

LIST OF ABBREVIATIONS

CSR	Corporate Social Responsibility
CO₂	Carbon dioxide
°C	Degree Celsius
dB(A)	A weighted decibel scale
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
ESP	Electrostatic precipitators
EMP	Environmental Management Plan
Engr.	Engineer
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Ordinance
GEL	Global Environmental Lab
GCD	Grey Cement Division
IEE	Initial Environmental Examination
km	Kilometer
KMLG	Kohinoor Maple Leaf Group
KTML	Kohinoor Textile Mills Limited
Ltd.	Limited
LTI	Loss Time Injury
LWI	Loss Work Injury
M.L.C.F.L	Maple Leaf Cement Factory Limited
M.L.C.F	Maple Leaf Cement Factory
m³	Cubic meter
m³/h	Cubic meter per hour
MW	Megawatt
M/S	Messrs



NEQS	National Environmental Quality Standards
No.	Number
NOC	No Objection Certificate
NO_x	Oxides of Nitrogen
OPC	Ordinary Portland cement
PEPC	Pakistan Environmental Protection Council
PEPA, 1997	Pakistan Environmental Protection Act, 1997
PEPA, 2012	Punjab Environmental Protection (Amendment) Act, 2012
PEPO	Pakistan Environmental Protection Ordinance
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipments
Pvt.	Private
RO	Reverse Osmosis
SMART	Self Monitoring and Reporting
SOPs	Standard Operation Procedures
SCD	Special Cement Division
SO_x	Oxides of Sulfur
TMA	Town Municipal Authority
tpd	Tons per day
WAPDA	Water and Power Development Authority



EXECUTIVE SUMMARY

INTRODUCTION

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for Grey Cement Line 3 of MLCFL located adjacent to Maple Leaf Cement Factory Limited. The main goal of the Proposed Project is to enhance the capacity of the company for manufacturing high quality ordinary Portland cement (OPC) to meet the increasing local and international market demands at affordable price and to promote economic growth and sustainable development of Pakistan. Also Proponent's intention is to become premium cement manufacturer by maintaining good quality of cement and satisfying stakeholder's expectations. For this instance, Environmental Impact Assessment of the Project has been conducted in accord with the Punjab Environmental Protection (Amendment) Act, 2012 read with Review of JEE/EIA Regulations 2000. The process for conducting environmental assessment and the results of EIA are described in this document.

INTRODUCTION OF COMPANY

The Kohinoor Maple Leaf Group was born from the trifurcation of the Saigol Group of Companies and is a reputable and leading manufacturer of textiles and cement. KMLG comprises of Kohinoor Textile Mills Limited (KTML) and Maple Leaf Cement Factory Limited (MLCF). Both companies are incorporated in Pakistan and are listed on three stock exchanges of the country.

Maple Leaf Cement is the third largest cement factory in Pakistan. It was set up in 1956 as a joint collaboration between the West Pakistan Industrial Development Corporation and the government of Canada. It is strategically located at Daudkhel (District Mianwali) in Northern Pakistan, which is an area rich in raw materials required for the production of cement. Kohinoor acquired the ownership and management of Maple Leaf Cement under the privatization policy of the government of Pakistan in 1992. At the time of privatization in

1992, the capacity of Maple Leaf to produce Ordinary Portland Cement (OPC) was 1000 tons per day (tpd). A second plant of 4000 tpd was commissioned in 1998 and a third plant of 6700 tpd came into production in 2006. At present total capacity to OPC is 11700 tpd. The capacity of White Cement has also increased from 100 tpd to 500tpd with the addition of a new plant. This plant also has provisions for doubling the capacity to 1000tpd. Presently Maple Leaf cement has 8% of the market share of OPC which is gradually growing and is a leading brand in Pakistan with a diverse customer base. It is also the largest producer of White Cement in the country with more than 90% of market share.

In order to remain competitive in the market the management at Maple Leaf continuously re-evaluates its business strategies. With the increase of furnace oil prices the company adopted coal as a more cost efficient and environmentally friendly fuel for kiln firing. Today the management believes that the future lies in exploring the possibilities of alternative and cheaper fuels such as waste firing. This would further reduce production costs whilst promoting a culture of environmental awareness, health and safety.

SALIENT FEATURES OF PROJECT:

PROPONENT NAME:	Schall Sadiq (G.M Finance MLCFL)
PROJECT TITLE:	Grey Cement Line 3 of MLCFL
PROJECT LOCATION:	Adjacent to MLCFL
CONSULTANT NAME:	Ecogreen Company (Pvt.) Ltd
COST OF THE PROJECT:	Rs. 24 billion approx
TOTAL LAND REQUIREMENT:	1050 kanals
METHOD OF MINING:	Top Slicing
FUEL REQUIREMENTS:	35.8-46.7tons/h coal for 7000 ton/d clinker production



SOURCE OF POWER:	Self-generation
PROPOSED CAPACITY:	Between 5000-10,000 tons/day
CURRENT STATUS:	Open Land
AIR POLLUTION ABATEMENT:	By Electrostatic Precipitators and Bag filters
GROUNDWATER TABLE:	Below 300m

PROJECT OBJECTIVES

The overall aim of the Proposed Project is to enhance the capacity of the company for manufacturing high quality ordinary Portland cement (OPC) to meet the increasing local and international market demands at affordable price and to promote economic growth and sustainable development of Pakistan. Also PropONENT's intention is to become premium cement manufacturer by maintaining good quality of cement and satisfying stakeholder's expectations.

PROJECT BENEFITS

The Project has been developed in response to a number of driving forces, including;

- Increase in cement demand locally and internationally
- Economic development
- Contribute to construction industry, cement industry etc.
- Poverty reduction
- Contribute in the development of infrastructure
- Improve living standard of the area
- Contribute into national GDP
- Project will create jobs for the indigenous/local persons.

- To provide better opportunities for the nearby vicinity including skilled and unskilled workers.

SITE ALTERNATIVES

For erecting a cement manufacturing plant, it is important that plant should be located as close as possible to main raw materials, especially limestone. Site selection needs very careful, well thought out and wise decision. Any oversight may lead to major miss fire. The most important factors for such a site selection include availability of raw material and land, seismic stability of site, existence of basic infrastructure including roads, water, manpower, proximity to electric transmission system, project economic viability with reference to specific site, land use policies, further expansion possibilities etc.

Three alternative sites are under consideration for the Proposed Project. Alternative site 1 is located near Special Cement Division of MLCFL, Alternative Site 2 is near Grey Cement Line 2 of MLCFL and Alternative site 3 is located near coal yard of Grey Cement line 2 of MLCFL. Site selection will be done on basis of certain points including:

- Close proximity to raw materials.
- Should not visually disturb the local environment.
- Site should have seismic stability.
- The limestone and clay deposits are easily accessible.
- Easy road and railway access for transport of fuel, raw materials and cement.
- Availability of adequate skilled & unskilled labor.
- Less transportation cost
- No settlements in close vicinity.
- No watercourse within a safe distance
- No ecologically sensitive or declared protected area

SCREENING

As per PEPA 2012, the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Regulations, 2000 the project falls in the **B (1) category (Cement Plants)** of the projects mentioned in Schedule II. Further, the client is required to fulfill the legal requirements of the section-12 of the Punjab Environmental Protection (Amendment) Act 2012 of filing an IEE/EIA with the EPA Punjab to obtain Environmental Approval before commencement of the project. The proponent will also conform to the other applicable environmental laws, rules and regulations (local as well as international to which our country is a signatory); the detail of which is presented in Chapter 2 of this Report.

ENVIRONMENTAL CONSULTANTS:

An Environmental Impact Assessment study report has been prepared to identify and predict the significant environmental impacts likely to arise from the commencement of the Proposed Project, along with environmental impact statement followed by delineation of appropriate Environmental Management Plan and Environmental Monitoring Plan to have a control over the adverse environmental impacts and to check the efficiency and effectiveness of the mitigation measures being implemented. For the purpose of this EIA, and to get Environmental Approval from Environmental Protection Agency (EPA) Punjab, management of M/S MLCFL has decided to engage the services of Environmental Consultant, M/S **Ecogreen Company (Pvt.) Ltd.**

PROJECT OUTLINE

The establishment of Grey Cement Line 3 of MLCFL is proposed to enhance the cement manufacturing capacity of MLCFL. The raw materials needed to produce cement (Limestone, Clay and gypsum) are generally extracted from quarries granted to MLCFL to fulfill its raw material requirements. These raw materials are retrieved from the quarry by either extraction or blasting. These naturally occurring minerals are then crushed through crushers. At this stage, additional minerals are added to ensure the correct chemical composition for

making cement. Blending produces a fine powder, known as raw meal, which is preheated and then sent to the kiln for further processing. The kiln is at the heart of the manufacturing process. Once inside the kiln, the raw meal is heated to around 1,500 degrees C - a similar temperature to that of molten lava. At this temperature, chemical reactions take place to form cement clinker, which contains hydraulic calcium silicates. Upon exiting the kiln, the clinker is cooled and stored, ready for grinding, to produce cement. A small amount of gypsum (3 percent to 5 percent) is added to the clinker to regulate how the cement will set. The mixture is then very finely ground to obtain "pure cement." During this phase, different mineral materials, called "additions," may be added alongside the gypsum. Used in varying proportions, these additions, which are of natural or industrial origin, give the cement specific properties, such as reduced permeability, greater resistance to sulfates and aggressive environments, improved workability, or higher-quality finishes.

Finally, the cement is stored in silos before being shipped in bulk or in bags to the sites where it will be used.

SCOPING

'Scoping' stage defines key issues that should be included in the Environmental Assessment and determines the scope, depth and Terms of Reference for the EIA study. This is a very important step both in identifying the impacts and controlling the size of the EIA. Effective scoping enables:

- defining the boundary of the EIA study
- consulting with relevant stakeholders to identify full range of concerns
- focusing on key issues that characterize the existing environment in the baseline studies
- reviewing the types of alternatives to be considered
- Exercising the option of canceling or drastically revising the project should major environmental problems be identified.

Several groups, particularly decision makers, the local population and the scientific community, have an interest in helping to deliberate the issues which should be considered,

and scoping is designed to canvass their views.

Scoping is important for two reasons; first, that problems can be pinpointed early allowing mitigating design changes to be made before expensive detailed work is carried out, and second, to ensure that detailed prediction work is only carried out for important issues. Scoping is an ongoing exercise throughout the course of project. Methodologies for scoping may range from interviews to use of checklists, matrices and network diagrams for visualization of sources and receptors of impacts and identifying which of these impacts requires attention in the study. These techniques collect and present knowledge and information in a straightforward way so that logical decisions can be made about which impacts are most significant.

MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Keeping in view, all the findings of the baseline study, and through general observation and desktop study, and understanding of the activities and processes involved in the project, environmental impacts have been anticipated. Following impact assessment methodology; i.e. defining the criteria for evaluation of the impacts, identification of mitigation measures (all possible options), evaluation of the residual impacts and identification of the monitoring requirements, adequate and effective mitigation measures have been proposed for all construction and operation related likely environmental impacts of the project. These mitigation measures have been proposed in order of attempts to eliminate or minimize the impact, provide some compensation or rehabilitate the environment by some means.

Weather describes an impact as having both spatial and temporal impacts, which can be described as the change in an environmental parameter over a specified period and within a defined area resulting from a particular activity compared with the situation which would have occurred had the activity not been initiated.




Key impacts related to the construction phase include:

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

Since the project is to be commenced on a reserved area and no human settlement exists within 2-3 km of the proposed sites, construction related impacts are not expected to extend to the community. Anticipated impacts associated with the construction phase however include noise (machine noise and vehicular noise), air emissions from earthwork and construction machinery and vehicles, and soil contamination due to leakage from or accidents of the construction or transportation vehicles or during on-site refueling, solid waste from construction, municipal water uses and safety of the workers and employment conflicts as the major adverse environmental impacts.

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

Key impacts related to the operation phase include:

- Noise
- Wastewater
- Solid Waste
- Air Pollution
- Safety, Public Health & Nuisances

Since the soil of the area is rich in water reserve, water extraction for the unit operation will not disturb the water availability in the area. Air emissions will be a significant issue if not managed properly. Solid waste will only comprise of municipal waste and packing waste. Heavy machinery will result in high noise at times, if not managed. Safety is of utmost concern in any occupational activity.

Municipal wastewater will be handled via Septic Tanks. Domestic and packing related Solid waste will entirely be managed by the solid waste management contractor, and in accordance with the TMA facilities in the area. Dust emitted during cement manufacturing is generally non-toxic, non-corrosive, non-inflammable, non-explosive, and also not hazardous. Nevertheless, adequate mitigation measures such as Electrostatic Precipitators (ESP) and Fabric Filters shall be put in place. Low NO_x emitting burners shall be used to reduce NO_x emission levels. In addition, further NO_x reduction shall be achieved by firing limestone under reducing atmosphere. Also, additional NO_x reduction shall be achieved through recycling of Kiln flue gases for use in the pre-heaters and pre-calcinators. SO_x levels are expected to be quite negligible. Noise from all the machines will be mitigated by enclosing them in sound proof rooms, regular servicing and tuning and providing them with silencers and mufflers, and by planting trees. Workers will be protected by providing them with PPEs (ear muffs, ear plugs, etc.). Safety issue will be managed by developing and updating from time to time, the SOPs for all work activities, training the workers to follow them, not tolerating any careless attitude of the employees during work, regular inspection to ensure no unsafe act or condition prevails

at work site and lastly, by providing the workers with necessary PPEs (safety helmets, dust masks, safety shoes, ear plugs, special suiting for various jobs and areas, etc.) and encouraging the workers to use them. Adequate solid waste management and good housekeeping will ensure healthy environment at the unit, as solid waste if not adequately managed, can serve as a source of pathogens. An Emergency Response Plan and a firefighting plan will also be in place to deal with all sorts of emergencies.

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:

Environmental impact of a project is worked out using various factors and parameters, so that an Environmental Management Plan can be evolved to take mitigation measures, wherever these might be considered necessary in order of appropriateness of elimination, reduction and compensation as the goals. The development of the EMP is to make some person responsible for implementing the mitigation measures as identified so that smooth implementation of the mitigation measures can be assured. Monitoring plans have also been included to ensure the compliance of the EMP by contractors and other responsible authorities. These plans have been included in Chapter-6 of the report.

During construction, ambient air quality for dust level in particular, vehicle and equipment exhaust, noise level (tests), solid waste management and soil contamination, and community and workers' safety (visual) need to be monitored. Monitoring Plan has been included in Chapter-7. During operation, noise level, ambient air quality and exhaust of all the machines (tests), solid waste management and community and workers' safety need to be monitored. Plan has been included in Chapter-6 of this Report.

CONCLUSION

The Environmental Impact Assessment contains description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation

measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study. While the objectives of this study have been to describe the project and its environmental impact, it also identifies adverse environmental factors associated with the project. Appropriate mitigation measures as explained in the environmental study should reduce, if not eliminate, these impacts so that these are within acceptable limits. It is further concluded that all potential environmental concerns associated with the project have been adequately addressed, and no further study is required in this context. The objective of preparation of an environmental study is to identify how the environment is impacted and to suggest mitigating measures to reduce if not totally eliminate adverse effects of a project. It is accordingly recommended that Environmental Approval for the project should be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponents of the project



LIST OF ANNEXURE

Following Documents are attached as annexure.

ANNEXURE I:	PROPERTY DOCUMENTS
ANNEXURE II:	PROPONENT CNIC
ANNEXURE III:	MACHINERY DETAILS
ANNEXURE IV:	MASS BALANCES
ANNEXURE V:	COMMUNITY DEVELOPMENT PLAN
ANNEXURE VI:	ENVIRONMENTAL MONITORING REPORTS
ANNEXURE VII:	SOPs OF DRILLING & BLASTING
ANNEXURE VIII:	PICTORIAL PRESENTATION
ANNEXURE IX:	EXPLOSIVES NOC
ANNEXURE X:	TERMS OF REFERENCES
ANNEXURE XI:	GLOSSARY
ANNEXURE XII:	REFERENCES
ANNEXURE XIII:	SOCIOECONOMIC SURVEY FORMS
ANNEXURE XIV:	PROCESS FLOW DIAGRAMS



TABLE OF CONTENT

LIST OF TABLES.....	23
1 CHAPTER 1: INTRODUCTION	24
1.1 GENERAL	24
1.2 THE PROPONENT	26
1.3 THE PROJECT	26
1.3.1 NATURE OF PROJECT.....	26
1.3.2 SIZE OF PROJECT	26
1.3.3 LOCATION OF PROJECT	26
1.3.4 LAND REQUIREMENT OF PROJECT.....	26
1.3.5 COST OF THE PROJECT	27
1.4 DETAILS OF CONSULTANTS.....	27
1.5 PURPOSE OF REPORT.....	27
1.6 SCOPE OF STUDY	28
1.7 EIA METHODOLOGY.....	29
1.7.1 SCOPING.....	29
1.7.2 BASELINE DATA COLLECTION.....	30
1.7.3 IMPACT ASSESSMENT.....	30
1.7.4 DOCUMENTATION	31
1.8 STRUCTURE OF REPORT.....	31
2 CHAPTER 2: STATUTORY REQUIREMENTS & STANDARDS	33
2.1 GENERAL	33
2.2 EXISTING LEGISLATION AND LEGAL FRAMEWORK.....	33
2.3 INSTITUTIONAL SETUP	34
2.3.1 ENVIRONMENTAL PROTECTION COUNCILS.....	34
2.3.2 ENVIRONMENTAL PROTECTION AGENCIES.....	34
2.3.3 ENVIRONMENT PROTECTION DEPARTMENT, PUNJAB	34
2.4 RELEVANT LEGAL / INSTITUTIONAL FRAMEWORK.....	34
Maple Leaf Cement Factory Limited (MLCFL)	15




2.4.1	PAKISTAN ENVIRONMENTAL PROTECTION ORDER (PEPO) 1983	35
2.4.2	PUNJAB ENVIRONMENTAL PROTECTION (AMMENDMENT) ACT2012	36
2.4.3	NATIONAL ENVIRONMENTAL POLICY 2005.....	36
2.4.4	REVIEW OF EIA / IEE REGULATIONS 2000	37
2.4.5	GUIDELINES FOR THE PREPARATION OF IEE/EIA REPORTS.....	37
2.4.6	THE PUNJAB LOCAL GOVERNMENT ORDINANCE, 2001.....	38
2.4.7	PAKISTAN PENAL CODE, 1860	38
2.4.8	THE LAND ACQUISITION ACT, 1894	38
2.4.9	FACTORIES ACT, 1934.....	39
2.4.10	LABOR LAWS.....	39
3	CHAPTER 3: DESCRIPTION OF PROJECT	40
3.1	GENERAL	40
3.2	TYPE AND CATEGORY OF PROJECT	40
3.3	OBJECTIVES OF PROJECT.....	40
3.4	ALTERNATIVES.....	40
3.4.1	Site Alternatives.....	40
3.4.2	Technology Alternative	43
3.4.2.1	RAW GRINDING.....	43
3.4.2.2	Mining	44
3.5	LOCATION AND LAYOUT OF PROJECT.....	46
3.5.1	Location of the Project	46
3.5.1.1	Alternative Site 1 (Near SCD):.....	46
3.5.1.2	Alternative Site 2(Near GCD Line 2)	47
3.5.1.3	Alternative Site 3 (Near GCD Coal Yard).....	50
3.6	LAND OWNERSHIP.....	52
3.7	GOVERNMENT APPROVALS	52
3.8	LAND USE ON SITE	52
3.9	ROAD ACCESS.....	52
3.10	RELOCATION AND REHABILITATION PLANS.....	52

3.11	VEGETATION FEATURES OF SITE	33
3.12	DESCRIPTION OF PROJECT	53
3.12.1	Raw Material Extraction and Preparation:.....	54
3.12.1.1	Limestone:	55
3.12.1.2	Clay:.....	56
3.12.1.3	Gypsum:.....	57
3.12.2	Raw mill department:	59
3.12.3	De-dusting	61
3.12.4	Raw Material Blending	62
3.12.5	Solid Fuel Preparation:.....	62
3.12.6	Pyro-process (Kiln System):	63
3.12.7	Clinker transport and storage:.....	64
3.12.8	Cement mill department:.....	65
3.12.9	Product collected in bag filter	66
3.12.10	Cement storage and packing:.....	67
3.12.11	Packing plant.....	67
3.12.12	Manual Truck loader	68
3.13	SUPPLIES	69
3.13.1	Water Requirement and wastewater management.....	69
3.13.2	Manpower	70
3.13.3	Electricity.....	71
3.13.4	Fuels	71
3.14	HEALTH, SAFETY & HYGIENE	71
3.14.1	First Aid facility.....	71
3.14.2	Safety Trainings	71
3.14.3	Use of Drugs and Narcotics	72
3.14.4	Security:.....	72
3.14.5	PERSONAL PROTECTIVE EQUIPMENTS.....	72
3.14.6	Fire fighting plan:	73



M. Singh

3.14.7	AIR EMISSIONS.....	73
3.14.8	NOISE.....	74
3.14.9	SOLID WASTE.....	75
3.14.10	Decommissioning and Abandonment:.....	75
3.14.11	LAND REQUIREMENT	75
3.14.12	COST OF PROJECT.....	76
3.14.13	COST AND MAGNITUDE OF OPERATION	76
3.14.14	PLANNING, DESIGN & IMPLEMENTATION SCHEDULE	76
3.14.14.1	Planning.....	76
3.14.14.2	Design.....	77
3.14.14.3	Schedule of implementation.....	77
4	CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT	78
4.1	GENERAL	78
4.2	METHODOLOGY OF CONDUCTING BASELINE STUDY.....	78
4.3	PHYSICAL ENVIRONMENT.....	79
4.3.1	GEOLOGICAL FORMATION	81
4.3.2	TEMPERATURE.....	83
4.3.3	RAINFALL	84
4.3.4	TOPOGRAPHY	85
4.3.5	WIND.....	85
4.3.6	AMBIENT AIR QUALITY	86
4.3.7	WATER RESOURCE	87
4.4	BIOLOGICAL ENVIRONMENT.....	87
4.4.1	AGRICULTURE.....	87
4.4.2	FLORA.....	89
4.4.3	FAUNA.....	89
4.5	SOCIOECONOMIC ENVIRONMENT	90
4.5.1	DEMOGRAPHIC PROFILE OF MIANWALI	90
4.5.2	GEOGRAPHICAL CONDITIONS.....	90



