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EIA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

M/S DW PAKISTAN PRIVATE LIMITED

ESTABLISHMENT OF CEMENT PLANT OF 7500 TPD CAPACITY NEAR
PHIRWANI IN DISTRICT DERA GHAZI KHAN, PUNJAB

**HTES-EIA-CEMENT-DGK-3820
2020**

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EXECUTIVE SUMMARY

Title and Location of The Project

M/s DW Pakistan (Pvt.) Ltd. intends to install a cement plant near lease of limestone covering area of 4948.68 acres in District Dera Ghazi Khan under the title of “Cement Plant of Capacity 7500 TPD Installation near Phirwani, District Dera Ghazi Khan”.

Under the Section 12 of the Environmental Protection Act 1997, Environmental Impact Assessment (EIA) of cement plants has been made mandatory and has also been demanded by the Mines and Minerals Department.

The cement plant is located near Phirwani, District Dera Ghazi Khan. The lease of limestone is covering area of 4948.68 acres. The google earth map showing the boundary of the limestone lease is shown in Figure below. A more detailed colored google earth image is presented in Annexure III on A3 size.



The coordinates of the limestone lease are given in Table below.

Points	Easting (meters)	Northing (meters)
A	2981824	694930
B	2985476	694927
C	2985486	689447
D	2981819	689464
Total Area = 4948.68 Acres		

The coordinates of the proposed Plant site are presented in following Table:

Plant Coordinates		
Points	Easting (Meters)	Northing (Meters)
A	2989285	693540
B	2989456	693596
C	2990810	693513
D	2991124	691202
E	2991166	689789
F	2990549	689128
G	2989006	689618

Name of the Proponent

Mr. Sheheryar Chishty is the CEO of the proposed project that is installation of cement plant.

Company Name	DW Pakistan (Private) Limited
Address	231-Ferozpur Road Lahore.
Proponent	Mr. Sheheryar Chishty
Designation	Chief Executive Officer

Name of Organization Preparing Report

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists. The company has the expertise of highly diversified experience and as such the business company with the sole proprietorship has a wide range service area as follows:

- Economic Geology
- Determination of geological exploratory techniques.
- Mine design
- Selection of mine machinery and equipment.
- Mine development & management.
- Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
- 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

- l) Expertise in coal and rock salt mining.
- m) Drilling and blasting for underground and surface mining techniques.
- n) Safety measures for mines operation.
- o) Specific alloys and their significance in the use of mine machinery.
- p) Any kind of consultancy relating to manufacturing, marketing and service areas.

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	42 Hajvery Town, Multan Road, Lahore
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Contact	(+92) 3219443210
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Brief Outline of the Proposal

The project aims at manufacturing of the cement in District Dera Ghazi Khan, Punjab. The production level of the plant will be 7500 TPD. The project will consist of limestone lease covering area of 4948.68 acres to fulfil the requirement of raw material. The feasibility study for the Project has been completed and submitted with Industries Department. The Mines and Minerals Department has been requested for the grant of the lease. The feasibility study contains the details of the financial and technical aspects of the project and other necessary issues in totality as required by any industrial project installation.

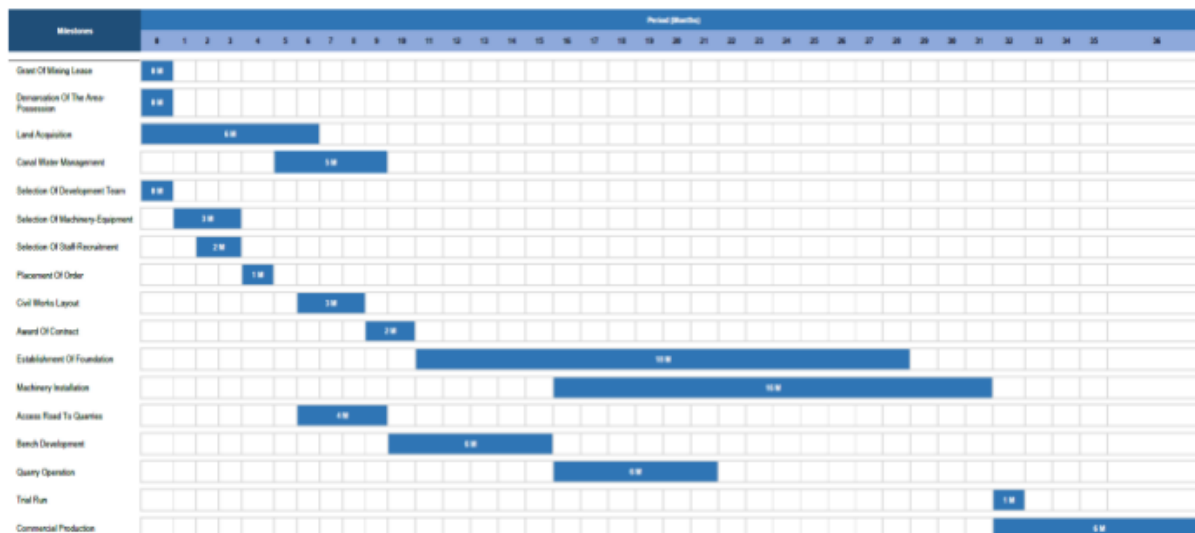
According to the Pakistan Environmental Protection Agency (Review of IEE & EIA) Regulations, 2000, the proposed project falls in Schedule II under sub-section (1) of Clause B (Manufacturing and Processing).

- **Objectives of the Project**

- a) To meet the market demand of cement.
- b) To expedite more avenues for new entries based on techno-economical parameters.
- c) To accelerate pace of development for technology-based business.
- d) To enhance production, productivity coupled with safety by improvising with the adaptable technology-mechanization.
- e) To 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) To undertake aggressive marketing to maximize export and domestic share.
- g) To expand community development program and social fabrics.
- h) To support economic agenda by creating job avenues.

The cost and magnitude of the project may be judged from the information given below.

The project activities will be carried out by considering all the environmental parameters. No project activity will pose any threat and danger to the environment. The project operations will be carried with due care and vigilance. All the impacts will be assessed in detail on every environmental setting. The corresponding mitigation measures will be suggested for every impact resulting from the project activities. A tentative schedule of implementation for three years of project activities is given below.



• Restoration and Rehabilitation Plan

The restoration and rehabilitation plan is provided in Table given below.

Measures for Land Rehabilitation & Restoration	Timeframe	Responsible Party
The importance of the site is due to its economic activity; otherwise it is similar to a barren land. The question of rehabilitation therefore doesn't arise except re-coursing the land formed from the cavities of the mined-out area	At Mine Closure	Proponent
Trees will be planted at the project area by coordinating with the local farmers who are benefitted by the removal of mineral from their lands. The plantation estimate is provided in <u>Annexure I</u>	Till Lease Tenure	Proponent
The site can be used for re-stocking the livestock	After Mine Closure	Proponent/Livestock Department
The land will be available for agricultural use	After Mine Closure	Land Owners/Farmers

The Major Impacts

The summary of the positive and the negative impacts observed on the environment by the cement production on the project area has been summarized in Table below. 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

(+) sign is used for positive impacts and (-) sign for negative impacts. The mitigation measures will be explained after a short while.

During Installation Phase

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+3	
	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
	Climate	Micro-climate changes.		0
	Atmosphere	Dust		-3
		Noise		-2
	Sub-Total		+3	-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	+1	
		Land Lease	+2	
		Worker's Health and Safety		-2
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0
		Community Development	+2	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
	Sub-Total		+20	-2
	Grand Total		+25	-7

During Operational Phase

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+2	
	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
		Climate	Micro-climate changes.	
	Climate Change			-2
	Atmosphere	Dust		-2
		Noise		-2
	Sub-Total		+2	-6
	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	+1	
		Land Lease	+2	
		Worker's Health and Safety		-2

		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0
		Community Development	+2	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total			+20	-2
Grand Total			+24	-8

Recommendations for Mitigation Measures

The negative impacts resulting from Cement production can be controlled through means and measures demonstrated in Table below. Further, the implementation agencies are also identified who can help in reducing the negative impacts. The aim of these measures is to conserve the local environment commensurate with the NEQS. The implementation of the mitigation measures is however linked to the production tenure only.

During Installation Phase

Environmental Component	Sources	Potential Impacts	Mitigation Measures
Physical Environment			
Air Quality	<ul style="list-style-type: none"> Cement plant installation Movement of vehicles and machinery 	<ul style="list-style-type: none"> Dust emissions are generated from Cement plant installation activities. Exhaust emissions from diesel engine vehicles. 	<ul style="list-style-type: none"> Controlled water sprinkling will be ensured to reduce PM₁₀. Maintain appropriate buffers between the site and receptors. Use of PPEs (face masks etc.) will be ensured by the workers and staff.
Solid Waste	<ul style="list-style-type: none"> Workers activities No solid waste will be generated from project installation. 	<ul style="list-style-type: none"> If not properly handled, it has the potential to degrade the quality of land. Odor problem Breeding of flies, birds, rodents etc. Nuisance to the nearby communities if present within the proximity of the lease area. 	<ul style="list-style-type: none"> Proper waste management plan will be developed. Waste will be stored at site in covered containers. Containers will be emptied before they reach their carrying capacity. Littering will be prohibited at the site. Awareness will be given to the staff and workers about handling of solid waste at site.
Noise	<ul style="list-style-type: none"> Installation of heavy machinery and equipment for production of cement. Movement of heavy 	<ul style="list-style-type: none"> Increased noise levels and vibrations. Disturbance to workers and local residents (if any). Reduced hearing issues for workers and staff. 	<ul style="list-style-type: none"> Use of PPEs (noise suppression equipment-ear muffers, ear plugs etc.) will be ensured by the workers where noise levels are higher than 85 (dBA). Project activities will be ensured at day

	machinery at site.		time when background noise levels are high. <ul style="list-style-type: none"> Vehicles speed limit will be maintained to avoid excessive vibrations. Regular maintenance of machinery will be ensured.
Wastewater	Nil	<ul style="list-style-type: none"> No wastewater will be generated from installation activities. Therefore, there will be no adverse impact on environmental setting due to this parameter. 	Nil
Biological Environment			
Flora	Nil	<ul style="list-style-type: none"> The project area is devoid of any forest cover. There are no trees except some small size bushes at the project site not worth mentioning. The proponent will not be cutting any trees coming in direct way of mining activities. Therefore, there is no question of tree cutting during the installation of the project as well. 	<ul style="list-style-type: none"> Excessive plantation will be done in and around the boundary of the project area as a potential environmental enhancement measure. <p>(Subject to the agreement between proponent and consultant and consent of the land owner also)</p>
Fauna	Nil	<ul style="list-style-type: none"> Temporary migration of mammals and birds from the area. 	<ul style="list-style-type: none"> As this impact is temporary, hence, no significant mitigation measures are

			required.
Endangered Species	Nil	<ul style="list-style-type: none"> No endangered species found within the vicinity of the project area, hence, no impact. 	Nil
Socio-economic Environment			
Worker's Health and Safety	<ul style="list-style-type: none"> Noise Dust 	<ul style="list-style-type: none"> Health and safety risks to workers due to high levels of dust and noise. Respiratory problems Hearing issues 	<ul style="list-style-type: none"> Provision of first aid box at site. Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.
Community Amenity	<ul style="list-style-type: none"> Noise Dust 	<ul style="list-style-type: none"> Reduced visual amenity Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions. 	<ul style="list-style-type: none"> 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.

During Operational Phase

Environmental Component	Sources	Potential Impacts	Mitigation Measures
Physical Environment			
Air Quality	<ul style="list-style-type: none"> Cement production activities Vehicles and machinery 	<ul style="list-style-type: none"> CO₂ emissions from cement plant. Dust emissions are generated from site clearing and project activities. Exhaust emissions from diesel engine vehicles. 	<ul style="list-style-type: none"> Proper plan will be developed to reduce CO₂ emissions. Controlled water sprinkling will be ensured to reduce PM₁₀. Maintain appropriate buffers between the site and receptors.

			<ul style="list-style-type: none"> Use of PPEs (face masks etc.) will be ensured by the workers and staff.
Solid Waste	<ul style="list-style-type: none"> Workers activities No solid waste will be generated from project operations. 	<ul style="list-style-type: none"> If not properly handled, it has the potential to degrade the quality of land. Odor problem Breeding of flies, birds, rodents etc. Nuisance to the nearby communities if present within the proximity of the project area. 	<ul style="list-style-type: none"> Proper waste management plan will be developed. Waste will be stored at site in covered containers. Containers will be emptied before they reach their carrying capacity. Littering will be prohibited at the site. Awareness will be given to the staff and workers about handling of solid waste at site.
Noise	<ul style="list-style-type: none"> Heavy machinery and equipment such as excavators and tractor trolleys 	<ul style="list-style-type: none"> Increased noise levels and vibrations. Disturbance to workers and local residents (if any). Reduced hearing issues for workers and staff. 	<ul style="list-style-type: none"> Use of PPEs (noise suppression equipment-ear muffers, ear plugs etc.) will be ensured by the workers where noise levels are higher than 85 (dBA). Production activities will be ensured at day time when background noise levels are high. Vehicles speed limit will be maintained to avoid excessive vibrations. Regular maintenance of machinery will be ensured.
Wastewater	Nil	<ul style="list-style-type: none"> No wastewater will be generated from 	Nil

		project activities. Therefore, there will be no adverse impact on environmental setting due to this parameter.	
Biological Environment			
Flora	Nil	<ul style="list-style-type: none"> The project area is devoid of any forest cover. There are no trees except some small size bushes at the project site not worth mentioning. The proponent will not be cutting any trees coming in direct way of mining activities. Therefore, there is no question of tree cutting during the operation of the project as well. 	<ul style="list-style-type: none"> Excessive plantation will be done in and around the boundary of the lease area as a potential environmental enhancement measure. <p>(Subject to the agreement between lessee and consultant and consent of the land owner also)</p>
Fauna	Nil	<ul style="list-style-type: none"> Temporary migration of mammals and birds from the area. 	<ul style="list-style-type: none"> As this impact is temporary, hence, no significant mitigation measures are required.
Endangered Species	Nil	<ul style="list-style-type: none"> No endangered species found within the vicinity of the project area, hence, no impact. 	Nil
Socio-economic Environment			
Worker's Health and Safety	<ul style="list-style-type: none"> Noise Dust 	<ul style="list-style-type: none"> Health and safety risks to workers due to high levels of dust and noise. Respiratory problems 	<ul style="list-style-type: none"> Provision of first aid box at site. Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers

		<ul style="list-style-type: none"> Hearing issues 	and staff.
Community Amenity	<ul style="list-style-type: none"> Noise Dust 	<ul style="list-style-type: none"> Reduced visual amenity Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions. 	<ul style="list-style-type: none"> 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.

Recommendations and conclusion

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

Conclusions	
General	<ul style="list-style-type: none"> All the positive and negative impacts resulting from Cement production 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 Cement production activities. The proponent is committed to ensure eco-friendly, sustainable, safe and sound environment.
Physical Environment	<ul style="list-style-type: none"> The type of solid waste produced will be municipal waste only. The solid waste produced will be stored in covered containers at the site. Proper mitigation measures may be adopted in the preliminary design including safe and environmental friendly disposal of solid waste. All the baseline environmental parameters including ambient air and noise are well within the permissible limits of PEQS. No wastewater will be generated during project activities. There is no water requirement during project operation except for drinking and sprinkling.

	<ul style="list-style-type: none"> There are no human settlements present within the vicinity of the project site. The settlements are away from the project site at safer distances. All the sensitive receptors are located at safer distances from the project area.
Biological Environment	<ul style="list-style-type: none"> No forest area or wildlife sanctuary exists within the vicinity of the project area, which may be affected by the project.
Socio-economic Environment	<ul style="list-style-type: none"> The project activities will provide additional job opportunities to the community of the area. The project will raise the income levels of the population of the area. Social cohesion is optimal. The environmental cost is negligible.
Recommendations	
General	<ul style="list-style-type: none"> 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 will be implemented in the true spirit throughout the lifespan of the project. Regular monitoring and auditing will be taken by the management to ensure the compliance of all the mitigation measures. Environmental monitoring will be carried out by the company as suggested and communicated by EPA, Punjab.
Physical Environment	<ul style="list-style-type: none"> Air pollution and high noise levels will be controlled with the use of good engineering practices. Transportation vehicles and equipment must be properly maintained and tuned well.
Biological Environment	<ul style="list-style-type: none"> Plantation must be carried out as potential environmental enhancement measure.
Socio-economic Environment	<ul style="list-style-type: none"> Periodic monitoring on occupational health and safety must be conducted to avoid workplace hazards. Proponent will take due care of the local community and its

	<p>sensitivity towards local customs and traditions.</p> <ul style="list-style-type: none"> • Firefighting arrangements will be made at site. Safety signs or boards may also be placed whenever and wherever needed within the premises of the project area. • Personal Protective Equipment (PPEs) will be provided and ensured that they are used by the workers during working hours. • The workers working near the noise generating areas will be strictly required to use earmuffs/ plugs. • Fire extinguishers or firefighting equipment will be provided at well notified points to cope with fire events (if any detected). • Good housekeeping will be ensured by the management of the project. • First aid box will be provided at the project site to act in case of injuries.
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Proposed Monitoring

The environment, safety and health-monitoring program for the operational phase of the project are as follows:

- Regular monitoring of machinery and vehicles.
- River flow monitoring (if present within the vicinity of the project area).
- Monitoring of environmental parameters including ambient air and noise in terms of their quality.
- Monitoring of the environmental parameters as suggested and directed by EPA, Punjab.
- Monitoring of implementation of Environmental Management and Monitoring Plan.
- Monitoring of parameters including in Occupational Health and Safety. Some of them are as follows:
 1. Provision of PPEs to the workers and staff.
 2. Provision of First Aid box at site.
 3. Provision of fire-extinguisher for emergency situations etc.

