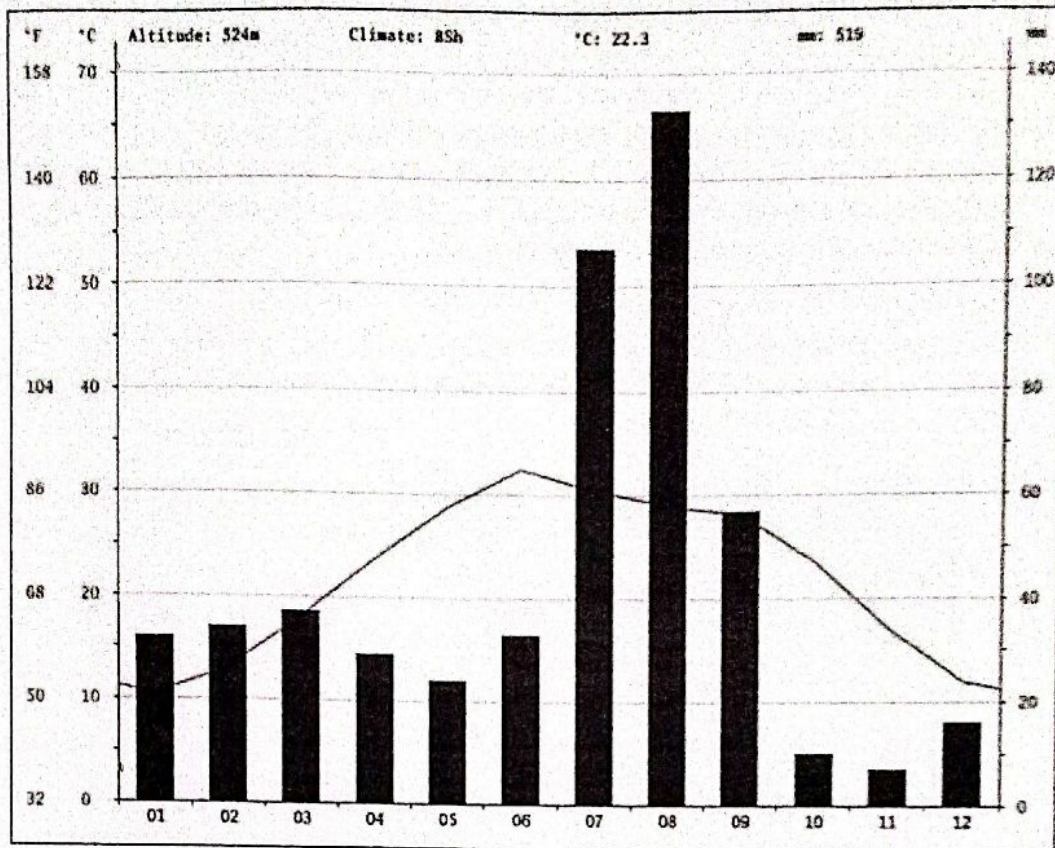


Figure 5-3 Climate of Chakwal

5.1.5 Temperature

The project area is semi-arid and characterized by large seasonal variations of temperature. June is the warmest month of the year. The temperature in June averages 32.5 °C. January is the coldest month, with temperatures averaging 10.5 °C. There is a difference of 126 mm of precipitation between the driest and wettest months. Throughout the year, temperatures vary by 22.0 °C.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	10.5	13.1	18.1	23.7	28.3	32.5	30.5	29	25.2	22.6	17.1	12
Min. Temperature (°C)	3.3	6.1	11.2	16.4	21.1	25.4	28.4	28.4	22.4	15.1	8.7	4.1
Max. Temperature (°C)	17.8	20.1	25	31	34.5	39.7	35.6	33.7	34	31.4	23.3	20
Avg. Temperature (°F)	50.9	55.6	64.6	74.7	83.8	90.5	86.9	84.2	77.3	72.7	62.8	53.6
Min. Temperature (°F)	37.9	43.0	52.2	61.5	70.0	77.7	77.7	75.9	72.3	60.4	47.7	39.4
Max. Temperature (°F)	64.0	68.2	77.0	87.8	97.7	103.5	96.1	92.7	93.3	88.5	73.9	68.0
Precipitation / Rainfall (mm)	32	34	37	29	24	33	137	133	57	10	7	16

Figure 5-4 Temperature of the Region



5.1.6 Rainfall

Chakwal lies within the monsoon range, and apart from occasional rainfall, there are two rainy seasons: the first, caused by the monsoon winds originating from the Bay of Bengal, begins from 15th of July and continues upto around the 15th of September; the second, caused by Mediterranean winds lies in the last two weeks of December and the first two weeks of January. The average rainfall is 22 to 25 inches. Choa Saidan Shah subdivision has the maximum rainfall in the district.

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 relative humidity values at various locations in the project area are 64%.

5.1.8 Geography

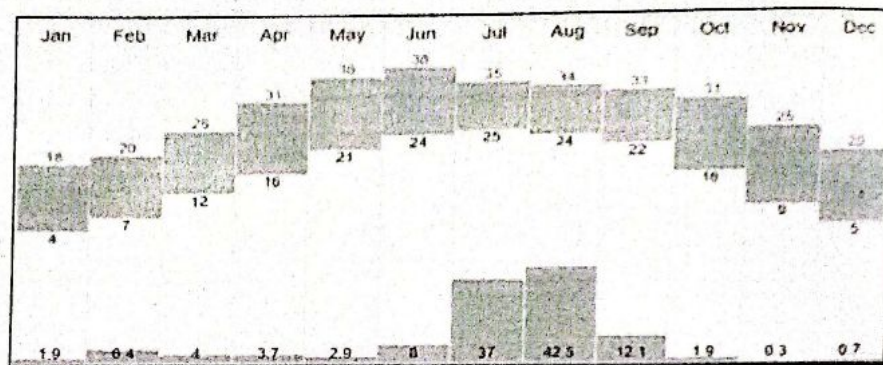


Figure 5-5 Average Humidity

The district is located between 33° 40' 38" N and 72° 51' 21" E. Chakwal district borders the districts of Rawalpindi and Attock in the north, Jhelum in the east, Khushab in the south and Mianwali in the west. The total area of Chakwal district is 6,609 square kilometres which is equivalent to 1,652,443 acres (6,687.20 km²). The southern portion runs up in the Salt Range, and includes the Chail peak, 3,701 feet (1,128 m) above the sea, and the highest point in the district. Between this and the Sohan river, which follows more or less the northern boundary, the country consists of what was once a fairly level plain, sloping down from 2,000 feet (610 m) at the foot of the hills to 1,400 feet (430 m) in the neighborhood of the Sohan; the surface is now much cut up by ravines and is very difficult to travel over.

5.1.9 Water Resources

- Surface Water/ Wetlands

There are four wetlands near the project site namely Katas Raj Temple Lake, Kallar Kal Lake, Khokhar Zer Dam and Kot Raja Dam.



- **Katas Raj Temple Lake**

Water from this pond has been used to irrigate the orchards of loquats in Choa Saidan Shah, a small town and union council in Chakwal district. It also supplied water to the nearby town for drinking purposes but now its own survival is at stake, with unsustainable development threatening its very existence. Situated in Punjab's Salt Range near Kallar Kahar (at an altitude of 2,000 feet), the Katas Raj Temple complex is considered the second-most sacred shrine in Hinduism. The pond from the Hindu legend occupies an area of two Kanals and 15 Marlas, with a maximum depth of 20 feet.

- **Kallar Kahar Lake**



Figure 5-6 Katas Raj Temple Lake

Kallar Kahar Lake is next to Sakh Aubau and is located in Punjab, Pakistan. Kallar Kahar Lake has a length of 3.81 km. Kallar Kahar Lake is the most important reason for Kallar Kahar to be famous among tourists. It is a saltwater lake. It is situated at an altitude of 1500 ft. above sea level. The lake spreads over an area of 8 km². The maximum depth of lake is about 4-5 ft. People enjoy pedal boating and motor boating on the lake. They also come here to spend picnics and holidays.



- **Khokhar Zer Dam:**

The Khokhar Zer Dam lies in the south of Chakwal subdivision in Pakistan. Its capacity is 2602 A.ft. and it irrigates 1230 acres. Water supplied to Chakwal city also comes from the dam.

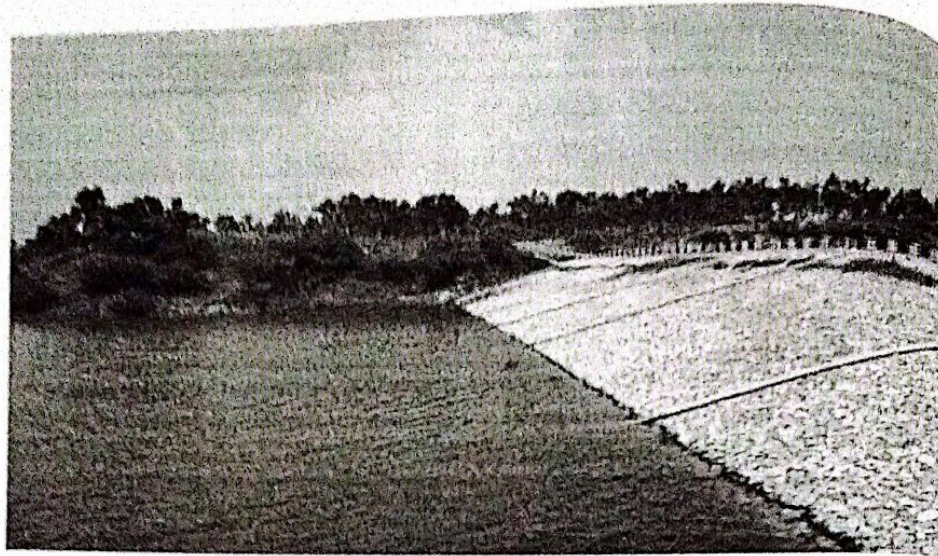


Figure 5-7 Khokhar Zer Dam View

- **Groundwater**

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 water resources 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 if it is un-treated. The project area lies in the district of Chakwal; the groundwater table normally exists approximately 5 feet to more than 20 feet below the GSL.

5.2 Baseline Ecological Environment

5.2.1 Fisheries and Aquatic Biology

The project area has different lakes, Nallas (Small local streams) and rivers. Fishes and other aquatic life is present in these water bodies; anyhow no commercial fishing activities are taken place in these water bodies. Aquatic life present near project site includes fishes, frogs, tortoises, snakes, snails, shrimps, algae, lot of different kinds of Junji.

5.2.2 Forestry

The forests which exist naturally, since Chakwal lies in the subtropical, semiarid zone, are dry deciduous scrub, consisting of the plant varieties which are typical of these kinds of forests- keeker, kau, phulai, sanatha, wild beri, gurgura and potaki.

The underbush mainly consists of saryala, khawi, mesquite and karir. In the plantations that have been carried out by the Forest Department and private farmers, apart from the naturally occurring species of trees, the sheesham, sufaida and to some extent the poplar trees have also been planted.



At present a total of 92382 acres of the district are under reserve forest and 57868 acres are under unclassified forest. The main reserve and unclassified forests in the district are at Diljabbah, Surullah, Drangan, Gandala, Khokhar Bala, Makhiala, Dandot, Chinji, Kot Kala, Simbli, Nurpur, Bagga, Sammarqand and Thirchak. Forests in Chakwal district are taken care of by the Chakwal Forest Division, headed by the Divisional Forest Officer who is assisted by four Sub-divisional Forest Officers. The Chakwal Forest Division is spread over an area of 150250 acres which includes 375 km roadside and 40 km rail side plantations.

5.2.3 Flora & Fauna

There is a very wide range of plant and animal species found in the district. Amongst plants, the species which are most abundant in the district are Kau (*Olea cuspidata*), Phulai (*Acacia modesta*), Sanatha (*Dodonesviscosa*), Gurgura (*Monothecabuxifolia*), and Pataki (*Gymnospo Riaroyleana*).

The general vegetation consists of dry deciduous scrub. The grass species which are dominant in the area are Sariala (*Heteropogancontortus*), Khawi, Mesquite (*Prosopis juliflora*), and Karir (*Capparis sphylla*). All these plant species are found throughout the district.