M. Umera

4.5.3	LANGUAGE	91
4.5.4	HEALTH FACILITIES	92
4.5.5	EDUCATIONAL FACILITIES.....	92
4.5.6	TRANSPORTATION AND COMMUNICATION	93
4.6	SOCIO-ECONOMIC SURVEY	94
4.7	QUALITY OF LIFE VALUES	95
4.8	LAB REPORTS OF ENVIRONMENTAL ANALYSIS	96
5	CHAPTER 5: STAKEHOLDER CONSULTATION.....	98
5.1	GENERAL	98
5.2	OBJECTIVE OF THE STAKEHOLDER CONSULTATION	98
5.3	CONSULTATION PROCESS	99
5.4	STAKEHOLDER CONSULTATION TECHNIQUES.....	100
5.5	STAKEHOLDERS CONSULTED.....	100
5.6	STAKEHOLDER CONCERNS AND RECOMMENDATIONS.....	101
5.6.1	Awareness Regarding the Proposed Project.....	101
5.6.2	Acceptability of the Proposed Project.....	101
6	CHAPTER6: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES....	104
6.1	GENERAL	104
6.2	OBJECTIVES	104
6.3	IMPACT ASSESSMENT METHODOLOGY	104
6.4	Anticipated Potential Environmental Impacts (Construction & Operation Phase).....	106
6.5	Impacts Associated with Project Location	110
6.6	Impacts Associated with Design.....	110
6.7	Impacts Associated with Construction Phase	110
6.7.1	IMPACTS ON PHYSICAL ENVIRONMENT.....	111
6.7.1.1	Effect on Geomorphology and soil.....	111
6.7.1.2	Water Quality	113
6.7.1.3	Water use	114
	Maple Leaf Cement Factory Limited (MLCFL)	19




6.7.2	Dust Emissions	115
6.7.2.1	Noise.....	117
6.7.3	IMPACTS ON BIOLOGICAL ENVIRONMENT.....	118
6.7.3.1	Vegetation loss	118
6.7.3.2	Wildlife and habitat.....	118
6.7.4	SOCIO-CULTURAL IMPACTS.....	118
6.7.4.1	Possible Displacement.....	118
6.7.4.2	Land use.....	119
6.7.4.3	Induction of Labor.....	119
6.7.4.4	Community Health	119
6.7.4.5	Safety.....	120
6.7.4.6	Interactions with Communities	121
6.7.4.7	Archeological or Cultural Resources	121
6.7.4.8	Security Risks	122
6.8	Impacts during Operational Phase	122
6.8.1	IMPACT ON PHYSICAL ENVIRONMENT	123
6.8.1.1	Water Consumption.....	123
6.8.1.2	Water Quality	123
6.8.1.3	Air Quality.....	123
6.8.1.4	Noise and Vibration.....	124
6.8.1.5	Solid Waste Management	125
6.8.1.6	Fuel Management.....	126
6.8.1.7	Emergency Response	127
	FIRE HAZARD.....	127
6.9	IMPACTS ON SOCIO-ECONOMIC ENVIRONMENT	128
6.9.1.1	Safety.....	128
6.10	Potential Environmental Enhancement Measures.....	129
6.10.1	Tree Plantation	129
6.10.2	Health Concerns.....	131




6.10.3	Community Development Plan.....	132
7	CHAPTER 7: ENVIRONMENTAL MANGEMENT AND MONITORING PLANS.....	133
7.1	GENERAL	133
7.2	OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN.....	133
7.3	MANAGEMENT APPROACH.....	134
7.4	COMPONENTS OF THE EMP The EMP consists of the following:.....	134
7.5	ENVIRONMENT MANAGEMENT PLAN	134
7.6	ENVIRONMENTAL MONITORING PLAN	146
7.7	INSTITUTIONAL CAPACITY OF THE UNIT	150
7.7.1	PRIMARY RESPONSIBILITIES	150
7.7.2	OPERATION MANAGEMENT & CONTROL	150
7.7.3	SUPERVISION & MONITORING	150
7.7.4	COMMUNICATIONS AND DOCUMENTATION.....	150
7.7.4.1	MEETINGS.....	150
7.7.4.2	CHANGES-RECORD REGISTER	151
7.8	ENVIRONMENTAL TRAINING.....	151
7.9	EQUIPMENT MAINTENANCE DETAILS	154
7.10	ENVIRONMENTAL BUDGET.....	154
8	CHAPTER 7: CONCLUSION AND RECOMMENDATIONS.....	155
8.1	CONCLUSION.....	155
8.2	RECOMMENDATIONS.....	156

LIST OF FIGURES

Figure 1: Alternative Site 1 (Near SCD).....	42
Figure 2: Alternative Site 2 (Near GCD Line 2)	42
Figure 3: Alternative Site 3 (Near GCD Coal Yard).....	43
Figure 4: Comparison of open pit mining and ground mining	45
Figure 5: Alternative Site 1	46
Figure 6: Distance of Alternative Site 1 from GCD	47
Figure 7: Distance of Alternative site 1 from Khirabad	47
Figure 8: Alternative Site 2	48
Figure 9: Distance of Alternative Site 2 from GCD	49
Figure 10: Distance of Alternative Site 2 from Khirabad.....	49
Figure 11: Alternative Site 3	50
Figure 12: Distance of Alternative Site 3 from GCD	51
Figure 13: Distance of Alternative Site 3 from Khirabad.....	51
Figure 14: Vegetation Features of Site.....	53
Figure 15: Cement Production Process Diagram.....	54
Figure 16: Limestone and Clay Crusher.....	57
Figure 17: Gypsum crusher.....	58
Figure 18: Grinding mill	61
Figure 19: Cement mill	66
Figure 20: Packing plant	68
Figure 21: Cement Manufacturing Process.....	69
Figure 22: Safety Trainings	71
Figure 23: Google Earth View of Mianwali.....	82
Figure 24: District Mianwali.....	82
Figure 25: Average monthly temperature in Mianwali.....	83
Figure 26: Climate of MLCFL.....	84
Figure 27: Average Yearly Precipitation in Mianwali	85
Figure 28: Near GCD	87
Figure 29: Near SCD.....	87
Figure 30: Geographical Location.....	91
Figure 31: Schools near MLCFL.....	93
Figure 32: Socioeconomic Survey.....	95
Figure 33: Ambient Air and Noise Analysis at Proposed Project Sites.....	97
Figure 34: Hierarchy of Mitigations.....	105
Figure 35: Tree Plantation by MLCF in Spring Season.....	130
Figure 36: Recent Tree Plantation Activity in Govt. College, Musa Khel	131



M. Ayub

LIST OF TABLES

Table 1: List of Experts.....	27
Table 2: Details of Crusher	55
Table 3: Gypsum crusher	58
Table 4: Average Monthly Temperature of Mianwali	83
Table 5: Main Crops of Mianwali.....	88
Table 6: Main Fruits of Mianwali.....	88
Table 7: Main Vegetables of Mianwali	89
Table 8: Town-Wise Distribution of Population	90
Table 9: Stakeholders Consultation and Recommendations	101
Table 10: Environmental Management Plan.....	135
Table 11: Environmental Monitoring Plan	148
Table 12: Training Schedule	152



CHAPTER 1: INTRODUCTION

1.1 GENERAL

Cement industry is one of the few industries that existed in Pakistan before the partition of the sub-continent. The major reason for the existence of this industry is the availability of the raw materials. Pakistan has inexhaustible reserves of limestone and clay, which can support the industry for another 50-60 years. The annual production of the cement at the time of the creation of Pakistan was only 300,000 tonnes per year. By 1954 the production increased to 660,000 tonnes per annum against a demand of 1,000,000 tonnes per annum. At this time the production reaches to 1,000,000 tonnes per annum. Since then besides expansion of the existing plants, new plants have also established. Besides producing OPC, the Pakistani cement industry also started producing SRC, Slag cement and white cement. Most analysts believe that the sector looks even stronger in the fiscal year 2015 - 16, as domestic demand has grown at 16% during year 2014 - 15 from previous year. It is probably the only sector that has enjoyed all the support of domestic as well as global trends for over years which has resulted in continuous increase in the sector's profitability.

A **cement** is a binder, a substance used in construction that sets and hardens and can bind other materials together. The most important types of cement are used as a component in the production of mortar in masonry, and of concrete, which is a combination of cement and an aggregate to form a strong building material. Portland cement is by far the most common type of cement in general use around the world. This cement is made by heating limestone (calcium carbonate) with other materials (such as clay) to 1450 °C in a kiln, in a process known as calcination, whereby a molecule of carbon dioxide is liberated from the calcium carbonate to form calcium oxide or quicklime, which is then blended with the other materials that have been

included in the mix to form calcium silicates and other cementitious compounds. The resulting hard substance, called 'clinker', is then ground with a small amount of gypsum into a powder to make 'Ordinary Portland Cement', the most commonly used type of cement (often referred to as OPC). Portland cement is a basic ingredient of concrete, mortar and most non-specialty grout. The most common use for Portland cement is in the production of concrete. Concrete is a composite material consisting of aggregate (gravel and sand), cement, and water. As a construction material, concrete can be cast in almost any shape desired, and once hardened, can become a structural (load bearing) element. Portland cement may be grey or white.

As per PEPA 2012 and the IEE/EIA Regulations, 2000 it is mandatory for the proponent of any development project to obtain Environmental Approval from EPA Punjab by filing an IEE or EIA as the case may be, before the Agency. This Report presents the Environmental Impact Assessment (EIA) for this proposed cement plant. For this purpose, the proponent has decided to engage environmental consultants, **M/S Ecogreen Company (Pvt.) Ltd.** The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the construction and operation phase of the project with the aim to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulate Environmental Management Plan (EMP) for implementation of the project in environment-friendly manner.

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

1.2 THE PROPONENT

Name: Mr. Sohail Sadiq (G.M Finance)

Address: Maple Leaf Cement Factory Limited, 42-Lawrance Road, Lahore

Contact Person Name: Muhammad Irfan Taher

Cell Number (Contact Person): 0316-4442052

1.3 THE PROJECT

The Proposed Project is titled as Grey Cement Line 3 of MLCFL. Its salient features have been described later in this Chapter, Chapter 3, and briefly in Executive Summary of this EIA Report.

1.3.1 NATURE OF PROJECT

This project is for a Cement Manufacturing Plant.

1.3.2 SIZE OF PROJECT

Production capacity of Proposed Project will range between 5,000-10,000 tons/day. It will be preferred to set capacity of plant to 7000 tons/day (same as existing cement plant of MLCFL) so that parts of machinery can be interchanged if required and shall drive down the maintenance costs.

1.3.3 LOCATION OF PROJECT

This Proposed Project is located adjacent to MLCFL.

1.3.4 LAND REQUIREMENT OF PROJECT

Total area required for Proposed Project is 1050 kanals.

1.3.5 COST OF THE PROJECT

Cost of project has been estimated at PKR 24 billion.

1.4 DETAILS OF CONSULTANTS

For the preparation of the EIA Report of this Proposed Project of Grey Cement Line 3 of MLCFL, the proponent has hired the services of the environmental consultants; **M/S Ecogreen Company (Pvt.) Ltd.** Team comprising of environmental engineers, chemical engineers, environmental experts and environmentalists has worked on this report. The following table lists the names of those experts:

Table 1: List of Experts

Mr. Farhan Awan	Environmental Economist
Engr. M. Asif	Environmental Design Expert
Engr. Muzna Manzoor	Environmental Engineer
Engr. Hira Iqbal	Environmental Engineer
Engr. Bilal	Environmental Engineer
Engr. Abdullah	Environmental Engineer
Mr. Zeeshan Ismail	M. Phil Environmental Sciences
Muhammad Waqas	Internee Environmentalist
Arman Ilyas	Internee Environmentalist
Asif Rafique	Field Assistant

1.5 PURPOSE OF REPORT

The main objectives of this EIA study were:

- 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 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.

1.6 SCOPE OF STUDY

For the EIA study, the scope of work is as under:

- Description of physical, ecological and socio-economic conditions in and around the proposed facility. Project impact identification, prediction and significance at all stages of the project including planning, implementation and operation.
- Identification and assessment of the workability of mitigation measures to offset or minimize negative project impacts on environment.
- Identification of occupational hazards during all stages of the project and laying down suggestions for improvement in the conditions.

1.7 EIA METHODOLOGY

Methodology of preparing EIA report follows:

1.7.1 SCOPING

The key activities of this phase include:

Project Data Compilation: A generic description of the activities relevant to environmental assessment is compiled with the help of the proponent.

Published Literature Review: Secondary data on weather, water resources and vegetation, and other relevant environmental features of the project area and the similar projects, is reviewed and compiled.

Legislative Review: Information on relevant legislations, regulations, guidelines, and standards is reviewed and compiled.

Identification of Potential Impacts: The information collected is reviewed and potential environmental issues are identified.

Identification of Mitigation Measures: Mitigation measures are identified for all the likely impacts in order of preference for avoiding the impacts altogether, minimizing their frequency or extent and compensating or rectifying the losses; as may be found practicable in the project.

Selection of Alternatives: Based on the potential impacts and the cost required to mitigate them, most crucial project employing the best available technology at the most feasible site is selected.

Scoping Meeting: A scoping meeting is held to share this basic level of project information with all the project stakeholders before the information is incorporated into the report, so that some improvement can be sought out in the data as may be

necessary, better or more friendly alternatives can be selected, and better and more practicable mitigation measures can be suggested

1.7.2 BASELINE DATA COLLECTION

A considerable amount of baseline information on the project area was available from the environmental studies previously conducted in the region of other projects. A field visit was conducted to collect primary data on the water quality, ambient air quality, noise level, and ecological species surviving in the area and the ecosystems prevalent, and the lifestyle, socio-cultural setup, income and sources of income and the facilities available for the residents in the areas around the proposed unit. For ambient air and water quality, tests were conducted by an EPA-certified laboratory, noise level was measured using noise meter, and for socioeconomic profile, people around the site were interviewed.

1.7.3 IMPACT ASSESSMENT

The environmental and socioeconomic features and other project information collected, is used to assess the potential impacts of the activities. The issues studied include potential project impacts on:

- Geomorphology
- Meteorology
- Groundwater and surface water quality
- Ambient air quality & noise level
- The ecology of the area, including flora and fauna
- Local communities

Wherever possible and applicable, the discussion covers the following aspects:

- The potential change(s) in environmental parameters likely to be effected by

project related activities

- The identification of potential impacts
- The evaluation of the likelihood and significance of potential impacts
- The defining of mitigation measures to reduce impacts to as low as practicable
- The prediction of any residual impacts, including all long-term and short-term, direct and indirect, and beneficial and adverse impacts
- The drafting of monitoring arrangements of residual impacts

1.7.4 DOCUMENTATION

This EIA Report is prepared according to the relevant guidelines prescribed by the Punjab Environmental Protection Agency at the end of assessment. It includes findings of all the phases of the assessment process. Before preparation of the final report for submittal to the EPA Punjab, draft report was presented to the Proponent for review and comments.

1.8 STRUCTURE OF REPORT

EIA report comprises following chapters:

Chapter 1: Introduction (A description of the project, proponent and consultants, the need for the project and the report and method of preparing it).

Chapter 2: Policy, statutory, and institutional Framework (A description of the pertinent national & provincial legislations, regulations and policies that are relevant and applicable to the project and a demonstration of how the project conforms to them).

Chapter 3: Project Description (Full description of the relevant parts of the project and summary of project inputs and outputs).

Chapter 4: Baseline Study (Description of project area's existing physical, biological

and socio-economic condition, including geomorphology and soils, water resources (air quality, flora, fauna and demography).

Chapter 5: Stakeholder Consultation (All stakeholders are consulted in a public hearing and their concerns are considered)

Chapter 6: Project Impacts and mitigation measures (Presents an assessment of the project's impacts, suggested mitigation measures in order of eliminating or minimizing the impacts or compensating for the loss or rehabilitating the environment, residual impacts and the monitoring requirements).

Chapter 7: Environmental Management & Monitoring Plans (Provides Environmental Management Plan & Environmental Monitoring Plan for both construction and operation phases of the project).

Chapter 8: Conclusions & Recommendations (Concludes the EIA report with a few recommendations to conduct the project in environment-friendly manner).

CHAPTER 2: STATUTORY REQUIREMENTS & STANDARDS

2.1 GENERAL

Sustainable development and green economy is a concept that has emerged over the past decades to describe a new framework aimed at economic and social development while maintaining the long term integrity of the ecological system and environmental resources. The principal of sustainable development is in the process of being incorporated into the national policy and legislation through various statutory instruments. This chapter describes the current legal responsibilities of the proponent in context of environmental and sustainable development, and the institutions that exist in the country that may influence the environmental management of the project. This section deals with the current policy as well as legal and administrative framework related to carrying out of Environmental Impact Assessment (EIA) of the project. An efficient and effective organizational structure is essential for successful implementation of the mitigation measures identified for the project. Like other projects, the project, before its implementation, is required to go through an Environmental Assessment, in accordance with the provisions of the Punjab Environmental Protection (Amendment) Act 2012.

2.2 EXISTING LEGISLATION AND LEGAL FRAMEWORK

The Federal Ministry of Environment was responsible authority for policy making on environmental protection in Pakistan but after 18th Amendment in the Constitution, the Provincial Governments have taken over the subject of Environment. This EIA study has been carried out in the light of the policy guidelines of the Preparation of IEE/EIA Reports under the procedures and practices formulated by the Pak EPA and adopted by the Punjab Environmental Protection Agency (EPA).

2.3 INSTITUTIONAL SETUP

2.3.1 ENVIRONMENTAL PROTECTION COUNCILS

The Punjab Environmental Protection Council (PEPC) is the apex decision-making body of Punjab. It has been developed under the provision of Punjab Environmental Protection (Amendment) Act 2012. It is headed by Chief Minister of Punjab with other members. The purpose of EIA is basically to obtain Environmental Approval from the Environmental Protection Agency (EPA), Punjab in compliance with Pakistan Environmental Protection Act (PEPA) - 1997, now having been replaced by Punjab Environment Protection (Amendment) Act 2012.

2.3.2 ENVIRONMENTAL PROTECTION AGENCIES

Pak EPA has been established at the Federal level and EPAs are established at Provincial level also. In Punjab an independent Environmental Protection Agency is constituted headed by the Director General.

2.3.3 ENVIRONMENT PROTECTION DEPARTMENT, PUNJAB

The Punjab Government has established Environment Protection Department (EPD) administratively controlled by the Secretary, Government of Punjab. The EPD has its independent Minister. According to the provisions of the Punjab Environmental Protection (Amendment) Act, 2012, EPD has a significant role in policy making and implementation of the environmental laws in the Punjab Province.

2.4 RELEVANT LEGAL / INSTITUTIONAL FRAMEWORK

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

A number of laws have been promulgated by the Government of the Pakistan to deal with the environmental and social aspects related to the implementation of various development projects in the country. In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO) that was replaced by the PEPA, 1997, through an Act of Parliament. According to the 18th Amendment in Constitution, the PEPA 1997 has been confined to Federal Area and provinces have been allowed to formulate their own environmental legislation in the subject of environment.

Under the PEP Act, it is mandatory to carry out IEE or EIA for all development projects. The Pak EPA has also framed guidelines for environmental assessment of projects in various developmental sectors, According to PEPA 1997; the National Environmental Quality Standards (NEQS) were established for effluents discharges and gaseous emissions of various Municipal and Industrial sources. The latest revision of NEQS as carried out in year 2000.

Provincial Environment Protection Departments are also working on the formulation and enforcement of environmental statutes and by-laws. The Pak EPA has issued several policies guidelines and adopted measures for streamlining the environmental assessment. Though, the need for environmental screening and assessment has received some weight during the recent past, strict implementation of the NEQS is still a dream to be realized. The applicable laws for the environmental study of the Project are briefly described below:

2.4.1 PAKISTAN ENVIRONMENTAL PROTECTION ORDER (PEPO) 1983

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO) 1983. It was the first legislation promulgated for the protection of environment. According to PEPO, 1983 it was necessary to carry out IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

2.4.2 PUNJAB ENVIRONMENTAL PROTECTION (AMMENDMENT) ACT2012

Section 12 of the Punjab Environmental Protection (Amendment) Act 2012 makes it mandatory for the proponent of a project to file with the Environmental Protection Agency either an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA), as the case may be, in respect of the project.

As per definition given in the Punjab Environmental Protection (Amendment) Act 2012, Environmental Impact Assessment (EIA) means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory, and compensatory measures, formulation of environmental management & training plans & monitoring arrangements, and framing of recommendations and such other components as may be prescribed. The provision of Section 12 has been incorporated "as it is" in the new Punjab Environmental Protection (Amendment) Act, 2012.

2.4.3 NATIONAL ENVIRONMENTAL POLICY 2005

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

The National Environmental Policy (2005) provides a framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of bio diversity, desertification etc.) confronting Pakistan. It recognizes the goals and objectives of the Pakistan National Conservation Strategy (PNCS, 1992), National Environmental Action Plans, and other existing environment related national policies, strategies, and action plans. It also provides broad guidelines to the Federal Government, Provincial Governments, federally administrated territories and local governments to address

their environmental concerns and to ensure effective management of their environmental resources.

2.4.4 REVIEW OF EIA / IEE REGULATIONS 2000

The Pak EPA has issued Review of the Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, to review the Initial Environmental Examination (IEE) / Environment Impact Assessment (EIA) reports. Categorization of the projects for IEE and EIA is one of the main components of the Regulations. Projects have been classified on the basis of expected degree of adverse environmental impacts. Projects type listed in Schedule I are designated as potentially less adverse effect, schedule I projects require an IEE and projects given in schedule II require EIA to be conducted.