The project manager, being aware and conscious of its responsibilities towards environment is committed that the project operations will be made keeping in line with the internationally accepted sustainable measures/practices and methods thus leaving negligible adverse impacts on any segment of environment due to proposed activity.

- **Environmental Management and Monitoring Program**

The negative impacts resulting from the project activity will be mitigated and monitored through different management and monitoring practices. Each impact will be managed and monitored properly during the whole lifecycle of the project. The EMMP include the

negative impact, its management and monitoring practices, timeframe, responsible authority and cost bear to mitigate that specific impact.

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
- **Air Quality 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	Throughout installation period	Contractor	0/-

		loading/un-loading points. Ensure that vehicles engines must be switched off at these points.			
Sub-Total					10,000/-

• **Noise Management & Monitoring Plan**

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 will entirely be planned during day time when most of the neighbors will be at work.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					5,000/-

• **Solid Waste Management & Monitoring Plan**

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	5,000/-
		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 will 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: 1. Source reduction 2. Reuse 3. Recycling	Throughout installation period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					5,000/-

• Health and Safety Management & Monitoring Plan

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	10,000/-
Sub-Total					25,000/-
Grand-Total					45,000/-

For Operational Phase

The EMMP for operational 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
 - Air Quality 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 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/-

• Noise Management & Monitoring Plan

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 will entirely be planned during day time when most of the neighbors will be at work.	Throughout project life	Proponent & Contractor	0/-
Sub-Total					5,000/-

• **Solid Waste Management & Monitoring Plan**

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 will 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: 4. Source reduction 5. Reuse 6. Recycling	Throughout operational period	Proponent & Contractor	0/-
	Use of durable, long-lasting materials that will 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

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	Once off	Proponent & Contractor	5,000/-

		equipment etc. should be made available and personnel must be trained to use the equipment.			
		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	5,000/-
Sub-Total					20,000/-
Grand-Total					40,000/-

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 cement plant has been made mandatory and has also been demanded by the Industries Department, Government of the Punjab, Pakistan.

The objectives of EIA study are to:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Proposed Project in that area.
- To identify pre construction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would strengthen environment, improve ecological resilience, eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval

This EIA Study presents the Environmental Impact Assessment (EIA) for this proposed cement plant. For this purpose, the proponent has engaged environmental consultants, M/s Hi-Tech Environmental Services (Pvt.) Ltd.

This EIA Report provides relevant information, as required under the officially approved format, to facilitate the decision makers i.e. EPA Punjab for the issuance of Environmental Approval/NOC.

1.2 Identification of the Project and Proponent

1.2.1 Details of the Project

M/s DW Pakistan (Pvt.) Ltd. intends to install a cement plant near lease of limestone covering area of 4948.68 acres in District Dera Ghazi Khan under the title of “Cement Plant of Capacity 7500 TPD Installation near Phirwani, District Dera Ghazi Khan”.

1.2.2 Details of the Proponent

Mr. Shaheryar Chishty is the CEO of the proposed project that is installation of cement plant.

Table 1-1 Details of the Proponent

Company Name	DW Pakistan (Private) Limited
Address	231-Ferozpur Road Lahore.
Proponent	Sheheryar Chishty
Designation	Chief Executive Officer

1.3 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:

- 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.

Table 1-2 Details of the Consultant

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	42-Hajvery Town, Opposite Mandi Stop, Multan Road, Lahore
Representative	Chaudhry Awais Ahmed Director Operations and Legal
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 1-3 Team Carrying Out the Study

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1	Dr. Zulfiqar Ali	Ph.D. Mineral Processing, M.Sc. Mineral Processing B.Sc. Mining Engineering	<ul style="list-style-type: none"> • Subject Specialist • Coordinator & Supervisor
2	Engr. Nabia Imran	Environmental Engineer B.Sc. Environmental Engineering	<ul style="list-style-type: none"> • Impacts Assessment and Proposing their Mitigation Measures. • Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
3	Engr. Zainab Arshad	Environmental Engineer B.Sc. Environmental Engineering	<ul style="list-style-type: none"> • Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
4	Engr. Ali Mehdi	Mining Engineer and GIS Management B.Sc. Mining Engineering	<ul style="list-style-type: none"> • Author of EIA Report • Development of Maps
5	Ch. Awais Ahmad	LLM (London)	<ul style="list-style-type: none"> • Site Visits • Legal Reviews • Coordination with Locals
6	Engr. Harris Naeem	B.Sc. Mining Engineering	<ul style="list-style-type: none"> • Mining Techniques

1.4 Brief Description of the Project

The project aims at manufacturing of the cement in District Dera Ghazi Khan, Punjab. The production level of the plant will be 7500 TPD. The project will consist of limestone lease covering area of 4948.68 acres to fulfil the requirement of raw material. The feasibility study for the Project has been completed and submitted with Industries Department. The Mines and Minerals Department has been requested for the grant of the lease. The feasibility study contains the details of the financial and technical aspects of the project and other necessary issues in totality as required by any industrial project installation.

According to the Pakistan Environmental Protection Agency (Review of IEE & EIA) Regulations, 2000, the proposed project falls in Schedule II under sub-section (1) of Clause B (Manufacturing and Processing).

The cement plant is located near Phirwani, District Dera Ghazi Khan. The lease of limestone is covering area of 4948.68 acres. The google earth map showing the boundary of the lease area is shown in Figure 1-1. A more detailed colored google earth image is presented in **Annexure III** on A3 size.



Figure 1-1 the location of Project

2.1 Screening

“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 (Cement Plant) falls under Schedule II (List of projects requiring EIA), Category B-I (Manufacturing and processing) Cement Plants.

2.2 Scoping

2.2.1 Spatial and Temporal Boundaries of Environmental Assessment

Project site is open land. After its development with time nature of area will change from open land to project site. Already same industrial activity is taking place nearby. Currently there is no significant population center present in the lease area. The current project site is 5-6 kilometers from population centers and all the parameters are within PEQS. No environmental sensitive area is present that could be impacted due to the current project.

2.2.2 Important issues and concern raised during consultation

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.

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

3.2 Design/technology alternatives, their selection and rejection criteria

There are two processes for cement manufacturing:

- Dry process
- Wet process

Under these conditions only the dry process is economical and environment friendly. The cement raw material available at in Dera Ghazi Khan District, has been found suitable for dry process with pre-heater, kiln with pre-calciner. The major difference between dry and wet process is the consumption of fuel. In wet process, raw material slurry is used and to evaporate this fuel consumption is more while in dry process all raw materials is dry so fuel consumption is less. In said project, dry process will be used. In dry process, size of kiln required is also less. Also wet process is obsolete from the World. Residence time of raw material in dry process is approx. 19 min and in case of wet process is 2-3hrs).

Imported coal will be used with low sulfur content will be used as a fuel.

3.3 Environmental Alternatives, their selection and rejection criteria

In proposed cement plant, the kiln and the raw mill will be equipped and de-dusted with latest technology and high efficiency bag house instead of electrostatic precipitator. As the particulate emissions standard limits have become increasingly stringent, ESPs have become larger and more expensive. Fabric filters are a potential alternative to ESPs because they offer high collection efficiency while remaining relatively independent of the type of coal burned. The relative indifference of a fabric filter to fuel characteristics allows for more variation in fuel characteristics, while still meeting particulate emissions limitations. Unlike ESPs, fabric filter design and performance is not restricted to tripping due to power failure. There are several disadvantages of ESPs compared to fabric filters: higher direct auxiliary power consumption (excluding the induced draft fan power consumption), lower ash collection efficiency during startup, lower collection efficiency of fine particulate and less flexibility in fuel and operating conditions. The fabric filter house has also the advantage that it still performs its functions tremendously unlike ESP even if some fiber filter got inefficient with passage of time. On other hand in ESP performance dramatically dropped due to dead chambers. Furthermore the inefficient fabric filter in bag house could be replaced in less time compare to ESP. The ESPs are also not as efficient in collecting particles in the range of 0.1 to 1.0 microgram. Finally, changes in the fuel, pulverizer grind, combustion efficiency or other operating conditions are much more likely to cause a degradation of ESP performance compared to a fabric filter. This can require retuning of controls or the addition of a flue gas conditioning system to improve the ash characteristics. Considering all above facts, Bag house filters are selected to be used as dust control technology for proposed cement plant. Water conservation strategies will be adopted i.e. rain water harvesting pond instead of using only surface water.

3.4 Economic Alternatives, their selection and rejection criteria

- Currently selected technology and design is economically efficient.
- WHRP will be installed to capture waste heat and will meet some of power consumption of the plant.
- Ash and dust collected will be re-used in process that will add-up in final product.
- Tree plantation will be done that will reduce temperature of the area and also act as noise barrier. Bag house filters will be installed that are economically efficient and their proper maintenance will be ensured.
- Waste should be used in cement kilns if and only if there are not more ecologically and economically better ways of recovery.

4 DESCRIPTION OF THE PROJECT

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

4.1 Objectives of the Project

The objectives of the project are:

- a) Expand business through added exploration and exploitation by new entries based on techno-economical parameters.
- b) Accelerate pace of development in the existing mines.
- c) Enhance production, productivity coupled with safety by improvising with the adaptable technology-mechanization.
- d) Add matching infra-structure, machinery and equipment along with other inputs needed as a factor of production to keep pace with the envisaged programs.
- e) Undertake aggressive marketing to maximize domestic share.
- f) Expand community development program and social fabrics
- g) 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)
- h) Supporting government's economic agenda by creating job avenues.

4.2 Location and Site Layout of the Project

The cement plant is located near Phirwani, District Dera Ghazi Khan. The lease of limestone is covering area of 4948.68 acres. The google earth map showing the boundary of the lease area is shown in Figure 4-1. A more detailed colored google earth image is presented in Annexure III on A3 size.



Figure 4-1 Location of the Project

The coordinates of the limestone lease areas is presented in Table No. 4-1.

Table 4-1 Coordinates of the Limestone and Clay Lease Area

Points	Easting (meters)	Northing (meters)
A	2981824	694930
B	2985476	694927
C	2985486	689447
D	2981819	689464
Total Area = 4948.68 Acres		

The coordinates of proposed plant are given in Table No. 4-2

Table 4-2 Coordinates of the proposed plant

Plant Coordinates		
Points	Easting (Meters)	Northing (Meters)
A	2989285	693540
B	2989456	693596
C	2990810	693513
D	2991124	691202
E	2991166	689789
F	2990549	689128
G	2989006	689618

The distances of major locations from project site are shown in Table No. 4-3.

Table 4-3 Distance of the Important Areas from the Project Site

Location	Approximate Distance (KM)
POPULATION CENTERS	
Phirwani	9.89
Khosa	12.10
Yarani	13.72
Mamdani	14.00
Gadi	16.00
Qasmani	17.81
Mamdani	10.68
Kalyary	5.68
Kot mitty	5.19
Kot sultan	51.1
Taunsa	27.26
INDUSTRIAL & MINING PROJECTS	
DG Khan Cement Plant	11.22

DG Khan Cement Company Limited	12.49
Crusher Plants	Many in radius of 300 kilometers
Rock Salt Mines	Many in 400 kilometers radius
Coal Mines	Many in 250 kilometers radius
WATER BODIES	
Damas Lake	72.75
Khar Jheel	89.14
Ghazi Ghat Seasonal Lake	47.95
Chenab Park Lake	87
Ravi River	379
Chenab River	291
FOREST AREAS	
Ranuja Protected Forest	31.37
Ghazi Ghal Forest	13.90
Dingi Dhand	22.13
Jarh Wala	28.44
Wadi-E-Andar Phunrr	90

4.3 Land Use on the Site

The areas where the mining and plant will be established is under no use. Most of proposed sites are abandoned. So, there won't be any loss or degradation of productive land.

4.4 Road Access

The project site is easily accessible through link roads originating from Phirwani Road connected to Indus Highway. The access roads are majorly utilized to transport cement to market places.

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. For the construction of said project site will be cleared and it will be re-vegetated after proposed plant installation. Plantation will be done in all open spaces and surroundings of project site.

4.6 Cost and the Magnitude of Operation

The tentative production capacity of the project is about 7500 tons of cement per day (TPD). This is also the threshold limit of the project. However, the production varies to a great extent from variety of factors.

DW Pakistan (Private) Limited
Project Cost

Annexure A

All Figures in PKR

Note	Description	Ref	Local	Foreign	Total Value
Project Cost					
Capex					
	Land and equipment	1	233,960,072	-	233,960,072
	Building, civil works and MEP	2	-	8,531,190,500	8,531,190,500
	Machinery and equipment	3	-	12,793,030,460	12,793,030,460
	Other assets	4	193,036,365	-	193,036,365
			426,996,437	21,324,220,960	21,751,217,397
	Other pre-operating costs	5	1,791,891,389	-	1,791,891,389
	Total Project Cost		2,218,887,826	21,324,220,960	23,543,108,786
1	Land and equipment				
	Plant site		214,012,981	-	214,012,981
	Quarry Development		19,947,091	-	19,947,091
			233,960,072	-	233,960,072
1.1	Cost of Quarry Development				
	Cost of exploration work for core drilling in limestone deposits.				3,860,727
	Quarry office 500 sft				257,382
	Explosive magazine 2000 sqft.				1,930,364
	Autosho 5000 sft.				3,217,273
	Labour shed at quarry 500 sft				128,691
	Access road to quarry 10mx 1.5km				257,382
	Quarry development 1st phase				3,860,727
	Quarry development 2nd phase				6,434,545
					19,947,091
2	Building, civil works and MEP				
	Civil works		-	6,322,050,000	6,322,050,000
	Steel structure delivery		-	1,397,910,500	1,397,910,500
	Design and engineering		-	140,000,000	140,000,000

Figure 4-2 Cost of the Project

The magnitude of operation includes:

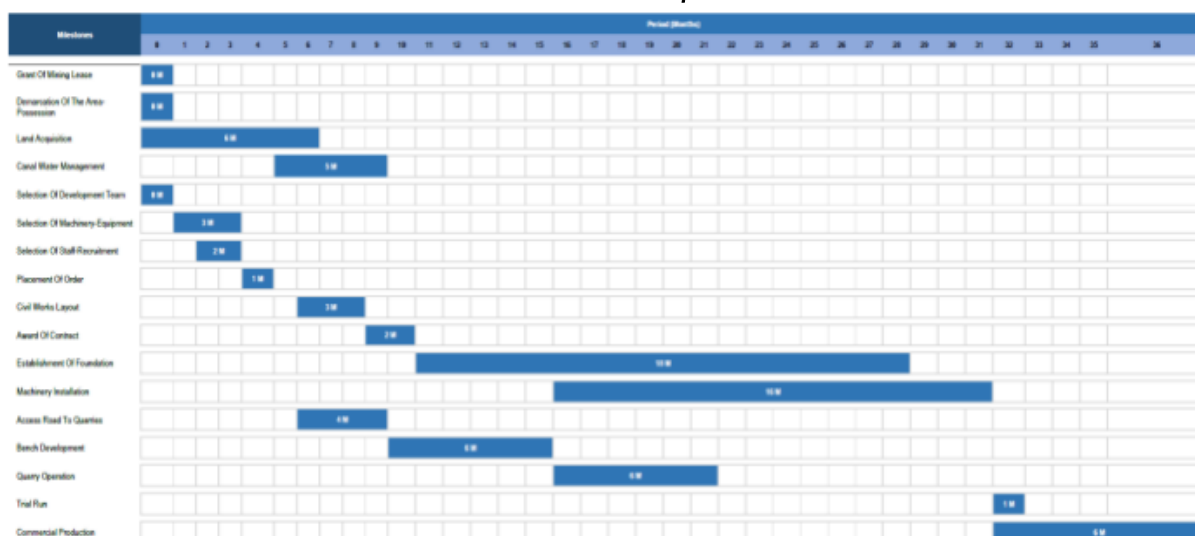
- Detailed site survey, planning and demarcation of the various regions in the project area
- Site suitability assessment
- Process, electrical and civil designing
- Purchase and delivery of equipment
- Civil construction
- Mechanical and electrical erection
- Testing and commissioning
- Plantation of various ecologically important species on the designated green space

4.7 Schedule of Implementation

4.7.1 Planning

The project 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 project is being analyzed in the subsequent chapters. A tentative schedule of implementation for three years of project activities is given in Table 4-5

Table 4-4 Schedule of Implementation



4.8 Description of the Project

4.8.1 Raw Material Extraction

The main raw material used in the manufacturing of cement includes: limestone, clay and gypsum and it will be obtained from nearby leased areas. The quarries will be developed in accordance with a well thought out plan for meeting the daily requirements of the factory. Limestone and clay will be excavated per working day and will then be transported to the feed-hoppers of the crusher.

4.8.2 Limestone & Clay crushing and pre-blending

The limestone will be supplied from mine to the plant through dump trucks and will be fed into the limestone hopper. The clay will be conveyed from mine to the plant through belt conveyors and will be fed into the clay hopper. Big size clay can be conveyed from mine to the plant clay hopper through dump trucks directly.

Limestone and clay will be fed into the respective apron feeder and then to be crushed together in the same crusher. The feeding size of limestone will be 95% below 1200 mm and of clay will be 95% below 300 mm. One set Double Hammer crusher with capacity of 1800tph is adopted for crushing limestone & Clay mix. The product size shall be 90% below 75mm.