The species which exist in various areas of Chakwal district are:

- **Grey partridge**—found all over the district, especially in areas, which are sparsely populated.
- **Black partridge**—found along the seasonal channels and water holes in the bellas throughout the district.
- **Chakore**— found in dry rocky areas in the district especially in the Choa Saidan Shah area.
- **See See partridge**—found at a number places in the district in the dry rocky area especially in the Kallar Kahar mountain belt leading into subdivision Talagang.

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

Socio-economic Indicators	District Chakwal
Number of households	1,270
Number of under-5 children	710
Improved source of drinking water	96.8%
Water treatment used in the household	2.6%
Percentage of population using sanitary means of excreta disposal.	69.5%
Proper disposal of solid waste	1.9%



Literacy rate	72.2%
Percentage of children for primary school entry	67.2%
Total child labor	1.9%
Had cough for more than last three weeks	1.0%
Diagnosed with Tuberculosis during last one year	0.2%
Diagnosed with Hepatitis during last one year	0.6%
Employed	87.6%
Unemployed and seeking job	12.4%
Household Utilities	
Electricity	0.1%
Natural Gas	19.3%
Radio	53.4%
TV	71.2%
Cable TV	10.5%
Telephone	21.7%
Mobile	79.0%
Socio-economic Development	
Livestock	54.1%
Mean household size	6.0%
Govt. hospitals	37.6%

Chakwal is one of the under-served districts of Pakistan. According to 2017 census, population of the District Chakwal is 1,495,982 persons scattered over an area of nearly 6524 square kilometers (sq.km). Geographically, it is part of Rawalpindi division and has five tehsils (Chakwal, Kallar Kahar, Talagang, Choa Saiden Shah and Lawa). Majority of the terrain is rain fed with small patches having access to irrigated water, while half of the terrain is not fit for cultivation, due to uneven rough terrain and extreme weather conditions. Chakwal is famous for making Zari Shoes. Khes weaving is also an important traditional craft of the District.

Average land holdings are very small. Agriculture is sparse and cannot contribute to any worth mentioning level of the livelihood of the people. The people also supplement their income by rearing goats, sheep and cows on a limited scale. The people of the area are generally poor. People mostly follow old traditions in almost all walks of their life. Elders are very much respected and play vital role in decision-making. Old people are mostly illiterate.

Old customs are being practiced. Arranged marriage system is followed and it is quite successful. People are proud of their traditions and customs. Joint family system prevails and people reap the fruits of this system. Families are quite coherent. Guests are welcome as a tradition from the old past. Life style is simple. Due to awareness about the importance of education most of younger generation, including both sexes, is now trying to get education. There is a rising trend in the society to change their old traditional



socioeconomic pattern of life. Print and electronic media are playing great role in bringing tangible change in the old pattern of life.

Groundnut and wheat are the major crops cultivated on the large scale in Chakwal District. There are some areas in district where ownership of the lands is rest with the landlord families but generally the people living in the district are the owners of the lands. Fruit orchids, especially of citrus, have been planted but only small area owing because of the shortage of the water. Fair size of loquat orchids is established in Tehsil Kallar Kahar and Choa Saidan Shah. Farming is done with conventional methods.

5.3.1 Quality of Life Values

- Population

According to the 1998 census, the population was 1083725 with 12.15% living in urban areas. The district consists of three tehsils. Figure 4-10 shows the population difference of District Chakwal between 1998 and 2017.

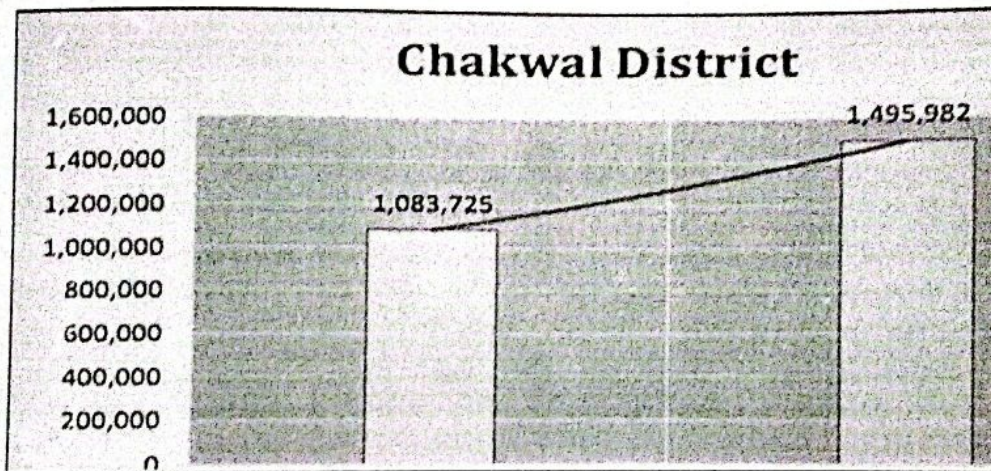


Figure 5-8 Population of District Chakwal

- Land Ownership/ Lease

The mining sites have been granted to the proponent. The coal is the proprietary of the state. The right to extract has been leased to the lease holder for tenure subject to renewal on satisfactory performance. The land incidental to the surface operation within the leased area is the ownership of the surface landowner. The right to use the surface land is negotiated either on rent or on purchase basis. The land used whether on surface or underground is be the subject to geo tours.

- Social Cohesion/ Attitude

People in the area around the project site live according to joint family system. Their attitude is positive for the present project because of better job opportunities.



- **Health**

The coal cutters hail from Swat and as such are resident. Their First Aid and medical care is done by local dispensary maintained by the company. In case of health emergencies suggesting hospitalization, the patients are transferred to Mines Labor Welfare Hospital Choa Saidan Shah.

- **Education**

The primary health and education facilities are provided in the nearby town. The higher education both for boys and girls are available in Choa Saidan Shah, Kallar Kahar, Khewra and Chakwal.

- **Economic**

- **Income Levels**

Generally, the people are poor. However, with increased job opportunities to be provided by company; their income levels are bound to rise.

- **Land Value**

The cultivation depends on rains; therefore, value of the land is not high.

- **Local Occupations and Employment**

Some of the locals are farmers. Many of them are employed in the mining business around as well as in the transport area. Other persons are doing labor work in Khushab, Chakwal, Islamabad, Faisalabad, Lahore and Gujranwala etc.

5.3.2 Government's Economic Agenda

The present policies of the Government (Both Federal & Provincial) favor economic development. These policies include the liberal import policy, deregulation of state control, provision of incentives, establishment of industrial units and infrastructural development under CPEC.

- **Existing Industries**

The district has Coal, Salt, Cement, Chemical Factories, Agricultural Implements, Cement, Cement Products, Flour Mills, Jute Textile, Packages, Rice Mills, Sewing Machines Parts, Soda Ash, Sugar, Textile Spinning, Vegetable Ghee / Cooking Oil and Woollen Textile Spinning / Weaving.

5.3.3 Institutional

- **Institutional Activities**

There are a few governmental and non-governmental institutions in the project area.

- **Institutional Effectiveness**

The institutions are yet in infancy stage. These are not fully effective.



5.3.4 Human Use

- **Telephone**

Nationwide and international telephonic and fax linkages are available in some of the villages.

- **Water Supply**

As the mines are located at higher altitude, the sub-surface water is not in the next available rocks. The rain-wash storage facilities are not available naturally due to high degree elevation difference. The potable water needs are met through dedicated water tank facilities.

- **Electricity**

No connection from National grid is available within the precinct of the mining lease. However, the facility for self-generation is available at site. The company has endeavored to shift its self-generation electricity from generator to solar system. The change in the system is pre-mature to offer any comments but working so far.

- **Agriculture**

Project is located on hill slopes based on rain-fed localities. The agricultural lands are far away from the bottom of the hills. The projects working in no way are threat to any agriculture lands or crops. The rain wash passing through the solid waste consisting of Patala Shale take some soluble along with which are rich in alum shales. The rain wash then carries fertile element and is supportive to the agricultural growth carrying some percentage of potassium.

- **Livestock**

The fodders and feeds are available in small quantities. Cows and buffaloes are commonly found. Rearing of sheep and goat is another means of livelihood.

- **Cultural Heritage**

The area does not boast of any significant cultural development. People follow the family/ village traditions.

- **Archaeological Monuments / Relics**

Katas Raj Temples exist in the project area but at a safer distance of about 15 km from lease boundary.

5.4 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



5.5 Site Suitability

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



6 ENVIRONMENTAL 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 is 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 Impacts Analysis and Prediction

The impacts on different environmental settings were analyzed by conducting different consultation sessions with environmental experts and individuals. Their views were recorded and incorporated in the report. The list of stakeholders and individuals consulted is be provided in the chapter of Stakeholder's Consultation.

6.3 Characterization of Impacts

Impacts were characterized on the basis of following parameters:

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



Categories	Characteristics
Nature	Direct: The environmental parameter is directly changed by the project. 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 is probably occur under most circumstances. Low: Impact could rarely occur at some time.
Significance of impact	Categorized as Positive or Negative. Based on the consequence, likelihood, reversibility, geographical extent, and duration; the level of public concern; and conformance with legislative of statutory requirements.



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

Table 6-1 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									NII						
Acid Mine Drainage									NII						
Land Resources															
Air Quality															
Climate Change									NII						
Noise															
Solid waste															
Wastewater															
Flora & Fauna															
Community Amenity															
Afforestation ,															
Local Economy, Community Development and Employment															
Resettlement									NII						
Health & Safety															

6.4 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 6-2 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

7.1 Anticipated Environmental Impacts Related to Project Design

The impacts related to design incorporates the impacts resulting from underground shortwall mining method. The steps involved in shortwall mining method have been discussed earlier in above sections. The overall impacts resulting from underground coal mining operation are discussed below.

- **Dust Generation**

Dust may be generated during extraction of coal from coal face either manually or through continuous miner. It may also be generated during haulage of coal to the surface.

- **Higher Noise Levels**

Higher noise levels and vibrations due to operation and movement of carts or continuous miner underground and drilling if being carried out in case of hard rocks.

- **Solid Waste and Wastewater**

No solid waste and wastewater is being generated underground due to mining method. The solid waste generated at mine site underground is partially dumped underground in the extracted coal chambers which may act as packing material and support system for walls stability. The shales associated with coal are generally dumped outside close to the mine mouth. These shales have impregnation of alum. This impregnation mixed with water is supporting mixture for vegetation growth. Hence, this impact is negligible.

- **Loss of Vegetation**

As coal mining method is underground. Therefore, there is be no loss of vegetation due to this neither at surface or underground. This impact is negligible in this case scenario.

- **Preventive Measures**

- Use of PPEs (face masks etc.) is be ensured by the mine operators and staff working at coal face.
- Use of PPEs (noise suppression equipment-ear mufflers etc.) is be ensured by the workers where noise levels are higher than 85 (dBA).
- Underground working carts/miners speed limit is maintained to avoid excessive vibrations.
- Regular maintenance of underground equipment is ensured.

7.2 Environmental Impacts during 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 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 is 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 is be ensured to reduce PM₁₀.
- Maintain appropriate buffers between the site and receptors.
- Use of PPEs (face masks etc.) is be ensured by the mine operators and staff
- Use of PPEs (noise suppression equipment-ear mufflers etc.) is be ensured by the workers where noise levels are higher than 85 (dBA).



- Construction activities is ensured at daytime when background noise levels are high.
- Vehicles speed limit is maintained to avoid excessive vibrations.
- Regular maintenance of machinery is ensured.
- Cutting of vegetation and trees is be avoided as far as possible.
- Afforestation is carried out as maximum as possible.
- Solid waste is managed efficiently. Solid waste at site is be stored in containers covered with lid.
- Waste water is disposed of as per the standards of TMA.

7.3 Environmental Impacts during Operational Stage

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

7.4 Identification of Potential Environmental Issues

The environmental issues identified during the literature review, site visits and discussion are enumerated in the Table 7-1.