Salient features of the Regulations are listed below:

- Categories of project requiring IEE and EIA are issued through two schedules attached with the regulations
- A fee depending on the cost of the project has been imposed for the review of IEE and EIA.
- The submittal is to be accompanied by an application in prescribed format included as Schedule IV of the Regulation.
- The EPA is required to issue conformation of compliance within 15 days of receipt of request and complete documentation.
- The IEE / EIA approval for construction of the project will be valid for three years from date of accord.

2.4.5 GUIDELINES FOR THE PREPARATION OF IEE/EIA REPORTS

The Pak EPA has also framed Guidelines for the Preparation of IEE / EIA of projects in various developmental sectors.

2.4.6 THE PUNJAB LOCAL GOVERNMENT ORDINANCE, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. There are not withstanding any specific provisions, every local government may perform functions conferred by or under the Punjab Local Government Ordinance, 2001, and in performance of such functions may exercise such powers, which are necessary and appropriate. Under the ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

2.4.7 PAKISTAN PENAL CODE, 1860

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

2.4.8 THE LAND ACQUISITION ACT, 1894

The Land Acquisition Act (1894) deals with the acquisition of private properties for public purposes. There are 55 sections in this Act mainly dealing with area notification, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.

Although quite old, this act laid out the legal basis for any property affected by a project and for compensating the effected owners of the land.

2.4.9 **FACTORIES ACT, 1934**

The clauses relevant to the project are those that concern the health, safety, and welfare of workers, disposal of solid waste and effluent and damage to private and public property. The Factories Act also provides regulations for handling and disposal of toxic and hazardous materials. Given that construction activity is classified as 'industry', these regulations will be applicable to the project contractors.

2.4.10 **LABOR LAWS**

Construction and operational activities during the course of construction may affect occupational health of workers. Employers are required to abide by labor laws in respect of their own employees and also to ensure that contractors to follow the relevant labor laws and rules relating to safety of the workforce and creating a healthy working environment. The proponents shall ensure that the labor force engaged at the project site is not exposed to any danger by monitoring the contractor's work frequently.

CHAPTER 3: DESCRIPTION OF PROJECT

3.1 GENERAL

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, selection of alternatives, 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.

3.2 TYPE AND CATEGORY OF PROJECT

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 the Proposed Cement Manufacturing Plant falls in the **B (1) category (Cement Plants)** of the projects mentioned in Schedule II.

3.3 OBJECTIVES OF PROJECT

The overall aim of the Proposed project is to enhance the production capacity of the company for manufacturing high quality Ordinary Portland Cement (OPC) also known as Grey Cement to meet the increasing local and international market demands at competitive price and to promote economic growth and sustainable development of Pakistan. Also Proponent's intention is to become premium cement manufacturer by maintaining good quality of cement and satisfying stakeholder's expectations

3.4 ALTERNATIVES

3.4.1 Site Alternatives

For erecting a cement manufacturing plant, it is important that plant should be located as close as possible to main raw materials, especially limestone. Site selection needs very careful, well thought out and wise decision. Any over sight may lead to major miss fire. The most important factors for such a site selection include availability of raw

material and land, seismic stability of site, existence of basic infrastructure including roads, water, manpower, proximity to electric transmission system, project economic viability with reference to specific site, land use policies, further expansion possibilities etc.

Three alternative sites are under consideration for the Proposed Project. Alternative site 1 is located near Special Cement Division of MLCFL, Alternative Site 2 is near Grey Cement Line 2 of MLCFL and Alternative site 3 is located near coal yard of Grey Cement line 2 of MLCFL. Site selection will be done on basis of certain points including:

- Close proximity to raw materials
- Should not visually disturb the local environment
- Site should have seismic stability
- The limestone and clay deposits are easily accessible.
- Easy road and railway access for transport of fuel, raw materials and cement.
- Availability of adequate skilled & unskilled labor.
- Less transportation cost
- No settlements in close vicinity
- No watercourse within a safe distance
- No ecologically sensitive or declared protected area



Figure 1: Alternative Site 1 (Near SCD)



Figure 2: Alternative Site 2 (Near GCD Line 2)



A handwritten signature or set of initials in black ink, located in the bottom right corner of the page.

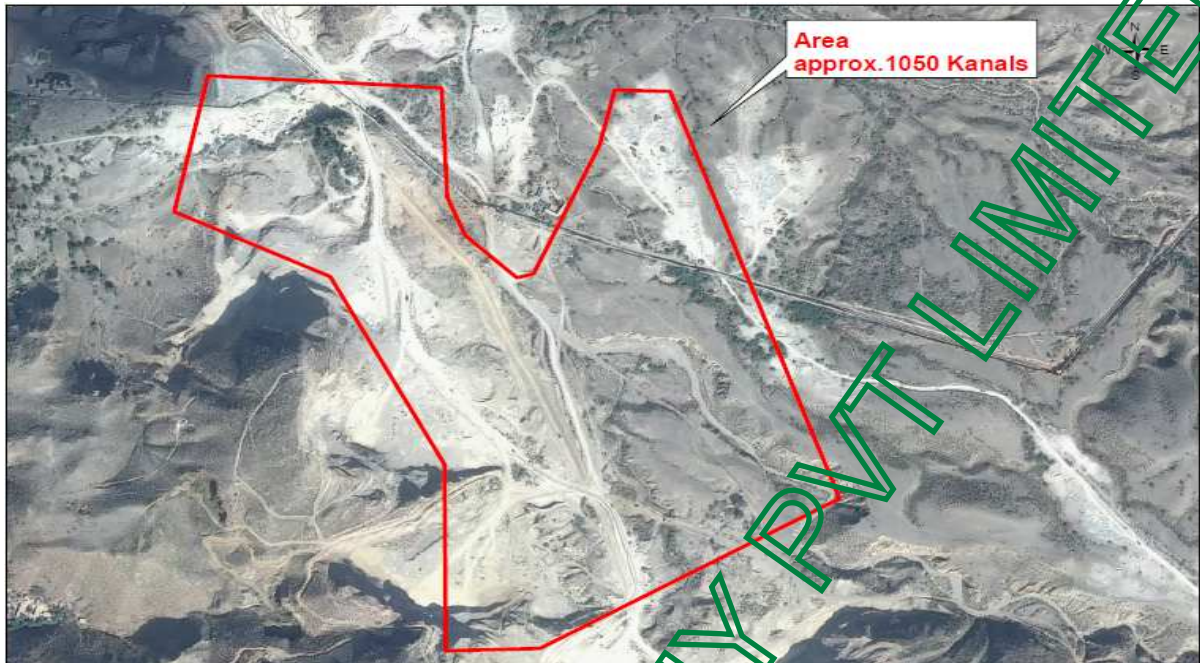


Figure 3: Alternative Site 3 (Near SCD Coal Yard)

3.4.2 Technology Alternative

3.4.2.1 RAW GRINDING

Basically, cement is produced in two steps: first, clinker is produced from raw materials. In the second step cement is produced from cement clinker. The raw materials are delivered in bulk, crushed and homogenized into a mixture which is fed into a rotary kiln. These elements mixed homogeneously (called “raw meal” or slurry) will combine when heated by the flame at a temperature of approximately 1450°C. The final product of this phase is called “clinker”. These solid grains are then stored in huge silos. The second phase is handled in a cement grinding mill which can be vertical raw mill or ball mill. Gypsum and possibly additional cementitious (such as blast furnace slag, coal fly ash, etc.) or inert materials (limestone) are added to the clinker. All constituents are ground leading to a fine and homogenous powder. For grinding of raw material, Vertical Raw mill will be employed over ball mill systems. This is because of the ability of a vertical roller mill to grind, dry, and classify - all in one compact

machine for simplicity of layout and construction cost savings. Grinding efficiency of vertical roller mill combined with drying capabilities and products classified in the same mill makes vertical roller mill better than ball mill.

Method of cement manufacturing is similar around the world so no other alternatives can be discussed. However different vendors are available for procurement process including FLSmidth, Gebr. Pfeiffer, Inc., KHD Humboldt Wedag, LOESCHE GmbH, Sinoma (Tianjin Cement industry Design and Research Institute Co., Ltd.), Sinoma (Chengdu Design and Research Institute of Building Material Industry Co., Ltd.). Any one of these vendors will be selected for said project to provide the complete technology or some machinery. Currently machinery procured from FLSmidth is in use for existing plants of MLCFL.

3.4.2.2 *Mining*

Open Pit Mining will be applied due to its advantages over other mining techniques. One of the main advantages of open-pit mining is that it is safer compared to alternatives, since the walls of a quarry created during the mining process are usually stable. Hence, they don't require extra support and are unlikely to slide or fall inwards, creating a safety hazard. The open pit also allows workers and machinery to access the site easily.

Open-pit mining doesn't require as much mechanical machinery as other mining methods. This reduces the overall cost of the mining process, and makes it financially viable to mine small deposits. More machine-intensive methods are often too costly to use on small deposits while still allowing the mine to make a profit.

Another advantage of open-pit mining is that it allows miners to get rid of low-quality materials quickly and easily. This is known in the industry as high selectivity, and it is one of the most important advantages of open-pit mining. Other methods, which have a lower selectivity, make it more difficult to filter out the low-quality materials.



Figure 4: Comparison of open pit mining and ground mining

M. Singh

3.5 LOCATION AND LAYOUT OF PROJECT

3.5.1 Location of the Project

Proposed Project is located adjacent to Maple Leaf Cement Factory Limited

3.5.1.1 Alternative Site 1 (Near SCD):

Distance from	Distance (m)
Water Bodies	6500
Khairabad Village	3000
KalaBagh Road	6000
Grey Cement Division	2300



Figure 5: Alternative Site 1

[Handwritten signature]

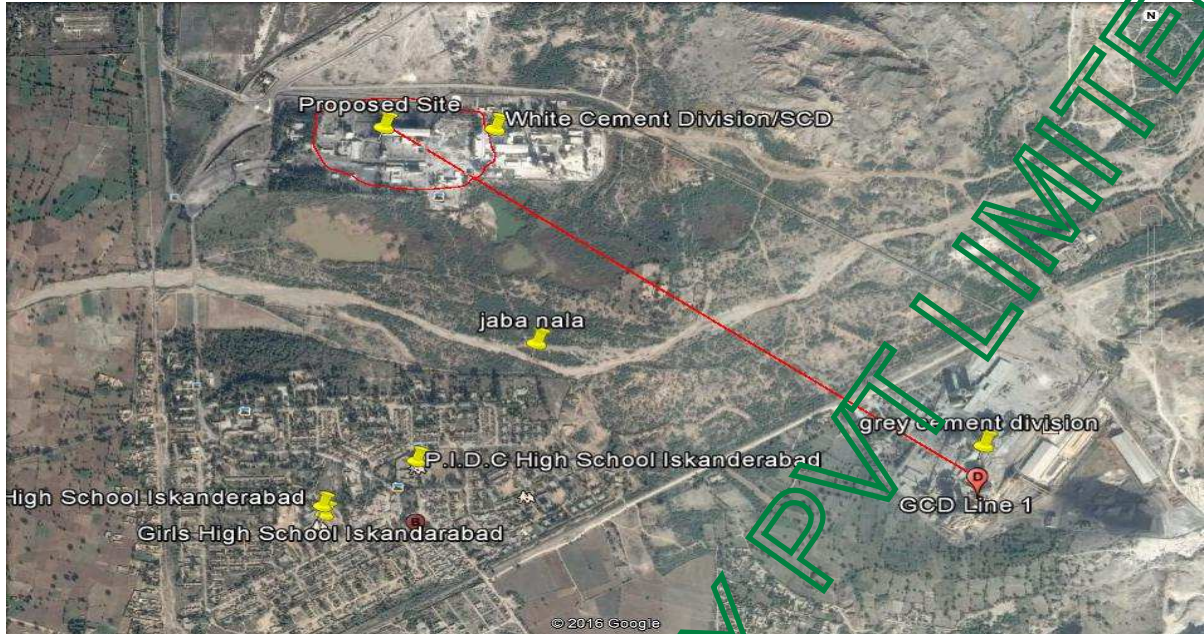


Figure 6: Distance of Alternative Site 1 from GCD



Figure 7: Distance of Alternative site 1 from Khirabad

3.5.1.2 Alternative Site 2 (Near GCD Line 2)

Distance from	Distance (m)
---------------	--------------

Water Bodies	8500
Khairabad Village	900
KalaBagh Road	9000
Grey Cement Division	450



Figure 8: Alternative Site 2

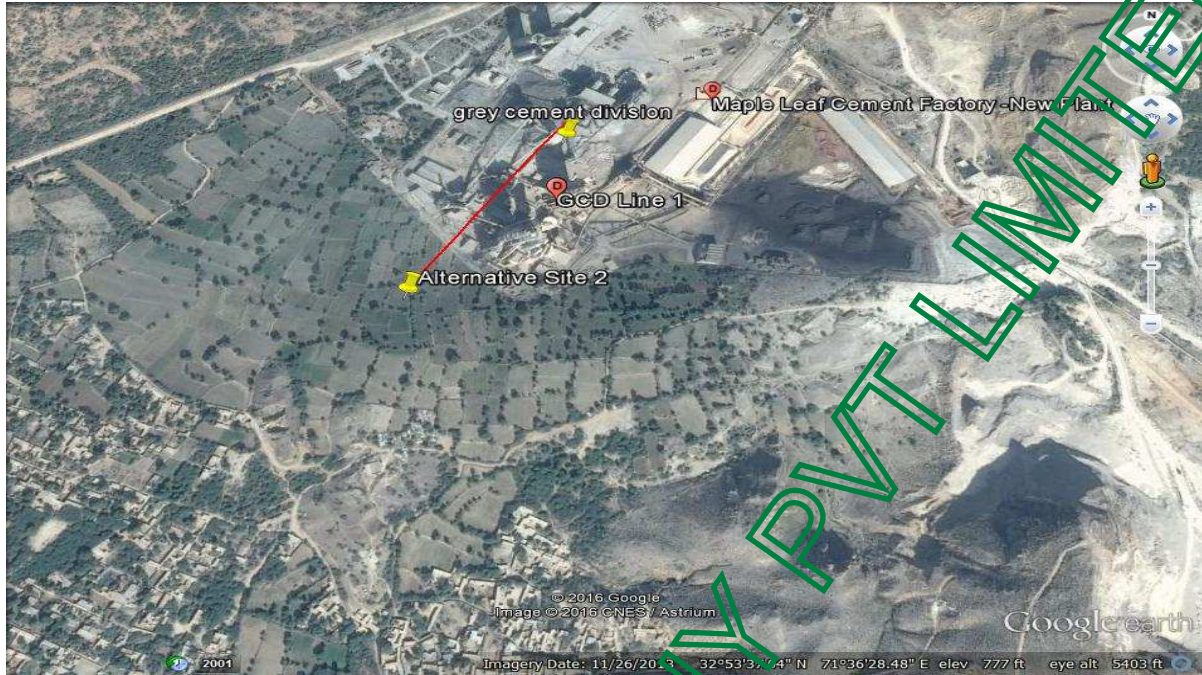


Figure 9: Distance of Alternative Site 2 from GCD

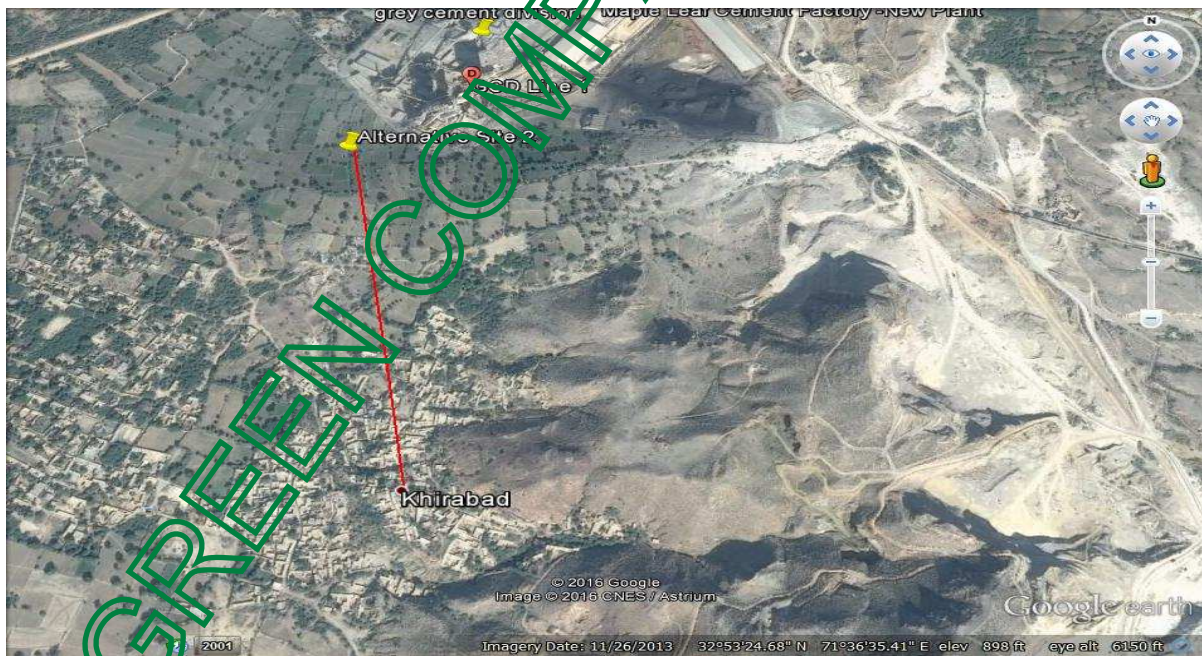


Figure 10: Distance of Alternative Site 2 from Khirabad



3.5.1.3 *Alternative Site 3 (Near GCD Coal Yard)*

Distance from	Distance (m)
Water Bodies	9000
Khairabad Village	1100
KalaBagh Road	9000
Grey Cement Division	1200



Figure 11: Alternative Site 3

[Handwritten signature]

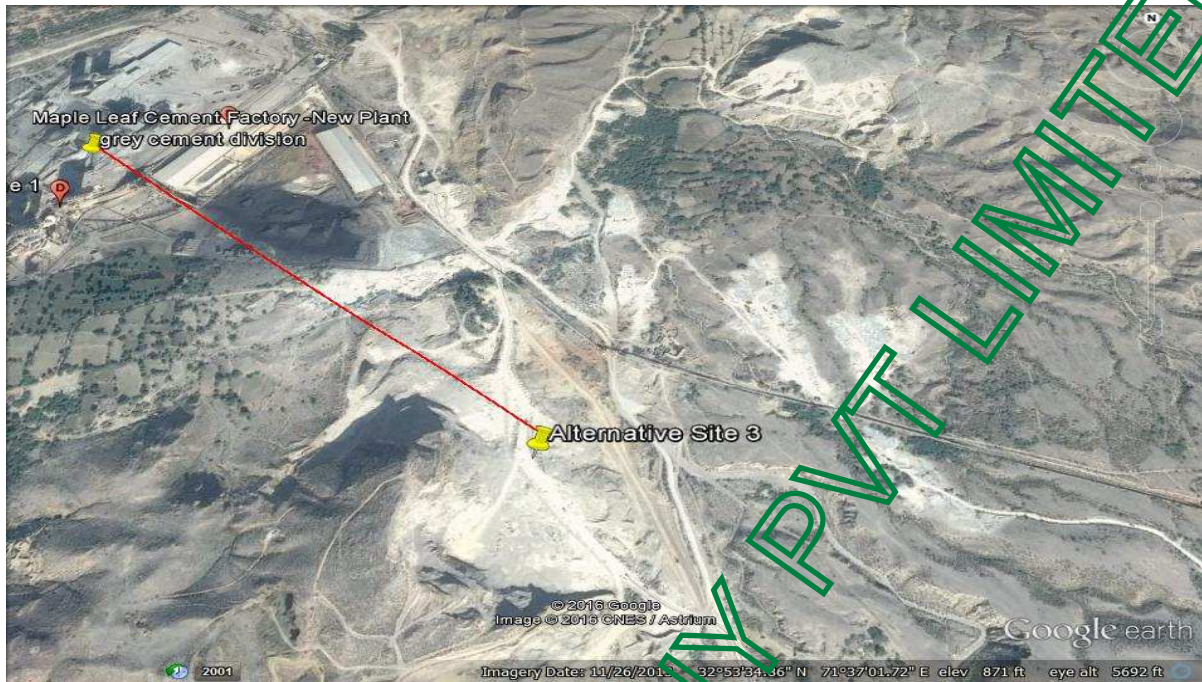


Figure 12: Distance of Alternative Site 3 from GCD



Figure 13: Distance of Alternative Site 3 from Khirabad



[Handwritten signature]

3.6 LAND OWNERSHIP

Property Ownership documents have been attached with this report clearly showing that the site for the Proposed Project is under undisputed ownership of proponent.

3.7 GOVERNMENT APPROVALS

Management has obtained license of explosives and license of lease for limestone, clay and gypsum quarries which are annexed in report. Now they have applied for environmental approval from EPA Punjab.

3.8 LAND USE ON SITE

Currently coal mill, cement silos and packing plant of old unit of SCD (which is non-functional after establishment of new special cement division of MLCFL) are present on alternative site 1 which will be demolished for establishment of Line 3 of MLCFL. Alternative Site 2 and Alternative Site 3 are open lands. The demolished waste will be completely reused in construction of line 3 and non-useable waste will be sold out to contractors.

3.9 ROAD ACCESS

The nearest main road is Mianwali-Kalabagh Road which is at a distance of about 6-9km from the proposed sites.

3.10 RELOCATION AND REHABILITATION PLANS

There exists no human settlement within 2-3 km radius of the selected project sites to be displaced owing to the commencement of the Proposed Project. No structure of any significance stands at the site to be relocated or dismantled. Land is already awarded to proponent, hence, no relocation and rehabilitation is required.