The crushed mix material shall be transported to pre-blending stockpile through belt conveyor. One set On-line Analyzer shall be installed for monitoring and control the raw material quality after crushing continuously, which shall record and control the quality of Limestone & Clay coming from crusher.

A longitudinal covered storage shall be provided for pre-blending the mix material Limestone & Clay, and H.G. Limestone, which storage capacity is 2×35000 +5000tons. A stacker with 1800tph and a re-claimer with 700t/h are adopted for stacking and

reclaiming the mix material from the stockpile. The H.G. Limestone will be fed into the feed hopper by pay loaders.

4.8.3 Correctives storage and transport

The correctives, laterite and bauxite shall be stored in the rectangular shed in the new plant, which storage capacity is 2×3000 tons respectively for laterite and bauxite. A pay loader shall be adopted to feed the correctives to hopper, and then they will be transported to raw material grinding regulation station by belt conveyor.

4.8.4 Raw materials proportioning & conveying

The raw materials proportioning station has four hoppers, which respectively store mix of Limestone and Clay , H.G. Limestone, Laterite ,Bauxite. Each material is discharged from bin via weighing feeder according to a certain proportion, and then fed into raw mill via belt conveyor. Weigh feeders shall be online calibration type. Magnetic separators, metal detectors shall be installed at convenient positions for removal of disgusted metals, for that, only pure and clean raw materials can be fed into raw mill. One set On-line Analyzer shall be installed for monitoring and control the raw material quality on the feeding belt conveyor, which shall record and control the quality raw material coming from weigh feeders.

4.8.5 Raw Meal Grinding System

One vertical roller mill will be adopted for raw meal grinding system with exterior circulating system, utilizing waste gas from pre-heater as the drying heat source. Materials from the proportioning station will be fed into the roller mill through a rotary airlock gate. On the mill table bed, material will be ground to fine powder and dried by hot air in the mill. With feeding size 90%<75mm, feeding moisture 3.8%, product moisture ≤1% and fineness of 90μm with the screen residue 12%, the system has a capacity of 650t/h.

In the mill, material will be forced to fly upwards by rising hot air. Going through the separator at the top of the mill, sufficient fined raw meal powder with gas will flow out of the mill and go into cyclone classifiers to separate meal from air. The collected meal powder will be conveyed into raw meal silo through air slide and elevator. The granularity of raw meal finished product can be controlled by adjusting rotor speed of the roller mill separator. A part of the waste gas, which goes out of cyclone classifiers, will go back into the mill as circulating air, and another part will go into waste gas processing system of kilns and mills. There is an automatic sampler set on the chute of the air-conveying slide. The sample will be sent to the lab for analysis to check the performance of raw meal product.

The exterior circulating system can save power consumption, and enlarge output. The exterior circulating materials, through belt conveyor and elevator, will be sent to the exterior circulating materials bin, and then conveyed into the mill for re-grinding by belt conveyor. To guarantee safe operation of the roller mill, electromagnetic metal separator and metal detector will be provided on the feed belt of mill, to safeguard the mill form iron or other metals. If there is metal in raw material feed, the metal will be discharged via a

dividing gate. System has fuel hot gas generator to supply heat to the mill at the start-up period of production, or when the raw material has high moisture.

4.8.6 Treatment of waste gas from kiln and mill

During compound operation, the high temperature waste gas from the pre-heater will be sent to raw meal and coal grinding system after the 2 ID fans, mixed with the waste gas from the raw mill fan. All waste gas after de-dusting and purifying in electrostatic precipitator will be released into atmosphere via the chimney. The dust content at outlet of chimney is less than 10mg/m³. If the raw mill stops working but the kiln system is still operating (direct operation), the high-temp gas from the pre-heater will be cooled in the conditional tower by spray water then flow to the bag filter. Dust collected by the electrostatic precipitator and the conditional tower will be sent to kiln dust bin, Kiln dust shall be extracted in controlled quantity with the help of flow meter. Kiln dust extracted from the kiln dust bin shall be fed to kiln feed bucket elevator.

4.8.7 Raw Meal silo & Kiln Feed System

Raw meal will be conveyed into a $\phi 22.4$ m CF homogenizing silo by belt bucket elevator. The effective storage capacity of the silo is 25500t. The silo has multifunction of storage and homogenization. In the silo there are seven outlets, from which raw meal will be discharged into the kiln feed bin. After dosing by flow meter, raw meal will be conveyed into the ascending duct between the first and the second cyclones of the double string five-stage cyclone preheater through air slide and bucket elevator. There is a sampler set on the chute of the air-conveying slide. The sample will be sent to the lab for analysis.

4.8.8 Pre-calcining system

The kiln inlet adopts pre-calcining system with double-series five-stage cyclone pre-heater and CDC calciner, and material flow distribution system is adopted to reduce the sulphur circulating in the smoke chamber and the harmful consequences.

Qualified raw meal from the CF homogeneous silo, after pre-heated and pre-calcined, will come into $\phi 5.3 \times 82$ m rotary kiln with two support for the rotary kiln, the pitch is 4%, rotary speed is 0.4~4 r/min, the capability is up to 8000tpd with its heat consumption of 705kcal/kg.cl. (without bypass system).

A grate cooler will be adopted with grate area about 177m², cooling capacity upto 8000t/d, and the discharging temp. of ambient temp. +65°C. Clinker from the grate cooler will be sent to the clinker silo by pan conveyor. Gas from the grate cooler will be sent to the calciner at the kiln inlet as the secondary and the tertiary gas. All waste gas after deducting and purifying in an EP will be released into air via the chimney. The dust content at outlet of chimney is not more than 10mg/Nm³.

4.8.9 Coal & pet coke transport and grinding

The Coal and Pet coke grinding system is designed based on the Atex standard. After transported to the plant by truck, the Coal is stored in the shed for 2×15000 tons (one for coal ,one for pet coke)and unloaded by Samson feeder with a capacity 20~200t/h. The coal with size is 0~50mm and will be sent to mill feed bins directly. Three steel hoppers with each capacity of 250t (two for coal, one for pet coke) shall be provided for raw coal

4.8.13 Storage of cement

Cement storage adopts two silos of $\phi 22\text{m}$ with capacity of 25000t each. There is a cement bulk loading device for truck with Weight Bridge and dispatch at the each bottom of silo, which capacity is 200tph.

4.8.14 Cement Packing

Packing system adopts six sets of 8-spout rotary packers(single discharge), each of which has a capacity of 150t/h (for packing 50kg/bag) and packing tolerance of $50\text{kg} \pm 150\text{ g}$ in paper bag as an average of 10 consecutive weighing from each spout. Each machine shall be equipped with automatic bags placer.

Cement out of the silo will be transported into the packers bin by elevator and vibrating screen of the packing system, then through an impeller feeder to the 8-spout rotary packer. The packed cement will be conveyed to trucks through discharging machine, electronic correcting scale and belt conveyor. The packing system consists of twelve manual truck loaders with 120 t/h each.

4.8.15 Air Compressor Stations

According to the requirement of each air-consuming item, there are two air compressor stations equipped with total 5+5 sets of compressor to meet the air consumption of the production line.

The capacity is 32m³/min, 0.85 MPa for every screw air compressor and relative accessories, such as dryers and filters are adopted in the station.

4.8.16 Laboratory

The existing central lab will be shared with the new line 4 for the chemical and the physical qualities tests of the fuel, semi-finished products and finished products throughout the plant.

4.8.17 De-Dusting

All the gas exhaust points and material transfer points will be provided with dust filters so as to ensure that the emission of dust anywhere in the plant is no more than permissible limit. The kiln and the raw mill will be de-dusted by primary bag filter. The dust will be returned to the kiln feed hopper or to the raw meal silos. Provision will be made to protect the filters from too high temperatures by providing an air dilution facility to the system.

4.9 Process Flow Chart

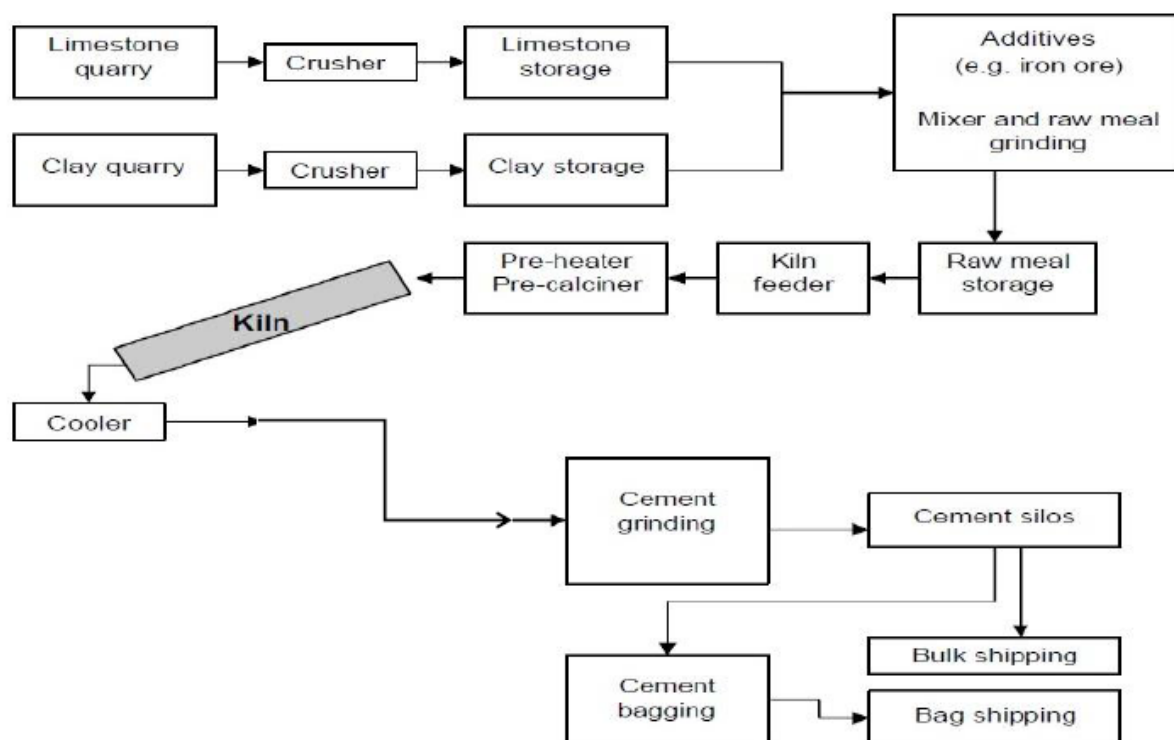


Figure 4-3 Process Flow Diagram

4.10 Supplies

Following supplies will be utilized for the installation and operation of instant project:

4.10.1 Manpower (Direct & Indirect)

The Project will require about 330 personnel for its Plant and Mine operation. Expected maximum manpower during installation phase will be about 1,500 persons. Installation will start with about 500 persons and then increase to maximum, and then decrease again to about 300 persons. During cold and hot commissioning there will be about 300 contractor staff and 330 M/s DW Pakistan (Pvt.) Ltd. staff on site.

4.10.2 Fire-Fighting System & Emergency Response Plan

The system covers the Fire Detection and Protection System for the cement plant. The system will include the following sub-system:

- Fire-fighting water supply system
- Outdoor hydrants system
- Indoor hydrants system
- Fixed water spray system
- Dry chemical and fire extinguishers
- Foam fire -fighting system
- Gas fire -fighting system
- Fire detection and alarm system

- Hand driven Fire engines

The scope of fire-fighting system design and supply will include the whole plant area, it include main block area, transformer area, coal-conveyance area and other auxiliary areas. Independent high-pressure fire water supply system will be provided for the plant. The system includes water storage tank, fire-fighting pumps and piping, etc.

4.10.3 Electricity

The power will then be distributed to the various load centers through a properly designed system of switchgears, cable, transformers, etc.

Waste gas heat power generation will also be available from this plant. WHRPP is part of cement plant construction and operation. WHRPP as embedded part of cement plant is technological integration to achieve sustainable development through producing clean energy from the waste heat of cement manufacturing. Such technological innovation is highly on the part of climate mitigation to produce clean and green energy.

4.10.4 Fuels

Cement industries in Pakistan are normally using furnace oil and coal as fuel. Some plants are also using natural gas as a fuel. Due to heavy commitment of natural gas for power generation and fertilizer industry, the availability of natural gas for the proposed plant is doubtful. Improved/washed coal is considered as an alternative fuel in said project.

In current Project Coal, pet coke and HFO is used as fuel for this plant. Good quality local and imported coal will be used. Allowing some consideration for possible wastage during starting, stopping and the occasional disturbance in the process of the plant, an estimated quantity of 780.73 tons of coal will be needed per working day on dry basis while 887.19 t/d on wet basis.

4.10.5 Water Requirement & Wastewater Management

The proposed project will adopt modern dry process of manufacturing cement. It is envisaged that approximately 8407 m³/d of water will be needed to meet the daily operational requirement of the cement plant. Water requirement in different steps/sections will be as mentioned in water balance below.

Source of water will be sourced from some nearest canal if present at accessible distance from project site. No process related wastewater will be generated during operation as the process will be employed for the production of the cement is the dry process and close loop system will be installed. Only domestic wastewater will be generated at a rate of 14m³/day during operation. Domestic wastewater generated during operation phase will be used for in-house horticultural practices such as; plantation, gardening and vegetation. During construction for domestic activities existing facilities will be used. Water balance of proposed plant is presented in Figure 4-4.

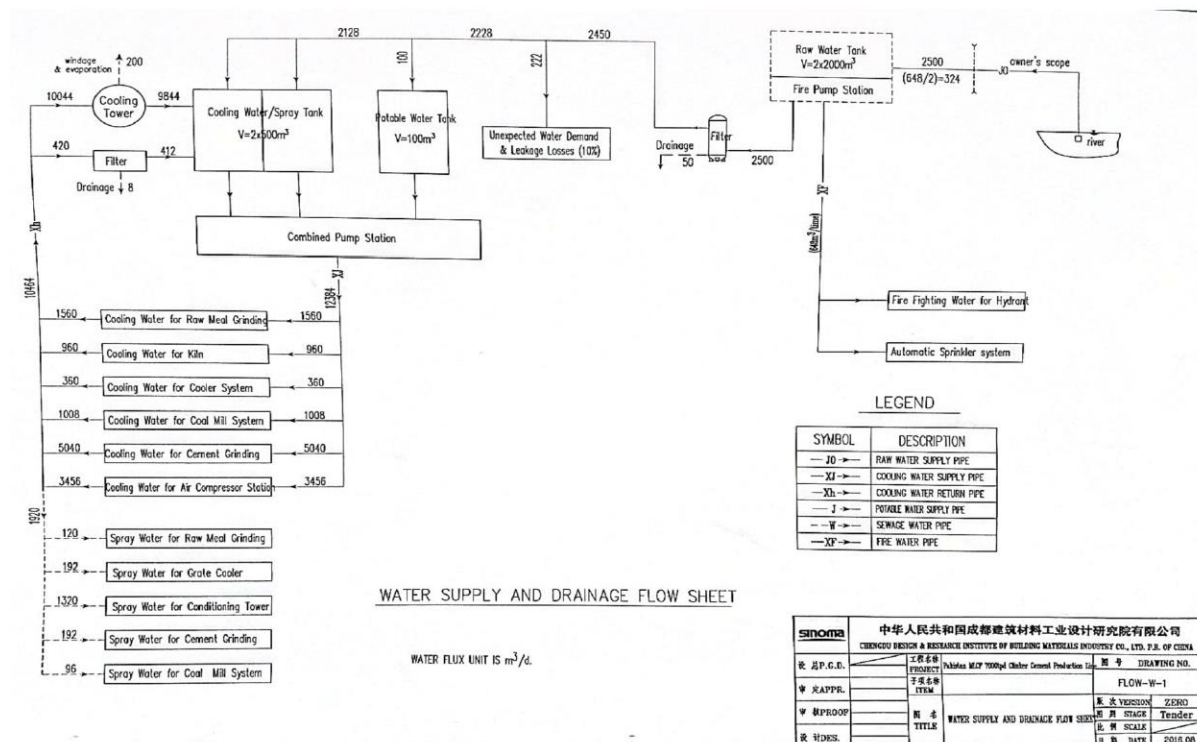


Figure 4-4 Water Balance of proposed plant

4.10.6 Noise

The principal noise emission sources will be associated with operation of; motors, fans, blowers, crushers, air compressor and mills. In-plant shielding of noise emissions will be adopted to ensure that noise levels at the boundaries are within the regulatory limits which demonstrates that the cement plant will be fully compliant with Punjab Environmental Quality Standards (PEQs) for noise emissions. It is environmentally friendly practice that loud sound equipment will be installed in specially designed sound proof buildings. All equipment to be employed for the proposed plant will be designed to operate with low noise levels and will not exceed the maximum allowable noise level for the surrounding receiving land use. Secondly, as the nearest residence is at a safe distance from proposed project site so no disturbance to community is envisaged.

4.10.7 Air Emissions

Air pollutants generated during the operation of the proposed project consist primarily of particulates from quarrying, raw/finished materials as well as fuel combustion by-products. At all stages of process, appropriate methods will be used to prevent dust

emissions. These include the use of enclosed conveyors, storage and dust collectors. All dust collectors will be designed and operated to ensure particulate emissions well below permissible limits. The kiln and the raw mill will be equipped and de-dusted with latest technology high efficiency bag house instead of electrostatic precipitator. Removal efficiency of bag filters is high and emissions will be in compliance with PEQS. The dust collected will be returned to the kiln feed hopper/ the raw meal silos for using in process. Quarry roads dust will be controlled by wet sprinkling.