Table 7-1 Environmental Impacts and their Description

Environmental Component	Environmental Issue	Description
Water Resources	Channel Water Quality	Since the Coal does not flow into the channels, quality of water is not affected. Hence, this impact is nil.
	Channel Water Discharge	The mining operation is not interrupt the flow of water into water channels. Hence, the flow of water in the channels is remain unchanged. On account of this finding, this is cause no impact on the channel water flow.
	Groundwater Quality and Level	Coal mining operation is not affect the quantity/ level of GW. Pumping is sometimes needed in rainy season. The quality of GW is remain unchanged as there is no introduction of any contaminant into the GW during coal mining.
	River Degradation	The question of river degradation arises in case if any river is present within the close vicinity of the mine. No river is present within the safe distance from the project area. Hence, no river degradation is take place.
	Surface Run-Off	Because of the coal mining operations underground, the surface topography is not being disturbed and hence no obstruction to the surface run-off. Thus, this impact is be insignificant.
	Drainage	The mining area lies on the natural developed crisscross drainage pattern and doesn't disturb its ecology, pattern and flow. Thus, this impact is be nil.



Land Resources	Soil Salinity	The coal mining operations do not add any saline materials into the soil. Thus, there is be no effect on the soil salinity.
	Soil Erosion	The coal mining operations do not carry out underground. The type of coal mining is underground coal mining. As all the mining activities is be operated underground, hence, no impact on soil erosion is observed.
	Land Use Change	The areas where the mining has been done since 1990 is under no use. Most of proposed coal mining sites are abandoned. So, there won't be any loss or degradation of productive land. Moreover, the coal is being extracted underground making no change on surface. Hence, there is be no impact on land use of the site.
	Land Utility / Productivity	The mineral is being worked underground and after the extraction of the mineable reserves the area is be available for the use of geo tours. Hence, this impact is be positive.
Climate	Micro-climate Changes	After mining of the coal, plantation is help in improving local climatic conditions to some extent. This impact is be positive.
Atmosphere	Dust and Air Emissions	Coal mining operations do not carry out underground. Small quantity of dust is generated only at underground locations. Dust is not being generated during loading of coal in trucks for its transportation to the markets as coal is in lumpy form. Hence, this impact is be negligible. Some additional measures is be taken to reduce the dust emissions.
	Noise and Vibrations	The sources of noise generation are generators, vehicular movement and drilling & blasting activities. All these operations have been carried out under controlled environment and do not exceed the threshold limit of 80 dBA. Hence, this impact is nil.
Waste Generation	Wastewater	The mining operations incidentally are carried out through such rock structures which do not provide access to water ingress in the mines. The question of effluents therefore doesn't arise. This impact is nil.
	Solid Waste	The solid waste generated at mine site is partially dumped underground in the extracted coal chambers which may act as packing the support system for walls stability. Hence, this impact is be negative.

Flora	Forests / Trees	The project area is devoid of any forest cover. Scant wild species are found. There are no trees except some small size bushes on the project site not worth mentioning. Therefore, there is no question of tree cutting during the operation of the project as well. The forest reserves are at a safer distance from the lease area. Hence, no impact is envisaged.
	Other Terrestrial Vegetation	Insignificant vegetation is growing in the area. Hence, there is be no impact on this parameter.
Fauna	Mammal Communities / Habitat	Only wild mammalian species are found. On extraction of coal underground, these species is rarely migrate to nearby areas. Hence, this impact is be temporary and insignificant.
	Reptile Communities / Habitat	Reptile species are not migrated and affected due to underground coal mining operations. Hence, these species are remaining un-effected. The impact on these species is be negligible.
Social	Population	Population is likely to increase by a national growth rate. Hence, positive impact is envisaged.
	Land Ownership	On completion of mining, the lease area land is available for geo-tours. Impact is be positive.
	Land Lease	As the mineral resources belong to Provincial Government which is enable the mineral exploitation and adding government revenue. Overall impact is positive.
	Social Cohesion/ Attitude	The project has added interwoven knitwear awareness. The group of people working from the local area is have more social inter-woven cohesion and inter-dependence for economic survival. The impact is positive.
	Food/ Nutrition	There is be positive impact since more resources is be available for the purchase of foodstuff.
	Health	Health of residents of nearby villages and workers are not being affected due to mining operations and activities. This impact is not significant.
	Education	On improvement of income level, people is send their children to educational institutions. Hence, this impact is be positive.
Economic	Income Levels	The project has positive impact on the income levels of the locals. The people of other parts of the country is also benefit from this project.



Institutional	Employment	The mining operations employ the locals from the nearby villages. Hence, the job avenues are increased for the locals. This impact is positive.
	Land Value	During the tenure of the mining project life, land value is escalating and may stabilize on post mining operation. Hence this impact is positive.
	Institutional Activities / Effectiveness	Various governmental and non-governmental offices become more active due to this activity. There is a positive impact.
Human Use	Cultivation and Livestock	As the area is non-agriculture, hence the livestock is not grazing ground. This impact is nil.
	Afforestation	Different plant species are planted within the vicinity of the project area to enhance the environmental conditions of the project area. Hence, this impact is positive.
	Domestic Water Supply	The project is located well away from the nearby towns/ villages. The project is not affect the quality and quantity of water supply to communities in the surrounding areas. This impact is nil.
	Community Development	The proponent is already on the supportive grid on community welfare program. Hence, this impact is positive.
Relocation/ Resettlement	Dislocation of Population	The project does not involve any dislocation of the local people. So, there is no impact.
	Loss of Property and Infrastructure	No movable or immovable property of public and private sectors are lost during mining operations. Hence, this impact is nil.
	Resettlement of Affected Communities	There is no requirement of resettling of even a single individual of the community as there is no loss of property and relocation. Therefore, this impact is nil.

7.5 Other Potential Issues

The impacts related to acid mine drainage, contamination of soil and groundwater from coal piles, mine worker's health and safety, emergency response plan for mine accidents/collapse, climate change impacts with corresponding mitigation measures are discussed below.

7.5.1 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 dissolve 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 cause the chances of acidity. In such cases the pumps used are specially galvanized for resisting 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 is 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.

7.5.2 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 is not get contaminated due to coal piles. The wastes extracted during the coal extraction is be filled in the goaf area underground while rest brought up is be covered with a layer of impermeable mud.

7.5.3 Mine Workers Health and Safety

Coal mining deep underground involves a higher safety risk than coal mined in open-pit 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.

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.

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.

Use of Drugs and Narcotics

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

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 is provide the requisite PPE to its employees where required.

7.5.4 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.

7.5.5 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.

7.6 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 7-2. The impacts have been given magnitude based on the scaling given below.



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 is explained after a short while. The magnitude of positive and negative impacts is given in Table 7-2.

Table 7-2 Environmental Impacts and their Description

Sr. No.	Component	Environmental Issue	Magnitude	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		River Degradation		0
		Surface Run-Off		0
		Acid Mine Drainage		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Use Change		0
		Land Utility / Productivity	+2	
	Solid Waste	Land Pollution Breeding of flies and rodents		-2

1	Wastewater	Odor		
		Land Pollution		
		Water Pollution		-2
	Climate	Micro-climate Changes		0
		Climate Change		0
	Atmosphere	Dust		0
		Noise		-3
Sub-Total			+2	5
2	Biological Environment			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total			+2
3	Socio-economic Environment			
	Social	Population	+1	
		Land Ownership	+2	
		Land Lease	+3	
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health & Safety		-3
		Education	+1	
	Economic	Income Levels	+2	
		Employment	+2	
		Land Value	+2	



	Institutional	Institutional Activities/Effectiveness	+1	
	Human Use	Cultivation	+1	
		Livestock	+2	
		Afforestation	+2	
		Infrastructure	+2	0
		Domestic Water Supply		0
		Community Development	+2	
	Relocation/Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
	Sub-Total		+25	-2
	Grand Total		+29	-7

The potential environmental impacts resulting during operational phase of the project and their possible mitigation measures are given in Table 7-3.

Table 7-3 Environmental Impacts and their Mitigation Measures in Operation Phase

Environmental Component	Sources & Potential Impacts	Mitigation Measures
Physical Environment		
Noise	- Increased noise levels due to use of heavy machinery such as tractors for transportation of extracted coal. - Disturbance to workers and residents. - Drilling and Blasting	For Drilling and Blasting - All blasting operations are carried out in compliance with conditions as specified in Coal Mines Regulations, 1926. - The area where blasting is being carried out is be fenced properly. - To avoid noise problems and disturbance to the community, blasting are carried out at specified days and between specified timings. - Proper monitoring of blasting

		operations are carried out by manager or concerned persons. • For Noise • Use of PPEs (noise suppression equipment-ear mufflers etc.) is be ensured by the workers where noise levels are higher than 85 (dBA). • Mining activities are ensured at daytime when background noise levels are high. • Vehicles speed limit is maintained to avoid excessive vibrations. • Regular maintenance of machinery is be ensured.
Air Quality	• Dust generation due to movement of trucks and vehicles • Drilling and Blasting	• Maintenance of buffers between the site and receptors. • Controlled water sprinkling is be ensured to reduce PM₁₀. • Use of PPEs (face masks etc.) is be ensured by the mine operators and staff. • To prevent air quality, blasting may not be carried out in extreme weather conditions, if practical/ possible.
Wastewater	• The mining operations incidentally are carried out through such rock structures which do not provide access to water ingress in the mines. The question of effluents therefore doesn't arise. • The domestic wastewater is be generated from camp offices and labor activities.	• The domestic wastewater generated from camp offices should be disposed of as per standards of TMA if applicable.
Solid Waste	• The solid waste generated at mine site is partially dumped underground in the extracted coal chambers	• Proper waste management plan is be developed. • The vegetation of the coal waste dumps happens to be a mitigation measure for the coal waste dumps



	as well as packing the support system for walls stability while the remaining rock waste is dumped on hill slopes without disturbing the natural drainage pattern. • Solid waste from camp sites is be produced by labor activities.	already developed • Littering is be prohibited at the site. • Containers is be emptied before they reach their carrying capacity. • Waste is be stored at site in covered containers.
Acid Mine Drainage	• Damage to aquatic life • Risks to human health • Soil contamination • Surface and groundwater quality contamination	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.
Biological Environment		
Flora	• The project area is devoid of any forest cover. There are no trees except some small size bushes on the project site not worth mentioning. Therefore, there is no question of tree cutting during the operation of the project as well.	Nil
Fauna	• Temporary migration of mammals and birds from the area.	• This impact is temporary and no significant mitigation measures are required.
Endangered Species	• There are no endangered species found in the project area, hence this impact is be negligible.	Nil

Socio-economic Environment		
Community Amenity	- Dust and visual amenity - Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions. - Noise associated with coal mining activities and traffic.	- Adopt and maintain good management practices. - Maintain appropriate buffers between the site and receptors. - If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.
Mine Workers Health and Safety	- Health and safety risks to workers due to explosion underground, formation of sink holes etc. - Damage to worker's health and can cause fatal injuries as well.	- Provision of first aid facility. - Provision of safety trainings to mine workers and staff. - Prohibition for use of drugs and narcotics at coal face underground. - Provision of Personal Protective Equipment to workers and staff working underground near coal face.

7.7 Potential Environmental Enhancement Measures

Responsibilities of the relevant stakeholders for implementation of the environmental enhanced measures are delineated in the Table 7-4. These measures are subject to the tenure of the lease holder.



Table 7-4 Positive Environmental Enhancement Measures

Positive Impacts	Enhancement Measures	Implementing Agencies
Improving Land Utility	- Optimize use of recovered land. - Consolidation of land - After conclusion of mining activities, geo-tours can be arranged. - Forest Cultivation can also be taken.	- Agricultural Department - Revenue Department - Proponent
Improvement of land activity	- Education of farmers on modern techniques of agriculture. - Use timely inputs for suitable soil conditioners.	- Agricultural Department - Formers
Improvement of Economic Conditions	Provision of more jobs to locals with efforts on integration of project products.	- Lease Owner - NGOs
Improvement of institutional performance	- Arrangements of credit facilities for agro based business encourage establishment of NGOs for improvement of socio environmental and literacy condition. - Persuade schools, banks and other departments to be effective and provide facilities to locals.	Agricultural Development Bank/ Schedule Bank/ NGOs/ Education Department
Improvement of agriculture and forestry	- Adopt modern techniques for agro productivity to use optimal inputs. - Plant trees and crops with lesser water requirement	- Agricultural Department - Forest Department - Farmers
Community Development	- Educate and train resident of villages on improvement of local conditions through NGO. - Encourage local participation in social education and health activities and programs.	- NGOs - Locals

7.8 Other Potential Environmental Enhancement Measures

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



8 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

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 is undertake and shows how the Project is mobilize organizational capacity and resources to implement these measures.