3.11 VEGETATION FEATURES OF SITE

Site is clear and there are no existing plants and vegetation on site. Only some scattered bushes are present. Various local plants will be grown in the open areas and plants will also be donated by proponent.



Figure 14: Vegetation Features of Site

3.12 DESCRIPTION OF PROJECT

The proposed plant will produce cement from solid raw materials; limestone, clay and gypsum. The raw materials are heated to a very high temperature (1450⁰C) in the pyro processing system via rotary kiln, causing thermal reactions which produce cement clinker. This clinker is then cooled and pulverized to produce the fine power (cement) for sale.

M. Singh

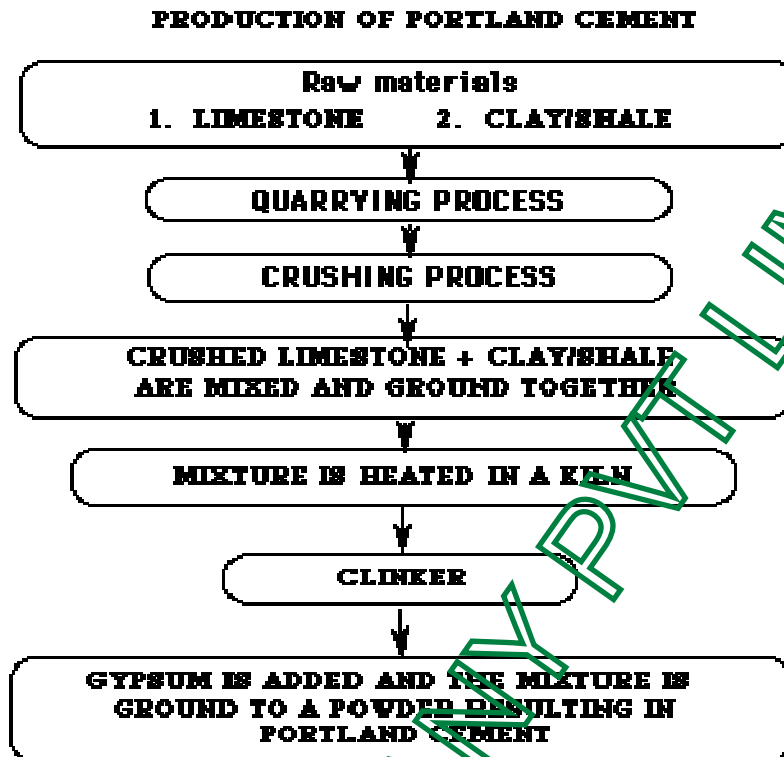


Figure 15: Cement Production Process Diagram

3.12.1 Raw Material Extraction and Preparation:

Extraction of the raw materials is from local quarries. The main raw materials are limestone, clay, and gypsum. Raw materials requirements for production of 7000 tons/day clinker production (capacity can be changed between 5000 tons/day to 1000tons/day) are summarized in the table below:

Description	Tones/hour
Limestone (raw meal)	950-1200tons/hour
Clay	300-500 tons/h
Gypsum	80-120tons/hour
Bauxite, laterite and sand	120 tons/h

3.12.1.1 **Limestone:**

Extraction:

Major raw material for the manufacture of cement is limestone (CaCO₃). This will be provided by mines awarded to MLCFL on lease (lease licenses are annexed). In Limestone quarries, surface mining method will be applied for mining. Top slicing/Open pit mining is a type of surface mining which will be used in which Strips of certain width are cut starting from top to bottom till ground level. Coordinates of these mines are given below:

Limestone Mines	Coordinates
Limestone 4	Latitude : 32 Degree 54 Minutes & 07 Seconds Longitude : 71 Degree 36 Minutes & 41 Seconds
Limestone 5	Latitude : 32 Degree 54 Minutes & 04 Seconds Longitude : 71 Degree 38 Minutes & 29 Seconds
Limestone 6	Latitude : 32 Degree 52 Minutes & 46 Seconds Longitude : 71 Degree 37 Minutes & 05 Seconds
Limestone 11	Latitude : 32 Degree 50 Minutes & 20 Seconds Longitude : 71 Degree 38 Minutes & 45 Seconds

Crushing:

Limestone is then sent for crushing into crusher installed at nearest distance from mine. By having crusher near to mine reduces transport cost. This crusher will convert limestone in form which can be used as a raw material in cement manufacturing plant. Details and specifications of crusher are as follows:

Table 2: Details of Crusher

Crusher	Hammer Crusher
Rotar dia. Incl. hammers	200 cm
Rotor width	300 cm



Peripheral speed	35 m/s
Speed component	Limestone
No of feeders to crusher	1
Production rate	1000 t/h
Feed size, max	1500 mm
Production size	Max 5% + 60mm

Transport:

Limestone is loaded on Dumpers with Loaders from Benches of Limestone Quarry and transported towards Limestone Crusher Hopper. After crushing, it travels to plant through belt conveyor and used as a raw material.

3.12.1.2 **Clay:**

Extraction

Mining of Clay reserves will be done through surface mining. No drilling and blasting is required as the clay bed is soft in nature. Mining of clay requires the mechanical extraction/excavation by use of Dozer, excavators and other machineries. The mechanical extraction/excavation is the environment friendly technology to insure vibration, dust, and noise are kept at a minimum. The clays are excavated from open cast mines and then it is transported by trucks and unloaded into the hopper of a clay crusher.

Crushing:

Clay is then sent for crushing into crusher installed at nearest distance from mine. By having crusher near to mine reduces transport cost. Both limestone and clay will be processed by single crusher. This crusher will convert Clay in form which can be used as a raw material in cement manufacturing plant.



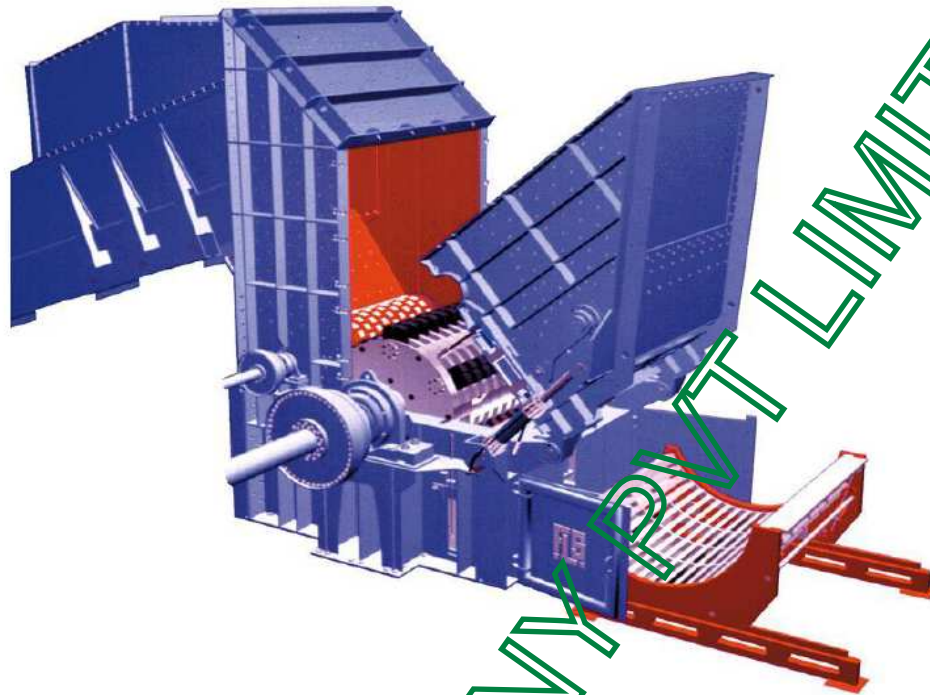


Figure 16: Limestone and Clay Crusher

Transport:

Clay is loaded on Dumpers with loaders from Benches of Clay Quarry and transported towards Crusher Hopper. After crushing it drops on Discharge Belt and from here it finally stacks on pile.

3.12.1.3 Gypsum:

Extraction:

Mining of Gypsum reserves will be done through surface mining by controlled blasting. Method of mining is top slicing of Gypsum. Gypsum is excavated through dozer and transported to storage piles through trucks and from here it is used as a raw material in cement manufacturing plant of MLCFL.

Crushing:

Gypsum is then sent through trucks to gypsum crusher installed near cement plant and after crushing it is used as a raw material in cement manufacturing plant.

Table 3: Gypsum crusher

Crusher	Hammer Crusher
Feed component (s)	Gypsum
Production rate	100 t/h Dry
Feed size, max	500 mm
Product size	Max 5% + 25mm
Rotor diameter (hammer tips) / width	1.9m/1.6m
Peripheral speed	34 m/s



Figure 17: Gypsum crusher

Transport:

Gypsum is loaded on Dumper with Loader from Gypsum stock yard and unloaded at Gypsum Crusher Hopper. After crushing it drops on Belt. Material is fed to Line 1 & 2 Hopper as per requirement through distributor.

3.12.2 Raw mill department:

For the grinding of raw materials vertical roller mill with the following specifications is proposed:

Design specifications	
Mill	Vertical roller mill
Production rate	562 t/h (dry)
Feed size limits for mill	0 % > 184 mm Max 2 % > 158 mm Min 30 % > 26 mm Actual for this case max 100 mm
Product fineness	Max 12 % + 90µm
Feed moisture	Max 6 %
Product moisture	Max 1 %

*** Specifications mentioned in above table is company secret, don't reveal it.

From the feed bins, the raw materials are fed to the raw mill, where they are ground into a fine powder. Separate weigh-feeders extract the feed components from the feed bins in the set proportions. The feed rate of each material is controlled automatically based on samples taken after the raw mill. Samples are taken at regular intervals, analyzed by X-ray and the individual feed rates will then be adjusted automatically to ensure that the accumulated raw meal production complies with the desired chemical analysis of the clinker.

The feed is transported to the inlet of the mill, where it enters the mill through a rotary air sluice. The feed belt is equipped with a magnetic separator and a metal



detector in order to prevent metallic objects from entering the mill. The metal detector, when activated, will operate a change-over gate, which for a short while will direct the material away from the mill.

Inside the mill the grinding takes place between the rotating table and the three rollers. The rotating table is surrounded by a nozzle ring, through which the hot gas for drying enters.

Coarse material from the separator is returned to the grinding table for further grinding, while finished raw meal leaves the mill with the exhaust gases.

The major part of the finished raw meal is precipitated in the mill cyclones. After having been through the cyclones the mill gas is passing through the mill fan, from where the greater part of the gas is going to the main filter for cleaning, before being released to the atmosphere. A smaller part of the mill gas is returned to the mill inlet, where it is mixed with the gasses from the kiln.

The mill is equipped with a system for external circulation of material. The system returns to the mill a controlled amount of material, which falls through the nozzle-ring.

The mill is equipped with a water injection system. In cases where the materials are dry or relatively fine the system, if required, can be used to stabilize the grinding bed.

The drying process in the mill is controlled automatically through the outlet temperature of the gases from the mill. The gas flow out of the mill must be kept constant in order to maintain stable flow conditions in the mill house as well as in the separator.

At all stages of raw material preparation, appropriate methods will be used to prevent the escape of air-born dust emissions. These include the use of enclosed conveyors and storage, minimization of material drops, numerous nuisance dust collectors, and the use of a primary bag filter for the kiln/raw mill exhaust gases which are used for drying of the raw materials.

All bag filters will be designed and operated to ensure particulate emissions below 30 mg/Nm³ including all other point sources, such as the clinker cooling, cement grinding, and coal grinding, in accordance with



industry standards.

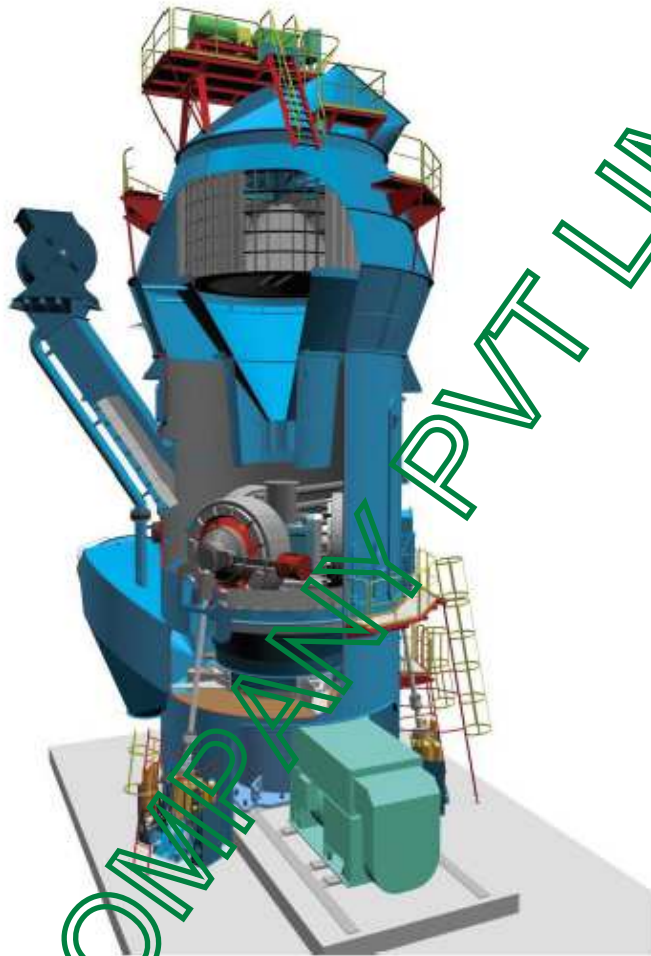


Figure 18: Grinding mill

3.12.3 De-dusting

The kiln and the raw mill will be de-dusted by primary bag filter. The returned 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.

3.12.4 Raw Material Blending

Product from the raw mill will be transported to the blending/kiln feed silos where final chemical adjustment will take place before being fed to the preheater/kiln. Blending is achieved by extracting from three different outlets at a time which are changed at regular intervals. Every time an outlet is in use, a different subsection of the outlet is aerated. The throttle plates causing different opening diameters in the outlets ensure a different flow rate from each outlet. This method of controlling the extraction ensures that the extracted raw meal is a mixture of different "layers" in the silo, thus achieving a well-blended raw meal. Additional blending takes place in a mixing tank below the silo where strong aeration fluidizes the raw meal to enhance the mixing.

3.12.5 Solid Fuel Preparation:

The production of cement requires the use of a significant amount of energy. In order to provide this energy, conventional solid fuels, such as coal, are burned in the pyro-processing system.

Raw coal is transported from storage to a feed bin. The raw coal transport is equipped with a magnet separator and a metal detector in order to prevent metallic objects from entering the mill. The metal detector, when activated, will operate a change-over gate, which for a short while will direct coal away from the feeding system.

The desired amount of raw coal is extracted from the feed bin and enters the mill through a double screw conveyor which is working as an air sluice, thus minimizing the amount of false air.

Grinding takes place between the rotating table and three rollers. A common center yoke connects the rollers which, through three pull rods, are forced onto the grinding table by a hydraulic tensioning system. The hydraulic system provides the feature of lifting the rollers during start and maintenance.



The coal mill system is designed for inert operation, thus minimizing the risk of fire and explosions. This is achieved by using the necessary amount of hot pre-heater gas with a low content of oxygen.

The hot gas is de-dusted in a cyclone before entering the mill system and the flow is provided by a booster fan.

3.12.6 Pyro-process (Kiln System):

From the mixing tank the raw meal is carried to the weighing system which is placed on load cells. Starting/stopping extraction from the silo is controlled by the level in the weighing system indicated by the load cells.

The kiln feed system is placed below the CF/homogenizing silo. When the weighing system is full, extraction from the silo is stopped and the weighing tank is gradually emptied. The raw materials are added and then heated to high temperatures; the cement "clinker" is formed as a result of thermal reaction. The cement plant will use the most modern and efficient design for undertaking this process.

When the tank reaches its minimum level, extraction from the CF/homogenizing silo starts again. During the subsequent filling period the flow control gate is operated according to the above-mentioned mathematical model until the tank level again reaches its maximum level after which extraction from the silo is stopped and the above procedure is repeated.

The raw meal is transported to the pre-heater top by a bucket elevator and airlides. The clinker leaves the kiln with a typical temperature around 1450 °C, and falls down onto the cooler inlet zone, after which the clinker is transported slowly down through the cooler. During this transport the clinker is constantly exposed to a cooling air stream from below. The purpose is clinker cooling as well as heat recuperation.

The cooling air passing up through the clinker bed is heated by the clinker, and for the first, i.e. warmest, part of the cooler, the air is sucked back into the kiln system and



used as preheated combustion air. Approximately 45% of the total cooling air is returned to the kiln system, corresponding to approximately 75% recuperation of the clinker heat. The remaining air is extracted as excess air from the cooler. The cooler excess air is de-dusted in a bag filter. The cooler excess air temperature is lowered by an air to air heat exchanger, placed before the filter. In order to further protect the bag filter against excessive temperatures during upset conditions the excess air duct is provided with a cold air damper. Temperature while entering cooler is 1650⁰C and at exit is 65⁰C.

3.12.7 **Clinker transport and storage:**

For the transport and storage of clinker the following equipment is proposed:

Design Specifications	
Clinker silo capacity	80,000-110,000 t
Silo diameter	60 m
Silo height	46 m
Extraction capacity	370 t/h (max. 450 t/h)
Off standard clinker silo capacity	2000-3,800 t

** Specifications mentioned in above table is company secret, don't reveal it.

An apron conveyor transports the clinker from the cooler to the top of the clinker silo. The apron conveyor is drawn by chain which has a drive station located on top of the silo.

After discharge from the apron conveyor the clinker enters an overflow chute. Clinker is extracted from the chute by a drag chain and when this is stopped, clinker will flow over and into the silo. Clinker is extracted from the bottom of the silo, by discharge gates and transported to the cement mill department by rubber belt conveyor. Off-standard clinker (insufficiently burnt clinker) is extracted from the over- flow chute by the drag chain and directed to a separate, smaller silo. The off-standard clinker is extracted from the bottom of the silo, by discharge gates, and can be dosed to the



main clinker belt conveyor leading to the cement mill department. The extraction rate is adjusted according to the total clinker demand and quality.

The off-standard clinker silo has a second outlet which can be used for loading a truck. This outlet is also used when the kiln production capacity has to be demonstrated (clinker drop test). The silo is equipped with instruments for measuring the internal silo level. The silo is de-dusted and collected dust is directed back into the silo. This system is also de-dusting the transport equipment located on the silo top.

3.12.8 Cement mill department:

For the grinding of cement vertical roller mills are proposed. Separate weigh-feeders are extracting the feed components from the feed bins in the set proportions. The feed is transported to the inlet of the mill by the means of the feed conveying system.

The transport to the mill inlet is equipped with a magnet separator, to sort out metallic objects of the mill feed.

Just before the mill feed is discharged into the mill it passes a metal detector. This is built in for protection of the mill. Any metal detected will activate the change-over gate, hence causing the feed containing the metallic object to go to the ground/waste bin instead of into the mill.

The mill inlet is equipped with an air sluice in order to minimize false air to the mill. The air sluice is of the type rotary air sluice.

The raw materials enter the mill by the inlet chute. The chute enters the mill on one side of the mill housing, placing the materials on the center of the grinding table.

Grinding aid diluted in water is added to the materials when entering the mill. The rotation of the table drives the material towards the edge of the table and under the rollers, where the grinding takes place. The rejects from below the mill table is



transported back to the mill feed by the re-circulating system. The re-circulating system consists of a conveying system discharging the recycled material into the mill feed via a magnetic separator.

The material carried by the gas to the separator, is separated in a coarse fraction, the rejects, and a fine fraction, the product. The rejects fall down through the separator reject cone onto the mill table for further grinding.

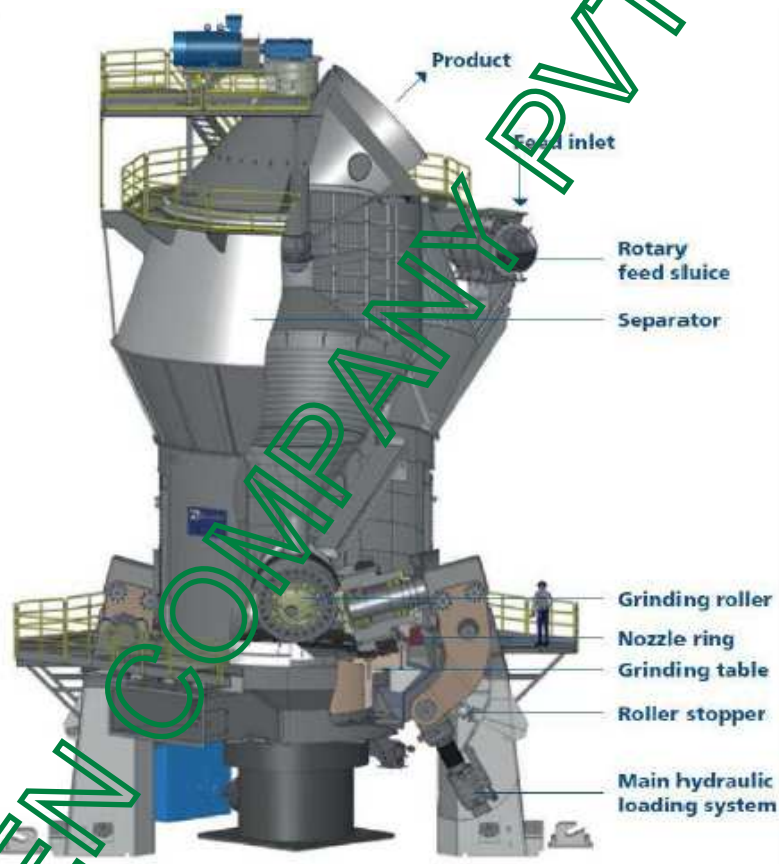


Figure 19: Cement mill

3.12.9 **Product collected in bag filter**

The finished product leaves the separator at the top, transported by the separator air to the bag filter, where air and material is separated. The fineness of the product is a

M. Singh

function of the gas flow through the mill and the separator rotor speed. The finished product collected in the bag filter is transported to the silos.