Modern technology low NO_x burners and proper dosing systems for fuel & kiln will be used to control NO_x emissions. SO_x emissions will be controlled by using good quality local and imported coal. Specification of bag filters is presented in Table 4-7.

Table 4-5 Specifications of Bag-House Filters

Cement Mill Bag House	Capacity: 650,000m ³ /h Net Filtering area: ~14000m ² Net Filtering speed:<0.88m/min Dust content at the inlet: ≤1000g/Nm ³ Dust content at the outlet: <10mg/Nm ³
Coal Mill Bag House	Capacity of bag filters: 165,000m ³ /h Net Filtering area: ~3350m ² Net Filtering speed:<1.0m/min Dust content at the inlet: ≤500g/Nm ³ Dust content at the outlet:<10mg/Nm ³

4.10.8 Mass Balance

Dust generated from raw mill, coal mill, cement mill and cooler will be collected in bag filters. This dust will be reused in raw meal. Mass balance for 8,000 t/d plant is given in Table 4-8.

Table 4-6 Mass Balance for the Production of the Cement

Raw material	Natural water content (%)	Proportion Ratio On dry basis (%)	Production loss (%)	Consumption ratio (kg/t)			Raw Material Balance					
				Dry basis		Wet basis	Dry basis consumption (t)			Wet basis consumption (t)		
				Theoretical	Actual	Actual	Hour	day	year	hour	day	year
Limestone	2.68	70.69	0.5	1226.31	1232.48	1266.42	359.47	8627.33	2847018	369.37	8864.91	2925419
Laterite	6.25	3.52	0.5	40.76	40.97	43.70	11.95	286.78	94636	12.75	305.89	100945
Clay	6.56	24.78	0.5	278.78	280.18	299.85	81.72	1961.28	647222	87.46	2098.97	692660
Bauxite	6.25	1.01	0.5	16.59	18.53	17.79	4.86	116.72	38519	5.19	124.51	41087
Raw meal		100.0	0	1518.72	1518.72		442.96	10631.02	3508238			
Clinker							291.67	7000	2310000			
CEM-I		100.0					307.02	7368.42	2431579			
Gypsum	17.19	5.0	0.5		52.63	63.41	15.35	368.42	121578.95	18.50	443.88	146481
Coal	12.0		2.00		111.53	126.74	32.53	780.73	257641	36.97	887.19	292774

Ignition loss of raw meal=35.5 %

Operation rate of rotary Kiln=90.41% (330d/a)

Heat consumption of Clinker= 2948 kJ/kg.cl(705 kcal/kg.cl)

4.11 Restoration and Rehabilitation Plan

After completion of construction site will be restored, proper leveling will be done all leftover construction material will be reused in other construction activities Feasibility studies carried out in relation to the project indicate a useful life span (approximately 50 years). At the expiration of the useful life of the project, adequate arrangements will be made to remove all movable assets. These may be sold or moved to another factory. Almost all the equipment and machinery shall be re-used for other industrial purposes. All plant facilities and machinery that are not deemed to be of further use will be sold off as scrap or recycled at metal depots/rolling mills.

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.

The district is named after the headquarters town Dera Ghazi Khan, which was founded some five hundred years ago by Ghazi Khan Mirrani, who was a great cattle-owner and was attracted by the plentiful supply of grass. Based on geography, topography and geology, the project area is briefly described below:

Tile district is the extreme south-western district of Multan division. It lies between north latitudes 28° 20' and 31° 15' and east longitudes 69° 35' and 70° 59'. It is bounded on the north by Dera Ismail Khan district; on the east by a fixed boundary with the Alipur tehsil of Muzafargarh district, running roughly parallel with the Indus up to the Panjnad confluence and further south by a fixed boundary with the Rahim Yar Khan district; on the south lies the District of Jacobabad while on the west lies foothills of Suleiman Range.

The town is the part of river Indus plains therefore the land is composed of an alluvial soil mixed with sand. Its fertility is through extensive canal irrigation system. The Dera Ghazi Khan canal is the main source of irrigation in the area and it is fed by a link from the river Indus at Taunsa Bridge. Generally, the natural slope is North-West to South-East. On the Whole the area is flat.

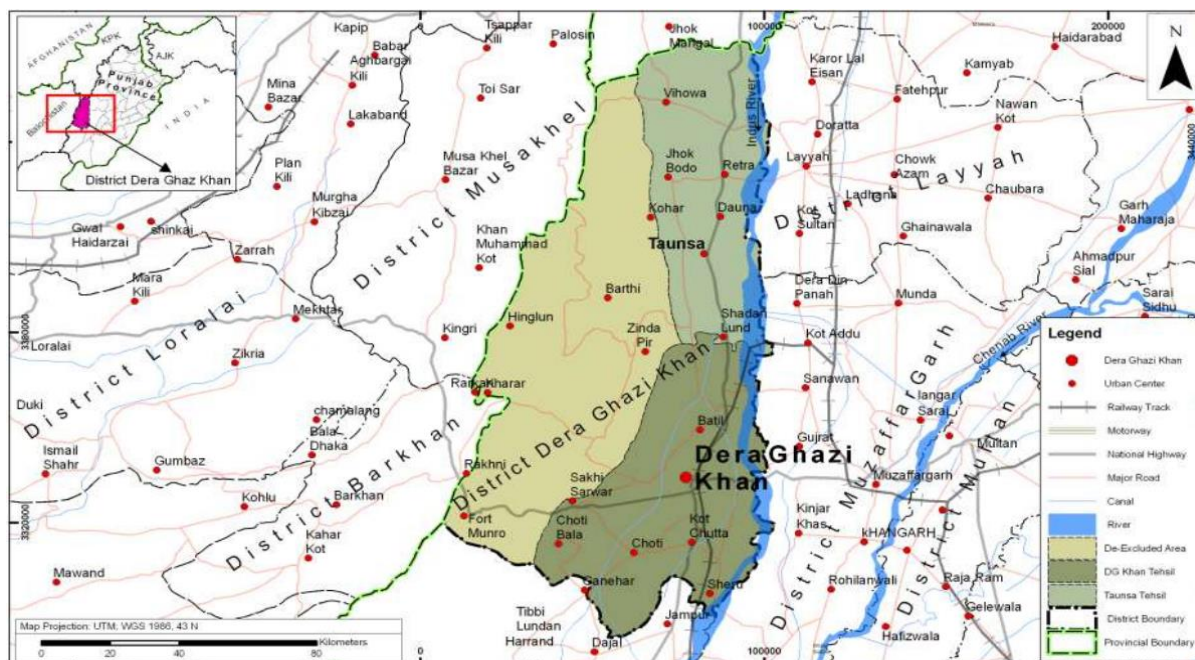


Figure 5-1 Map of District Dera Ghazi Khan

The trees commonly found in the area are, Jand, frash. The Kikar also grows widely. Shisham and Sirin are also found. Dwarf palm, which is called pish, grows in the Suleiman Mountains. Mats are made from pish leaves and ropes and Sandals are made from its coarse leaves. Deb is naturally grown and is mainly used as fodder for animals. Pig and hog deer are found in jungles in the riverain. Hares are fairly common. Black and gray partridges are also found. In cold weather many varieties of duck and teal visit the area. The Indus contains a variety of fish. The best one is Rohu. In cold weather when the river recedes fish are caught in greater quantity.

5.1.2 Physical Features and Topography

The district is divided into three different tracts: (1) Pachadh, (2) Chahi-Nehri an (3) Sindh Circle.

Table 5-1: Physical Features of Dera Ghazi Khan

Item	Value
Creation of Tehsil	During British Raj
Creation of City	Year1910
Number of Union Councils	7
Total Area of the City	12.79 Sqkm
Total Population of the City (Census 1998 including current urban growth)	320,481
Population - Male	166,412
Population - Female	154069
Literacy rate of the City (census 1998)	62.2%
Average Household Size	7.5

Source: Outline Development Plan Dera Ghazi Khan, Urban Unit, District Census Report 1998.

The Pachadh contains the area stretching along the base of hill, where the cultivation depends on the flow of hill torrents. In the Rajanpur Sub-Division the Pachadh tract is

divided into nine Patwar Circles each with an area of more than eighty square miles. This tract is inhabited mainly by the Baloch tribe. The people live on sheep and came breeding and are always migrating either into the hills or to the canal or riverain tracts. The cultivation of this tract depends on rainwater brought down by hill torrents from the adjacent Suleman hills. The sub-soil water is bitter, and the people leave the area as soon as drinking water is exhausted. The only settled population is in the canal irrigated tract were in three urban areas - Rajanpur, Mithankot and Rojhan are situated with few important villages. The rest of the population lives in hamlets or small concentrations near the wells. There are, however, small villages situated all along the fixed bank of the river Indus.

The Sindh Circle is mostly comprised of lands which are subject to river action. The cultivation in this area depends on river spill.

The Chahi-Nehri tract forms the intermediate zone between Pachadh and riverin area. The cultivation is based on wells or canals.

The Dera Ghazi Khan is located in a strip between the river Indus and the Koh-Suleman range of mountains separating it from the Baluchistan Province. It is surrounded by Dera Ismail Khan district on the North and the district of Rajanpur on its South. Indus river flows on the East across where lies the district of Muzafargarh and Layyah. Loralai and Sibbi district of Muzaffargarh and Layyah. Loralai and Sibbi districts of Baluchistan Province lies on the West separated by the Koh- Suleman range of mountains.

The district is spread over an area of 11,922 Square Kilometres and comprises the tehsils of:

- i) Dera Ghazi Khan
- ii) Taunsa Sharif
- iii) Tribal Areas

The important towns in the district are Kot Chutta, Sakhi Sarwar, Fort Minroo, Sahah Saddar Din, Shadan Lund, Vehova, Kot Qaisrani, Mangorotha, Mithanwali, peer Akil, Mana Ahmadani, Notabk, Jhoke Yar Shah Jakkar Imam Shah, Drahma, etc.

5.1.3 Mountains and Hills

The Suleiman mountains drain the torrents in the district. In the north they rise to peaks as high as 10,000 feet above the sea, and two smaller chains run parallel with the main range between it and the plain; the two merge into one and disappear in the North of Dera

5.1.7 Seismicity of the Project Area

According to seismic zoning of Pakistan the project area lies in seismic zone 2A and represents minor damage. Seismic zoning map of Pakistan is given in Figure No. 5-2.

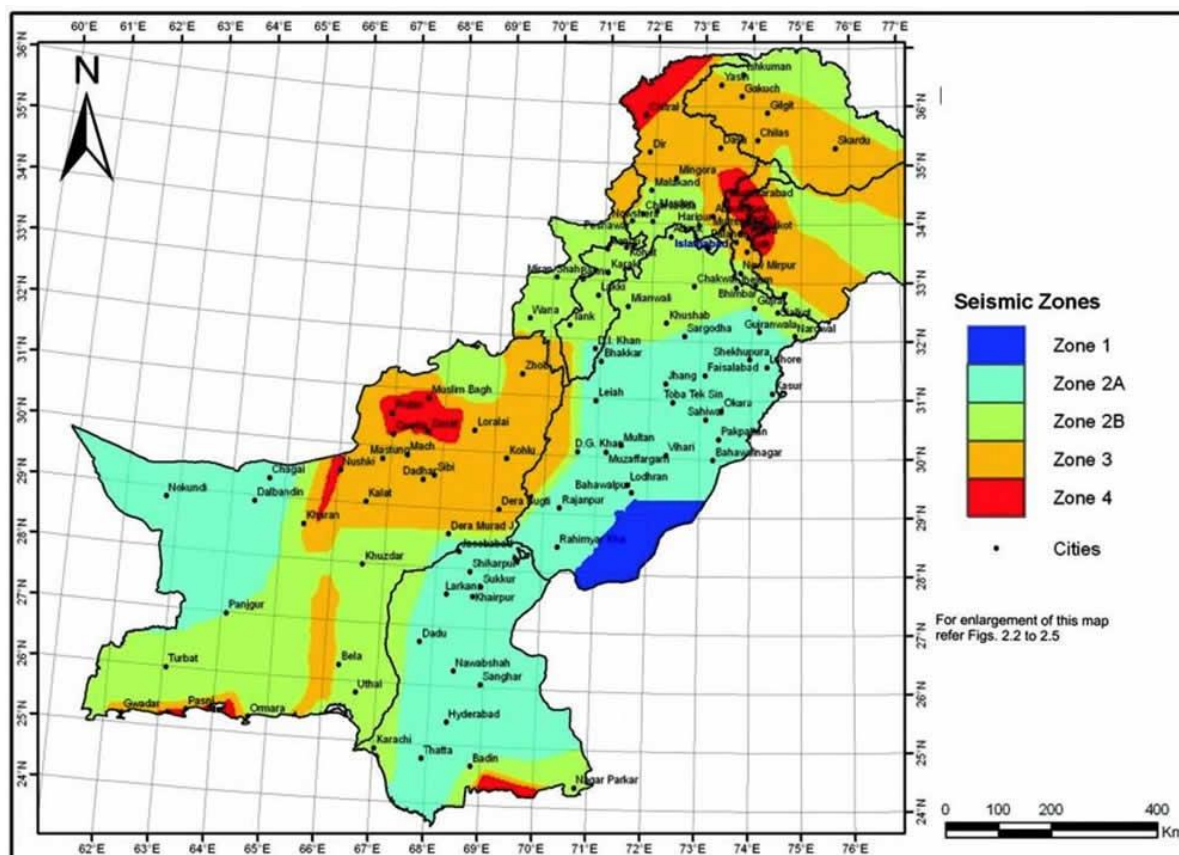


Figure 5-2 Seismic Map of Pakistan

5.1.8 Climate

The climate of district is hot in summer and cold in winter. The climate is almost uniform throughout the district except hilly-portion which has severe winter and a mild summer. Except the hilly trash, the land of the Dera Ghazi Khan tehsil is plain while the land of Taunsa Sharif is traversed by 'Road Kohis' which run from the mountains through the plains.

5.1.9 Wind

The prevailing wind direction is North-South. Due to the barren mountains of Koh-Suleman (Sulaiman Mountains) and the sandy soil of the area, windstorms are common in the summer. During summer, the temperatures are generally amongst the highest in Pakistan. Fort Munro, located on the edge of Punjab Province, has relatively cooler weather. In winter, scattered snowfall has been reported.

5.1.10 Temperature

The temperature during summer is usually about 115 °F (46°C), while during winter season the temperature is as low as 40°F (4°C).

Table 5-2 Temperature Range of the DG Khan Zone

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	25.0 (77.0)	30.0 (86.0)	35.0 (95.0)	38.0 (100.4)	42.0 (107.6)	46.0 (114.8)	44.0 (111.2)	42.0 (107.6)	40.0 (104.0)	38.0 (100.4)	32.0 (89.6)	22.0 (71.6)	46.0 (114.8)
Average high °C (°F)	20.3 (68.5)	22.1 (71.8)	26.9 (80.4)	33.5 (92.3)	38.7 (101.7)	41.5 (106.7)	38.5 (101.3)	37.4 (99.3)	36.7 (98.1)	33.4 (92.1)	27.7 (81.9)	21.9 (71.4)	31.5 (88.8)
Daily mean °C (°F)	12.2 (54.0)	14.7 (58.5)	19.9 (67.8)	26.0 (78.8)	30.9 (87.6)	34.2 (93.6)	32.7 (90.9)	31.9 (89.4)	30.2 (86.4)	25.3 (77.5)	19.1 (66.4)	13.6 (56.5)	24.2 (75.6)
Average low °C (°F)	4.2 (39.6)	7.3 (45.1)	12.9 (55.2)	18.5 (65.3)	23.1 (73.6)	26.8 (80.2)	26.9 (80.4)	26.4 (79.5)	23.8 (74.8)	17.3 (63.1)	10.5 (50.9)	5.3 (41.5)	16.9 (62.4)
Record low °C (°F)	-2.2 (28.0)	-2.0 (28.4)	4.0 (39.2)	9.5 (49.1)	14.4 (57.9)	17.5 (63.5)	18.6 (65.5)	19.5 (67.1)	15.8 (60.4)	8.0 (46.4)	2.2 (36.0)	-2.8 (27.0)	-2.8 (27.0)
Average precipitation mm (inches)	10.0 (0.39)	17.5 (0.69)	34.8 (1.37)	21.7 (0.85)	17.2 (0.68)	14.4 (0.57)	60.8 (2.39)	57.5 (2.26)	17.6 (0.69)	4.8 (0.19)	2.1 (0.08)	10.4 (0.41)	268.8 (10.57)
Mean monthly sunshine hours	222.2	206.8	234.3	259.2	290.1	247.7	241.3	261.1	271.1	283.2	249.7	220.4	2,987.1

5.1.11 Ambient Air Quality

The primary source of air pollution at the project sites is the vehicular emissions, and the key pollutants likely to be found at project proposed locations are carbon monoxide (CO), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), and particulate matter (PM). Other source of air pollution is dust arising from construction activities.

The project locations are well outside the metropolitan centers. As a result, the ambient air quality of these sites is expected to be well within the acceptable limits, and no major criteria pollutants are likely to be found in excess of the limits prescribed by national and international standards.

5.1.12 Water Resources

DG Khan Irrigation Zone

The D. G Khan Irrigation Zone (District D.G.Khan, Rajanpur & Muzaffargarh) consists of fertile lands, contributing a part of the Gross Domestic Production of the country. An irrigation network consisting of 2671.13 miles of canals provide irrigation to a culture able command area of 2.084 million acres in the D.G.Khan Irrigation Zone. Irrigation supplies for the zone are diverted from two barrages namely Chashma Barrage and Taunsa Barrage to irrigate its command area.