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

8.1.1 Objectives

The objective of the Environmental Management and Monitoring Plan (EMMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the operational phase of the project. The proper implementation of the EMP is ensure that all the adverse environmental impacts identified in the EIA report are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies.

The EMMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The EMMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project Proponent for the implementation of EMMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project.
- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed in the EIA report.
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA report.
- Defining the requirements for communication, documentation, training, monitoring, management, and implementation of the mitigation measures.

8.2 Implementation of EMMP

The implementation of EMMP has been carefully coordinated with the design and operational program of the project. This ensures the implementation of relevant mitigation measures at the appropriate project stages. It is also ensuring that adequate resources are properly allocated to achieve the desired results. This EMMP has been prepared to satisfy the requirement of "IEE and EIA Regulations, 2000".

8.3 Environmental Budget

The environmental budget of the project has been given in Table 8-1.

Table 8-1 Environmental Budget Breakdown

Sr. No.	Item/Activity		Quantity (No.s)	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
5	Total Environmental and Social Management Cost			200,000/-	

8.4 Environment Management Team

Following functionaries is involved in the implementation of EMMP:

- The project Proponent as owners of the EMMP.
- Project contractor(s) as executors of the EMMP during installation and operational phase of the project.
- Operational & Maintenance (O&M) and the Health, Safety and Environment team of the project as an executor of the EMMP during the installation and operational phase of the project.



Table 8-2: List of Individuals and their Responsibilities

Designation	Responsibilities
Manager	• Direct operations at the site. • He is act as team lead. • Interact with other executives, mine staff and community residents. • Effectively motivate staff to follow protocols and to work productively. • Look after the Health and Safety Related issues. • Responsible for scheduling staff and ensuring that supplies are stocked. • He is play a direct role in developing business goals for the mine they run, and he is help to produce a business plan to ensure that those goals are met.
Accountant	• Proper management of the funds for the CSR. • Development of fund proposal for environment related expenses. • Ensuring the smooth transaction of funds for environmental related projects/activities. • He prepares the yearly budget. • Taking minutes in meetings and other administrative duties. • During his shift timings, he is responsible to look into smooth functioning of the process in environmentally sustainable way. • He is responsible to rectify any problem regarding environmental matter in collaboration with concerned authorities. • Prepare reports on different events and incidents. • He is report all matters regarding E.M. to the manager.

8.4.1 Responsibilities of Functionaries

• Responsibilities of Management of Project

Management of the project is responsible for the environmental management and supervisory affairs during the project activities. Environmental personnel designated by the management of the project is look after the environmental related issues during the project activities. The responsibilities of environmental personnel are as follows:

- Monitoring progress of the project as per planned schedule of activities.
- Exercising oversight over the implementation of environmental mitigation measures by the contractor.
- Documenting the experience in the implementation of the environmental process.
- Preparing training materials and implementing programs.
- Maintaining interfaces with the other lined departments/ stakeholders and
- Reporting to the management of the project on the status of EMMP implementation.

8.5 Proposed Environmental Management and Monitoring Plan (EMMP)

The Environmental Management and Monitoring Plan (EMMP) is be used as a management and monitoring tool for implementation of the mitigation measures identified in the EIA report.

The EMMP matrix lists down:

- The required mitigation measures recommended in the EIA report.
- The person/organization directly responsible for adhering to or executing the required mitigation measures and monitoring adherence to the mitigation measures.
- The parameters, which is be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.
- Budget allocated for management practices (cost of EMMP).
- Project Proponent is hold primary and overall responsibility for ensuring full implementation of the EMMP.

The Environmental Management and Monitoring Plan have been provided for both installation and operational phases of the project below:

8.5.1 EMMP for Installation Phase

The EMMP for installation phase of the project includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Table 8-3: Air Quality Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at project site.	Throughout installation period	Proponent	0/-
		Avoid installation activities in extremely dry weathers.	Throughout installation period	Proponent	0/-
		Sprinkle water at site when necessary, to reduce dust spread.	Throughout installation period	Proponent & Contractor	5,000/-



Hi-Tech Environmental Services Environmental Impact Assessment for the Mining Lease for Coal over an Area of 697.30 Acres of Land					
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout installation period	Proponent & Contractor	5,000/-
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout installation period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout installation period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout installation period	Contractor	0/-
		Sub-Total			10,000/-
Implementation & Monitoring Plan for Installation Phase					

Table 8-4: Noise Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of Noise and Vibrations					
1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During installation period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.	Throughout installation period	Proponent & Contractor	0/-

	Ensure that machinery is kept in good condition to reduce noise generation.	Throughout installation period	Proponent & Contractor	5,000/-
	The noisy installation works is entirely be planned during day time when most of the neighbors is be at work.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total				5,000/-

Table 8-5: Solid Waste Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During installation period	Proponent	0/-
		Proper waste management plan must be developed.	During installation period	Proponent	0/-
		Waste must be stored at site in covered containers.	During installation period	Proponent	10,000/-
		Containers must be emptied before they reach their carrying capacity.	During installation period	Proponent	0/-
		Littering must be prohibited at the site.	During installation period	Proponent	0/-
		Awareness is be given to the staff and workers about handling of solid waste at site.	During installation period	Proponent	0/-
		Use of an integrated solid waste management system i.e. through a hierarchy of options: • Source reduction	Throughout installation period	Proponent & Contractor	0/-



		- Reuse - Recycling			
		Use of durable, long-lasting materials that is not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					10,000/-

Table 8-6: Health and Safety Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of occupational health and safety risks					
1	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during installation of the project.	Throughout installation period	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	5,000/-
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	5,000/-
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the project area.	One-off/as per required	Proponent	5,000/-

	Provision must be made for persons to be trained in first aid.	One-off	Proponent	5,770/-
Sub-Total				20,000/-
Grand-Total				45,000/-

8.5.2 EMMP for Operational Phase

The EMMP for operational phase includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Table 8-7: Air Quality Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at mining site.	Throughout operational period	Proponent	0/-
		Avoid operational activities in extremely dry weathers.	Throughout project lifecycle	Proponent	0/-
		Sprinkle water at site when necessary, to reduce dust spread.	Throughout operational period	Proponent & Contractor	5,000/-
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout operational period	Proponent & Contractor	5,000/-
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout operational period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment	Throughout operational period	Proponent & Contractor	0/-



	shall be properly tuned and maintained.			
	Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout operational period	Contractor	0/-
Sub-Total				10,000/-

Table 8-8: Noise Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of Noise and Vibrations					
1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During operational period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.	Throughout operational period	Proponent & Contractor	0/-
		Ensure that machinery is kept in good condition to reduce noise generation.	Throughout operational period	Proponent & Contractor	5,000/-
		The noisy production works is entirely be planned during day time when most of the neighbors is be at work.	Throughout project life	Proponent & Contractor	0/-
Sub-Total					5,000/-

Table 8-9: Solid Waste Management & Monitoring Plan for Operational Phase

Table 8-9: Solid Waste Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During operational period	Proponent	0/-
		Proper waste management plan must be developed.	During operational period	Proponent	0/-
		Waste must be stored at site in covered containers.	During operational period	Proponent	5,000/-
		Containers must be emptied before they reach their carrying capacity.	During operational period	Proponent	0/-
		Littering must be prohibited at the site.	During operational period	Proponent	0/-
		Awareness is be given to the staff and workers about handling of solid waste at site.	During operational period	Proponent	0/-
		Use of an integrated solid waste management system i.e. through a hierarchy of options: • Source reduction • Reuse • Recycling	Throughout operational period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that is not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout operational period	Proponent & Contractor	0/-
Sub-Total					5,000/-



Table 8-10: Health and Safety Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of occupational health and safety risks					
1	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during operation of the project.	Continuous	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	10,000/-
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	5,000/-
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the lease area.	One-off/as per required	Proponent	5,000/-
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	10,000/-
Sub-Total					30,000/-
Grand-Total					50,000/-

8.6 Environmental Monitoring and Evaluation

8.6.1 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.

8.6.2 Environment, Health & Safety Policies

8.6.2.1 Environment Policy

The environment policy right from initiation of project installation to its proper operations is 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.

8.6.2.2 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 is set nationally acceptable standards for practice and is 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.

8.7 Equipment Maintenance Details

8.7.1 Objectives

The maintenance of equipment and machinery used during project activities is carried out to achieve following objectives:

- To avoid environmental pollution including dust issues, exhaust emissions, excessive noise and vibrations etc.
- To avoid any risk to health and safety of the workers including injuries.
- To avoid any hindrance and to ensure smooth operation of project activities.

8.7.2 Measures for Equipment Maintenance

Measures for the maintenance of equipment involve:

- All the machinery and vehicles are inspected and monitored.
- Always keep a suitable fire extinguisher ready for emergency situations.
- Always keep a first aid box within the premises of the project site.
- Secure unbolted heavy parts or engines if necessary to leave the work.
- Monthly tuning, servicing and cleaning of machinery and vehicles.

8.8 Training Needs

There is requirement of training of the members of Monitoring and Evaluation department of multifarious environmental aspects pertaining to coal production. Training may be arranged at a suitable institution.

8.8.1 Training Schedules

- **Environmental Technical Assistance and Training Plan**

To raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. The proponent is playing a key role in this respect and arrange the trainings.

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

Proponent is manage the environmental training program. This is organize training courses for contractor staff to train them in specialized areas such as air and noise pollution monitoring; develop environment operation manuals in consultation with the EPA, Punjab. The training is take place in three phases;

Table 8-11: Training Schedules

Phases	Description
Phase-1	- The workers and labor force is be given basic training on project activities. They is be explained on different possible environmental impacts resulting from the project activities. - The environmental management and monitoring staff is be given basic knowledge of the possible environmental impacts, how to mitigate them and methods of personnel protection. This is take place during the design phase.
Phase-2	- Second phase of training is take place at the start of operational phase. - It is involve a hands-on experience of carrying out the different activities during operational phase, responsibilities of each individual, implementation of mitigation measures, use of personnel protective equipment and an emergency handling and exit drill
Phase-3	- All the staff is be briefed about the implementation of EMMP. - The staff and workers is be provided with suitable and required PPEs.



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 is better understanding 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 information management and processing accordingly. At the same time, the different types of content according to their professional background.

4.4 Stakeholder Consultation

Stakeholder consultation is a two-way flow of information and dialogue between the project proponent and stakeholders, specifically aimed at developing issues that can help shape project design, resolve conflicts at an early stage and to implement and monitor ongoing activities.

During the project and work activities in terms of the stakeholder consultation that include discussions, meetings and field visits, a series of briefing sessions and formal stakeholder consultations were carried out with environmental experts and officials. The meetings were held at various locations.

4.5 Key Consulted Stakeholders

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

The organizations consulted are as under:

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

The department was contacted to seek wisdom during an information of the stakeholders.

Responsible Authority

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

For departments and agencies

In the impact analysis detailed meetings of local community, education institutions, health centers, hospital and NGOs were held with the management. Matters were discussed that affect the environment and also the implementation of proposed project. All possible impact measures were considered and incorporated in the Environmental Management Plan. During sessions, focused group discussion and wide consultations were held with the relevant stakeholders in the area. The purpose of such consultations is to obtain feedback from the relevant persons.

Page No. 24/25

Official

August 2022



Environmental Practitioners and Experts Team

Experts of M/s Hi-Tech Environmental Services (Pvt.) Ltd. 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.

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.

9.5.1 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.