An automatic sampling device enables continuous sampling of the finished product. The gas taken through the mill and the separator is circulated by a fan. The mill fan is placed after the bag filter. A duct placed after the fan allows re-cycling of gas back to the mill inlet.

The amount of gases not recycled is taken in as fresh air of ambient temperature through the fresh air damper.

3.12.10 Cement storage and packing:

For the storage and dispatch of cement the following equipment is proposed

Design specifications	
Cement silo(s)	2 storage silos
Silo capacity (each)	25.000 t
No. of packing lines	6
Capacity per line	120 t/h
Bulk loading to truck	1 × 120 t/h
Big bag loader	1

** Specifications mentioned in above table is company secret, don't reveal it.

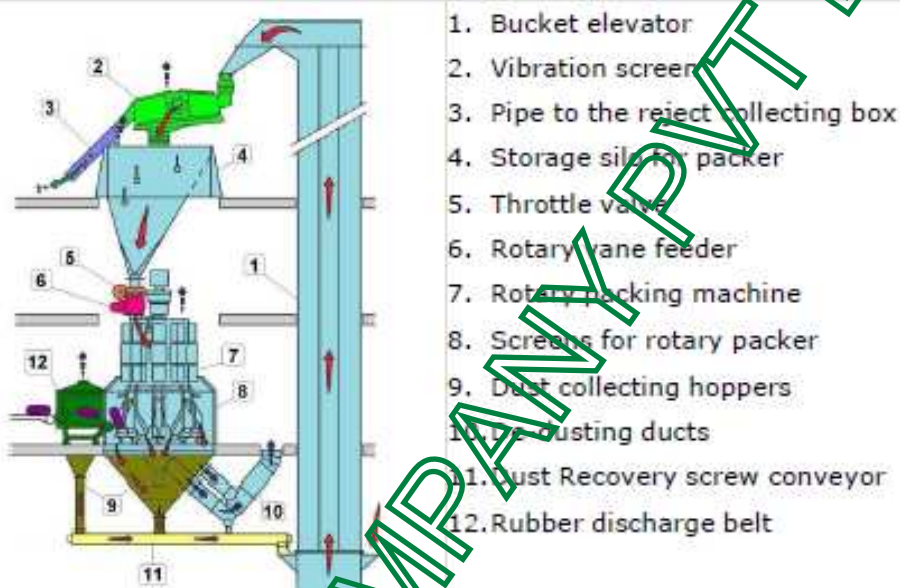
The cement silo allows simultaneous filling and extracting.

3.12.11 Packing plant

The packing plant can be divided in two sections: the first dedicated to fill bulk cement in bags and the second, after some bag transport by belt conveyors, to load the bags on the trucks/pack the bagged cement on pallets.

The bulk cement is transported to the packing plant from the cement silo(s) through air slides and lifted by a bucket elevator, screened and stored in a small silo above the packing machine.

The empty bag are manually placed on the spouts/placed on the spouts by manual bag applicator and filled during the packer rotation; once the threshold of the preset weight has been attained, the bag is evacuated onto the bag treating unit. A bag applicator is removing the full bags from the spouts. Additional equipment is available for specific purpose of the plant as bag sealing, additional improved automation or production data reporting.



1. Bucket elevator
2. Vibration screen
3. Pipe to the reject collecting box
4. Storage silo for packer
5. Throttle valve
6. Rotary vane feeder
7. Rotary packing machine
8. Screens for rotary packer
9. Dust collecting hoppers
10. Dusting ducts
11. Dust Recovery screw conveyor
12. Rubber discharge belt

Figure 20: Packing plant

3.12.12 **Manual Truck loader**

The manual truck loader is a machine on a trolley designed to transport the bags up to the loading platform of the truck where one or two operators take one bag at a time and deposit it on the vehicle, forming a sequence of layers suitable for their transport. Nominal capacity is about 2400 bags/h and can be affected by operators number and dexterity.

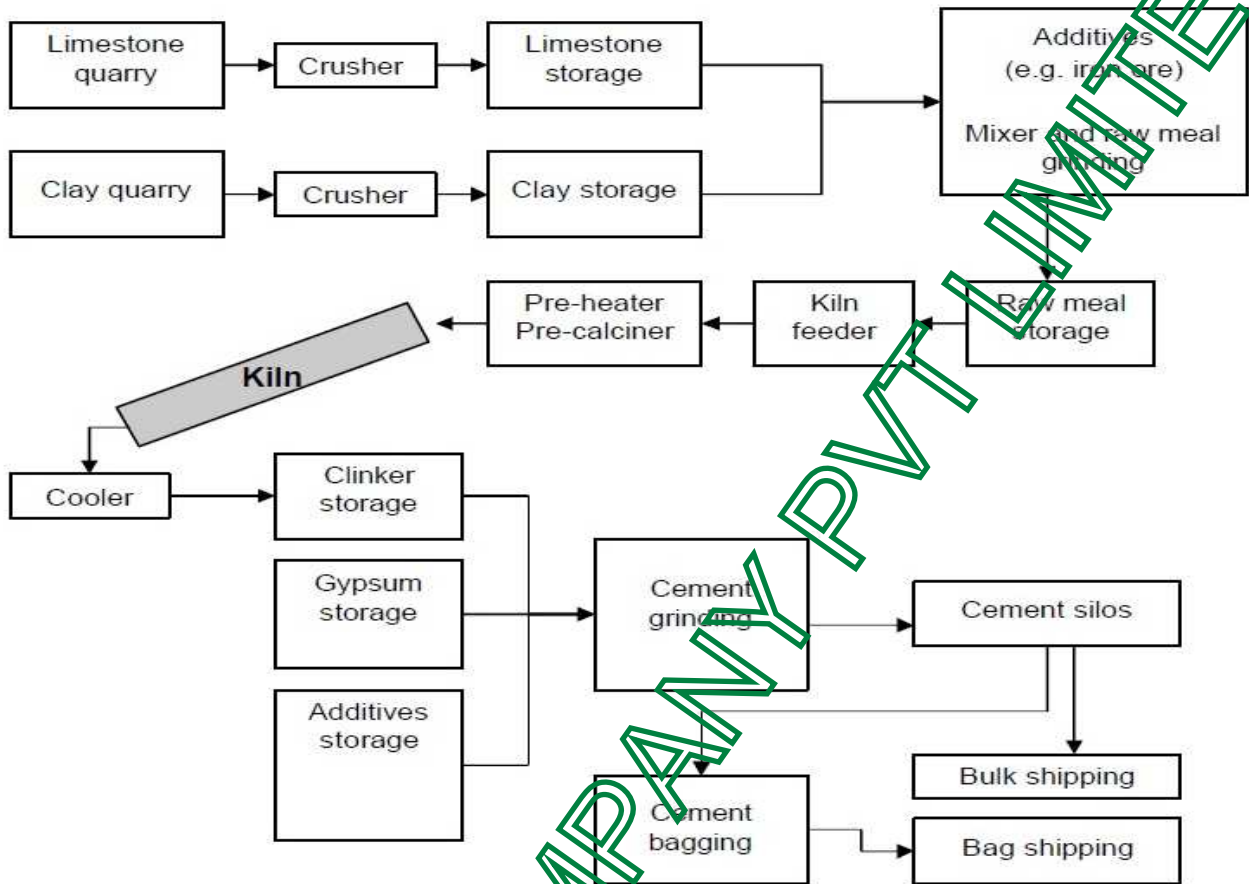


Figure 21: Cement Manufacturing Process

3.13 SUPPLIES

3.13.1 Water Requirement and wastewater management

Water consumption will be only for plant cooling evaporative losses and for domestic use. This water will be taken from wells 0.5 km away from Indus River. No process related wastewater will be generated during operation of plant. Domestic wastewater will be handled by septic tanks and discharge in sewerage lines of area.

3.13.2 Manpower

The Project will require manpower in both of its project components: the quarry component and the cement plant component during both the construction and operational phases. During the operation phase of the project, the total manpower requirement is estimated to be **188** people comprising administrative, technical, and non-technical persons. These include engineers, chemists, computer operators, accountants, administrative assistances, secretaries, etc. All recruited staff will be given appropriate training in order to educate them on the specific job tasks to be performed; safety procedures; and the concepts of quarrying and cement manufacturing.

Departments	Staff				Total
	SM	M	AM/DM	Junior Technician	
Production	1	1	4	34	41
Q.C		1		18	19
Mining				10	10
Civil					0
House keeping					0
Mechanical		1	4	53	59
RCM			4	3	7
Electrical	1	2	4	29	36
PGP & WHRP				12	12
Project Engineering					0
HSE			4		4
Total	3	6	20	159	188



3.13.3 Electricity

Source of power will be self-generation of electricity and WAPDA.

3.13.4 Fuels

South African Coal will be used as a fuel in Proposed Project. The composition of coal to be used in this project is annexed.

3.14 HEALTH, SAFETY & HYGIENE

Health, Safety & Hygiene includes the following:

3.14.1 First Aid facility

At workplace workers and employers should have enough information, knowledge and training regarding first aid treatment in case of any emergency. The subject project will provide proper medical facilities to workers and staff to cope with any incidental accidents and proper training about first aid will be provided to workers and staff.

3.14.2 Safety Trainings

Workers and all the staff will be provided with proper training about the work and safety practices. MLCFL already do trainings sessions for their workers.



Figure 22: Safety Trainings

M. Ayub

3.14.3 Use of Drugs and Narcotics

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

3.14.4 Security:

Parameters will be defined through boulders and tape so that no irrelevant person can enter. Safety signs & boards should be placed during mining activity. At the time of extraction activity proper SOPs will be followed like pre-announcement in the loud speaker and others.

3.14.5 PERSONAL PROTECTIVE EQUIPMENTS

To control any health and safety risk and to reduce the magnitude of any adverse impact, we have to devise control strategies and adopt them in the following category order:

- a. Control at source
- b. Propagation Control
- c. Control at receiver end

Of these three, the first two are of prime importance but the last one should always for every risk at every workplace; standardized according to the working conditions and the people employed in the job. The first two effectively mitigate the risks and impacts but the third one compensates the left over and unavoidable losses by protecting the receiver and keeping it to a tolerable exposure level for that impact/risk. For this purpose, the equipment provided are termed as 'Personal Protective Equipment'. Following PPEs will be provided in the Proposed Chemical Store Room.

1. Safety Helmet

2. Safety Shoes
3. Dust Mask
4. Safety Gloves
5. Safety Jackets
6. Safety Belt
7. Ear Muffs

3.14.6 Fire fighting plan:

Fire hydrants, Sand buckets, fire extinguishers availability will be assured and workers will be trained to use them. Details of fire fighting equipments are annexed in report.

3.14.7 AIR EMISSIONS

Air pollutants generated during the operation of the Project consist primarily of particulates from quarrying, raw, and finished materials as well as fuel combustion byproducts. ESP and/or Bag filters and bag houses will be employed as de-dusting equipment to control major emissions in the Kiln, Raw Mill, Grate Cooler, Coal Mill and the Cement Mill. For other emissions, a sufficient number of standardized bag filters will be installed at all transfer points at hopper, bins or silos as well as dust producing machinery (crushers, loading equipment, conveyors etc.) for de-dusting purposes.

Modern technology burners, dosing systems for fuel and kiln feed, and kiln control systems are used for the plant processes to control emissions (NO_x, SO_x, CO). Emissions from burning of fuel will be provided passive control (ignore pollution) by using South African coal having less sulfur and nitrogen contents.

List of air pollution control devices is as follows:

Area	De Dusting Bagfilters	Process Filters	Water Showering	Cyclones	Electrostatic Precipitators
Lime & Clay Crusher	5	-	-	-	-
Iron Ore Feeding	1				
Lime & Clay Storgae	2	-	1	-	-
Gypsum Crusher	2	-	-	-	-
Coal Transport	5	-	-	-	-
Raw Mill Feed	4	-	-	-	-
Raw Mill	3	-	1	4	1
CF Silo	4	-	-	-	-
Cooler	1	-	-	-	1
Coal Mill	1	1		1	-
Clinker Storage	15	-	-	-	-
Cement Fill Feed	3	-	-	-	-
Cement Mills	4	1	-	-	-
Cement Fill Feed	3	-	-	-	-
Cement Mill 2	4	1	-	-	-
Cement Silo	5	-	-	-	-
Loading Chute	2	-	-	-	-
Packing plant	12	-	-	-	-

3.14.8 NOISE

Most cement projects generate significant, intermittent noise levels during blasting within the quarry. The principal noise emission sources will be associated with quarry drilling operation, 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 Pakistan National Standards for noise emissions. All equipment to be employed for the 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.. At times of blasting, workers will not be allowed in mine area to protect them from any injury or hazard.

3.14.9 SOLID WASTE

There will be no significant solid waste during operation. Only Overburden during mining will be there but in very minuet amount and will be used with limestone. But if its layer is thick then it will be placed on remaining mine. Sources of solid waste in cement manufacturing include clinker production waste, mainly composed of spoil rocks, which are removed from the raw materials during the raw meal preparation. Another potential waste stream involves the kiln dust removed from the bypass flow and the stack, if it is not recycled in the process. All of this waste is recyclable and reusable.

3.14.10 Decommissioning and Abandonment:

Feasibility studies carried out in relation to the project indicate a useful life span. 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.

3.14.11 LAND REQUIREMENT

Total area required for the Proposed Project is 1050 kanals.

SR. No	Description	Kanal
1	L/Stone and clay Crusher	20
2	Limestone and Clay Storage	100
3	R.Mill ,Kiln, Coal Mill	100
5	Clinker Storage ,OK Mills	120
6	Packing plant	23



7	Grid Station	21
8	WHRP	17
9	Coal Yard	235
10	Store	15
11	Scrap Yard	115
12	Management House	30
13	Time Office	9
14	CCR	2
15	Conveyor Belt	50
16	Roads	100
17	Vehicle parking space	30
18	Open space	150
	Total Area	1,050

3.14.12 COST OF PROJECT

Total cost of project is estimated at PKR 24 billion

3.14.13 COST AND MAGNITUDE OF OPERATION

Lease of mines, Transportation cost and operation and maintenance of machinery and vehicles, are the costly activities involved in the operation phase of the project. Equipment safety will be assured if these operations are carefully managed. No separate fund allocation is required. However, budget will be allocated for purchase and maintenance of standardized PPEs for workers. Despite these costs, this project was found to be financially feasible in the feasibility report.

3.14.14 PLANNING, DESIGN & IMPLEMENTATION SCHEDULE

3.14.14.1 *Planning*

The project is at its feasibility study stage. This EIA study is a basic and necessary part of the overall planning for the project and will be integrated into the feasibility study.

3.14.14.2 **Design**

Deliberations on plant designing and detailed engineering studies are in progress. Number of vendors / OEM are under consideration for provision of all machinery and its fabrication. The vendors for technology design and provision include FLSmidth, Gebr. Pfeiffer, Inc., KHD Humboldt Wedag, LOESCHE GmbH, Sinoma (Tianjin Cement industry Design and Research Institute Co., Ltd.), Sinoma (Chengdu Design and Research Institute of Building Material Industry Co., Ltd.). The contractors under consideration for construction and fabrication of erection foundations are Descon, HMC and Izhar Construction. After the completion of detailed studies a contractor will be selected, and plant fabrication and procurement of equipment & machinery will be commenced thereafter.

3.14.14.3 **Schedule of implementation**

Tentative project implementation schedule is presented below. Final schedule will be available after selection of contractors.

Pre- contract activities	24 weeks
Utilities availability	70 weeks
Preliminary works	2 weeks

The above schedule shows that, it will take about 22-29 months from basic construction to commercial production.



CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT

4.1 GENERAL

This section describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Project Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other relevant agencies.

Information regarding physical environment is collected within project area as well as the study area. While in case of biological and social environment, efforts were made to collect the information in one km around the project area for detailed Land cover classes and even up to 10 km buffer data in case of any direct or indirect impacts were envisaged. The Mianwali District is a district in the northwest of Punjab province, Pakistan.

A Social survey in the Project Area was also carried out through consultation with the various communities. Local residents living in the Project Area were interviewed to obtain their feedback regarding the construction of the proposed Project and its impacts on their daily life, future in the short and long term.

4.2 METHODOLOGY OF CONDUCTING BASELINE STUDY

Establishing the environmental baseline includes both the present and likely further state of the environment, taking into account changes resulting from natural events and from other human activities.

The guiding factors for the present baseline study are the EPA's requirements for the Environmental Impact Assessment notification and local regulations and directives.

The studies were conducted by considering the following:

Maple Leaf Cement Factory Limited (MLCFL)

- The various environmental attributes were divided into primary and secondary studies
- Primary attributes such as air environment, water, soil noise, flora and fauna
- Micro-meteorology were assessed by conducting field studies, on-site monitoring
- Review of the past studies conducted
- Secondary attributes such as land use studies, geology, physiological characteristics
- Socio-economic environment have been assessed by literature review of previous studies conducted by various Government publications etc.
- A reconnaissance survey was conducted to identify the sampling locations on the basis of:
 - Locations of villages / towns / sensitive areas for noise, air, socio economics
 - Accessibility of power connection and security for monitoring equipment, pollution
 - Pockets in the area; and
 - Areas that best represent the baseline conditions.

The scoping and the extent of data generation were formulated with interdisciplinary team discussions, criteria questions and professional judgment.

The field data generated has been used to

- Identify extent of impacts on natural resources and nearby communities
- Identify mitigation measures and monitoring equipment

These data can be used to prognosticate possible future impacts on environment and lead to suggesting suitable measures to stem or minimize the adverse impact (if any) as far as possible.

4.3 PHYSICAL ENVIRONMENT

This part examines the physical resources such as topography, soil, climate, surface and ground water resources and quality, ambient air quality and geology of not only the Project site but also the city as a whole to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of Mianwali city and the project site is present in the following sub sections.

The district can be divided into two parts, a hilly terrain in the north, south-west and north-east, and firm clay plain falling in the front of Salt Ranges and the Dhuk hills, Khattak and Niazi hills in the north-west and the Salt Ranges in the south-east.

Bhangikhel hills are situated at the extreme north of the district all along the Indus and Khattak hills of Kohat. The area is covered by the steep hills, deep ravines and small nullahs and streams. Cultivation is possible only on the hilly slopes, flattened hill tops and along the beds of the hill torrents. At the base, the hills bifurcate, one range, known as Maidani or Khattak Niazi, going round the north and west of Isakhel tehsil in the form of the bow, until it all but touches a prolongation of the Khesore and Paniala hills of Dera Ismail Khan district at Para Tang which is a small pass cut out by the water of the Kurram river. The Khesore hills stretch all along the southern most limit of the district. The other range cut off from the base by the narrow stream near Kalabagh, shoots south-east through Mianwali tehsil and is linked with the Salt Range proper at Sakesar.

The central and southern plain areas consist of cultivated tract between the river Indus and its high banks and sandy deserts as Thal. The Thal plain starts south, enabling the canal water to flow down conveniently. South of Sakesar hills and extends across the southern limit of the district. It was an area, notorious for scanty rain fall and devoid trees and vegetations, but due to the vigorous efforts of the new settlers as well as the local population, it looks green where ever the canal channels carry water.

4.3.1 GEOLOGICAL FORMATION

The soil of the Mianwali belongs to the typical alluvium of the Indo-Gangetic plains. The majority of the soils are loamy or sandy loam consisting of soil crust of different depths. Hardly any profile characteristics are observed; soluble soils are present in considerable amounts. The lower layer consists of kankar nodules. The soils have generally an alkaline reaction and are adequately supplied by phosphorus and potash, but are deficient in organic matter and nitrogen.

The district is of considerable geological interest as it includes both cis-Indus and trans-Indus portions of the Salt Range. Apart from the technical details of interest for the experts, spread all over the range, the Dhak range is conveniently known as the geological museum of Pakistan. A gorge occurring near the eastern arm of an anticline and the top of the arch attracts many students of geology from all parts of the country. Geologically the alluvium is divided into Khaddar, i.e., the newer alluvium of sandy generally light colored and of less concretionary composition; and Bhangar, i.e., the older alluvium of the more clay composition, generally of dark appearance and full of kankar. The soil differs in consistency from drift sand to loam and from fine silt to stiff clay. A few occasional pebble beds are also present. Layers of kankar in the Indo-Gangetic alluvium of the district are also observed.



Figure 23: Google Earth View of Mianwali

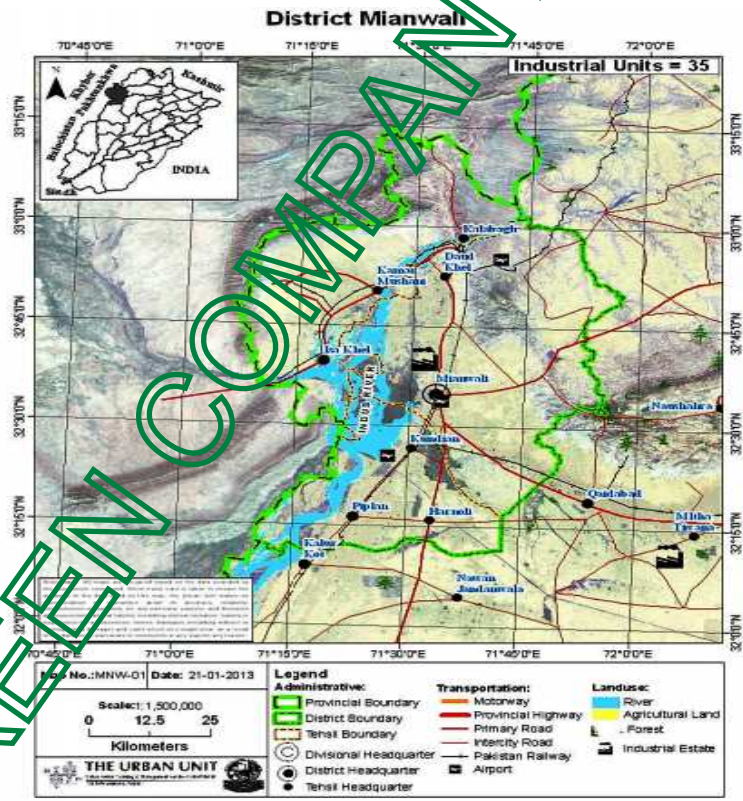


Figure 24: District Mianwali

[Handwritten signature]

IN PROJECT AREA:

Dominate nature of terrain in project area is hilly, moderately steep to mountains (slope > 30%)

4.3.2 TEMPERATURE

Mianwali district has an extreme climate, with a long, hot summer season and cold, dry winters. Summer lasts from May to September and winter lasts from November till February. June is the hottest month with average temperatures of 42 °C (highest recorded temperature 52 °C) in winter, December and January monthly average temperatures can be as low as 3 to 4 °C.