About 200 hill torrents, of which 13 are major, originate from Suleman Range and flow through D.G.Khan and Rajanpur Districts towards the River Indus. The catchment area of these torrents is 11881 Sq miles. The area extends over a length of 360 km (200 miles) from Ramak to Kashmore, while in width it varies from 25 Km to 40 km. The area between the foot hills of the Suleman Range from Ramak to Kashmore and Chashma Right Bank Canal System and D.G.Khan Canal and Dajal Branch is locally known as PACHAD area. Flood water is used for irrigation through a network of diversion and dispersion structures. D.G Khan Canal off takes from Right side of Taunsa Barrage commissioned in 1959 for a Designed Capacity of 8757 Cs. It has been revised with Capacity of 11549 Cs, responsible for irrigation to an area of 943980 Acres of D.G Khan and Rajan Pur Canal Divisions. Link No. I, Link No. III and Dajal Branch are the Main Branches of the D.G Khan Canal. There are 24 Nos. are direct off-takes of D.G Khan Canal.

Salient statistics of the D.G Khan Canal are tabulated in Table 5-3.

Table 5-3 Salient Statistics of DG Khan Canal

GCA (Acres)	CCA (Acres)	Nos. of Channels		Length of Main/ Branch Canals (Miles)	Length of Disty & Minor (Miles)	Nos. of Outlets
		Main Canal/ Branches (No.)	Distys / Minors (No.)			
989087	943980	4	160	193.28	1002.32	3682

Prior to commissioning of Taunsa Barrage, a small part of the area of D.G Khan and Rajan Pur Districts got canal supply for irrigation through a network of Inundation Canals which were later-on linked with D.G Khan Canal System. It was anticipated at that time that whole area between the D.G Khan Canal and River Indus, besides the partial area on right side of canal will be irrigated through D.G Khan Canal Irrigation System, for which D.G Khan Canal will be remodeled to carry a discharge of 14400 Cs. However, initially the D.G Khan Canal was designed for a discharge of 8757Cs. Its capacity was further revised to 11549 Cs: which is still lagging behind the anticipated discharge of 11540Cs.

Due to deterioration of banks, side erosions, excessive berm growth and silt deposit in the bed of Channel, the design parameters of D.G Khan Canal have been entirely changed. The Channel could not be maintained due to the paucity of funds, with the result that capacity of the channel has been reduced, resulting canal supply at the tail of the system (Rajanpur Canal Division) has been suffering badly. Ground water is brackish, rate of rainfall is very low and there is even no supply for drinking purpose. The life is always at stake due to non-availability of canal supply. Having with ample canal supply, not only the life would be secured, but also the abandoned land be brought under cultivation. The plantation along road and canal side would be raised. This target can only be achieved by allowing the canal supply to irrigate these areas through rehabilitation of D.G Khan Canal System. There are a No. of structures on the channels like Bridges, Hill-Torrent X-ing, Head Regulators of off taking / escape channels and gated structures which need rehabilitation.

During heavy rains in the Suleman Range, flood water with high velocity approaches the Right Bank of D.G Khan Canal and often enters into it after breaching its banks and causing damage to the channel and its structures. Kachhi Canal has recently constructed along right side of D.G. Khan Canal. It is necessary to study the effect of construction of Kachhi

Groundwater

The main source of drinking water in the area is groundwater, which is pumped through hand pumps, pressure pumps and tube wells. The groundwater is also used for irrigation purposes.

5.2.1 Fisheries and Aquatic Biology

Fishing is not common in the tract. Jhelum Rivers, which flow in the south of salt range, Indus River on its northern boundary and various lakes and small dams are the main abode of fishery. Major species of fish found in these waters are Indian carps, such as Rahu (*Labeo rohita*), Thela (*Catla catla*), Mori (*Cirrhinus mrigala*) and Singhari (*Aorichthysaor*). Out of these varieties, Rahu and Singhari are being reduced every year on account of water pollution.

An area of 58630 Acres is under forests, which is about 1.99% of the total area of the district. There is also linear plantation of 1047.78 Km alongside the roads/rails/canals in the district. Trees grown in the area are Kau, Phalai, Kikar and Shisham.

The trees most commonly found in the district are deb, Jand and Frash (*Tamarix Articulata*). The Kikar (*Acacia Arabica*) also grows widely. Shisham (*Dalbergia Sisso*) and Siris (*Albizzia Lebbex*) are also found.

Pig and hog-deer are thick in the dense river jungles. Hares are also fairly common and black and grey partridges are also found in the same locality. In the cold weather, many

varieties of duck and teal visit the district. The river Indus contains a variety of fish which the best is the Roh. Fish are caught in greater quantities in the cold weather when the river recedes. The best fishing is in the Hairo Dhand in Jampur and in the Vang, Nurpur and Rojhan Dhands.

D. G. Khan Rangelands between the base of Suleman hills and the Indus river and stretches over D.G.Khan and Rajanpur districts. The soil is deep, well-drained, calcareous, medium-textured and low in organic matter. Climate is broadly characterized by cold winters and very hot summers.



Figure 5-3: Type of Flora Existing in District

Table 5-4 shows the trees and grass types.

Table 5-4 Types of Trees and Grass

TREES	
Jand	Prosopis cineraria
Ber	Zizyphus mauritiana
Van	Salvadora oleoides
Kikar	Acacia nilotica
Grass	
Dhaman	Cenchrus ciliaris
Khabbal	Cynodon dactylon
Kahi	Saccharum spontaneum
Chimber	Eleusine flagellifera
Malai	Panicum antidotale
Gorkha	Elionurus hirsutus
Lumb	Aristida depressa

5.3 Socio-Economic Perspectives

The prominent employers in Dera Ghazi Khan are the D.G. Khan Cement Company, Pakistan Atomic Energy Commission and the Al-Ghazi Tractor Company. It is considered that these companies, along with various other flour mills, companies in the cotton, chemical, textile industries, as well as rice, sugar, and ghee mills, form the backbone of the Pakistan's economy. However, private sector investment is increasing rapidly from previous few years and a large number of Private Banks, National Corporations are offering their services in the City. A site survey was conducted to access the socio-economic conditions of the project area. Besides the results from this survey, 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.

No further segregated information available in the Publications by Bureau of Statistics-Planning and Development Department Punjab. Population of Rural and Urban Ratio within Tehsil can help to estimate for an idea of urban proportional.

Table 5-5: Summary of Socio-Economic Indicators

Socio-economic Indicators	District DGK
Number of households	1,653
Number of under-5 children	1,566
Improved source of drinking water	89.1%
Water treatment used in the household	2.6%
Percentage of population using sanitary means of excreta disposal	43.9%
Proper disposal of solid waste	2%
Literacy rate	43.7%
Total child labor	6.7%
Employed	94.6%
Unemployed and seeking job	5.4%
Household Utilities	
Electricity	84%
Natural Gas	12.1%
Radio	35.5%
TV	38.5%
Cable TV	10.9%
Telephone	8.3%
Mobile	58.9%
Socio-economic Development	
Livestock	74.3%
Mean household size	6.6

5.3.1 Quality of Life Values

Population

According to the 1998 census, the population was 905,711 with 24.76% living in urban areas.

Table 5-6 Population of Dera Ghazi Khan Tehsil

Tehsil	1951	1961	1972	1981	1998	2018
Population	238000	311000	465000	636000	1151000	1226612

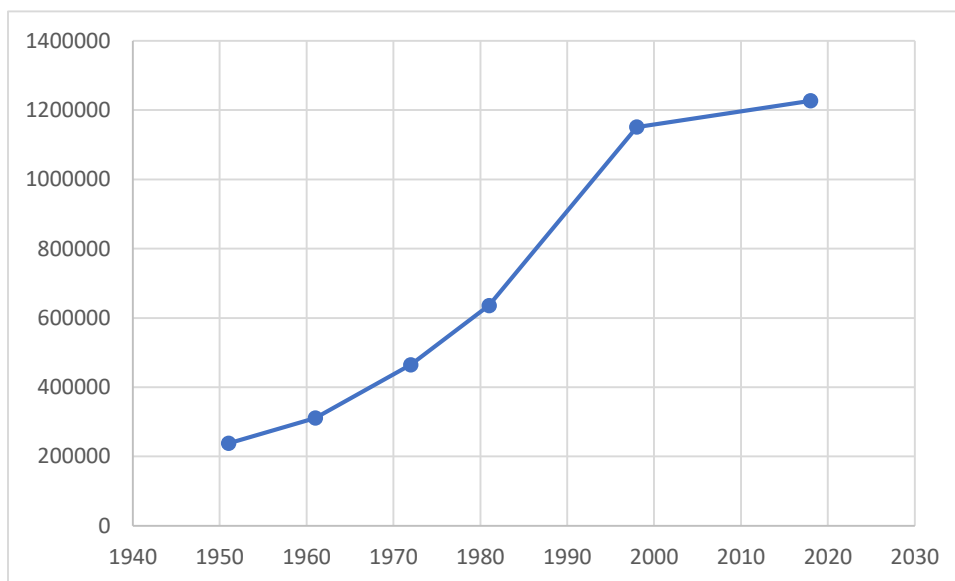


Figure 5-4 Graphical Representation of Dera Ghazi Khan Tehsil Population

Health Facilities

In D.G Khan, there is a civil hospital called the Divisional Headquarters Hospital, along with many private hospitals and labs. The number of beds is being doubled from 250 to 500 in DHQ. Along with the DHQ there are several Private Hospital working for the welfare of the People of D.G. Khan. The overall conditions of public health are miserable in the city and need improvement.

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.

Manpower Availability

As regards availability of skilled labour, there are 09 technical / commercial / vocational institutions (6 for men and 3 for women) imparting training in various trades e.g. mechanical, electrical, autoengineering, welding, wood working and commerce. Vocational institutions for women impart training in hand/machine embroidery, stitching and knitting, etc. In all about 1349 trained technicians/artisans/workers are turning out every year.

Education

The primary health and education facilities are provided in the nearby town. The higher education both for boys and girls are available in Dera Ghazi Khan.

Languages

Saraiki is the main language spoken in this region. Other languages that are spoken include Urdu, Balochi, Punjabi, Pashto, and Sindhi.

Industries

Large deposits of argillaceous, gypsum, fuller earth silica sand, iron ore and limestone exist in the district. At present, there are cement and gypsum processing/plaster of paris manufacturing units in the district. There is a big scope for gypsum processing units because gypsum is also used for reclamation the saline areas. In Punjab thousand hectares are already affected by the salinity. Besides, there is a big scope for another cement unit and there exists virgin market for activated fuller's earth unit. It is used as a bleaching agent in sugar, edible oil, glucose and pharmaceutical industries and the of oil-wells. Its entire requirements are being met through imports.

Besides, textile, cement and gypsum units, other important industries operating in the district are Fiat Tractors Manufacturing Unit and Auto Parts i.e. oil, fuel and air filters manufacturing units in the district. It is strongly viewed that by developing working relations with the tractors plant, some important engineering industries can be developed in the district e.g. good quality agricultural implements like trolleys, tillers, reapers, harrows, drills, rotavators, threshers, pulleys, etc., accumulated batteries for tractors and other automobiles.

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 Karachi 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 Agricultural Implements, Auto Parts, Carpets, Cement, Cold Storage, Cotton Ginning & Pressing, Electric Poles, Flour Mills, Fruit Juices, Gypsum Industry, Ice Cream, LPG Gas, Pesticides & Insecticides, Petroleum Products, Power Generation, Rice Mills, Soap & Detergent, Textile Spinning, Tractors and Vegetable Ghee / Cooking Oil.

5.3.3 Traditional Crafts

The traditional crafts of the district Dera Ghazi Khan include making of mats, baskets, baan and hand fans from date-leaves in DG Khan Tehsil. Similar articles are also made in Fort Minroo from a grass called 'Peesh' which is grown in hilly areas. Woollen carpets called 'Khalase' are made from hand-spun goat hair, mainly in Fort Minroo. Wooden combs are made in Taunsa Sharif. About 3280 persons are estimated to be engaged in these crafts in the district.

5.3.4 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.

5.3.5 Manpower

As regards availability of skilled labour, there are 17 technical / commercial / vocational institutions (9 for men, 8 for women) imparting training in various trades e.g. mechanical, electrical, auto-engineering, welding, wood working and commerce. Vocational institutions for women impart training in hand/machine embroidery, stitching and knitting etc. In all about 4,392 technicians/artisans/workers are trained every year.

5.3.6 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

There are 6 grid stations in the district.

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

No site of archaeological importance exists in the project area.

5.4 Lab Reports of Environmental Analysis

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

- Ambient air quality
- Noise levels
- Ground 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 will not have impacted by the construction activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation are required for the development of proposed project.

6 IMPACT ASSESSMENT

This section discusses the potential environmental impact for cement plant, 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

These potential impacts due to Establishment of a New Cement Plant by DW Pakistan can be both positive (beneficial) and negative (adverse) depending on the resources and receptors involved along with other parameters such as geographical scope (magnitude and extent), temporal scope (duration) and reversibility. It is anticipated that this project will have positive impacts on sectors such as the economy, employment and foreign exchange earnings among others. Moreover, the project is expected to result in negative impacts of short-term duration and transient in nature. Having identified and characterized the potential significant impacts during design, construction and operation phase of project an Environmental Impact Severity Matrix & checklist to summarize all the identified impacts as mentioned below in Table No. 6-2, 6-3, 6-4 and 6-5.

Table 6-1 Impact Significance Criteria

Impact	Condition
No Impact	When the proposed activity will have no impact
Long Term	When the impact is of high intensity with high spread and high duration or of high intensity with medium spread and medium duration
Moderate Term	When the impact is of moderate intensity with high spread and high duration or of high intensity with low/ moderate spread and low duration
Short Term	When the impact is of low intensity but with moderate spread and moderate duration or of moderate intensity
Insignificant	When the impact is of low intensity, low spread and low duration
Adverse	When the impact is of large intensity, spread easily and long-term
Beneficial	When the impacts are positive and improve the environmental conditions

Table 6-2 Impact Matrix Checklist for Designing Phase

Environmental Sensitivities	Intensity of impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	National	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Topography													
Land Acquisition													
Seismicity													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Physical Parameters													
Local Economy													
Social impacts													

Table 6-3 Impact Matrix Checklist for Construction Phase

Environmental Sensitivities	Intensity of impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	National	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Air Quality													
Noise													
Water Quality													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Physical Parameters													
Local Economy													
Social impacts													
Health and Safety													

Table 6-4 Impact Matrix for Operational Phase

Environmental Sensitivities	Intensity of impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	National	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Air Quality													
Noise													
Water Quality													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Physical Parameters													
Local Economy													
Social impacts													
Health and Safety													

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 will be provided in the chapter of Stakeholder's Consultation.

6.3 Characterization of Impacts

Impacts were characterized for the project are done on the basis of following parameters:

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

6.4 Impact Significance

After the evaluation of all the potential impacts, the impacts significance is be 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.

Table 6-5 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

- Road infrastructure should be according to the laws and regulations
- Waste water drainage should be design vast to bear the rain water capacity of the society.
- Proper design of fencing

7.2 Environmental Impacts during Construction Stage

During construction phase of the project pollutants like effluent, gaseous emissions, particulate matter, solid wastes and noise will be generated but will be controlled to threshold limits.

Details are also given as how environmental management practices to be adopted will help to undo adverse environmental impacts on all segments of the environment.

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.

Excavation, construction activities, moving vehicles, machinery & materials transport activity and plant installation are the likely main sources of pollution during construction phase.

7.2.1 Impacts and Their Mitigation Measures

Pollutants

The pollutants during construction will be emissions including sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO); particulate matter (PM); noise from machinery and vehicles and sewage from the work force. Dust (PM) will also be generated especially during leveling, excavations of the land for civil construction, moving machines and transport.

Remedies

Construction activities will be carried out according to a well-planned action plan based on sound environmental management and controls principles. The construction plan will be prepared also keeping in view avoiding maximum use of machinery at the same time. Rather, the minimum number of machines and execution of minimum number of operations/construction/plant installations jobs at a time will be followed. Under all these construction and other operations gaseous emissions, particulate matter and noise from the machinery and vehicles will be minimized and curtailed within limited area of the project. Therefore, pollution factor will be further reduced at source. As far as possible construction work will be carried out during daytime.

Frequency of the vehicles to visit the site, carrying plant machinery and other materials will be regulated to avoid rush on the public roads and at the project site. Rather their visit will be regulated under a well-considered plan. They will approach the project site at different intervals of time and in limited number. As far as possible, well maintained vehicles will be engaged for the project work.

The project area will be declared “No Horn Zone”. This will drastically further reduce unnecessary noise levels.

Domestic sewage to be generated will be treated according to standard method. The treated sewage will be used within the four walls of the project site for irrigation of vegetation and plants and sprinkling on the dusty roads to suppress dust and thus minimize PM pollution from the roads also. If some volume were left unused it will be discharged in proper way.

Even during plant machinery installation period the best environmental management practices are to be strictly followed according to a plan encompassing environmental element.

Blasting is not predicted during construction phase however if required legal permission will be obtained. No hazardous chemicals will be used during construction without the required health safety and environmental plan in place. All construction machinery will be kept clean to avoid any oil and grease. Hence no mitigation is required.

Noise can be generated due to the construction activities.

To keep noise levels within the prescribed limits of the NEQS Pakistan, power mechanical equipment will be used with low sound power, whenever possible. Construction machinery will be well maintained & regularly serviced.