List of Individuals Consulted Along with their Written Feedback

No. of Individuals = 11

Day & Timing = 03-AUG -2023 (1.30 P.M)

Sr	Names/ Person consulted	CNIC	Concern/Comments
Government Department			
1.	Chief Inspectorate of Mines Punjab	-	Mining activity should follow rules and regulation. No mining activity should be done without submitting environment report to EPA.
2.	DG Mines and Minerals Punjab	-	PPEs should be given to the workers. No Natural reserve is be affected by the project activity. Proper implementation of mitigation should be done. Job Opportunities is be provided to locals.
3.	Representative (Forest Department)	-	Vegetation should be done. No forest should be affected.
Local Residents			
4.	Ali Mehmood	37302-1843660-7	Dust Issues
5.	M. Zaheer	38201-8924524-3	Job Opportunity + Dust Issues
6.	Amjad Iqbal	38201-5715106-1	Job Opportunity
7.	Muhammad Shamim	37202-4629486-1	Road Construction
8.	Muhammad Javed	42401-9795969-7	Job Opportunity
9.	Naeem Khan	37202-2019837-9	Job Opportunity
10.	Mudassir Ameen	37202-3733815-9	Water Problem
11.	Rana Wali M.	38201-1054401-7	Water Problems + Dust Issues



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

Conclusions	
General	• The coal extraction is very crucial for meeting increased energy demands on national as well as International level. • 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. • Mitigation measures have been suggested for each negative impact resulting from the coal mining activities.
Physical Environment	• No wastewater is generated during project activities. The water, if exposed during underground coal mining is used for drinking purposes. • The type of solid waste produced at the surface is food waste only. The solid waste produced underground consists of material excavated for mine space widening. • The food waste at the surface is disposed of in covered containers to avoid any waste littering. The solid waste underground is used to fill up the cavities formed due to coal extraction. This saves the transportation cost of solid waste to dispose of at the surface. It also provides additional support to the mine against subsidence. • Proper mitigations may be adopted in the preliminary design including safe and environmentally friendly disposal of solid waste. • 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. • All the baseline environmental parameters including ambient air and noise are well within the permissible limits of PEQS.

	• 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.
Biological Environment	• 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 is be disturbed by the Project activities and may have to move into nearby areas. This is a temporary insignificant impact. Anyhow the outskirts blank area is to be covered with green trees so project site is not give barren look.
Socio-economic Environment	• 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. is be of temporary nature. • The mining activities provide additional job opportunities to the community of the area. The project is raise the income levels of the population of the area. • Social cohesion is optimal. • The environmental cost is negligible. • The proponent is committed to ensure eco-friendly, sustainable, safe and sound environment.
Recommendations	
General	• All measures as suggested in EMP should be adopted to minimize adverse impacts. • All appropriate environmental management & monitoring measures detailed in this report, together with any other environment management commitments should be implemented throughout out the entire life of the project. • Environmental Management and Monitoring Plan proposed is be implemented in the true spirit throughout the lifespan of the project. • Regular monitoring and auditing is be taken by the management to ensure the compliance of all the mitigation measures. • Environmental monitoring is be carried out by the company



as suggested and communicated by EPA, Punjab.	
Physical Environment	• The mining site and the road links should adopt such measures and select such machinery and their operations to minimize the dust spread. • Dust suppression machine should be available on each site for wetting of all the materials to avoid effects of dust such as respiratory diseases. • Water contamination, air pollution and high noise levels is be controlled with the use of good engineering practices. • Proper measures is be taken to control the air emission or high noise levels. • Transportation vehicles and equipment must be properly maintained and tuned well.
Biological Environment	• Extensive plantation must be carried out throughout the tenure of lease as an environmental enhancement measure.
Socio-economic Environment	• Periodic monitoring on occupational health and safety must be conducted to avoid workplace hazards. • Proponent is take due care of the local community and its sensitivity towards local customs and traditions. • Safety signs or boards is be placed wherever needed within the premises of the Project site. • Personal Protective Equipment (PPEs) is be provided and ensured that they are used by the workers during working hours. The workers working near the noise generating machines is be strictly required to use ear muffs/ plugs. • Fire extinguishers or firefighting equipment is be provided at well notified points to cope with fire events. • Good housekeeping is be ensured by the management. • First aid medical facility is be provided at the project site.

APPENDICES

August 2023

PAIDAL/CXL/14123

Recd.



Appendices-I: Glossary

Act means the Pakistan Environmental Protection Act, 1997.

Contamination is introduction of impurities in the environment.

Environment means (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors in sub-clause (a) to (f).

Environmental Assessment a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead.

Environmental Management to carry out the developmental activities in sustainable manner.

Impact on Environment means any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources.

Mitigation Measures means the measures for the control, reduction or elimination of an adverse impact of a development on the environment, including a restorative measure.

Project Proponent is a person, company, NGO or any agency that sponsors and promotes a project.

Regulations means the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environment Impact Assessment Regulations, 2000.

Pollution means the presence in the environment or the introduction into it, of substances that have harmful or unpleasant effects.

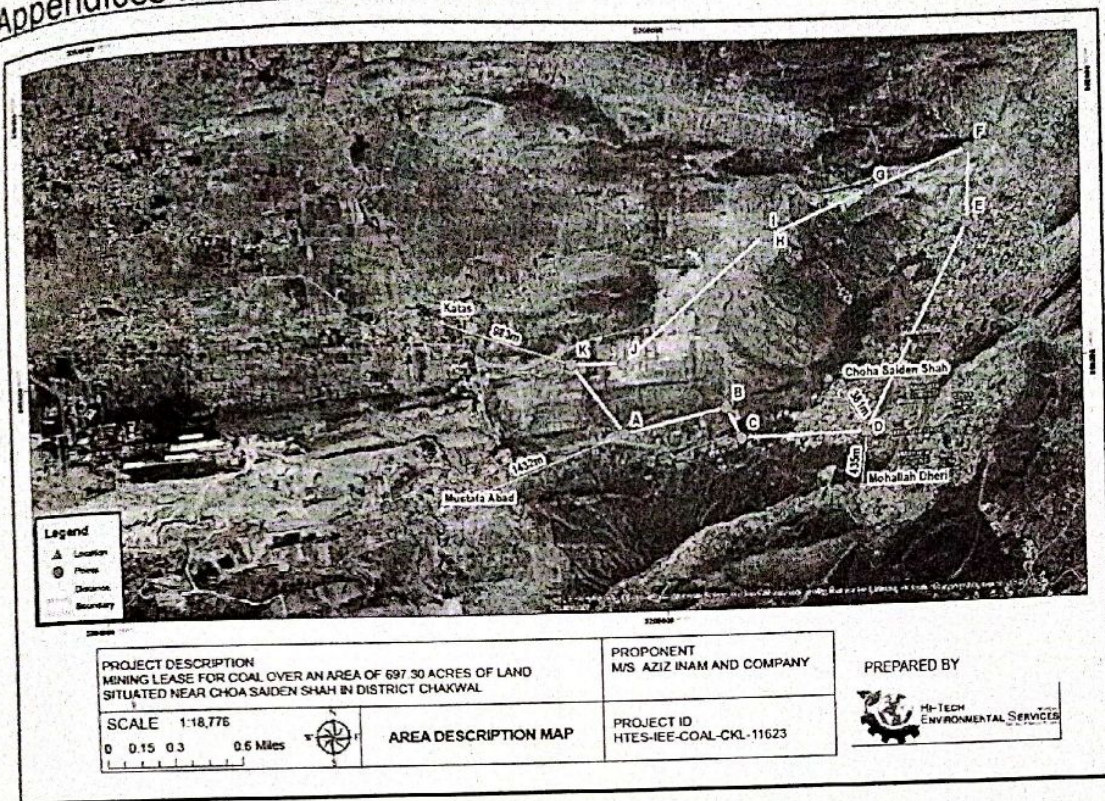
Social Cohesion is defined as the isingness of members of a society to cooperate with each other in order to survive and prosper.

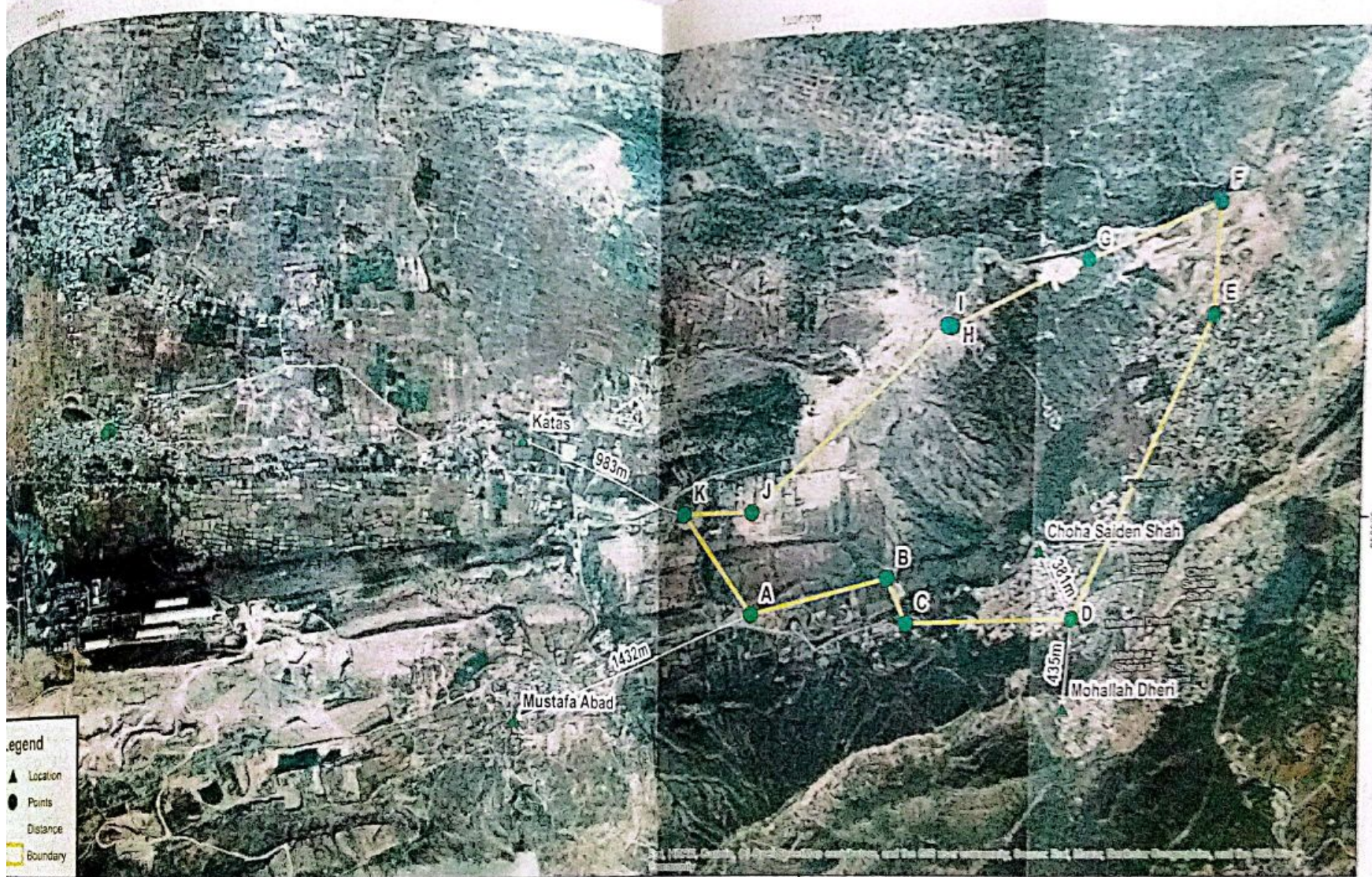
Screening is the first step of IEE/EIA study. It helps in determining whether a project requires an IEE or EIA.

Sensitive Receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants.

Afforestation is the planting of trees on land which was formerly used for land uses other than forestry is called afforestation.