Table 4: Average Monthly Temperature of Mianwali

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Avg high °C	19	21	26	33	38	42	40	37	37	33	28	21	31
Avg low temperature °C	3	6	12	17	22	27	27	26	23	16	9	4	16
Rainfall in. (cm)	1.6	2.1	4.1	2.4	1.9	1.8	7.6	11	4.5	0.7	0.1	0.9	38.5

Source: *Weather base*



Figure 25: Average monthly temperature in Mianwali

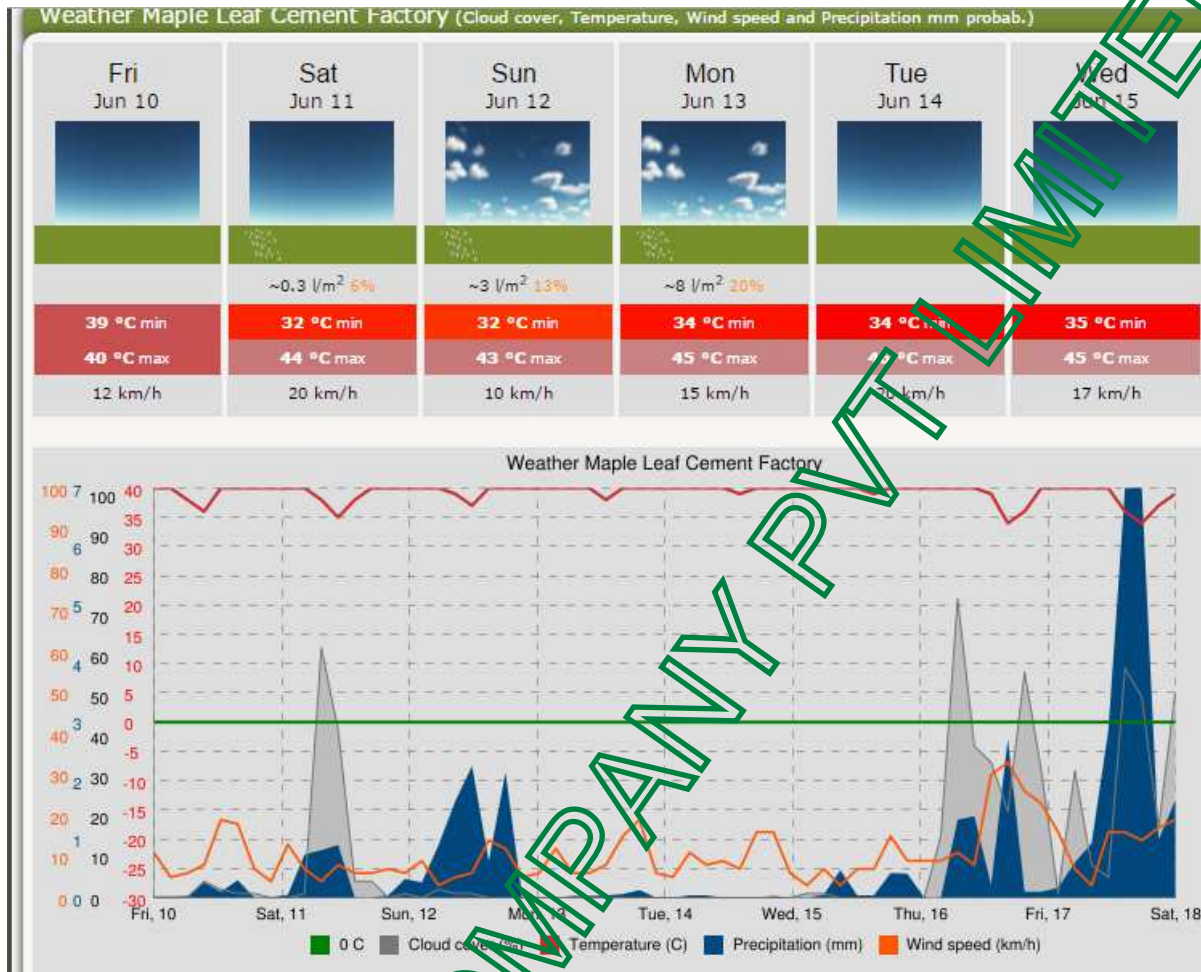


Figure 26: Climate of MLCFL

IN PROJECT AREA:

In project area the temperature remains between 48 to 51 °C in summer and falls to 0 °C in winter. Relative humidity of area is max 75 % and min 35%.

4.3.3 RAINFALL

The average rainfall in the district is about 385 mm. Rain fall in the district is but scanty, the average for Mianwali district has never arisen above 40 millimeters. The least amount of rainfall occurs in November. The average in this month is 6 mm. The

M. Ayub

greatest amount of precipitation occurs in August, with an average of 194 mm.

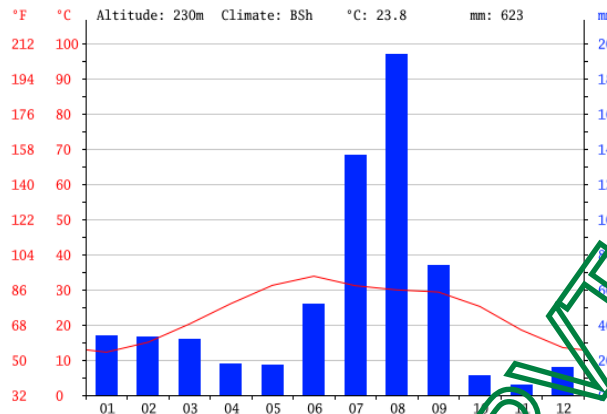


Figure 27: Average Yearly Precipitation in Mianwali

IN PROJECT AREA:

Rainfall observed in area falls between 400-500mm.

4.3.4 TOPOGRAPHY

Mianwali district falls in arid and semi-arid zone of Pakistan. The land is of multiple type and can be classified as loamy with clay soil which is suitable for wheat and maize, sandy soil, cultivated mainly for the rain-fed gram, Mong and Guara, and the irrigated areas which are mostly under wheat, cotton and sugarcane crops. Citrus plantation is also being carried out successfully in the area.

Mianwali district is among those areas of the Punjab where an elaborate irrigational system is in operation. Two systems of Thal Canal, off-taking from the Indus at Jinnah Barrage, namely Mohajir Branch and Dullewala Branch irrigate an area of 123,024 acres in Mianwali district.

4.3.5 WIND

Regular cyclones do not pass over the district. Dust storms, which were common in

summer in the past, are now rare in frequency and milder in ferocity. It is due to forestation and the conversion of desert into greenery. Hailstorms do occur and sometimes destroy entire crops.

Wind speeds are low during winter picking up during spring season and peaking during the summer months.

IN PROJECT AREA:

Wind direction in project area is from North to North East between Nov & May and from South East to South between June to October. Wind speed of area is 3.7km/hr near sunset. The wind reportedly increases upto 28 to 37 km/hr from the east during the warmer months.

4.3.6 AMBIENT AIR QUALITY

Atmospheric pollution particularly in urban area has a strong impact upon daily life. Mianwali economic growth, industrial & transport increase and rising energy consumption are causing the increase in air pollution. The main sources of air pollution are exhaust from motor vehicles and industry. SO₂, NO₂, CO₂, CO, O₃, Particulate Matter (PM) and noise are investigated as the pollution indicators.

The overall air quality in the study area is of moderate nature. Dust particles along with oxides of nitrogen, sulfur and carbon are the major causes of air pollution in the ambient air quality. It was observed during the visit that Petrol and Diesel operated vehicles emitting smoke and exhaust gases is a source of environmental pollution and responsible for the air quality deterioration although being a remote area this impact is of negligible nature. Ambient Air analysis of the Project area is annexed with this report.



Figure 28: Near GCD

SOURCE	CO	SO ₂	NO ₂	PM ₁₀	SPM	CO ₂	O ₃	VOC,s	Humidity	Temp
UNIT	ppm	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	ppm	%	%
NEQ,s	9	120	80	150	500	NS	130	NS	NS	NS
Near GCD	0	0	26	43	61	536	9	0	26	44

Figure 29: Near SCD

S. NO.	Source	CO	SO ₂	NO ₂	PM ₁₀	SPM	CO ₂	O ₃	VOC'S	Humidity	Temp.
	Unit	ppm	µg/m ³	µg/m ³	µg/m ³	µg/m ³	ppm	µg/m ³	ppm	%	°C
	NEQS	9	120	80	150	500	NS	130	NS	NS	NS
1	Proposed area of Line # 3	0	5.22	58.0	23	38	631	12	0.04	42	39

4.3.7 WATER RESOURCE

Under ground water resources are not adequate in the district especially in Tehsil Isa Khel. The sub soil water in and around the district is suitable for industrial purposes only. Mianwali district is among those areas of the Punjab where an elaborate irrigational system is in operation. Two systems of Thal Canal, off-taking from the Indus at Jinnah Barrage, namely Mohajir Branch and Dullewala Branch irrigate an area of 123,024 acres in Mianwali district.

4.4 BIOLOGICAL ENVIRONMENT

There are no significant or well shaped trees and shrubs on the project site.

4.4.1 AGRICULTURE

a) Main Crops



Wheat, Sugarcane, Gram, Maize and Cotton are the main crops grown in the district. Production of these crops during the period 2008-09 to 2010-11 is given in Table Below

Table 5: Main Crops of Mianwali
Production of Main Crops
(2008-09 to 2010-11)

Crop	Production (Th. M.Tons)		
	2008-09	2009-10	2010-11
Wheat	332.75	382.25	411.98
Sugarcane	108.43	175.3	185.13
Gram	18.7	17.9	21.0
Bajra	13.0	10.2	9.7
Cotton (000 Bales)	50.07	72.2	54.65

Source: Directorate of Agriculture, Crop Reporting Service, Punjab

Besides, Ground Nut, Rice, Moong, Mash and Masoor are also grown in minor quantities in the district.

b) Main Fruits

Citrus, Guava and Mango are main fruits grown in the district. Production of these fruits during the period 2008-09 to 2010-11 is in Table Below

Table 6: Main Fruits of Mianwali
Production of Main Fruits
(2008-09 to 2010-11)

Fruit	Production (M. Tons)		
	2008-09	2009-10	2010-11
Citrus	17178	18767	19860
Guava	1192	1273	1511
Mango	523	437	515

Source: Directorate of Agriculture, Crop Reporting Service, Punjab

Besides, Banana, Pomegranate, Dates and Figs are also grown in minor quantities in the district.

Besides, Banana, Pomegranate, Dates and Figs are also grown in minor quantities in the district.

c) Main Vegetables



Onion, Turnip and Tomato are main vegetables grown in the district. Production of these vegetables during the period 2008-09 to 2010-11 is given in Table below

Table 7: Main Vegetables of Mianwali

**Production of Main Vegetables
(2008-09 to 2010-11)**

Vegetable	Production (M.Tons)		
	2008-09	2009-10	2010-11
Onion	12536	12007	11804
Turnip	1050	1030	1076
Tomato	1519	1478	1372

Source: Directorate of Agriculture, Crop Reporting Service, Punjab

Besides, Bottle Gourd, Bitter Gourd, Chillies, Carrot, Cauliflower, Peas and Garlic are also grown in the district in minor quantities.

4.4.2 FLORA

Trees, also called the ‘lungs’ of the earth, are important for the restoration of the ecosystem. People can benefit incalculably from their survival and existence. Trees have also been a source of medicine for thousands of years and a refuge for various species of birds.

No threatened or endangered species and no medicinal plants are present in the project area.

IN PROJECT AREA:

There were no forests or plantation within a safe radius of project area. The forests and village that were present at a safe radius had trees like kikar, Phulahi, jand, khagga and ber.

4.4.3 FAUNA

With an increase in the rate of urbanization, the ecology of mianwali has been considerably affected but there is no threatened or endangered species found in the

project site. Similarly no wildlife is present.

IN PROJECT AREA:

The Jackals, Foxes and rabbits are the species that were found in nearby forests of project area.

4.5 SOCIOECONOMIC ENVIRONMENT

Socio economic environment is represented by the human and economic development and quality of life values. For the study of socio-economic environment of the project area, field surveys were conducted and interviews were held with the general public and neighbors. The baseline conditions of the city are as follow:

4.5.1 DEMOGRAPHIC PROFILE OF MIANWALI

According to Punjab Development Statistics 2011, total population of Mianwali district is 1,328 thousand persons out of which 666 thousand are male and 662 thousand are females. Density of population in the district is 227 persons per square Kilometre. Tehsil wise distribution of Urban and Rural population is given in Table below:

Table 8: Town-Wise Distribution of Population

Town	Population (Thousand Nos.)		
	Urban	Rural	Total
Mianwali	129	525	654
Rawat	55	280	335
Binan	92	247	339
Total	276	1052	1328

Source: Punjab Development Statistics, 2011

IN PROJECT AREA:

Population 1000

4.5.2 GEOGRAPHICAL CONDITIONS

Mianwali district covers an area of 5,840 square kilometres (2,250 sq mi). The area in north is a continuation of the Pothohar Plateau and the Kohistan-e-Namak. The district consists of various towns, including Kalabagh, Isa Khel, Kundian, Paikhel, KamarMushani, Mochh, Swans, BoriKhel, Rokhri, Harnauli, Musakhel, Anuwali, Wan Bhachran, DaudKhel, and the district capital, Mianwali city.

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

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



Figure 30: Geographical Location

4.5.3 LANGUAGE

As per the 1998 census of Pakistan, the following are the demographics of the

Mianwali district, by spoken language:

- Punjabi: 74.2%
- Saraiki: 12%
- Pashto: 10%
- Others: 6%

Though Mianwali is claimed an integral part of Seraiki speaking belt by the Seraiki language activists but Punjabi-Seraiki division seems to hold little influence on common people in this district. Awans, Jats, Ghakkars with various subclans living in Mianwali and Khushab always associate themselves with Punjabi identity. While Niazis associate themselves with Seraiki identity. According to 1998 census three fourth (74.2 percent) of the population named their spoken language as Punjabi while only 12 per cent answered that they speak Seraiki.

4.5.4 HEALTH FACILITIES

The city of Mianwali in Pakistan is served by a number of private and government hospitals offering world-class medical facilities. The rural and urban areas are served by various other medical centers and dispensaries offering modern medical facilities. The hospitals, dispensaries and medical centers in Mianwali aim to provide the citizens best medical facilities and prevention from contagious and other harmful diseases. There is no health care facility in close near vicinity of the project area.

4.5.5 EDUCATIONAL FACILITIES

Mianwali is the Capital of Mianwali District and located in the Province Punjab, a lot of educational institutions and authoritative bodies are doing their best to increase the literacy rate in this region. Although there are several educational institutions are already offering their educational services to educate the entire community located in Mianwali region such as Govt. Technical Training Institute, Govt. Vocational Training

Institute (W), Govt. Technical Training Centre, Govt. College of Commerce Leads Group of Colleges and other educational institutes are playing a vital role in the education sector for the career building of the students.

73% men and 47% women aged 10 years and older are literate in Mianwali. Overall, the district is ranked at 19 among 37 districts on literacy indicator

4.5.6 TRANSPORTATION AND COMMUNICATION

Infrastructure of Mianwali includes Road-Links and Rail-Links. The district has a total metalled road-length of 868 Kilometers. Mianwali City is linked with Chakwal, Bhakkar, Khushab and Saroghda through metalled roads. And District Mianwali is linked with Attock through railway network.

There are 12 grid stations in the district (ranging in capacity from 66 KV to 132 KV). Natural gas is available in Chashma, Daudkhel and Iskandarabad only. There are 16 telephone exchanges operating in the district (ranging in capacity from 206 lines to 5850 lines).

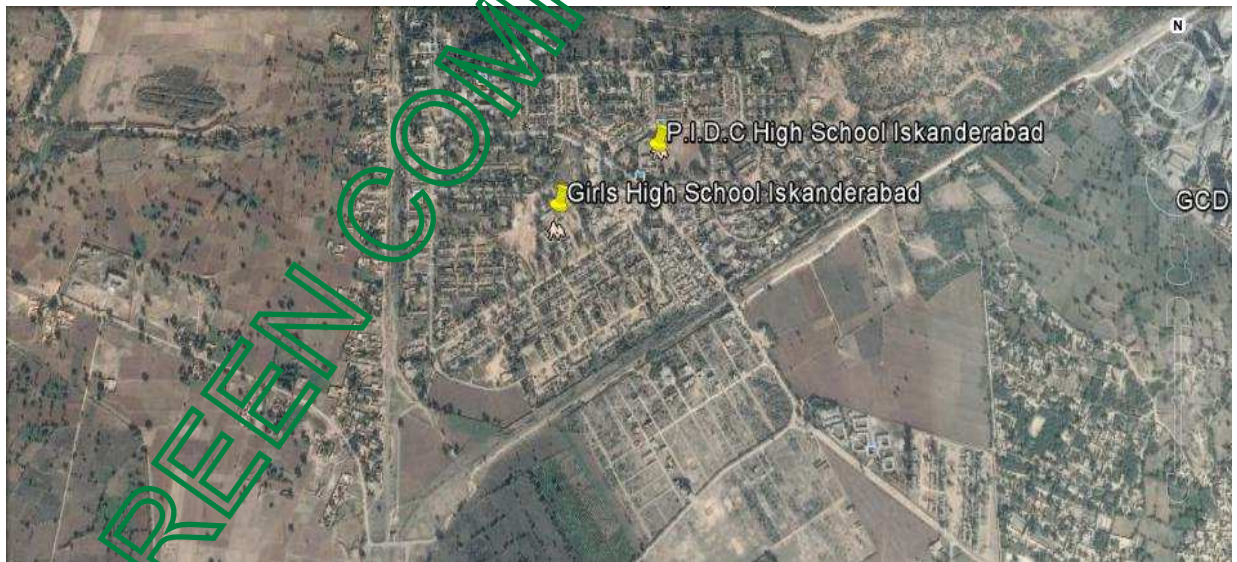


Figure 31: Schools near MLCFL

[Handwritten signature]

4.6 SOCIO-ECONOMIC SURVEY

From socio-economic survey and interviews conducted, it is concluded that no residential area is present near the project site. The individual assessed from the neighboring communities of the project area were involved in industrial and agricultural practices.

Neighboring community inhabitants involved in different occupations were asked about their monthly income but most of them hesitated to tell and stated that they earn just enough to fulfill their basic demands. Regarding the project, almost all of the interviewed members were in favor of the project as it does not involve any chemical manufacturing or pollution causing operational activities which generate pollution.

Data was also collected to assess the health status of the community members at the project site. The diseases prevalent in the community were stomach disorders, fatigue, joint pain, diabetes and arthritis. But it was also observed that all these disease are commonly due to improper diet and water contamination.





Figure 32: Socioeconomic Survey

4.7 QUALITY OF LIFE VALUES

Majority of people in project area are working in MLCF and Tara fertilizer. Some of them are working as farmers and many do their own common business (shopkeepers). The locals of proposed area are provided with basic facilities like electricity, roads, rail, transport etc. If we talk about educational facilities then education up to primary level

M. Ayub

are available in almost all the localities and are easily approachable. They have Model School and Educators School for Primary Education. They are also provided with health facilities including maple leaf dispensary, housing colony hospital where basic health facilities are provided to workers and community. Common diseases observed in that area were diabetics and heart diseases.

4.8 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Testing of different parameters was done from a certified laboratory to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis and noise) is given in annexure.





Figure 33: Ambient Air and Noise Analysis at Proposed Project Sites

Maple Leaf Cement Factory Limited (MLCFL)

CHAPTER 5: STAKEHOLDER CONSULTATION

5.1 GENERAL

Any person, group or organization with an interest in the project or who can be affected directly or indirectly, negatively or positively by the project activities is a project stakeholder. Because of their interests and concerns, it is very important to take stakeholders into confidence regarding the project need and impacts, and their management. Stakeholder consultation is a mean of involving the entire primary and secondary stakeholders in the project decision making process in order to address their concern, improve project design and give the project legitimacy. Stakeholder consultation, if conducted in a participatory and objective manner, is a mean of enhancing the project stability.

Community input (both of knowledge and values) on socioeconomic and environmental issues can greatly enhance the quality of decision making. Stakeholder consultation was therefore conducted in the project area, not only to satisfy legal requirement of EIA in Punjab but also to improve and enhance the social and environmental design of the project.

5.2 OBJECTIVE OF THE STAKEHOLDER CONSULTATION

Role of the public participation is very important in the design making process to achieve the goal of sustainable development. The major objectives of public consultation are as follows:

- Promote better understanding of the project, its objectives and its likely impacts and their management.
- Identify and address the concerns of all interested and affected parties of the project.
- Provide a mean to Identify and resolve issues before plans are finalized and

development commences, thus avoiding public anger, resentment and potentially costly delays.

- Encourage transparency, and inculcate trust among various stakeholders to promote cooperation and partnership with the communities and local leadership.

5.3 CONSULTATION PROCESS

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in Urdu and native language. During these meetings, a simple, non-technical, description of the project was given, with the overview of the project's likely human and environmental impacts. This was followed by an open discussion allowing participants to voice their concerns and opinion. In addition to providing communities with information on the project, their feedback was documented during the primary stakeholder consultation. The issues and the suggestions raised were recorded in field notes for analysis and interpretation.