Construction activities will be scheduled in such a way that noise intensive operations side by side with an increased net noise levels are avoided. Workers will be required to use ear plugs or ear muffs to avoid damage to hearing besides ensuring adoption of safe work practices.

Further, the area subject to excavation or construction is devoid of any fauna life. As such there is no sensitivity of environment within the area of influence of the project activity. Construction activities will be carried under controlled measures to avoid any damage to nearby waters or any element of environment in the area of influence of the project during construction. And last but not the least, the entire phase of construction is short lived, accordingly the likely minor addition of sediments to nearby waters having extremely large dilution capacity will hardly matter from environmental point of view.

Topsoil Removal

The main direct ecological impact resulting from the construction phase of the project will be the loss of vegetation associated with the “clearance” at the quarry areas, and the access road alignments. At the quarry about 1 - 3 meters of topsoil at surface, including vegetation will be removed.

Remedies

These will be store in a designated area for future re-vegetation purposes. Any trees in the plant & quarry area will be cut and supplied to the local community as firewood.

However, Proponent shall establish forest nurseries in association with this project. Tree seedlings are used:

- (i) to provide physical screening of quarries and cement plant sites and
- (ii) For subsequent site restoration.

The establishment of nursery should assist with short-term mitigation and longer term on and off-site restoration of damaged habitat.

7.2.2 Mitigation Measures of the Impacts Observed During the Construction Phase

The Table 7-1 shows the mitigation measures for impacts observed during the construction phase.

Table 7-1 Environmental Impacts Mitigation during Construction Phase

Environmental Impact	Proposed Mitigation	Residual Impact
AIR QUALITY		
Dust emissions during construction and ground works.	Development of procedures for: -water spraying roads and dusty materials stockpiles - covering vehicles carrying dusty materials on leaving the site to prevent materials being blown from the vehicles -speed limits on unpaved surfaces on site to limit dust.	Dust propagation will be limited to construction area and will not influence local community. Workers will be supplied with dust masks.
GROUND & WATER QUALITY		
Importation of pollutants already present within the materials to be used for filling and site levelling operations	Ensure that pollutants are not present in materials imported onto the site by appropriate selection of source material by the Contractors and chemical	Potential for importation of pollutants in the material will be minimized through Proponent's specifications to Contractors and

	analysis by Proponent if required.	monitoring by proponent project team.
Accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, especially in the construction lay-down area, during delivery to the site.	Appropriate procedures and protocols to be established and monitored for materials delivery and handling to ensure there are no spills.	Potential for accidental release during delivery of materials to the site will be minimized via written procedures and protocols.
Accidental release of fuels, oils, chemicals, liquid waste, hazardous materials, etc., to the ground, especially in the construction lay-down area, during storage.	All storage areas will have appropriate environmental security measures to prevent accidental release to ground.	Potential for accidental release of materials during storage on the site will be minimized.
Accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, especially in the construction lay-down area, during transport to the area of use.	Appropriate procedures and protocols to be established and monitored for materials transport and handling whilst on the site.	Potential for accidental release of materials during transport within and handling on the site will be minimized.
Accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, during use, [for example, re-fuelling, maintenance, etc.]	Appropriate procedures and protocols to be established and monitored for materials handling and use. Where possible, refuelling and maintenance areas will include some form of secondary containment.	Potential for accidental release of materials during use will be minimized.
Accidental release of liquid wastes during removal from site.	Appropriate procedures and protocols to be established and monitored for waste materials removal.	None
Accidental discharge of sanitary wastewater to ground and groundwater from the workers camp.	Sanitary waste will not be discharged to the ground. Contractors will provide appropriate Sewage Treatment Facilities.	Potential for release of harmful of effluent if the facility is underspecified or not managed correctly.

Discharge of pollutants in water used for plant, equipment and vehicle washing to ground.	Washing activities will take place on areas with appropriate containment and procedures and protocols will be established and monitored to ensure that the preventative measures are sufficient to meet the effluent standards.	Potential for accidental release of pollutants to the ground during washing activities will be minimized.
Increase of sediment load in natural aquatic receptors resulting from direct runoff disposal.	Minimization of excavations face during Construction. Temporary drainage grooves and sedimentation ponds for surface run-off collection. The topography is nearly flat.	None
Natural aquatic receptors degradation due to direct disposal of domestic type wastewater.	Construction of appropriate sewage system and wastewater treatment facility by Contractor. Effluent if any will meet the standards.	None
Groundwater contamination from leakage of polluting substances.	Usage of non-hazardous construction materials for human health and environmental protection. Storage of potential polluting materials in appropriate areas, including secondary containment. Any contaminated land occurred during construction will be directly removed and disposed of in accordance with local regulations for waste disposal.	None
MATERIAL USE & WASTE MANAGEMENT		
Waste generation.	Introduction of waste storage and control procedures Segregation	Waste for disposal will be disposed of at an

	and recycling of waste by EPC Contractor into metal components, plastics, glass separately.	approved waste disposal site.
ECOLOGY AT PLANT & MINE SITE		
Loss of vegetation on site clearance.		Vegetation loss cannot be avoided, but clearance with successful restoration, improvement and long-term management of the surrounding areas for conservation and productive uses will provide significant compensation.
Further land take over (habitat loss) for temporary Construction Camp.	Build temporary construction camp on land that in due course be reused for Proponent for other activities. Contractors/Proponent will also restore, wherever possible to green areas such as the planting of grass, shrubs & trees.	No additional impact since is visualized.
Destruction of fauna and habitat (mammals, birds, reptiles, amphibians, invertebrates).	Further ecological/fauna survey at appropriate seasons and translocations monitored by the Proponent specialist.	Moving fauna to neighboring sites may help short-term survival, but not medium-term if these sites are already occupied. In long term populations may recover on restored sites.
Increase in exploitative pressures on habitats neighboring the sites.	Conduct and implement further "Habitat Survey and Management Study", in close consultation with local officials & communities.	With co-operation of officials & local community and project providing alternative source of income, habitats should be improved.
On ecology of surrounding area by temporary workforce as a result of removal of	Education, monitoring and enforcement program.	Implementation may be difficult, and some impact can be expected.

vegetation and the displacement of wildlife.	Adequate waste management and sanitation facilities. No permits will be provided to Contractors for any burning.	
LANDSCAPE AND VISUAL		
Damage to the landscape character and visual amenity due to Introduction of incongruous features and activities.	Sensitive planning of site works and worker's compound. Advanced structure planning. Minimize lighting and nighttime workings.	Some exposure to alteration of the landscape character and loss of visual amenity, predominantly due to out-of-site activity.
NOISE & VIBRATION [Incorporating Transport]		
Noise from construction of new plant/mine and link roads.	<ul style="list-style-type: none"> • Good site management; • Appropriate choice of machinery; • Methods of working; • Hours of working; • efficient material handling. 	A baseline noise study needs to be carried out. But further study may be needed to predict whether there may be noise increases at nearby villages.
Noise from traffic relating to construction using existing roads through local residential areas & cities	Define access routes to the site with the smallest number of properties in proximity to it. Keep vehicle movements to a minimum. Once link roads are completed, all construction traffic to/from the site should only use the link roads.	There may be noise increases at residential properties in proximity to the chosen access route, and then from the link road once completed.
SOCIAL		
Worker - industrial emergency	Prearranged quality curative treatment in Hospitals	Depends on nature of emergency
Non-local worker living conditions and quality of life. Utility and service provision impacts on local villages.	Contractors will provide detailed specification of camp layout, facilities, and utility provision (and disposal) in accordance	Depends on individual worker susceptibility. If conditions are poor multitude of issues could arise in camp and spill into local communities.

	with identified international standards. Proponent to monitor health and safety and terms and conditions of employment.	
Disturbance and conflict in camp	In-camp codes of conduct and enforcement of key behaviors shall be required.	None Identified
Disturbance and /or conflict with local population.	Camp code of conduct upheld by workers and enforced by camp. Provision of employment and opportunities to local population to minimize hostility.	Some residual impact expected but scale limited by worker free time, and local interaction with camp, especially if "Liaison Committee" is formed early.
Potential for increased incidence of transferable disease (TD) in local populations and amongst workers.	Preventative health awareness campaigns for TDs provided to workers and targeted at key local locations / groups. Contractors will provide health checks and immunizations before movement to site.	Difficult to identify cause or source of such disease. However some disease may be spread and curative treatment may be required for the different diseases.
OCCUPATIONAL SAFETY AND HEALTH		
Construction and operational activities could expose workers to health and safety risks. In particular, the following activities could have negative health impacts: noise and dust; working with heavy equipment (strains and accidents); working in confined spaces (fumes could mean respiratory impacts), heavy lifting, storage, handling and use of dangerous substances and waste (strains and accident	The Company needs to demonstrate a best practice occupational health scheme, and share plans for the health maintenance and emergency services for their employees so that local health infrastructure capacity is not put under greater strain. An important mitigation is the forming of partnerships of understanding and relationship building with local health care providers. Company's contractors should adopt strict	None

risks), and working under noisy conditions (hearing and stress/psychological impacts). There are chances of heat stroke to quarry workers if they are not wearing PPEs. Excavations and transportation of materials may cause further health and safety negative impacts.	construction and operation practices with best technology and health and safety training to ensure the safety of its workers.	
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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.

The potential effects of the proposed development during operation can be divided as follows:

- i. Impacts on air quality as a result of emissions from the cement production process and dust from the quarry activities and crushing and grinding processes. Also, international scale impacts as a result of the emissions of greenhouse gases from the production process.
- ii. Impacts associated with noise, particularly the impact of noise on nearby human receptors.
- iii. Impacts of the plant and quarries by changes to the landscape and visual impacts.
- iv. Impacts on the local ecology by the loss of habitat taken by the development and impacts associated with the operations on the surrounding ecology.
- v. Impact on the surface water regime (hydrology) by changes to the natural drainage of the landscape within the development area and potential emissions of fine particles (suspended solids) into the water as a result of the industrial activities. Potential release of contaminated effluents into the surface water drainage. Also, impact on the underground water, called groundwater (hydrogeology) as a result of extraction of raw materials for use in the industrial process.
- vi. Use of significant volumes of raw materials and the production of waste
- vii. Impacts of transport.

7.3.1 Identification of Potential Environmental Issues during Operation Phase

The summary of environmental impacts identified is presented in Table No. 7-2.

Table 7-2 Summary of Environmental Impacts

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Acid Mine Drainage		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+2	
	Solid Waste	Land Pollution Breeding of Flies and Rodents Odor Problem		-1
	Climate	Climate Change		0
		Micro-climate Changes	+1	
	Atmosphere	Dust		-2
		Noise		-2
	Sub-Total		+3	-4
2	Biological Environment			
	Flora	Forests /Trees	+1	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		+1	0
3	Socio-economic Environment			
	Social	Population	+1	

		Land Ownership	+2	
		Land Lease	+3	
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+2	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+2	
		Afforestation	+1	
		Infrastructure		0
		Domestic Water Supply		0
		Community Development	+3	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
	Sub-Total		+24	0
	Grand-Total		+28	-4

The environmental issues identified during the literature review, site visits and discussions are enumerated in the following Table No. 7-3 below.

Table 7-3: Anticipated Environmental Impacts

Environmental Component	Environmental Issue	Description
Water Resources	Channel Water Quality	Since the cement production does not flow into the channels, quality of water is not affected. Hence, this impact is nil.

	Channel Discharge	Water	The proponent will take NOC from the irrigation department for the utilization of water from the canal passing at a distance of 6 kilometers almost.
	Groundwater and Level	Quality	The major source of water that the project will utilize is from the canal passing at a distance of 6-8 kilometers. The impact will be of low level on groundwater quality and level.
	Surface Run-Off		Because of the mining operations on surface, the surface topography will be disturbed. However, appropriate water channel paths will be maintained. Thus, this impact will 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 will be nil.
Land Resources	Soil Salinity		The mining and cement manufacturing operations will not add any saline materials into the soil. Thus, there will be no effect on the soil salinity.
	Soil Erosion		Due to surface mining operations and cement manufacturing may cause soil erosion. Therefore minor impact is expected.
	Land Utility / Productivity		The mineral is being on surface and after the extraction of the mineable reserves the area will be available for the use of geo tours. Impact will be moderate positive.
Climate	Micro-climate changes		The plantation done by the proponent will bring positive impact in the micro-climate. This impact will be minor positive.
	Climate Change		There wont be any climate change due to the mining and cement plant operations. Therefore the impact would be nil.
Atmosphere	Dust and Air Emissions		During regular plant operations the following pollutants/wastes will accrue: Stack: If not controlled, they may cause various diseases among human beings, pollute nearby waters, damage aquatic life, change pH of soil and thus may damage it. It may damage trees, plants, vegetation, structures and anything that comes under its influence. The levels of their emissions into the air will be controlled well within the limiting values of the environmental standards of the NEQs Pakistan by employing/using:

		<p>Combustion controls to minimize the formation of CO.</p> <p>The use of low NO_x burners technology to reduce NO_x, a Greenhouse Gas (GHG), will also be in the spirit of Kyoto Protocol and practical demonstration of adoption of Cleaner Development Mechanism (CDM).</p> <p>A bag filters and ESP's for control of PM emissions. The stack emissions concentrations of these gases and the PM will correspond to the required limits of the NEQs Pakistan</p>
	Noise and Vibrations	<p>The sources of noise generation are generators and vehicular movement/trucks. All these operations will be carried out under controlled environment and do not exceed the threshold limit of 80 dBA. Hence this impact is nil.</p>
Waste Generation	Wastewater	<p>The Cement Plant produced wastewater, sanitary & sewage water and oily wastewater, etc., will be treated as: neutralized, flocculated, bio-contact oxidation technology processing and oil-water separators respectively. After treatment the wastewater is expected to meet Pakistan NEQS effluent standard and will be reused. The question of effluents therefore doesn't arise. The wastewater treatment plant will be built to ensure the compliance with the NEQS. This impact is nil.</p>
	Solid Waste	<p>Main solid wastes anticipated and their disposal methodology are given hereunder: -</p> <ul style="list-style-type: none"> • Metal/wooden waste: Metal and wooden waste to be sold in the market for reuse. • Empty drums or containers: Empty drums/containers will be returned to the suppliers for recycling/reuse at their end. • Cotton rags: Waste cotton rags to be generated after cleaning of equipment will be incinerated in an incinerator to be installed on the project site. • Dispensary wastes: All dispensary wastes will be incinerated in incinerator. • Miscellaneous waste: Miscellaneous solid waste including redundant tires, tubes, batteries, belts, nylon strips, filters, scrap

		<p>wood, steel scrap, etc., will be sold in the market through contractors.</p> <p>Solid wastes to be generated from the project production activities will be sold in the market for their recycling & reuse. Some of them will be used on site. However, while disposing any solid waste material, all environmental aspects/impacts of such wastes will be communicated clearly to the concerned contractor. Record of all such sales will be maintained for later use if and when required.</p> <p>Environmental pollution on all accounts from the project activity on regular basis shall be managed by strict compliance with the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMP) as recommended in this EIA Report, and following environmentally sustainable practices/cleaner production practices under the five (5) "R" concept- Reduce, Recycle, Reuse, Retrofit and Refurbish.</p>
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. Hence, no impact is envisaged.
	Other Terrestrial Vegetation	Insignificant vegetation is growing in the area. Hence, there will be no impact on this parameter.
Fauna	Mammal Communities / Habitat	Only wild mammalian species are found. On extraction of limestone and cement production, these species will rarely migrate to nearby areas. Hence, this impact will be temporary and insignificant.
	Reptile Communities / Habitat	Reptile species will not be migrated and affected due to operations. Hence, these species will remain un-effected. The impact on these species will be negligible.
Social	Population	Population is likely to increase by a national growth rate. Minor positive impact is envisaged.
	Land Ownership	On completion of mining, the lease area land will be available for geo-tours. Impact will be moderate positive.
	Land Lease	As the mineral resources belong to Provincial Government which will enable the mineral

		exploitation and adding government revenue. Overall impact is major positive.
	Social Cohesion/ Attitude	The project has added interwoven knitwear awareness. The group of people working from the local area will have more social inter-woven cohesion and inter-dependence for economic survival. The impact is minor positive.
	Food/ Nutrition	There will be major positive impact since more resources will be available for the purchase of foodstuff.
	Health	Health of residents of nearby villages and workers will not be affected due to mining operations and activities. This impact is not significant.
	Education	On improvement of income level, people will send their children to educational institutions. Hence, this impact will be minor positive.
Economic	Income Levels	The project has moderate positive impact on the income levels of the locals. The people of other parts of the country will also benefit from this project.
	Employment	The mining and plant operations employ the locals from the nearby villages. Hence, the job avenues will increase for the locals. This impact is moderate positive.
	Land Value	During the tenure of the mining & project life, land value will escalate and may stabilize on post mining operation. Hence this impact is moderate positive.
Institutional	Institutional Activities / Effectiveness	Various governmental and non-governmental offices will become more active due to this activity. There will be moderate positive impact.
Human Use	Cultivation and Livestock	As the area is non-agriculture, hence the livestock will not have greasing ground. This impact is nil.
	Afforestation	Different plant species will be planted within the vicinity of the project area to enhance the environmental conditions of the project area. Hence, this impact will be minor positive.
	Domestic Water Supply	The project is located well away from the nearby towns/villages. The project will not affect the quality and quantity of water supply to communities in the surrounding areas. This impact is nil.