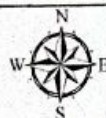
Appendices-II: Environmental Map





PROJECT DESCRIPTION
 MINING LEASE FOR COAL OVER AN AREA OF 697.30 ACRES OF LAND
 SITUATED NEAR CHOA SAIDEN SHAH IN DISTRICT CHAKWAL

SCALE 1:18,776
 0 0.15 0.3 0.6 Miles



AREA DESCRIPTION MAP

PROPONENT
 M/S. AZIZ INAM AND COMPANY

PROJECT ID
 HTES-IEE-COAL-CKL-11623

PREPARED BY



Appendices-III: List of Abbreviations

NCS	National Conservation Strategy
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
CKL	Chakwal
M. Tons	Metric Tons
in	Inches
GLS	Ground Level Surface
MTa	Metric Tons Annually
TPD	Tons Per Day
HSE	Health Safety and Environment



Appendices-IV: References

- <https://en.wikipedia.org/wiki/chakwal> District
- <https://en.wikipedia.org/wiki/chakwal> District#Geography
- <https://latitude.to/articles-by-country/pk/pakistan/34134/Chakwal-district>
- <https://en.climate-data.org/asia/pakistan/punjab/Chakwal-3077/>
- <https://en.climate-data.org/asia/pakistan/punjab/Chakwal-3077/>
- <https://www.worldweatheronline.com/Chakwal-weather-averages/punjab/pk.aspx>
- <https://www.scribd.com/document/385301710/First-Report-of-ethnobotanical-studies-of-tehsil-Noorpur-Thal-District-Chakwal-Punjab-Pakistan>
- Multiple Indicator Cluster Survey(MICS)2007-08
- The IUCN Red List-A Key Conservation Tool
- Punjab Development Statistics 2005
- Minerals and Rocks for Industry, Geological Survey of Pakistan.
- Pakistan Highway Rehabilitation Project Sectoral Social and Environmental Assessment Phase I &II.
- Mineral Processing Technology: An Introduction to the Practical Aspects of Ore Treatment and Mineral Recovery By Barry A.Iss and James A.Finch.
- (Khawaja, Saima Amin and Nusrat Jahan Nabeela. 2014), "Review of Pakistan Environmental Protection Agency Regulations, 2000", Published by: IUCN Pakistan (National Impact Assessment Programme), pp.7,11&13).
- (J.Yamatomi and S.Okubo), "Surface Mining Methods and Equipment",CIVIL ENGINEERING - Vol. II, pp. 1-2.
- 10. (Alecia M. Spooner), Environmental Science for Dummies, "The Environmental Science of Surface Mining".
- National Mineral policy 2013, Government of Pakistan, Ministry of Petroleum and Natural Resources, Islamabad, Pakistan February 2013.
- 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.
- 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 Canal and Drainage Act, 1873.
- The Punjab Plantation and Maintenance of Trees Act, 394.
- The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act and Rules, 394.
- Information and data provided by the project proponent.
- Technical design data related to the project.
- Information gathered through discussions with the project related persons of the project proponent.
- 29. "Guidelines for Self-Monitoring and Reporting by the Industry (SMART)," Final Report, March 1998, approved by PEPC, August 1999
- Mining & Environment by Prof. Bharat B. Dhar.
- Mining Environmental Handbook by Jerrold J. Marcus.
- https://mnm.punjab.gov.pk/important_minerals_occurring_in_punjab#14
- <https://en.wikipedia.org/wiki/Marl>

August 2023

REGISTRATION NO. 14123

Arif



Appendices V: TERMS OF REFERENCE FOR EIA REPORT

The agreement hereinafter called Agreement, is made between M/s Hi-Tech Environmental Services (Pvt.) Ltd. (Consultancy Firm/Consultant) and M/s Aziz Inam & Company (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 697.30 Acres of Land Situated Near Choa Saidan Shah in District Chakwal".

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:

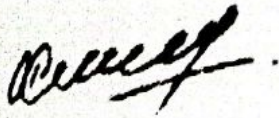
NOW THEREFORE, the parties here to hereby agree as follow:

- 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 is provide Lab Test Reports from EPA certified lab including noise level monitoring, wastewater analysis and ambient air monitoring report or any report/document/information demanded by the EPA.
- The client provides 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.
- Is evaluate all the activities during the installation and operational phases and recommend suggestions/actions to comply with PEQS.
- Is 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

Environmental Services (Pvt.) Ltd.
Environmental Impact Assessment for M/s Aziz Inam & Company
for Coal over an Area of 697.30 Acres of Land Situated near Choa Saidan Shah, District Chakwal.

217

adverse impacts during and after installation phase.
Shall suggest mitigation measures for all such activities which may cause adverse impacts.



For and Behalf of

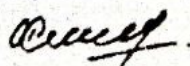
M/s Hi-Tech Environmental Services
(Pvt.) Ltd.
(Consultancy Firm/Consultants)



For and Behalf of

M/s Aziz Inam & Company

14123



August 2023



Appendices-VI: Consultant Team

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 150 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

- w) Economic Geology
- x) Determination of geological exploratory techniques and mine design
- y) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
- z) Preparation of Environment Management Plans
- aa) Preparation of reports on HRD /Mines Rescue & Recovery.
- bb) Assessment of Impact of mining on environment and mitigating measures.
- cc) Mine surveying & interpretation of boundary disputes.
- dd) Legal opinion on mine regulatory regime.
- ee) Energy fuels and selection of choice fuels for specific energy
- ff) Drilling and blasting for underground and surface mining techniques.
- gg) Safety measures for mines operation.

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26-B, Zahoor Elahi Road, Gulberg-II, Lahore
Representative	Advocate Chaudhry Awais Ahmed
Contact	(+92) 3219443210
e-Mail	consultantshtma@gmail.com info@hitechma.com

Environmental Services (Pvt.) Ltd.
Environmental Impact Assessment for M/s Aziz Inam & Company
Lease for Coal over an Area of 697.30 Acres of Land Situated Near Choa Saidan Shah, District Chakwal.

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

Name	Qualifications & Brief Experience	Roles Assigned
1. M. Hamza Tariq	BS Hon. Environmental Sciences	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
2. Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Author of EIA Report • Development of Maps
3. Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
4. Engr. Harris Naeem	B.Sc. Mining Engineering GIS Management	• Mining Techniques & Suggestions • Recommendations • Review of Report

August 2023

OKL-14123

Handwritten signature



Appendices-VII: Approvals from other Concerned Departments

FORM C

[Rule 9 (a)]

No. 1521 of 1987 -1988

ACKNOWLEDGEMENT OF REGISTRATION OF FIRM

The Registrar of Firms, Lahore Division, hereby
acknowledges the receipt of the statement prescribed
by Section 58 (1) of the Partnership Act, 1932.

The statement has been filed and the name of the
firm " AZIZ INAM & CO.

124-Ferozpur Road, Lahore.

has been entered in the Register of Firms.



Lahore :
Dated 21 JUN 1988

(Signature)
Registrar of Firms,
Lahore Division.

Document No. RFD-5265

Recd

NO. ML. VOL. I. COAL (133) / 13
DIRECTORATE GENERAL OF MINES & MINERALS PUNJAB,
POONCH HOUSE, MULTAN ROAD, LAHORE
Dated Lahore, the 14.1.2009

10 ✓ M/s Aziz-Inam & Company,
124-Ferozepur Road,
Lahore

SUBJECT: MINING LEASE FOR COAL OVER AN AREA OF 697.30 ACRES
CHOA SAIDAN SHAH CHAKWAL
NEAR IN DISTRICT

I have to refer to your application dated 12.2.2008 for the grant of renewal in period for mining lease as subject cited above and to inform you that the Licensing Authority has been pleased to renew the mining lease for a period of (15) years with affect from 22.6.2009 to 21.6.2024 under rule-134 of the Punjab Mining Concession Rules, 2002 on the terms and conditions already contained in the original allotment letter dated 30.12.1990 in accordance with Punjab Mining Concession Rules, 2002 as well as on the following:-

(MUHAMMAD ASLAM)
DIRECTOR SMALL MINES
ASSISTANCE/TITLE PUNJAB LHR

Copy to:-

1. The Chief Inspector of Mines, 153-Shahjamal Colony, Lahore.
2. The Deputy Director/Assistant Director, Mines & Minerals.
District Complex, Ghaziabad, Chakwal
3. The Chief Statistical Officer, Federal Bureau of Statistics Energy & Mining
Statistics Section Plot No.17/8 (Markaz) Islamabad.
4. The Accounts Branch (Mines & Minerals) H.Q. Punjab, Lahore.
5. The Drawing Branch (Mines & Minerals) (H.Q. Punjab, Lahore.
6. The Misc. File.
7. The Master File P.A. to Director General (Mines & Minerals)



NO: ML, CKL, I, COAL (133) 2715
DIRECTORATE GENERAL OF MINES & MINERALS
PUNJAB (DIVISION)
POONCH HOUSE, MULTAN ROAD, LAHORE.

Dated Lahore, the

7-7 2006

To
✓ M/s Aziz Inam & Company,
124-Ferozpur Road, Lahore.

SUBJECT: MINING LEASE FOR COAL OVER AN AREA OF 697.30 ACRES
NEAR CHOA SAIDAN SHAH IN DISTRICT CHAKWAL.

With reference to your application dated 02.2.2002 & in pursuance of rule 13 of the Punjab Mining Concession Rules-2002 the Licensing Authority is hereby pleased to grant to you an area of 179.58 acres and merge it in your existing leased area under lease No. ML, CKL, I, Coal (133) so as to make it a consolidated area of 697.30 acres on the existing terms and conditions as well as subject to the following:-

- i) That within one month of the date of issue of this letter you will return one copy out of the attached three copies of the plan to this office Directorate & another copy to the Assistant Director, Chakwal after affixing your signature and rubber stamp thereon in token of your having accepted the same & retain one copy for your use and record.
- ii) That you will demarcate the area in accordance with the enclosed map containing survey data as given below:-
- iii) That you shall appoint technical staff as per requirement of Rule 161 of the Punjab Mining Concession Rules-2002 & the Chief Inspector of Mines, Punjab under the Mines Act, 1923.
- iv) That you shall abide by the instructions issued by the Director Environment Facilitation Division of this Directorate to reduce the environmental impact caused due to prospecting/mining operation, control of environmental concerns and rehabilitation affected sites etc.

SURVEY SHEET NO. 43-D/14

POINTS	EASTING	NORTHINGS
A	08000	38460
B	08789.15	38642.57
C	03903.13	38405.29
D	09864.	38420
E	10640.	40000
F	10660	40572
G	09900	40270
H	09130.46	39943.35
I	09100	39950
J	08000	39000
K	07600	38000

Total Area 697.30 acres.

The boundary pillar shall be fixed by you such that each pillar height of not less than one metre above the surface of the land and is not less than one metre square of in diameter at the base. Demarcation certificate to this effect duly signed by a surveyor registered with this Directorate shall be submitted to the Directorate within two months of the date of issue of this letter. Demarcation certificate should clearly describe the position of the boundary pillar with respect of nearby surface features of permanent character. If upon subsequent official checking demarcation is found to be incorrect it will be corrected and you shall pay the demarcation fee on determined by Licensing Authority.

(v) That you will intimate within two months from the date of issue of this letter the amendment/change in the scheme of development of the area if any, for the approval of the Licensing Authority.

(vi) That you shall not commence mining operations in the included area unless you have submitted a copy of the plan signed by you in token of your acceptance and a demarcation certificate as required under clauses (i) and (ii) and the change in any in the rules scheme of development submitted by you under clause (iii) has been approved by the Licensing Authority.

(vii) That you will observe and abide by all other terms and conditions laid down in the mining concession rules, in force and as amended or revised from time to time.

If the grant of mining lease over the consolidated area is acceptable on the terms and conditions as mentioned above you should communicate accordingly to this office within one month from the date of issue of this letter and comply with the requirement of clause (i) to (v) within the prescribed time limits. If the allotment of the additional area shall be treated to have lapsed.