By reaching out a wider segment of population and using various communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews and participatory rural appraisal. EIA involved the community in important decision making. This process will continue even after the EIA has been submitted, as well as during future EIAs in which similar tools will be used to create consensus among the stakeholders on specific environmental and social issues in context of the project.

Secondary stakeholder consultations were more formal as they involved government representatives and local welfare organization, NGOs consulted during face to face meetings and through telephonic conversations. They were briefed in the EIA process about the potential negative and positive impacts of the project on the area's environment and communities.

It is important not to raise community expectation unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflicts with tribal leaders or local administrators. The issues recorded in the consultation were examined, validated, and addressed in EIA report.

5.4 STAKEHOLDER CONSULTATION TECHNIQUES

In recognition of diversity of views within any community, it is very important to obtain a clear understanding of the different stakeholders' views and concerns regarding the project and to analyze their capacity and willingness to be involved in some or all of the project and its planning process. It is important to be aware of how different power relations can distort the participation. It is also important to know that how community skills, resources and knowledge can be applied to improve the project implementation. All of this can be achieved by careful use of various tools of stakeholder consultation. Therefore the following participatory techniques were employed during stakeholders' consultation:

- Focused Group Discussion
- Scoping Sessions
- Formal Group Meetings
- Informal Group Meetings

5.5 STAKEHOLDERS CONSULTED

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

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

Meeting with stakeholders comprised of community consultation meeting, focus group discussion interviews with men and limited focus discussion with women.

5.6 STAKEHOLDER CONCERNS AND RECOMMENDATIONS

The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below

5.6.1 Awareness Regarding the Proposed Project

Out of total 37 respondents, 56% knew about the project whereas 44% were not aware of the project planning and implementation.

5.6.2 Acceptability of the Proposed Project

Majority of the respondents, 99% favored the construction of the project keeping in view its importance

Table 9: Stakeholders Consultation and Recommendations

Serial No.	Name	CNIC No.	Address	Concerns
1.	M. Naeem Iqbal Khan	38301-9625670-9	Mohalla Khelko Tehsil & District Mianwali	Source of employment
2.	Muhammad Kamran	38302-4795903-3	Mohalla New abbadi, Tehsil & District Mianwali	No concerns
3.	Kaleem Zia	38302-6468066-5	Block 138-F, Rawalpindi	Local Good quality Cement
4.	Niaz Muhammad	38302-0655369-9	Dera Ghazi Kamboh wala Tehsil & District Mianwali	Employment Opportunities
5.	Muhammad Ishtaq	38302-5380239-9	Paki Shah Murdan, Tehsil & District Mianwali	Availability of Cement at door step
6.	Muhammad Ramzan	38302-1121687-9	Iskandarabad, Tehsil & District Mianwali	Good for society development
7.	Muhammad iqbal	38302-1117764-7	Daak Khana Sikandarabad Tehsil & District Mianwali	Source of employment

8.	Shahid Iqbal	38302-2714624-7	Khair Abad Tehsil & District Mianwali	Easy access to cement
9.	Javaid Iqbal	38302-1213437-5	Samaal khail Tehsil & District Mianwali	Local good quality cement
10.	Muhammad Junaid Khan	38302-7882831-7	Mohalla Islam abad Tehsil and District Mianwali	Good for society development
11.	Muhammad Fayaz	38302-0974238-9	House # F-2 Sikandarabad, Mianwali	No concerns
12.	Muhammad Akram Khan	38302-1213589-3	Samaal Khail Mianwali	Employment opportunities
13.	Sajid Iqbal	38302-0743434-7	Mohalla Dao Khail Mianwali	Easy access to cement
14.	Malik Khalid Hameed	38301-0746990-7	Sikandar abad Mianwali	Good for society development
15.	Ghulam Shabir	38302-3353011-5	Mohalla Karimabad Mianwali	Availability of cement at door step
16.	Muhammad Hanif	38302-1171322-3	Paki Shah Mardan Mianwali	Source of employment
17.	Abdul Aziz	38301-7200939-7	Nawa Sheher Kala Bagh Mianwali	Easy acces to cement
18.	Muhammad Yaseen	38301-1045288-3	Purana lari ada Mianwali	No concerns
19.	Hikmat Ullah Khan	38302-1115874-7	Mohalla Shakor Khail Mianwali	Employment opportunity
20.	Mehar Muhammad Naveed	38302-3728853-7	Iskandarabad, Tehsil & District Mianwali	Low cost Cement
21.	Gulwez Shahid	38403-9249591-7	132KV Grid Station Khushab Road, Wapda Colony Sargodha	Beneficial for society related to jobs
22.	Mubeen Khan	38302-1230112-1	F11 Housing Colony, Iskandarabad, Tehsil & District Mianwali	Employment Opportunities
23.	Suneel Maseeh	38302-7221530-1	House No. 77F, Iskandarabad, Tehsil & District Mianwali	Local Manufactured Cement
24.	Shafaqat Hussain	38302-9524117-7	Kambohwala, Tehsil & District Mianwali	Availability of cement at door step

25.	Walayat Khan	38302-5301332-6	House No. G34, Iskandarabad, Tehsil & District mianwali	Employment Opportunities
26.	Muhammad ilyas	38301-1462724-4	Mohallah paki Shah, Tehsil & district Mianwali	No concerns
27.	Muhammad Nawaz	38302-6664363-7	Lari Adda Mianwali	Easy Access to Cement
28.	Muratab Ali	38301-9394561-2	Iskandarabad Tehsil & District Mianwali	Local Good Quality Cement
29.	Noman Ijaz	38302-3497342-3	Saman Khel Tehsil & District Mianwali	Low Cost Cement
30.	Sajjad Saqib	38302-3761891-2	Mohalla Shakor Khail Tehsil & District Mianwali	Source of Employment
31.	Muhammad Arshad	38301-3268451-7	House No. F-5 Sikandarabad Tehsil & District Mianwali	Good for local people
32.	Haibat Muheeb Ullah	38302-8154683-6	Kher Abad Tehsil & District Mianwali	Employment opportunities
33.	Naeem Iqbal Khan	38302-3645128-7	P.O Khas Iskandarabad Tehsil & District Mianwali	Good quality cement at cheaper rate
34.	Muhammad haneef	38302-6235526-1	Pakki Shah Mardan, P.O Khas Tehsil & District Mianwali	Employment resources
35.	Asad Ali	38301-3657528-2	Near Railway Station House # F-7/7 Eisa khail, Mianwali	Beneficial for society development
36.	Muhammad Fiaz	38302-8273672-4	Jalal pura, Tehsil Eisa Khail District Mianwali	Local cement manufacturing opportunity is provided
37.	Hussain Khan	38302-2542161-7	House # 11/13 Iskandarabad Tehsil & District Mianwali	Reduces unemployment

CHAPTER 6: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION

MEASURES

6.1 GENERAL

This section discusses the project's potential environmental impact on the area's geomorphology, soil, water resources, air, biological resources and socioeconomic condition and, where applicable, identifies mitigation measures that will reduce, if not eliminate, its adverse impact. The assessment carried out in this section is based on potential impacts on overall environmental receptors within the project area.

6.2 OBJECTIVES

Objectives of screening all possible impacts and then providing their mitigation measures are:

- To find different alternatives and ways of doing the project activities.
- To enhance the environmental and social benefits of proposal.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept in acceptable limits

6.3 IMPACT ASSESSMENT METHODOLOGY

• **Screening of Potential Impacts**

Based on site visit, observation, brain storming, provided information and social interviews, significant impacts were anticipated and evaluated. Then qualitative and quantitative (where possible) assessment of these anticipated impacts is to be carried out.

• **Identification of Mitigation Measures**

After anticipation and screening of significant impacts, certain mitigation measures



are to be provided in order to enhance benefits of project and reducing impacts. These measures can be classified as:

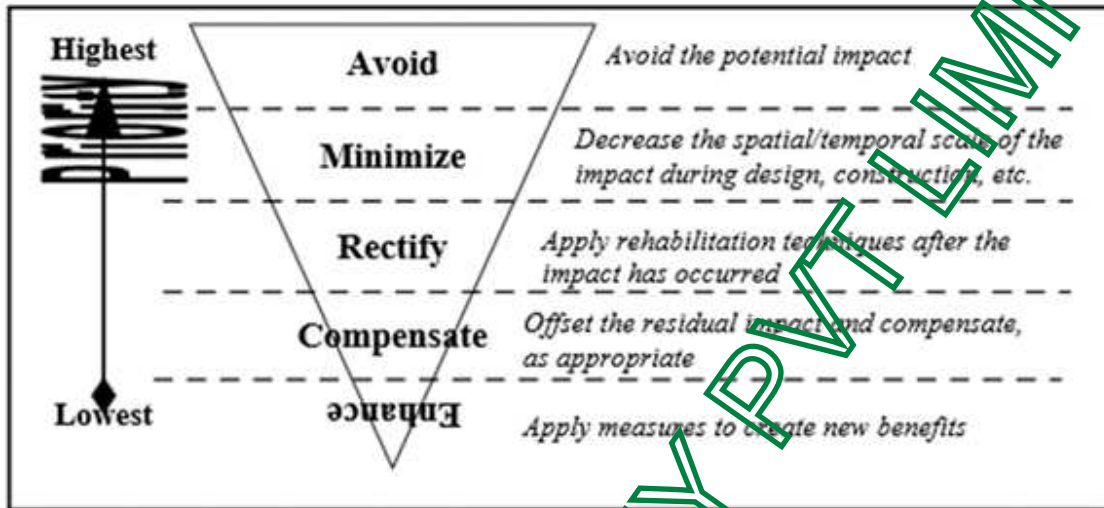


Figure 34: Hierarchy of Mitigations

- **Evaluation of the Residual Impacts**

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of the project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied.

- **Identification of Monitoring Requirements**

The last step in the assessment process is the identification of minimum monitoring requirements. The scope and frequency of monitoring depends on the residual impacts. The purpose of the monitoring is to confirm that the impact are within the prescribed limits and to provide timely information if acceptable limits are being breached.

6.4 Anticipated Potential Environmental Impacts (Construction & Operation Phase)

Characterization is done on the basis of significance, probability and prevalence of the potential impacts in the surrounding environment. Primarily, anticipated impacts have been categorized as direct, indirect and induced. These groups of impacts can be further broken down according to their nature into:

- Positive and negative impact;
- Minor, major and moderate impact;
- Local and widespread impact;
- Temporary and permanent impact;
- Short and long term impact; and
- Reversible and Irreversible impact

Notion of Significance

Evaluation of impacts will be based on determining the significance of impacts as well as characteristics of impacts. Indicators considered for determining the significance include: predicted increase in the acceptable level (established standard e.g., NEQS and duration) in relation to key species life cycle and requirement for population maintenance, geographical extent of an effect, assimilative capacity of environmental attributes. To determine the significance of impacts on bio-physical and socio-economic environment of the proposed project, impact characterization is discussed and is given as Table for construction and operation phase.

The criteria used to define the significance of impacts in terms of low, moderate and severe impact are as follows:

Negligible/No Impact:

The impact, which has unapparent and negligible influence on natural and socio-economic environment.

Low Adverse Impact:

The impact, which has a slight influence on the natural and socio-economic environment.

Moderate Adverse Impact:

The impact, which can be eliminated/ mitigated after applying the appropriate mitigation measures.

Severe Adverse Impact:

The impact, which can be partially/ but not fully mitigated by applying the mitigation measure.

Positive/Beneficial Impact:

The impact, which improve/enhance the natural and socio-economic environment.

		Physical Components						Biological Components				Social Components							Aesthetical Components					
		WATER			AIR			TERRESTRIAL FLORA & FAUNA																
		Spills and Leakage of hazardous materials in water	Pollutants released into water	Particulates matter	Emission of GHG	noise level	vibration	Effect on vegetation	Effect on Agricultural land	Effect on wetlands	Reduction of Biodiversity	Change in living standard	Psychological Problem	Availability of new facilities	Traffic Congestion	Impairment of health	Worker safety issues	Community safety issues	Occupational diseases due to pollutant exposure	Employment	Economy	visual/scenic beauty	Odor Problem	
PHASE I	Pre-Construction	Land Acquirement	NA	NA	NA	NA	NA	NA	O	O	O	O	LB	NA	NA	NA	NA	NA	NA	NA	MB	HB	O	O
	PHASE II	Construction	Instrument installation	LA	O	O	LA	LA	LA	O	O	O	O	LA	LA	O	O	LA	O	LA	MB	MB	O	LA
Storage of construction material			O	O	MA	O	O	O	O	O	O	O	LA	LA	O	O	LA	LA	O	LA	HB	MB	O	O
Transportation of construction material			LA	O	LA	LA	LA	O	O	O	O	O	LA	LA	O	O	LA	LA	O	LA	HB	MB	O	O

ECOGREEN COMPANY PRIVATE LIMITED

PHASE III Post-Construction / Operation	Construction of Temporary sites	O	LA	LA	LA	LA	O	O	O	O	O	LA	LA	O	O	LA	LA	O	LA	HB	MB	LA	O
	Laying of transmission & pipe lines	LA	O	LA	LA	LA	O	O	O	O	O	O	LA	O	O	LA	LA	O	LA	HB	MB	O	LA
	Heavy equipment operation	LA	O	LA	LA	LA	LA	O	O	O	O	LB	LA	LB	O	LA	LA	O	LA	HB	MB	LB	LA
	Manufacturing Process	LA	O	MA	LA	MA	O	O	O	O	O	O	LA	O	O	LA	LA	O	LA	HB	LB	O	LA
	Redundant machinery/Equipment	O	O	LA	MA	MA	LA	O	O	O	O	LA	MA	O	O	MA	O	O	MA	O	O	O	O
	Solid Waste Management	O	O	O	O	O	O	O	O	O	O	LA	LA	O	O	O	O	O	LA	LB	O	LA	LA
	Discharge of liquid effluents	LA	LA	O	O	O	O	LA	O	O	O	LA	O	O	O	O	O	O	O	O	O	O	LA

Legend

O - Insignificant / no impact

NA - Not Applicable

LA = Low Adverse

LB = Low Beneficial

MA = Medium Adverse

MB = Medium Beneficial

HA = High Adverse

HB = High Beneficial



ECOGREEN COMPANY PVT LIMITED

6.5 Impacts Associated with Project Location

While citing a plant, care should be taken to minimize the adverse impact of the facility on immediate neighborhood as well as distant places. The application of good and sound citing criteria is often the best and first strategy to minimize the environmental and social impacts that can be caused by a cement manufacturing plant. The Proposed site is undisputed open land and under the ownership of the Proponent.

Easy road and rail access, no settlements in close vicinity, no archeological or cultural resources to be dismantled or relocated, and no ecologically sensitive or declared protected area existing on proposed site that favors the point of no impact due to project location.

6.6 Impacts Associated with Design

At the design phase, no considerable impact will occur on land, soil, topography, ground water, and on people of the area. However in pre-construction phase a management system should be provided at design level so impacts can be reduced. Design of the proposed building will adhere to all standard technical requirements in order to avoid adverse impacts on environment and human health.

Mitigation Measures

The Proponent intends to construct the unit on modern lines, meeting International Standards, with incorporation of Imported Technology. The design, if maintained and operated in an environment-friendly manner, is expected to cast positive impact on the Environment and will not pose any adverse impact or threat on any component of the Environment.

6.7 Impacts Associated with Construction Phase

The Environmental and Socio-Economic Impacts associated with the construction activities of the plant are the following:

- Construction Noise

- Dust Emission During Construction
- Change of Land Use
- Water Sourcing
- Vehicle and Equipment Exhaust
- Soil Contamination
- Camp Effluent
- Hazardous and Non-Hazardous Waste Management
- Disturbance to Wildlife
- Socioeconomic Impact
- Community and worker's Safety
- Traffic Disturbance
- Local Employment Conflicts
- Archeological Resources
- Project and Community Interface

6.7.1 **IMPACTS ON PHYSICAL ENVIRONMENT**

6.7.1.1 *Effect on Geomorphology and soil*

Potential Impacts:

Spills of fuel during handling, transportation and storage may result in contamination of soil at the construction site. During a typical construction project spill of fuel, lubricants, can take place. As a result contamination of soil will occur, significance will depend on the nature of material, location of spill and quantity of spill.

The likely impacts of these activities may include:

- Physical scarring of the landscape
- Increased risk of land slippage



- Erosion from road sides, well pads and sloped surface as well as soil and silt from the cleared area, results in increased sediment load in surface run off.
- Soil contamination

Impact Assessment

Soil contamination may occur due to spillage and leakage of fuels. This possibility of impact is more at fuel and chemical storage areas at campsites, vehicles and machinery used in the field and areas of vehicle fueling and maintenance.

There are no visible signs of any adverse impacts on the soils and to avoid such conditions following mitigation measures are provided and will be followed

Mitigation Measures

- Spill Prevention and Response Plan for storage, use and transfer of fuel and hazardous materials should be prepared.
- Workers should be trained on spill prevention and response plan.
- Thick Plantation is recommended after completion of project to minimize land slippage and soil erosion impacts.
- Fuels and lubricants should be stored in covered areas, underlain with impervious lining
- Maintenance and washing of vehicles and equipment should be carried out at designated areas
- Any hard surface or tarpaulin should be spread on area to prevent soil contamination
- Regular inspections should be carried out to detect leakages in construction vehicles and equipment
- Appropriate arrangements, including shovels, plastic bags and absorbent materials, should be available near fuel storage areas.

Residual impacts

No residual impact to soil will be caused provided the above-mentioned measures are implemented properly.

Monitoring requirement

- Regular inspection of soil of the project area should be undertaken
- Document all related accidents of spillage to take corrective actions and to avoid reoccurrence.

6.7.1.2 Water Quality

Potential impacts

The quality of surface and groundwater supplies may deteriorate if pollutants mixes with surface runoff during rain are carried to water resources in the vicinity, or if pollutants leach into the ground.

The storage and handling of fuels and lubricants may also contaminate surface and groundwater resources, if there are spillages that wash into surrounding areas or seep into the ground.

Improper disposal of domestic effluent from the camp may result in contamination of soil and water and become a health hazard. A significant impact on the environment will be interpreted if the wastewater discharged is not in compliance with the National Environmental Quality Standards for municipal effluent

Impact Assessment

A significant amount of sediment may get washed into fields and watercourses if it rains during the construction period; however the impact is not expected to be significant. Potential sources of pollution in such cases may include:



- Domestic waste (sanitary and kitchen discharge)
- Oil and grease from vehicles
- Sediments from altered land surfaces (campsites)
- Stored Fuel, and other chemicals

Mitigation Measures

- Fuels and lubricants will be stored in areas with impervious floors
- Proper drainage will be provided to construction camp and construction site, especially near excavations.

Residual Impacts

Implementation of the proposed mitigation measures is not likely to leave any significant impact on the soil or surrounding land.

Monitoring requirement

Periodic monitoring will include:

- Discharge rate of wastewater
- Chemical analysis of the wastewater

6.7.1.3 Water use

The water during the construction activity will be required for the domestic water consumption at the construction camp and for the construction activities including sprinkling of water for dust suppression. This water will be taken from wells near river.

Potential impacts

The extraction of water for the construction may affect the water availability for other water users. An adverse impact on the water resources will be interpreted if it is established that the water extraction during construction has directly affected the



ability of the community to meet their water needs

Mitigation measures

Following mitigation measures should be incorporated to minimize any impacts,

- Water conservation program will be initiated to Prevent Wastage of water.
- Water will be extracted from well 0.5km away from river

6.7.2 Dust Emissions

Dust generated during construction activities can be substantial. Dust emission from construction sites is a concern particularly if the site is near residential areas. Dust or the equivalent technical term 'particulate matter' is generally defined as any airborne finely divided solid or liquid material up to the size of about 100 microns (micrometers or one millionth of a meter).

Potential Impacts

Particulate matter emitted during construction activities can result in deterioration of ambient air quality in the vicinity of the source, and be a nuisance to the communities and plant workers. The main health hazards are the particles smaller than 10 microns (designated as 'PM10') as they are Respirable. Larger particles also tend to settle rapidly and often do not reach receptors. In cases where they reach the receptors, the dust is considered a nuisance as it may spoil property and affect visibility. A significant effect on the environment will be interpreted if there is an increase in visible dust beyond the boundaries of the power plant due to activities undertaken at the plant site, or the dust affects local property or results in complaints from the community.

Impact Assessment

Potential sources of particulate matter emission during construction activities include

Maple Leaf Cement Factory Limited (MLCFL)

earthworks (dirt or debris pushing and grading), exposed surfaces, exposed storage piles, truck dumping, hauling, vehicle movement on unpaved roads, and concrete mixing and batching. The quantity of dust that will be generated on a particular day will depend on the magnitude and nature of activity and the atmospheric conditions prevailing on the day.

Mitigation measures

- The most effective means of reducing the dust emission is wet suppression. Watering exposed surfaces and soil with adequate frequency to keep soil moist at all times can reduce the total dust emission from the project by as much as 75%
- Dust emission from soil piles and aggregate storage stockpiles will be reduced by covering the piles, for example with tarpaulin or thick plastic sheet.
- Good quality (low-sulfur) fuel will be used for vehicle and machinery
- Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.
- Provision of dust respirators to equipment operators who are exposed to dust while operating their equipment.
- Tree planting on open and disturbed areas which will not be used by the operations.

Residual Impacts

The effects of the dust nuisance are temporary with no long lasting impact expected after the completion of the construction.

Monitoring requirements

- Dust emission will be visually monitored
- Ambient air quality will be checked near or at project site.

6.7.2.1 Noise

Potential issues

Depending on the Construction Equipment used and its distance from the receptors, the community and the Existing Plant workers may typically be exposed to intermittent and variable noise levels. During the day such noise results in general annoyance and can interfere with sleep during the night. The potential noise related issues during construction is the disturbance to workers and the surrounding communities of plant due to construction machinery operation on the plant site.

Impact Assessment

The potential sources of significant noise during the construction period include the construction machinery, generators at camps and construction related traffic. The noise will be maximum during the day time when construction activities are ongoing.