	Community Development	M/s Proponent. is already on the supportive grid on community welfare program. Hence, this impact will be major positive.
Resettlement	Dislocation of Population	The project does not involve any dislocation of the local people. If dislocation is required, proper compensation will be done. So, there will be no impact.
	Loss of Property and Infrastructure	No movable or immovable property of public and private sectors will be lost during mining operations. Hence, this impact will be nil.
	Resettlement of Affected Communities	There is no requirement of resettling of the community as there will be no loss of property and relocation. Therefore, this impact will be nil. If the resettlement is required, proper compensation will be done.

7.4 Mitigation Measures of the Environmental Impacts during Operational Phase

The mitigation measures for the environmental impacts have been suggested in Table No. 7-4.

Table 7-4 Mitigation Measures during Operation Phase Environmental Impacts

Environmental Impact	Proposed Mitigation	Residual Impact
AIR QUALITY		
Release of combustion gas emissions from the kiln stack	Equipment design and primary operational management control techniques	Local air emissions will be based on NEQS Pakistan for the protection of human health at all emission point sources. On that basis, it is concluded that there will be no adverse health effects in the local population due to the operation of the cement plant.
Release of particulate emissions from the kiln, the clinker cooler, the coal mill and the cement mill.	Bag filters – dust abatement using very stringent 30 mg/Nm ³ standard and ESP 100 mg/Nm ³ standard.	Local air quality will be virtually unaffected in Project area & surroundings, and will be based NEQS Pakistan for the protection of human health.
Release of dust	Use of best practice	It is unlikely that there

emissions from the quarry operations.	management techniques during extraction and loading of raw materials.	will be any discernible adverse effect due to dust deposition at any residential properties.
Release of combustion emissions from transport associated with transport of materials to and from the site.	Use of new, efficient vehicles, driver training to minimize emissions (e.g. prevention of over running, shut off engines when vehicles not in use), proper maintenance, rationalization of traffic management system to optimize transport efficiency.	Localized minor effects on air quality at any properties very close to certain roads, but increments a very small fraction of air quality criteria. Given the volume of trucks, however, impact is Moderately adverse.
SURFACE WATER AND GROUND WATER QUALITY		
Increase of sediment content in surface due to fugitive dust dispersion.	<p>For cement plant: Storm water management through ditches and or gutters and settlement ponds.</p> <p>For mines: Mine face will be kept minimal. Gradual rehabilitation (through landscaping and planting) of locations where extraction works have been completed.</p> <p>Storm water management through peripheral ditches and settlement pond.</p>	None
Degradation of surface waters quality due to process water direct disposal or leakage of polluting materials.	For cement plant: Process water circulation is closed circuit including settlement tank for treatment. Storage of fuels for cement production in enclosed storage area. Tidying the plant on regular basis with mechanical sweepers removing dust collected on the streets and gutters. Thorough washing of surfaces in case of polluting	None. Appropriate collection and transportation of potential polluting materials (e.g. spent oil, lubricants, etc.)

	<p>materials spillages and further processing of collected washings as special waste.</p> <p>For mines special considerations for clay quarry. Preventative maintenance of quality equipment, protocols and procedures.</p>	
Pollution of surface water due to release of harmful/untreated sewage.	The sewage treatment system will be sized for peak demand during operation phase. No hazardous liquids will be released on to the sewage treatment system. The provision of a large balancing tank before industrial use will act as a storage unit in the event of accidental release into the sewage system.	None
Soil Erosion	<p>For cement plant: EP Contractor to design proper drainage system consistent with seasonal winds.</p> <p>For mines: Proper Drainage design by the Contractor as well as gradual rehabilitation of location where extraction works have been completed.</p>	Soil erosion will be limited on-site the quarries.
Ground and Groundwater contamination.	<p>For cement plant and mines: Secondary containment for potential polluting materials.</p> <p>Any contaminated land removal and disposal in accordance with local and</p>	Potential contamination will be limited on-site.

	general international requirements.	
LAND QUALITY		
Accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground during delivery to the site.	Appropriate procedures and protocols to be established and monitored for materials delivery and handling. Proponent will have, at all times, clean up kits available.	Potential for accidental release during delivery of materials to the site will be minimized.
Accidental release of fuels, oils, chemicals, liquid waste, hazardous materials, etc., to the ground during storage.	All storage areas will have appropriate environmental security measures to prevent accidental release to ground. EP Contractor to design the plant for berms/detrimental retainer walls that are designed for 1.5 times the capacity of any such storage tank.	Potential for accidental release of materials during storage on the site will be minimized.
Accidental release of fuels, oils, chemicals, liquid waste, hazardous materials, etc., to the ground during transport to the area of use.	Appropriate procedures and protocols to be established and monitored for materials transport and handling whilst on the site	Potential for accidental release of materials during transport within and handling on the site will be minimized.
Accidental release of fuels, oils, chemicals, liquid waste, hazardous materials, etc., to the ground during use, for example, re-fueling, maintenance, etc.	Appropriate procedures and protocols to be established and monitored for materials handling and use. Where possible, re-fuelling and maintenance areas will include some form of secondary containment.	Potential for accidental release of materials during use will be minimized.
Accidental release of liquid wastes during removal from site.	Appropriate procedures and protocols to be established and monitored for liquid waste materials removal.	Potential for accidental release of waste during removal from the site will be minimized.
Accidental discharge of sanitary wastewater and wastewater to ground.	Sanitary wastewater will not be discharged to the ground. Wastewater sumps and pits will be properly	None

	designed. Pipework will be inspected periodically by Proponent and recycle water wherever possible.	
Discharge of pollutants in water used for plant, equipment and vehicle washing to ground	Washing activities will take place on areas with proper drainage systems with containment and treatment. Effluent, if any, will meet the standards.	Potential for accident release of pollutants to the ground during washing activities will be minimized by proper design and use by Proponent
ENERGY AND GREENHOUSE GAS BALANCE		
Use of solid fuels and direct and indirect greenhouse gas emissions.	Ensure that combustion and processing is as efficient and in full compliance with IFC requirements for cement plant and maintenance and monitoring by Proponent.	<p>The Carbon dioxide (CO₂) emissions from Portland cement manufacturing are generated by two mechanisms. As with most high-temperature, energy-intensive industrial processes, combustion of fuels to generate process energy releases substantial quantities of CO₂. Substantial quantities of CO₂ also are generated through calcining of limestone or other calcareous material. This calcining process thermally decomposes CaCO₃ to CaO and CO₂. Typically, Portland cement contains the equivalent of about 63.5 percent CaO. Consequently about 1.135 units of CaCO₃ are required to produce 1 unit of cement, and the amount of CO₂ released in the calcining process is about 500 kilograms (kg) per tonne of Portland cement produced.</p> <p>Total CO₂ emissions from the pyro-process depend on energy consumption and</p>

		generally fall in the range of 0.85 to 1.35 tonnes of CO ₂ per tonne of clinker.
MATERIAL USE AND WASTEWATER MANAGEMENT		
Storage of solid and liquid wastes.	Inspection of all waste storage areas to ensure appropriate identification, segregation and containment.	Potential release into the environment
Waste management	<p>Establishment of waste management disposal/recycling techniques and appropriate choice/negotiation of EPC contractor by Proponent. Establishment of filter dust handling procedures and choice of the contractors. Hazardous waste disposal techniques to be established. Review of waste minimization and recycling options for all waste will be exhaustive.</p> <p>The sewage treatment system (capacity of 200m³/d) includes sewage tank, treatment unit and treated sewage tank. The treatment unit includes aeration tank, sedimentation tank, sludge drying field and chlorination devices etc. bio-chemical units. The treated sewage can be drained or reused.</p>	<p>Waste management will be covered by internal procedures and will be regulated through local regulations. Increased quantity of waste will be disposed of off-site. Proponent will monitor its procedures to increase or maximize recycling/reuse of any waste generated, including firing in the cement manufacturing process and composting.</p>
ECOLOGY OF CEMENT PLANT AND MINE SITES.		
Dust deposition on leaves leading to loss of vegetation productivity and health.	The planting of tree lines by Contractors during the construction phase to provide local screening in	Some dust emissions at the quarry sites, associated with excavation, etc., are inevitable, but emissions

	accordance with ecology expert's recommendation as a mean to reduce dust emissions at the source during operation. Proponent will ensure that the trees are planted to aid in the prevention of dust accumulation on foliage outside the plant.	and impacts can be kept to an acceptable level by use of latest technologies and best working practices. Mining plan and procedures to be implemented per the recommendations and approval by ecology expert.
Productivity and quality of vegetation for herbivores reduced.	In-plant road will be paved. Mine access roads will be clay and will be periodically wetted to minimize any impact.	Some impact is inevitable, but Proponent will make it a priority.
Disturbance of wildlife by noise.	Reduced at source and less than 60 dB at the plant fence.	The project site does not have any sensitive species.
Disturbance of wildlife by human presence and activities.	Environmental educational program. On-site ecologist by Proponent.	There should be some habituation to human presence by some non-sensitive wildlife.
LANDSCAPE AND VISUAL		
Damage to the landscape character and visual amenity due to introduction of incongruous features and activities	Proper design of light sources by establishing and effective balance between safety/security and environmental sensitivity. Sensitive and uniform (paint specifications) coloration of cement plant and vehicles. Minimize the time between working and restoration phase of quarry	Some exposure to alternation of the landscape character and loss of visual amenity, predominantly due to off-site quarry activities.
TRAFFIC AND TRANSPORT		
Increased heavy vehicles traffic both locally and nationally.	Maximize the use of the rail network, when available, for bulk deliveries and abnormal loads. Restricting delivery hours to reduce noise nuisance; avoid heavy truck movements in the night hours will be considered whether	The traffic has the potential to contribute to congestion and lead to complaints due to noise/vibration nuisance on a local basis. However, the study indicates that there will not be a significant impact.

	deliveries should be scheduled to avoid peak times to reduce congestion; heavy construction traffic will be subject to a traffic management plan, as necessary.	
Coal unloading at Port Qasim and transportation to cement plant site has the potential to generate fugitive dust.	The fugitive dust can be reduced by: Importing coal without fines and in larger sizes. Importing coal with moisture content ranging at 7% to 8%. This will also lessen fire hazard. Using tarpaulin or other covers during transportation.	None
NOISE AND VIBRATION		
Noise from cement plant	None recommended unless the plant and various installation differ significantly from similar established cement plants used as a reference. IFC guidelines for noise will be followed by Proponent.	None expected
Noise from mining activities	Good site management; appropriate choice of machinery; methods of working; hours of working; efficient material handling.	None expected
SOCIAL		
Increased Employment. (Positive Change)	Measures to maximize local employment. Recommended: Local recruitment and training. Prioritization of employment of Project Affected People (PAP's)	This depends on skills of the people. Enhanced apprenticeship/training for some local people whose skills could be improved including Recruitment Policy to extend in future to limited sponsorship for workers / local people children.

	Identification of targets of local people to be employed by skill levels.	
Loss of Land and property "RUPPER" Village household and compensation (minor benefit/minor adverse)	An appropriate compensation plan will be developed and agreed upon. Compensation Plan & Framework Documents will be prepared.	No negative residual impact should be incurred by PAP's. The assessment should include all applicable entitlements. Monitoring process to review and report
Hazards associated with development of new roads from main Highway to the cement plant and from the quarry to the cement plant.	<p>With regards to identified 'high' risks:</p> <p>Design measures to ensure landslips/falling rocks do not cause accidents</p> <p>Inclusions of pedestrian walkways and crossings</p> <p>Lighting, particularly at intersections.</p> <p>Planned access and parking.</p> <p>Risk of accident shall be reduced by implementation of education (road safety awareness) programs and liaison with the local communities as well as driver training programs and implementation of near-miss/accident reporting procedures. Communities to consider the need for additional safety bylaws.</p>	Some residual impact is expected, but should be limited by implementation of aforementioned mitigation measures.

7.5 Environmental Enhancement Measures

Responsibilities of the relevant stakeholders for implementation of the environmental enhanced measures are delineated in the following Table No. 7-5 below. These measures are subject to the tenure of the lease holder.

Table 7-5: Positive Environmental Impact Enhancement Measures

Positive Impacts	Enhancement Measures	Implementing Agencies
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Improving Land Utility	<ul style="list-style-type: none"> • Optimize use of recovered land. • Consolidation of land • After conclusion of mining activities, geo-tours can be arranged. • Forest Cultivation can also be taken. 	<ul style="list-style-type: none"> • Agricultural Department • Revenue Department • Proponent
Improvement of land activity	<ul style="list-style-type: none"> • Education of farmers on modern techniques of agriculture. • Use timely inputs for suitable soil conditioners. 	<ul style="list-style-type: none"> • Agricultural Department • Farmers
Improvement of Economic Conditions	<ul style="list-style-type: none"> • Provision of more jobs to locals with efforts on integration of project products. 	<ul style="list-style-type: none"> • Lease Owner • NGOs
Improvement of institutional performance	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Agricultural Development Bank/ Schedule Bank/ NGOs/ Education Department
Improvement of agriculture and forestry	<ul style="list-style-type: none"> • Adopt modern techniques for agro productivity to use optimal inputs. • Plant trees and crops with lesser water requirement 	<ul style="list-style-type: none"> • Agricultural Department • Forest Department • Farmers
Community Development	<ul style="list-style-type: none"> • Educate and train resident of villages on improvement of local conditions through NGO • Encourage local participation in social education and health activities and programs 	<ul style="list-style-type: none"> • NGOs • Locals

7.6 Potential Environmental Enhancement Measures

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

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 will be 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

Sr. No.	Designation	Responsibilities
1	Sr. Manager HSE	HSE Supervision
2	Manager HSE	Ensure EMP implementation
3	Assistant Manager	Operational management and control
4	Dy. Manager	Supervision and monitoring

8.4.1 Responsibilities of Functionaries

- Responsibilities of Management of Project

- 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.

- 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	500,000/-
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout installation period	Proponent & Contractor	100,000/-
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					600,000/-

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	500,000/-
		The noisy installation works will entirely be planned during day time when most of the neighbors will be at work.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					500,000/-

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	100,000/-
		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 will 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: 7. Source reduction 8. Reuse 9. Recycling	Throughout installation period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					100,000/-

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	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	50,000/-
		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	50,000/-
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	50,000/-
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	50,000/-
Sub-Total					200,000/-

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	500,000/-
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout operational period	Proponent& Contractor	50,000/-
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					550,000/-

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	500,000/-
		The noisy production works will entirely be planned during day time when most of the neighbors will be at work.	Throughout project life	Proponent & Contractor	0/-
Sub-Total					500,000/-

Table 8-9: 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	50,000/-
		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 will 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: 1. Source reduction 2. Reuse 3. Recycling	Throughout operational period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout operational period	Proponent & Contractor	0/-
Sub-Total					50,000/-

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	900,000/-
		Ensure the general safety and security at all times by providing day and night security guards and	Continuous	Proponent	500,000/-

		adequate lighting within and around the premises.			
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	500,000/-
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	100,000/-
Sub-Total					2,000,000

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 will be based on:

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

manufacturing. Training and capacity building trainings will be conducted on the regular basis to enhance the capacity of the workers hired for proposed project. Following is the detailed plan along with the schedules of the training:

Table 8-11 Training schedule

Sr.	Training Session	IH/EX	Facilitator	Participants	Trg. Dur.	Trg. Inst.	Venue	Cost/Session	Remarks
1	Personal Protective Equipment (PPEs)	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
2	Risk Assessment	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
3	Permit To Work	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
4	LOTOTO	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	MLCFL	On-Site	2000	Total 4 Sessions of each SOP
5	Work at Height	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
6	Confined Space Entry	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
7	Fire safety and Prevention	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
8	Emergency Planning and Response	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
9	Safe use of Electrical Appliances & installation	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
10	Road Transport Safety Procedure	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
11	Cranes Safety	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
12	Chemical Handling	IH	DM HSE	AM & Above (Total 135) Each	2 Hours	In-house	On-Site	2000	Total 4 Sessions

				Batch of 35 participants					of each SOP
13	Tools Safety	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
14	Machine Guarding	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP
15	Conveyor Belt Safety	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	2 Hours	In-house	On-Site	2000	Total 4 Sessions of each SOP

9 INVOLVEMENT OF STAKEHOLDER'S / PUBLIC CONSULTATION

9.1 Introduction

Stakeholder's consultation is a tool used for communication with a diverse group of stakeholders having multifarious aims such as information dissemination, exchanging views, soliciting feedback and suggestions on issues pertaining to the project, plan future actions. This practice initiates a need assessment and identifies areas of concern for all the parties that maybe affected by the project activities.

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

9.2 Benefits and Objectives of Stakeholder's Consultation

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

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

An informed public will better understand the tradeoffs between project benefits and disadvantages; be able to contribute meaningfully to the project design; and have greater trust with the project Proponent and support for the project, says the Asian Development Bank. These factors contribute towards improved project implementation sensitized to the human environment of the area. The objectives of stakeholders' consultation are to:

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

9.3 Identification and Classification of Stakeholders

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Identification of stakeholders is important for the sustainability of a developmental project and helps to evaluate and envisage the role of stakeholders. The influence or impact of the project on stakeholders can be elaborated in

9.4 Methodology for Consultation

Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits. A series of scoping sessions and formal focus group discussions were carried out with environmental experts and individuals. The meetings were held at various locations.

9.5 Key Consulted Stakeholders

The organizations consulted are as under:

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

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.

Following conclusions have been drawn from this EIA study and corresponding recommendations have been given.