The mining lease is valid upto 21.6.2009

(AMIR AHMED CH.)
DEPUTY DIRECTOR MINES & MINERAL
DEPUTY DIRECTOR SMALL MINES
ASSISTANCE/TITLE PUNJAB LHR

Copy to:

The Chief Inspector of Mines
The Deputy Director

CS CamScanner

August 2023



Appendices-VIII: Laboratory Reports of Environmental Analysis



ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 08
Gaddafi Stadium Complex, Lahore



Validation for Stack & Ambient Monitoring / Sampling

Emission Monitoring under CIM-34 or CIM-39			
Facility Name & Address	No of Stacks / Sampling Point		
Mining Lease for Coal			
Chakwal, Choa Saldan Shah			
Industry Category			
Analyzer Model & Make			
Average stack emission values of CO, NOx (in mg/NM ³)			
Excess Air / Excess Oxygen (Range)			
Analyzer exposed for Ramp Up phase to the sample gas for 5 minutes	Yes	No	NA
Analyzer flow rate and EC temperature monitored during calibration and testing	Yes	No	NA
Test Data Phase of sample gas recorded with 15 second interval	Yes	No	NA
All key requirements to ensure QA/QC complied for said EPA approved Method	Yes	No	NA
Particulate Matter (PM) Monitoring / Sampling under USEPA Method 5 / 17			
Model & Make of Iso-kinetic PM Assembly			
The PM sampling train is complete as per Method 5 & 17	Yes	No	NA
Leak Test performed prior to sampling	Yes	No	NA
Field data Sheet for PM Sampling filled during PM sampling	Yes	No	NA
Data for determining of "K" factor & DGM "Y" Factor filled during sampling	Yes	No	NA
All method key requirements during sampling were complied to ensure QA/QC	Yes	No	NA
Filter of Particulate matter is suitable for metal Testing	Yes	No	NA
SOx sampling as per Method 8 (Thurin Indicator Method)			
The right absorbent solution are available for SOx Sampling	Yes	No	NA
The equipment is capable to maintain flow rate @ 2.0LPM or as per method 8 requirement	Yes	No	NA
Sampling for SOx is performed as per method	Yes	No	NA
Ambient Air Quality Monitoring by Automatic Monitors for CO, O ₃ , SO ₂ , NOx, PM _{2.5} & PM ₁₀			
In case of continuous monitoring at a site, One Point QC Check Single analyzer & Zero/span check is performed every 14 days	Yes	No	NA
The CE of NOx analyzer is ensured to be maintained within 96% - 104.1%	Yes	No	NA
Zero/span check is performed prior to starting ambient monitoring	Yes	No	NA
All key requirements for Critical & Operational Criteria for ambient air monitoring by automatic monitors were complied during monitoring	Yes	No	NA
The measuring techniques of monitors comply PEQS	Yes	No	NA
Ambient Air Sampling of SPM, PM ₁₀ , Pb by High Volume Sampler			
In case of Sampling for SPM through samplers, the flow rate of sampler comply PEQS (1 m ³ /min)	Yes	No	NA
Calibration of Sampler performed prior to sampling	Yes	No	NA
Vehicular Emissions & Noise Measurement			
Sampling of Vehicle emissions and noise measurement have been performed as per method and SOPs	Yes	No	NA

Remarks (if Any)

Signature

Name of EPA Officer with Office Address
RAs / ROs / OOs (Label must Print)
Govt. of the Punjab, Islamabad

Dated

Name of Assistant / Deputy Analyst, Analyst
with Name of Private Lab along with Address



ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 06
Qaddafi Stadium Complex, Lahore



Validation for Wastewater & Drinking Water

Facility / Project Name & Address Phone	Mining Lease for Coal over an Area of 697.30 Acres of Land Situated Near Ghisa Saidan Shah, District Chakwal		Sampling Point	01	
Waste Water (WW) Treatment Facility	Primary Secondary Tertiary NA		Drinking Water (DW) Treatment Facility		
Total WW collected Sample	Total Collected Drinking water samples				
Sample tag for testing parameter is assigned on sample container	Yes		Yes	NO	NA
Sample is preserved properly for each testing parameter	Yes		Yes	NO	NA
Sample size is adequate for testing the target parameters	Yes		Yes	NO	NA
Water quality measurement performed to ensure sample representativeness	Yes		Yes	NO	NA
No. of Waste Water outlets	Waste Water Flow m ³ /hr from each outlet (Optional)	Water Intake m ³ /hr (Optional)	Water Mass balance complied during sampling (Optional)	Sample Type	
			Yes NO	Grab	Composite
Parameter	Unit	Container	Sample Size	Preservation	Yes NO NA
Calcium, Total or Free	mg/l	Stark	100 ml	Refrigerate to 4°C	✓
Chloride, Total or Free	mg/l	Stark	100 ml	0.1N HCl, Thiosulfate & cool to 4°C	✓
Color, Turbidity	PCU	Graduated	400 ml	Cool to 4°C	✓
Dissolved Solids	mg/l	Filter	100 ml	0.45 µm filter, Cool to 4°C	✓
Nitrate, Nitrite, Phenolic Compounds, Oil & Grease, COD, BOD	mg/l	Filter	100 ml	0.45 µm filter, Cool to 4°C	✓
Alkalinity, General	mg/l	Stark	100 ml	0.1N HCl, Cool to 4°C	✓
Cyanide, Total	mg/l	Stark	100 ml	0.1N HCl, Cool to 4°C	✓
Pesticides, General	mg/l	Filter	100 ml	0.45 µm filter, Cool to 4°C	✓
Field Parameters*					
Field parameter	pH meter, Model Make		Measurement Method	Calibrated in Field	Assessed value
pH	HANNA		Electrode	Yes NO	
Temp					
Cl					

* Field testing parameters only be validated by RAS, ROs, OD (Labs)
Remarks for Sample Quality (if Any):

Signature
Name of EPA Officer with office Address
Inspectors / RAS / ROs or ODs

31/7/2023
Dated

Signature
Name of Assistant/Deputy Analyst, Analy
with Name of Private Lab along with Address

Receipt



ENVIRONMENTAL SERVICES PAKISTAN

CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)



Reference Number: **ESPAK/0453P/23/AA/4326/00429** Date: **04/08/2023**
Name of Industry/Clients: **M/s Aziz Inam & Company (Mining Lease for Coal)**
Address: **Choa Saidan Shah, District Chakwal**
Validation Officer: **Amin Baig, Research Officer**
Nature of Sample: **Ambient Air** Monitoring Location: **Mid - Point of Site**
Date of Sample Collection: **31/07/2023** GPS: **31°43'11.63"N 72°58'57.23"E**
Sample Collected/Sent By: **Shahzad Ali, Analyst (Field), ESPAK** Grab / Composite: **Continuous - 24 Hours**
Date of Completion of Analysis: **01/08/2023**

S. No	Parameters	Limit Values (PECs-24Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m ³ (8 Hours)	5.4 mg/m ³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO ₂)	120 µg/m ³	21.2 µg/m ³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O ₃)	110 µg/m ³ (1 Hour)	14.3 µg/m ³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO ₂	40 µg/m ³	15.4 µg/m ³	Chemoluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO _x	80 µg/m ³	26.9 µg/m ³	Chemoluminescence Detection	Within Prescribed Limits
6	Particulate Matter PM ₁₀	35 µg/m ³	34.1 µg/m ³	Particulate Sensor	Within Prescribed Limits
7	Particulate Matter PM _{2.5}	150 µg/m ³	131 µg/m ³	Particulate Sensor	Within Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m ³	395 µg/m ³	High Volume Sampler (HVS)	Within Prescribed Limits

PECs: Pakistan Environmental Quality Standards for Ambient Air, 2016

+ Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on this one-hour rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Notes:

- The report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of this report lies with the client.
- The values represent sample conditions when monitoring/testing was carried out.
- The report data is not intended to be used legally by the client.

- Sample Analyzed By: **Shahzad Ali**
Analyst (Field)
- Name of Chief Analyst with Seal: **Muhammed Arfan**
- Signature of Incharge of the Environmental Laboratory:

Name: **Imran Akif**
General Manager
Date: **04/08/2023**

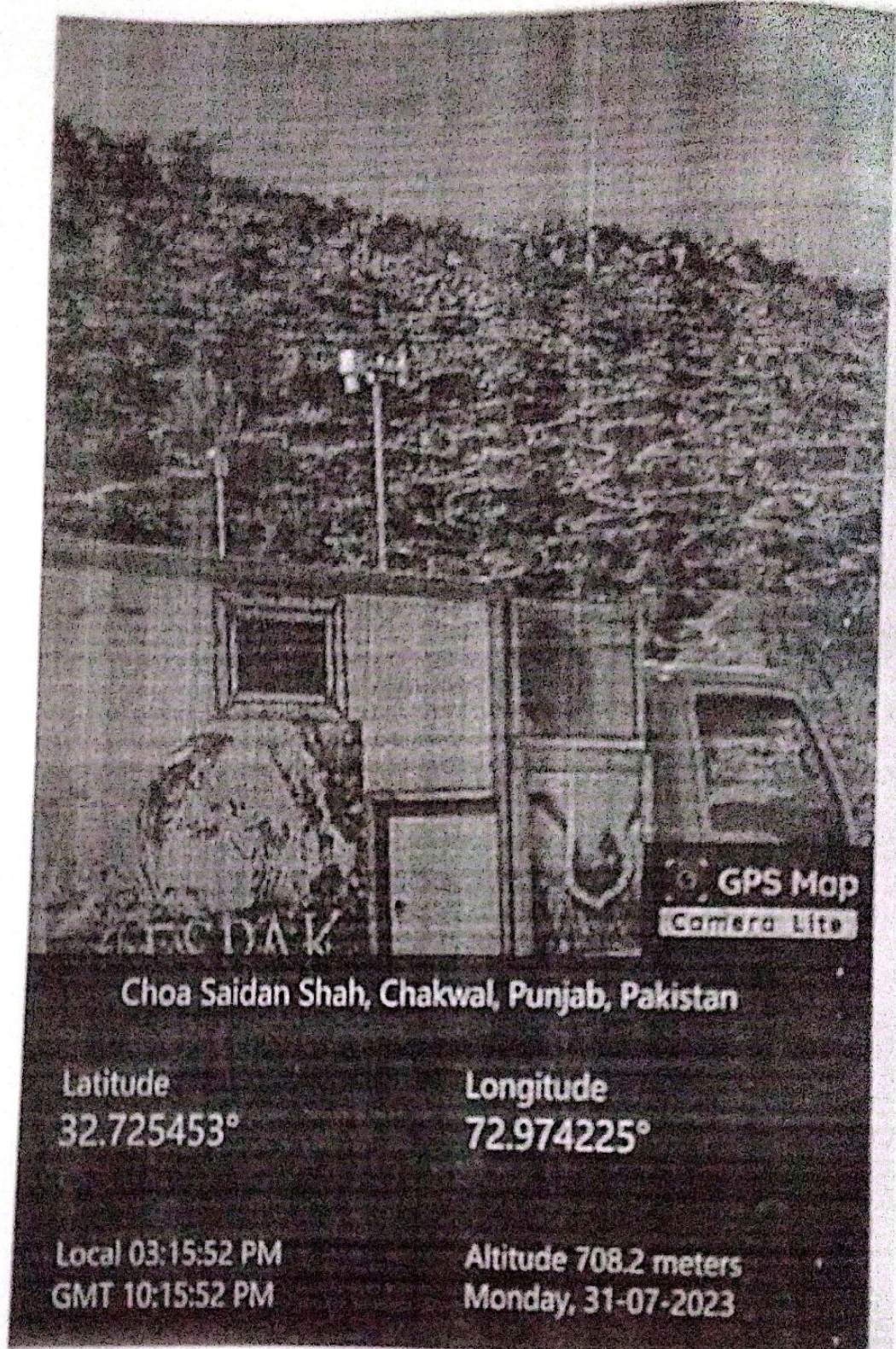
End of Report

Lahore Office
Office No. 731,
Block - 7, Sector D1,
Shah Daman Road, Township
Lahore, Pakistan.
Tel: +92 (42) 3515 4015-16

Islamabad Office
Office No. 314, 3rd
Floor, Gulberg Empire,
Gulberg Green,
Islamabad, Pakistan.
Tel: +92 (51) 5915060

Peshawar Office
Unit No. 244-TT,
Dean's Trade Center
Sadat Court,
Peshawar, Pakistan.
Tel: +92 317 0849599





Environmental Services (Pvt.) Ltd.
Environmental Impact Assessment for M/s Aziz Inam & Company
Mining Lease for Coal over an Area of 697.30 Acres of Land Situated Near Choa Seiden Shah, District Chakwal.