- The cement production is very crucial for meeting increased construction demands at national as well as international level.
- All the positive and negative impacts resulting from the plant and 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 plant activities.
- No wastewater will be generated during project activities. All the wastewater will be treated.
- 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 NEQS.
- There are no human settlements present within the vicinity of the project site. The settlements are away from coal mines at safer distances. All the sensitive receptors are at a safer distance from the project area.
- No forest area or wildlife sanctuary exists within the vicinity of the Project Area, which may be affected by the Project. Few reptiles like lizards and snakes will be disturbed by the Project activities and may have to move into nearby areas. This will be a temporary insignificant impact. Anyhow the outskirts blank area is to be covered with green trees so project site will not give barren look.
- The other social issues like safety of public and workers, security problems, community accessibility issue, women accessibility to fields for their daily routine life etc. will be of temporary nature.
- The mining activities will provide additional job opportunities to the community of the area. The project will raise the income levels of the population of the area.
- Social cohesion is optimal.
- The environmental cost is negligible.
- M/s DW Pakistan is committed to ensure eco-friendly, sustainable, safe and sound environment.

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

APPENDICES

Appendice-1: 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 willingness 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.

Cement Clinker is a solid material produced in the manufacture of Portland cement as an intermediary product.

Appendice-2: Maps

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
KHB	Khushab
M. Tons	Metric Tons
in	Inches
GLS	Ground Level Surface
MTa	Metric Tons Annually
TPD	Tons Per Day
HSE	Health Safety and Environment

- <https://www.cemnet.com/News/story/161808/pakistan-cement-sector-prospects.html>
- 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.Wills 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, 1974.
- The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act and Rules. 1974.

- 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 Prf. Bharat B. Dhar.
- Mining Environmental Handbook by Jerrold J. Marcus.
- https://mn.m.punjab.gov.pk/important_minerals_occurring_in_punjab#14
- <https://en.wikipedia.org/wiki/Marl>
- <https://www.sciencedirect.com/topics/engineering/cement-production>
- https://en.wikipedia.org/wiki/Cement_clinker

Appendice-5: Terms of Reference of Environmental Reports

TERMS OF REFERENCE FOR EIA REPORT

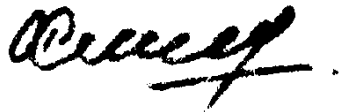
The agreement hereinafter called Agreement, is made between M/s Hi-Tech Environmental Services (Pvt.) Ltd. (Consultancy Firm/Consultant) and M/s DW Pakistan (Pvt.) Ltd. (Client) to prepare and carry out follow up of Environmental Study/ Environmental Impact Assessment (EIA) Report for obtaining Environmental approval under Section 12 of Punjab Environment Protection Act 1997 (Amended 2012) for proposed project of "Cement Plant of Capacity 7500 TPD Installation near Phirwani, District Dera Ghazi Khan".

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

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

- The client shall provide assistance and access to the information contained in the feasibility study, layout plan and other project relevant documents as and when required by the consultancy firm/consultant for performance of his obligations.
- The client shall provide all available data, maps, reports, etc. about the project including but not limited to layout plan of the project. Client will provide Lab Test Reports from EPA certified lab including noise level monitoring, wastewater analysis and stack emissions report or any report/document/information demanded by the EPA.
- The client will provide to the consultancy firm with the letter of introduction and authorization and other documents as may be needed to enable consultancy firm consultant to perform the service.
- Responsible to pay all the dues of the consultants as per the agreed terms and conditions.
- The consultancy firm/consultant shall carry out the services in accordance with the provisions of the agreement including:
- Shall follow up the EIA Report and other file required with due diligence necessary/required for obtaining its approval from EPA Punjab under the statutory requirements of PEPA 1997 (amended in 2012).
- Shall give the consultancy for the preparation of the detailed Environmental Management & Monitoring Plan for enhancing the environmental conditions during installation and operational phases such as mitigation measures for wastewater, solid waste, stack emissions, plantation, management of surface runoff, mitigation of socially adverse impact, if any.
- Will evaluate all the activities during the installation and operational phases and recommend suggestions/actions to comply with PEQS.

- Will follow up the EIA Report and file documents considering information/documents provided by the client.
- Shall examine the entire activities and list of the details of activities likely to cause adverse impacts during and after installation phase.
- Shall suggest mitigation measures for all such activities which may cause adverse impacts.



For and Behalf of

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



For and Behalf of

M/s DW Pakistan (Pvt.) Ltd.
(Proponent)

Appendice-6: 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:

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

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	42-Hajvery Town, Opposite Mandi Stop, Multan Road, 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:

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1	Dr. Zulfiqar Ali	Ph.D. Mineral Processing, M.Sc. Mineral Processing B.Sc. Mining Engineering	<ul style="list-style-type: none"> • Subject Specialist • Coordinator & Supervisor
2	Engr. Nabia Imran	Environmental Engineer B.Sc. Environmental Engineering	<ul style="list-style-type: none"> • Impacts Assessment and Proposing their Mitigation Measures. • Preparation of Environmental Management Plan (EMP)

			<ul style="list-style-type: none"> • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
3	Engr. Zainab Arshad	Environmental Engineer B.Sc. Environmental Engineering	<ul style="list-style-type: none"> • Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
4	Engr. Ali Mehdi	Mining Engineer and GIS Management B.Sc. Mining Engineering	<ul style="list-style-type: none"> • Author of EIA Report • Development of Maps
5	Ch. Awais Ahmad	LLM (London)	<ul style="list-style-type: none"> • Site Visits • Legal Reviews • Coordination with Locals

Appendice-7: Approvals from other Concerned Departments

1257

NO. DG(M&M)/SM/MT/100-DG Khan-Lime Stone 10/20
DIRECTORATE GENERAL OF MINES & MINERALS,
PUNJAB, POONCH HOUSE, MULTAN ROAD,
LAHORE.

To ✓ DW Pakistan (Pvt) Ltd.
231-Feeroze Pur road LAR.

Dated Lahore, the 05-11-2020

SUBJECT: APPLICATION DATED 5-11-2020 FOR THE GRANT OF
OF 6948.88 ACRES NEAR FOR 6.51 km OVER AN AREA
DG Khan IN DISTRICT.

Dear Sir(s),

I am to refer to your application cited as subject above and to state that it is presented to the undersigned today through M/s HTMA alongwith the following documents:-

- (i) Application on the prescribed form duly filled in and complete in all respect.
- (ii) Attested copies of the National Identity Cards of the applicant.
- (iii) Plan showing the boundaries of the applied for area within the prescribed limits of 6948.88 acres of 2.51 km
- (iv) Original receipted copy of the treasury challan for Rs. 200000/- being the application fee / cost of plans.
- (v) Statement showing your transaction with the bank during the proceeding one year.
- (vi) Certificate of ownership of immoveable property issued by the Competent Authority showing the particulars and value of the property.
- (vii) Statement of fixed deposit including DSC/NIT units etc.
- (viii) An authenticated copy of your partnership deed registered with the Registrar of Firms and Registration Certificate.
- (ix) A copy of Memorandum & Articles Association alongwith an attested copy of the certificate of Incorporation of your company and certificate from Chartered Accountant and list of share holders (Form E).
- (x) Clearance Certificate from the Accounts Branch of this Directorate.
- (xi) Development report on the Prescribed Performa.
- (xii) General Surface Plan (Scale 1=1000) and geological plan 1=1000.
- (xiii) Feasibility Report.
- (xiv) Environmental Impact Assessment Report. Not approved by ERA
- (xv) Environmental Rehabilitation Report.
- (xvi) Upto date statement of accounts.
- (xvii) Upto date and year-wise production report.

2. The aforesaid application has been allocated for registration vides serial number 10 Page 222 of the application register.

(Signature)
Deputy/Assistant Director (LSM)
For Director General Mines & Minerals,
Punjab, Lahore.

A009430


SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN
COMPANY REGISTRATION OFFICE
LAHORE

CERTIFICATE OF INCORPORATION
[Under section 2 of the Companies Ordinance, 1984 (XLVII of 1984)]

Corporate Universal Identification No. 0093796

Whereby certify that **DW PAKISTAN (PRIVATE) LIMITED** a company
day incorporated under the Companies Ordinance, 1984 (XLVII of 1984) and that the
company is Limited by Shares.

Given under my hand at Lahore this Fourth day of June Two Thousand
Fifteen

Fee Rs 5,000/-


(LIAQUAT ALI DULLA)
Additional Registrar of Companies

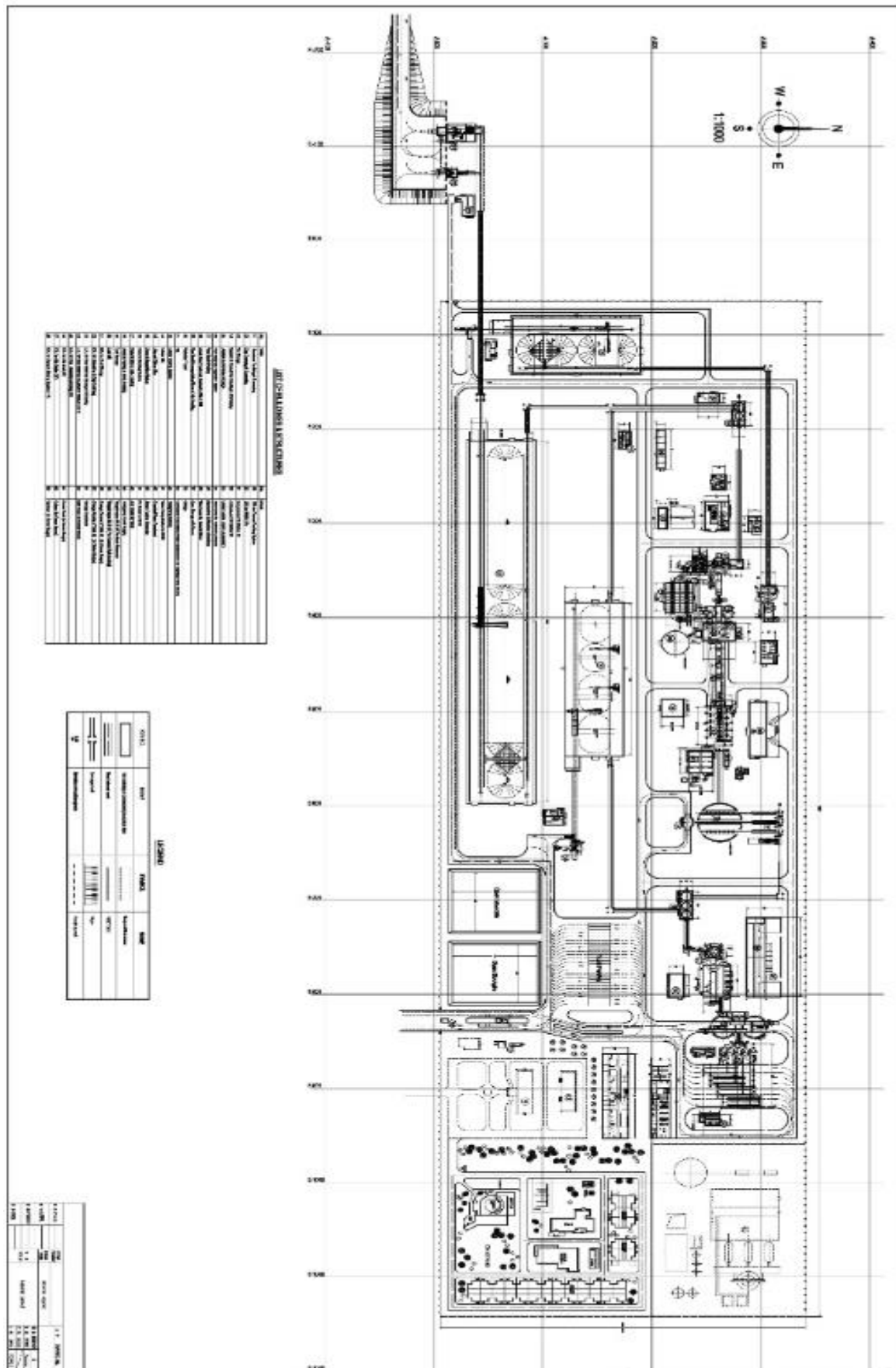


No. ARU / 50263 Dated: 04-06-2015

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ASSISTANT REGISTRAR OF COMPANIES
COMPANY REGISTRATION OFFICE
LAHORE.

Appendice-8: Cement Plant Layout



Appendice-9: Lab Reports

Water, Environment Laboratories & Consultancy Services (WELCOS)


EPA CERTIFIED

Water Quality Test Report

Reference No. WELCOS/BL/2020/DW/801

Date: 19 Dec, 2020

Name of Industry/ Proponent: M/S DW PAKISTAN (PVT.) LTD
NEAR PHIRWANI IN DISTRICT DG KHAN

Address:

Nature of sample: Drinking Water

Analysis Date: 15 Dec, 2020

Sample Collected By: Client **Grab/Composite:** Grab

Date Of Completion Of Analysis: 19 Dec, 2020


Analysis Parameters


Sr.#	Parameters	Units	PEQS	Result	Test Method Used	Remarks
1.	pH	-	6.5-8.5	7.35	APHA 4500H ⁺ B	Complies
2.	TDS	mg/l	< 1000	587	APHA 2140 C	Complies
3.	Bicarbonate	mg/l	NGVS	158	APHA 2320 B	Complies
4.	Conductivity	μS/cm	NGVS	736	APHA 2510 B	Complies
5.	Chloride	mg/l	< 250	57.1	APHA 4500 Cl-B	Complies
6.	Hardness	mg/l	< 500	173	APHA 2340 C	Complies
7.	Calcium	mg/l	200	68	APHA 3500 Ca-B	Complies
8.	Magnesium	mg/l	150	4.5	APHA 3500 Mg B	Complies
9.	Turbidity	NTU	<5 NTU	0.58	APHA 2130 B	Complies
10.	Fluoride	mg/l	≤ 1.5	0.29	APHA 4500 F D	Complies
11.	Iron	mg/l	0.3	0.10	APHA 3113-B	Complies
12.	Sodium	mg/l	NGVS	62	APHA 4500 Na-B	Complies
13.	Potassium	mg/l	N.S	0.89	APHA 3500 K-B	Complies
14.	Nitrate (NO ₃)	mg/l	≤50	0.11	APHA 4500 NO ₃ -B	Complies
15.	Nitrite (NO ₂)	mg/l	≤ 3	0.077	APHA 4500 NO ₂ B	Complies


Abbreviations:
PEQS: Punjab Environmental Quality Standards APHA: American Public Health Association

Terms and Conditions:

- Test was conducted on the request of project proponent for base line study.
- Report cannot be used for any kind of court case/PO litigation etc.
- The report should be reproduced as a whole not in parts.
- Differentiated instruments were used for analysis.


 Prepared By


 Reviewed By




 Approved By


-----Report End-----


No. 18163

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 ISO 9001:2015
 ISO 14001:2015
 OHSAS 18001:2015

Water, Environment Laboratories & Consultancy Services (WELCOS)



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Noise Monitoring Test Report

Reference No. WELCOS/BL/2020/N/801 Date: 19 Dec, 2020
Name of Industry/ Proponent: M/S DW PAKISTAN (PVT.) LTD
Address: NEAR PHIRWANI IN DISTRICT DG KHAN
Nature of sample: Noise
Analysis date: 15 Dec, 2020
Sample analyzed By: WELCOS Representative
Date of Completion of Analysis: 15 Dec, 2020

Analysis Parameters

Location Point	Min.dB(A)	Max. dB(A)
East of Boundary	51.1	54.7
West of Boundary	52.5	56.4
North of Boundary	54.5	55.5
South of Boundary	55.7	58.5
Central Boundary	55.8	57.7
Punjab Environmental Quality Standards (PEQS) Day Time industrial Area 75 dB		

Abbreviations:

PEQS: Punjab Environmental Quality Standards

Terms and Conditions:

- Test was conducted on the request of project proponent for base line study.
- Report cannot be used for any kind of court case.
- The report should be reproduced as a whole not in parts.
- Duly calibrated instruments were used for analysis.


Prepared By


Reviewed By


Approved By

-----Report End-----

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OHSAS 18001:2015

Water, Environment Laboratories & Consultancy Services (WELCOS)



EPA CERTIFIED

Ambient Air Quality Test Report

Reference No. WELCOS/BL/2020/AA/801 Date: 19 Dec, 2020
Name of Industry/ Proponent: M/S DW PAKISTAN (PVT.) LTD
Address: NEAR PHIRWANI IN DISTRICT DG KHAN
Nature Of Sample: Ambient air
Analysis Date: 15 Dec, 2020
Sample Analyzed By: WELCOS Representative
Date Of Completion Of Analysis: 15 Dec, 2020

Analysis Parameters

S. #.	Parameters	PEQS Limits	Result	Remarks
1.	Oxides of Nitrogen as NO ($\mu\text{g}/\text{m}^3$)	40 (1 Hrs)	36.5	Complies
2.	Oxides of Nitrogen as NO ₂ ($\mu\text{g}/\text{m}^3$)	80 (1 Hrs)	61.2	Complies
3.	Suspended particulate matter (SPM), ($\mu\text{g}/\text{m}^3$)	500 (1 Hrs)	135.5	Complies
4.	Carbon monoxide ($\mu\text{g}/\text{m}^3$)	10(1 Hrs)	8.9	Complies

Abbreviations:

PEQS: Punjab Environmental Quality Standards

Terms and Conditions:

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- Report cannot be used for any kind of court case EPO/litigation etc
- The report should be reproduced as a whole not in parts.
- Dully calibrated instruments were used for analysis.


Prepared By


Reviewed By


Approved By

Report End



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