ENVIRONMENTAL SERVICES PAKISTAN

THE QUALITY STANDARD

NOISE MONITORING REPORT

Date: 04/08/2023



Reference Number:
Name of Industry/Client:
Address:

Validation Officer:

Nature of Sample:

Date of Sample Collection:

Sample Collected/Used By:

Date of Completion of Analysis:

Method/Equipment Used:

ESPAK/0453P/11/M/4377/00501

M/s Aziz Inam & Company (Mining Lease for Coal)

Choa Seiden Shah, District Chakwal

Amin Raig, Research Officer

Noise

Grab / Composite: Continuous 24 Hours

31/07/2023

Shahzad Ali, Analyst (Field), ESPAK

01/08/2023

Sound Level Meter

S. No	Measurement Point	Limit Values (PERC3)	Noise Level in dB(A) 1m	Remarks
1	Mid - Point of Site (GPS: 32°43'31.83"N 77°19'27.21"E) - Day time	75 dB(A)	70 dB(A)	Within Prescribed Limits
2	Mid - Point of Site (GPS: 32°43'31.83"N 77°19'27.21"E) - Night time	65 dB(A)	61 dB(A)	Within Prescribed Limits

PERC3: Pakistan Environmental Quality Standards for Noise in Industrial Area, 2016 Day Time hours (6:00 am to 10:00 pm) Night Time hours (10:00 pm to 6:00 am).
• Uncertainty of Measurement (U95%) data will be provided on request, where available. The statement of conformity is produced in the report, it is based on the best estimate of possible acceptance or rejection with equal shared risk due to measurement uncertainty.

- NOTE:
- The report should be reproduced as a whole and not in parts.
 - The responsibility of the ethical use of this report lies with the client.
 - The values represent sample conditions when monitoring/testing was carried out.
 - The report data is not intended to be used legally by the client.

1. Sample Analyzed By:

Shahzad Ali
Analyst (Field)

2. Name of Client Analyst with Seal: Muhammad Arfan

3. Signature of Incharge of the Environmental Laboratory:

Name: Imran Mulla
General Manager
Date: 04/08/2023

End of Report

Labore Office

Office No. 731,

Block - 2, Sector 01,

Shah Jahan Road, Township

Labore, Pakistan.

Tel: +92 (42) 6516 4015-16

Islamabad Office

Office No. 314, 3rd

Floor, Gulberg Empire,

Gulberg Greens,

Islamabad, Pakistan.

Tel: +92 (31) 5915060

Peshawar Office

Unit No. 244-TI,

Dawn's Trade Center

Sadar Cantt,

Peshawar, Pakistan.

Tel: +92 312 0849379





ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA'S PUNJAB EPC CERTIFIED

CHEMICAL ANALYSIS TEST REPORT (DRINKING WATER)



Reference Number:

ESPAK/0453P/23/DW/4328/01000

Date: 08/09/2023

Name of Industry / Client:

M/s Aziz Inam & Company (Mining Lease for Coal)

Address:

Choa Saidan Shah, District Chakwal

Validation Officer:

Amin Baig, Research Officer

Nature of Sample:

Ground Water

Date Sample Received:

02/08/2023

Grab / Composite: GRAB

Date of Sample Collection:

31/07/2023

Sample Collected / Sent By:

Shahzad Ali, Analyst (Field), ESPAK

Date of Completion of Analysis:

04/08/2023

S. No	Parameters	Limit Values PECS	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	—	ND	SMWW 9221 B	—
2	E. Coli	Must not be detectable in any 100ml Sample	ND	SMWW 9221 F	Within Limits
3	Color	≤15 PCU	ND	SMWW 2120 C	Within Limits
4	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	Turbidity	≤5 NTU	ND	SMWW 2130 B	Within Limits
7	Total Hardness as CaCO ₃ *	≤500 mg/L	200 mg/L	SMWW 2340 C	Within Limits
8	Total Dissolved Solids (TDS)*	≤1000 mg/L	323 mg/L	SMWW 2540 C	Within Limits
9	pH*	6.5 to 8.5	7.5	SMWW 4520 H/B	Within Limits
10	Nitrate (NO ₃ -)	≤50 mg/L	16.3 mg/L	SMWW 4500 NO ₃ - B	Within Limits
11	Nitrite (NO ₂ -)	≤3 mg/L	ND	SMWW 4500 NO ₂ - B	Within Limits
12	Residual Chlorine	0.2 to 0.5 mg/L	ND	SMWW 4500-CL B	—
13	Chloride (as Cl ⁻)*	≤250 mg/L	11 mg/L	SMWW 4500 CL ⁻ B	Within Limits
14	Fluoride (F ⁻)*	≤1.5 mg/L	0.2 mg/L	U.S. EPA 9234	Within Limits
15	Phenolic Compounds (as Phenol)	NGVS	ND	SMWW 5530 C	—
16	Cyanide (CN ⁻)	≤0.05 mg/L	ND	SMWW 4500 CN ⁻ F	Within Limits
17	Cadmium (Cd)	0.01 mg/L	ND	U.S. EPA 200.7	Within Limits
18	Chromium (Cr)	≤0.01 mg/L	ND	U.S. EPA 200.7	Within Limits
19	Copper (Cu)	2.0 mg/L	ND	U.S. EPA 200.7	Within Limits
20	Lead (Pb)	≤0.05 mg/L	ND	U.S. EPA 200.7	Within Limits
21	Mercury (Hg)	≤0.001 mg/L	ND	U.S. EPA 200.7	Within Limits
22	Nickel (Ni)	≤0.02 mg/L	ND	U.S. EPA 200.7	Within Limits
23	Zinc (Zn)	5.0 mg/L	0.2 mg/L	U.S. EPA 200.7	Within Limits

Signature

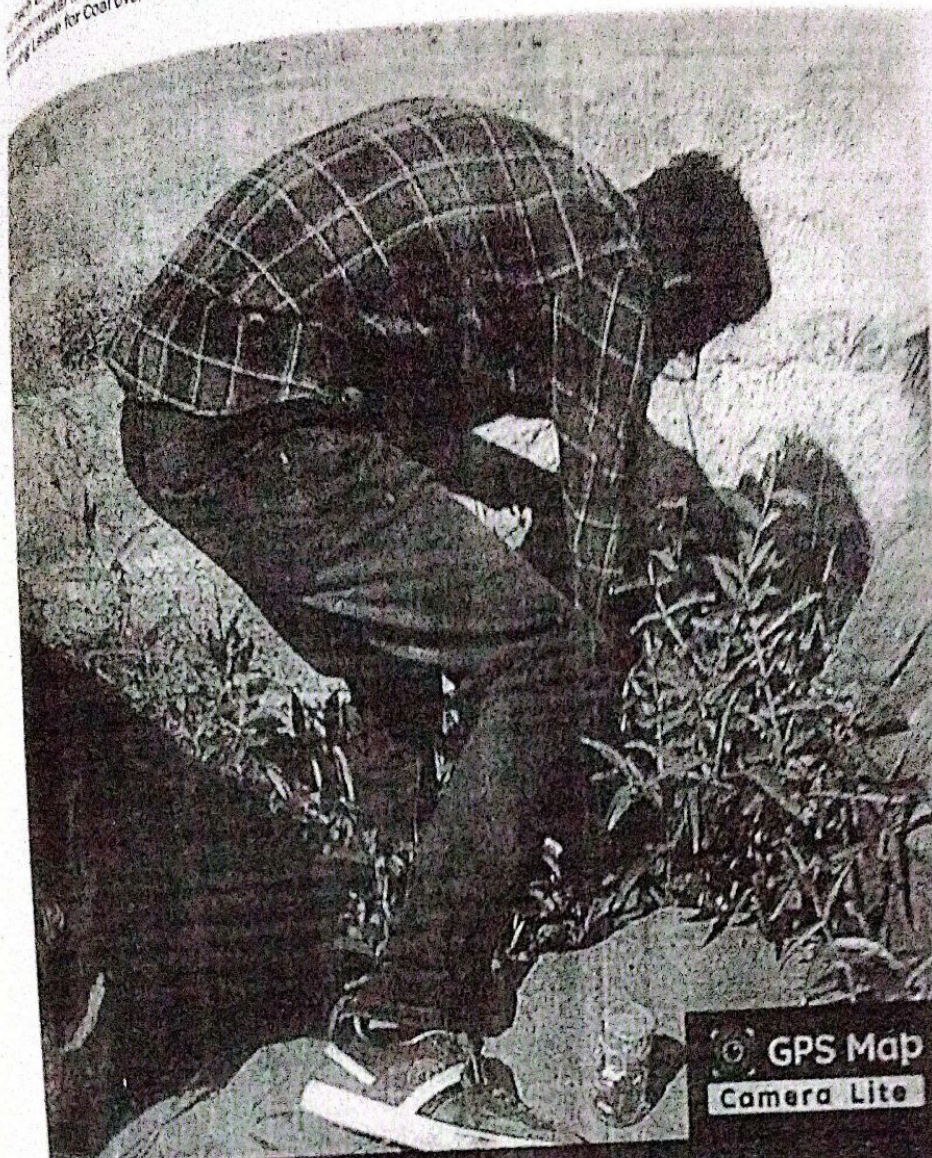
Lahore Office
Office No. 731,
Block - 2, Sector D3,
Shah Jahan Road, Township
Lahore, Pakistan.
Tel: +92 (42) 3515 4015-16

Islamabad Office
Office No. 314, 3rd
Floor, Gulberg Empire,
Gulberg Greens,
Islamabad, Pakistan.
Tel: +92 (51) 5915060

Peshawar Office
Unit No. 244-TF,
Dean's Trade Center
Sadar Cantt,
Peshawar, Pakistan.
Tel: +92 312 0849599



Signature



GPS Map
Camera Lite

Choa Saidan Shah, Chakwal, Punjab, Pakistan

Latitude
32.725475°

Longitude
72.974231°

Local 03:21:48 PM
GMT 10:21:48 PM

Altitude 708.2 meters
Monday, 31-07-2023



ENVIRONMENTAL SERVICES PAKISTAN

CHEMICAL ANALYSIS TEST REPORT (DRINKING WATER)

Reference Number:

ESP/BA/SP/21/09/432A/01908

Date: 04/08/2023

Name of Industry / Client:

M/s Aziz Inam & Company (Mining Lease for Coal)



S. No	Parameters	Limit Values FIS/IS	Concentration	Method / Equipment Used	Remarks
24	Arsenic (As)	10.0 mg/L	ND	U.S. EPA-200.7	Within Limit
25	Barium (Ba)	0.7 mg/L	0.1 mg/L	U.S. EPA-200.7	Within Limit
26	Aluminum (Al)	10.0 mg/L	ND	U.S. EPA-200.7	Within Limit
27	Manganese (Mn)	10.0 mg/L	0.04 mg/L	U.S. EPA-200.7	Within Limit
28	Boron (B)	0.1 mg/L	0.01 mg/L	U.S. EPA-200.7	Within Limit
29	Fecal Coliform Bacteria	Must not be detectable in any 100ml sample	ND	Standard 9222.2	Within Limit
30	Ammonia (NH)	0.005 mg/L	ND	U.S. EPA-200.7	Within Limit
32	Selenium (Se)	0.01 mg/L	ND	U.S. EPA-200.7	Within Limit

PLQ: Punjab Environmental Quality Standards for Drinking Water, 2015

SMWW: Standard Methods for the Examination of Water and Wastewater 23rd Edition, American Public Health Association, American Water Works Association, Water Environment Federation USA (2017)

USEPA: United States Environmental Protection Agency

ND: Not Detected

ND: Not Detected

Laboratory tests and measurements were carried out at 25 ± 5 °C and 50 ± 20 % Relative Humidity conditions unless specified otherwise.
Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of uncertainty is provided in the report to be used as a decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

- The report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of this report lies with the client.
- The values represent sample conditions when monitoring/testing was carried out.
- The report data is not intended to be used legally by the client.
- Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.

- Sample Analyzed By: Waqar Ahmad, Abdul Aziz, Muhammad Shauq, Khairi Raza, Ghulam Mustafa
Analyst (ICP-AES), Analyst (Chemical), Analyst (Chemical), Analyst (Microbiology), Analyst (Microbiology)
- Name of Chief Analyst with Seal: Muhammad Arfan
- Signature of Incharge of the Environmental Laboratory:

Name: Nusrat Malik

Date: 04/08/2023

End of Report

Lahore Office
Office No. 211,
Block-2, Sector 01,
Shah Alam Road, Township
Lahore, Pakistan

Islamabad Office
Office No. 214, 3rd
Floor, Gulberg Empire,
Gulberg Green,
Islamabad, Pakistan
Tel: +92 312 6440100

Pentawar Office
Unit No. 345-7F
Darya Trade Center
Sagar Cantt,
Pentawar, Pakistan
Tel: +92 312 6440100



Arfan