Mitigation Measures

- Reduce equipment noise at source by proper design, maintenance and repair of construction machinery and equipment
- Minimize noise from vehicles and power generators by use of proper silencers and mufflers
- Use noise-abating devices wherever needed and practicable.
- The movement of vehicle should be restricted during night time.
- Providing workers with noise related PPE's
- Planting of trees that could serve as sound buffers.
- Noise barriers must be put in on and around the project boundary
- Hauling trucks shall be operated at low speed to minimize vibration, promote road safety, etc

Monitoring requirement

Monitoring will be done on regular basis to avoid increase in noise beyond N205

6.7.3 IMPACTS ON BIOLOGICAL ENVIRONMENT

6.7.3.1 *Vegetation loss*

The project area is an Open area owned by M/S Maple leaf cement factory. As such there's not any natural vegetation on the project site. So there is no possibility of vegetation loss. But Proponent has planned a Tree Plantation plan within the Project area.

6.7.3.2 *Wildlife and habitat*

During the construction phase, there will be considerable human interventions in the project area which can potentially affect the wildlife resources of the project area. Following mitigation measures will be followed for prevention of accidents of wildlife and birds

Mitigation

- A 'no-hunting, no trapping, no harassment' policy will be strictly enforced.
- Trading of wild animals or birds by project personnel will also be prohibited.
- Wildlife protection rules will be included in the Camp Rules
- Proper signs for birds protection will be placed

6.7.4 SOCIO-CULTURAL IMPACTS

6.7.4.1 *Possible Displacement*

As the site is owned by proponent and resettlements and community are at a safe distance from site (almost 2km), so no displacement or relocation of people is expected.



6.7.4.2 *Land use*

Proposed land is open land and it is going to be improved to industrial land so its value will be increased and positive land use will occur.

6.7.4.3 *Induction of Labor*

During the proposed project, unskilled, semi-skilled, and skilled labor will be employed for various jobs. All of this means that the proposed program will create job opportunities for the local community. Families close to the project activities expect an improvement in their quality of life and employment not equitably and judiciously distributed between the tribes of the project area will result in intertribal conflict.

Mitigation Measures

- All unskilled jobs will be provided to the local communities.
- Before project, the local communities and other stakeholders in the project area will be informed of the employment policy in place and the number of people that can be employed from the local communities.
- Local people from villages closest to the project site (and therefore the most likely to be affected by project activities) will be given preference.

6.7.4.4 *Community Health*

People from the project area regularly travel to other cities, and thus cannot be considered isolated from the rest of the country. They are regularly exposed to illnesses common to urban populations, and have similar levels of immunity. Workers will undergo medical examinations before being hired, and will be screened for communicable diseases. In addition, there will be very little contact between workers and local people. The project is therefore very unlikely to lead to an epidemic of any sort among local communities.

Mitigation Measures

The crew will undergo medical examinations before being hired, and will be screened for communicable diseases. The project is therefore very unlikely to lead to an epidemic of any sort among local communities.

- All employees shall undergo regular check up with physician to ensure that they have good health.
- The proponent will provide regular medical practitioners for the regular checkup of the employees' health.
- Conduct free clinic and medical mission to regularly check the health condition of the residents of the community

6.7.4.5 Safety

Potential Issues

Safety always remains an area of utmost concern in any occupational activity; construction being one. Not only workers but the people from surrounding communities on the roads adjacent to the site are at stake of safety risks as well.

The safety issue is that of traffic entering and leaving project site for transport of goods and materials. Workers safety is also an issue because of machinery if they show carelessness.

Mitigation measures

To reduce the hazard, the following mitigation measures will be implemented:

- A stop sign will be put up on the access road
- A speed breaker will be constructed on the access road
- The speed limit for the access road will be kept low
- A public safety plan should be developed and displayed



- Community complaint register and other mean should be adopted for the community to complain.
- All entry points into the construction area should be staffed 24 hour a day. People who are not related to the project should not be allowed inside.
- No machinery should be left unattended, particularly in the running condition.
- Nighttime driving of project vehicles should be limited.
- Drivers will be trained to drive slowly following traffic rules.

6.7.4.6 *Interactions with Communities*

There is expected to be very little interaction between crews and local communities, expect for the local people who are hired for the project.

Mitigation Measures

Proponent will strive to maintain contact with major stakeholders, particularly local communities, through all stages of project implementation. This is necessary to engender sense of community in the project proponents and to ensure that the community's concerns are responded to at every stage. The purpose of such contact is to develop a relationship of trust with the local communities.

6.7.4.7 *Archeological or Cultural Resources*

It is possible that the project may damage structures, such as archaeological sites, houses, water wells and canals and water courses, owned and used by local people. No known sites of archeological or cultural value are known to exist near the proposed well site or along the access road. The project is therefore not expected to have any impact on archeological or cultural resources of the area

Mitigation Measures

The following mitigation measures will be taken to reduce the impact on the area's

cultural resources and infrastructure:

- All graveyards and shrines and other cultural sites in the vicinity of the project area will be identified before the survey.
- Communication will be established with the local spiritual leaders and the communities to explain about the activities near the sites

6.7.4.8 **Security Risks**

During construction phase a large number of workers will be hired including engineers and laborers. The increase in people to the area, as well as the periods where some construction workers are unemployed could lead to an increase in crime and violence in surrounding areas.

Mitigation measures

- Proper Security will be provided
- Security guards will be appointed at all exit and entry points

6.8 **Impacts during Operational Phase**

The Environmental and Socio-Economic impacts associated with the operation phase of plant are following:

- Air Emissions
- Plant Noise
- Wastewater
- Exhaust Gas Emissions
- Water Resources
- Hazardous Material and Waste Handling
- Waste Management
- Occupational Health and Safety



6.8.1 IMPACT ON PHYSICAL ENVIRONMENT

6.8.1.1 Water Consumption

The increased withdrawal of surface water for the Proposed Project may affect the water availability for the other users of the Project Area. A significant impact will be interpreted if water extracted for the project directly affects the ability of the community and other users to meet their water needs.

Impact Assessment

Main water usage will be for domestic use and for makeup water for evaporative losses.

Mitigation Measures

- Water conservation program will be initiated in plant colony to prevent wastage of water.
- Reusing/recycling water.

6.8.1.2 Water Quality

Potential Impacts

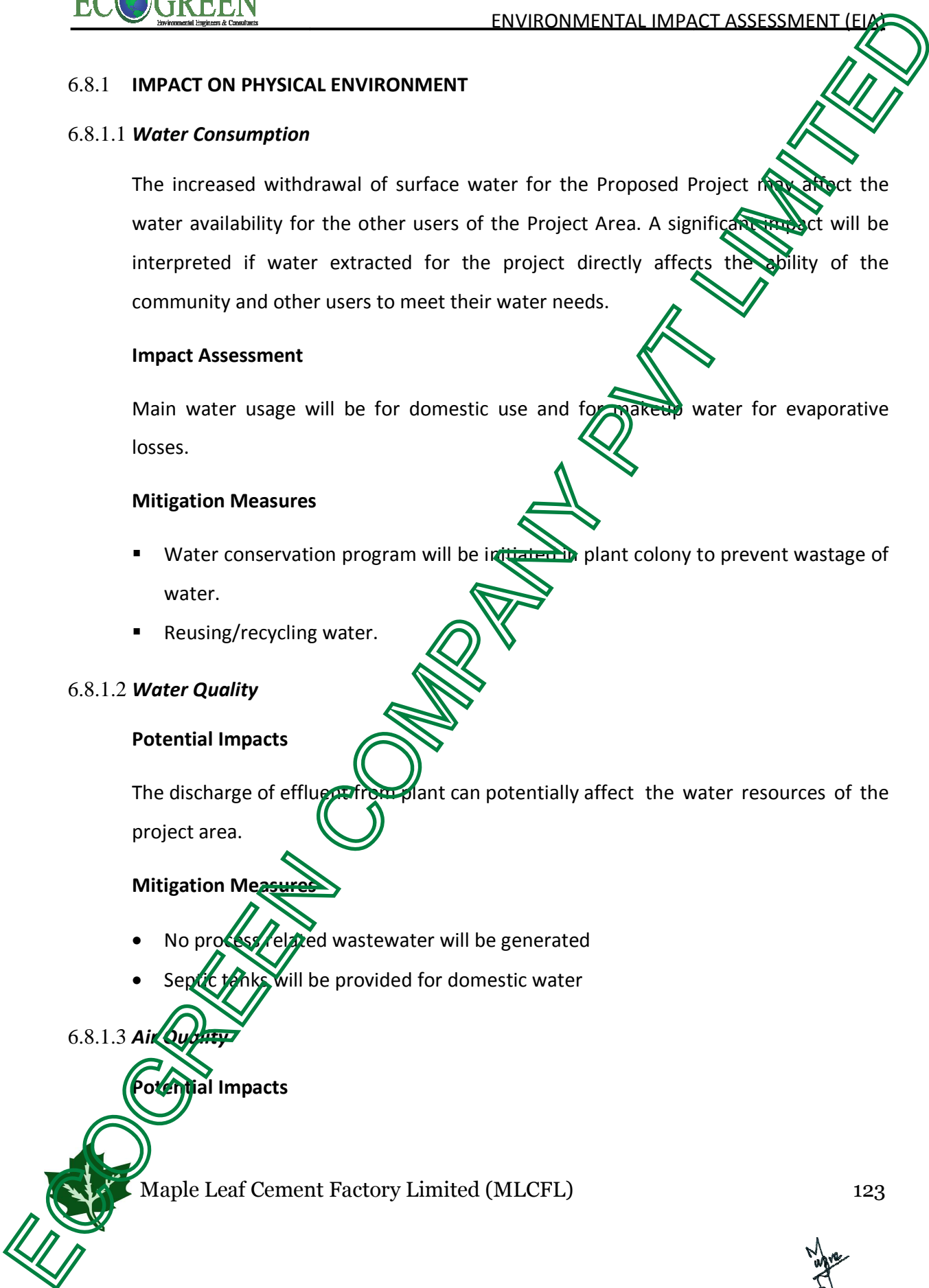
The discharge of effluent from plant can potentially affect the water resources of the project area.

Mitigation Measures

- No process related wastewater will be generated
- Septic tanks will be provided for domestic water

6.8.1.3 Air Quality

Potential Impacts



The Establishment of the Proposed cement Plant is likely to result in a range of emissions including SO_x, NO_x, CO₂ gases as well as particulate matter being emitted into the atmosphere. In terms of human health, SO₂ emissions are part of the concern. SO₂ can damage human respiratory functioning. Oxides of nitrogen are particularly harmful to children and can lead to respiratory diseases.

Mitigation measures

- Use of low sulfur coal as fuel
- High efficiency (>99%) Electrostatic Precipitators (ESP) or Baghouse Filters (99.9%) will be installed to limit total PM emissions
- Low NO_x burners will be designed to minimize the NO_x generation
- Strict plantation is recommended after completion of project.

Monitoring Requirements

Regular Environmental Monitoring has been conducted for parameters designated for cement industries and Power Generation Plant (PGP) (according to SMART rules given by EPA Punjab in 2001) and corresponding reports are submitted to EPA Punjab on monthly basis, consolidated report on quarterly, bi-annual and annual basis to show the compliance of Emission and Discharges with PEQS. Same system will be adopted for the monitoring of Line 3.

6.8.1.4 Noise and Vibration

Potential Impacts

The Proposed Plant will result in increase in noise. The increased noise may be a source of disturbance to nearby communities and the plant workers colony. The significance of noise impacts is linked to the type of surrounding land use in the area, and can be divided into residential, industrial, mining and agriculture. The human

settlement that is most likely to be sensitive to increased noise levels is located at distance almost 3km from plant site so no significant noise effects are expected.

Impact Analysis

Noise, if emitted during the project operation can potentially be a nuisance for the nearby surroundings. In this project noise shall be emitted during running of machinery. Silencers will be installed with machinery to reduce sound. Sound proof room will isolate the noise to the room.

Mitigation measures

- The noise producing equipments will be placed inside the acoustic enclosures to reduce noise at source.
- Workers should be told and encouraged to use PPEs (ear plugs or ear muffs).
- Selecting equipment with lower sound power levels;
- Install silencers for fans
- Suitable mufflers or silencers should be installed in intake and exhaust channels
- Vibration isolation should be installed for mechanical equipment
- Reducing project traffic routing through community areas wherever possible;

Residual Impacts

Implementation of the mitigation measures proposed above will result in negligible / no residual impact due to plant noise on surrounding environment.

Monitoring Requirements

During project operation, it should be ensured that the noise level at the project site does not exceed the prescribed limits.

6.8.1.5 *Solid Waste Management*

Potential Issues

The solid waste generated during the operational phase of Proposed Project can pose a health hazard, pollute soil, surface and ground water if not managed properly. A significant impact will be interpreted if the waste management is not carried out properly; which may effect to health of workers, pollution of soil, surface or groundwater:

Mitigation Measures

Key elements of the Waste Management System will be the following:

- Separate waste bins will be placed for different type of wastes
- All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed off through approved waste contractors.
- Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.

Residual Impacts

Proper implementation of the mitigation measures will ensure that the residual impact from waste is minimum. Monitoring and inspection will be undertaken to ensure compliance and minimize any residual impact.

6.8.1.6 Fuel Management

Fuel will be required both for combustion and for generators and vehicles. Adverse impacts of a temporary nature on the surface waters and ground water may result if accidental spill of petroleum products occur. Therefore, storing and transferring such materials at locations away from drainage ways will minimize the risk of such occurrence.

Following specific guidelines for fuel storage and handling should be considered:

- Proper warehouses or storage areas should be designated for fuel storage
- Training to the workers should be provided for fuel handling
- Fuel storage areas should be clearly marked or barricaded to ensure that moving vehicles do not damage them.

6.8.1.7 **Emergency Response**

Incidents and accidents may take place unexpectedly during project operations no matter how effective, strong and efficient the mitigation measures for all adverse impacts; especially the safety issues may be adopted. These may include;

- Fire hazard

FIRE HAZARD

During operational phase of the project, fire hazard poses a serious threat.

Mitigation

- Fire extinguishers should be properly maintained and checked periodically.
- Adequate fire hydrant system should be installed.
- Flammable materials should be prohibited in the premises.
- Fire alarm systems should be maintained for detection and warning of fire.
- Pressure gauges should be checked monthly.
- Adequate training of workers on use of firefighting system to deal with the situation.
- Administration of the unit will make a proper evacuation plans for emergency escape from all halls.
- Emergency call service must be made available.
- Firefighting team must remain ready at all times.

6.9 IMPACTS ON SOCIO-ECONOMIC ENVIRONMENT

6.9.1.1 Safety

It includes Occupational Hazards like physical injuries arising from accidents such as being hit by falling weak structures, being overrun by heavy equipment and etc. The major safety issues in operational phase are:

- Electrical hazards
- Machine guarding
- Eye, head and foot protection
- Fire and explosion hazards
- Housekeeping Issues

Mitigation measures

- Care will be taken to properly ground and insulate all equipment
- Standard procedures for confined space entries will be displayed in written form
- Proper machine guarding, which is critical for the prevention of injuries to workers by isolating them from moving machinery, will be provided
- Head, arms and foot PPE's will be provided
- Emergency Eye wash equipment should be placed in chemical room.
- Firefighting equipment will be available in the form of ABC fire extinguishers as a minimum, and their locations will be clearly marked.
- Exits from work places will be well marked and visible in dim light.
- Fire water will be located throughout the plant in well-marked piping.
- Housekeeping will be frequent and thorough to prevent slips, trips, and falls
- SOPs will be established for all the activities and will also be displayed wherever required.
- Training on observation of SOPs will be provided to the employees and the visitors,

as may be required.

- Workers will be told and encouraged to use PPEs as may be standardized
- Workers' awareness and safety wall chart showing safety symbols will be displayed.
- First Aid Box will be kept in easy approach of all in case of any injury or mishap.
- Basic medical and health facilities will be provided to all employees
- Safety, health and educational drive should be given to residents living near the construction site.
- Safety and warning devices such as reflectors, lights, etc. shall be installed at designated spots

Residual Impacts

Implementation of the suggested mitigation measures may leave behind some residual impacts of safety incidents.

Monitoring requirements

Visual monitoring of hazards and accidents will be done

6.10 Potential Environmental Enhancement Measures

6.10.1 Tree Plantation

Management of MLCF has planted numerous indigenous trees, shrubs and ornamental plants inside and outside the factory premises. They have made it a permanent feature of their Corporate Social Responsibility (CSR) profile to conduct tree plantation campaigns twice a year in both planting seasons i.e Spring and Monsoon. They have Planted more than 130,000 Trees of minimum height 6-7 feet in consultation with District Forest Officer and District Officer (Environmental), Mianwali. They do tree plantation campaign every monsoon. This year management of (MLCFL) celebrates **World Forest Day** and **World Environment Day** to create awareness among individuals

about the importance of trees, forests and Environment in our life. These activities show that MLCF is very conscious about environment.

This year in Spring Season 1,810 Trees were planted. 441 trees are planted in Gray Cement Division (GCD), 405 trees are planted in Special Cement Division (SCD), 640 trees are planted in HC, and 324 trees are planted in Power Generation Plant (PGP) by MLCF management. Total 4 Gardeners are deployed to plant these trees .Total Expenses on these tree plantation events were Rs. 435,000.

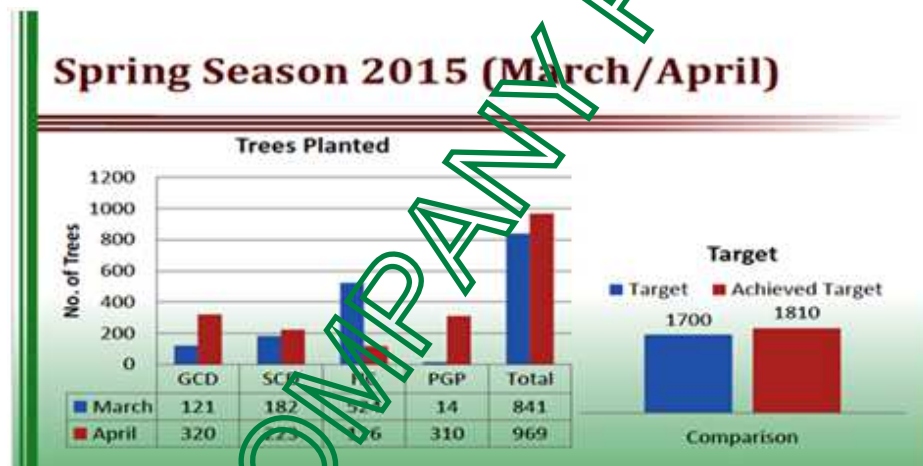


Figure 35: Tree Plantation by MLCF in Spring Season

MLCF have also established Inhouse nursery. They have made it a permanent feature of their Corporate Social Responsibility (CSR) profile to conduct tree plantation campaigns twice a year in both Planting Seasons.



Figure 36: Recent Tree Plantation Activity in Govt. College, Musa Khel

The management of MLCFL do their full effort to integrate social & environmental concerns in their business operations to achieve a balance of economic, environmental and social imperatives. Further Tree plantation and cropping within and outside the premises has also been planned by the proponent for environmental enhancement. The Proponent will also make arrangements for protection and maintenance of trees.

6.10.2 Health Concerns

MLCF have established their own dispensary where all employees and families are having a standardized facility for treatment of different ailment and severe illness. Housing colony hospital is also there to serve people. Regular health training sessions are also conducted through internal and external sources in coordination with human resource department to improve awareness level of employees. They will also arrange free medical camps for community and workers to facilitate them. A new primary health care center is also under construction which will be operated by SHIFA.

6.10.3 Community Development Plan

The management of MLCF has developed a Community Development Plan for the benefit of communities near Project Area. This Community Development Plan has been submitted to EPA Punjab vide EPA Punjab Memo No. 1652/DIR (EIA) dated 19-07-2011. This plan is annexed with this report.



CHAPTER 7: ENVIRONMENTAL MANGEMENT AND MONITORING PLANS

7.1 GENERAL

This EIA provides the Environmental Management Plan (EMP) of the project to keep it environment benign as well as the monitoring plan to ensure the compliance of the established EMP.

Outline and key features of the EMP for operations phase is presented. As per the environmental legislation in Pakistan, the EMP for the operations phase, along with other documents, is to be submitted to the environmental protection agency to obtain confirmation for compliance and Environmental Approval for project operation.

Even after implementation of the suggested mitigation measures, the impact may remain significant, and require monitoring. This section also underlies the monitoring framework for both construction and operation phases to check compliance of the EMP and to take timely actions for correction in case any accident of significant criteria, requirements or goals are found.

7.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

7.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the key players are summarized below:

Proponent: The project proponent will undertake overall responsibility for compliance with the EMP. Concerned Departments will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements.

Contractors: The contractors will implement the majority of environmental and social mitigation measures. The contractors will carry out field activities as part of the project. The contractors are subject to certain liabilities under the environmental laws of the country, and under its contract with proponent.

7.4 COMPONENTS OF THE EMP

The EMP consists of the following:

- Management plan
- Monitoring Plan
- Communication and documentation
- Institutional capacity
- Environmental training

7.5 ENVIRONMENT MANAGEMENT PLAN

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect in line during operational phase with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by reducing its impacts and making it environmental friendly.

Table 10: Environmental Management Plan

PROJECT ACTIVITIES	TYPE OF IMPACT	POTENTIAL IMPACTS ON ENVIRONMENT	EXTENT / MAGNITUDE	MITIGATION MEASURE	INSTITUTIONAL RESPONSIBILITY	
					IMPLEMENTING BODY	SUPERVISION
PRE-CONSTRUCTION						
Land acquirement and land use	Physical , Social and Aesthetical	Positive use of land but proper planning will be required	More/to MLCF	<ul style="list-style-type: none"> Land is owned by proponent and there is no settlement so no impact will be there. Land will be improved from open land to industrial land. 	Contractor	Proponent* *proponent may give responsibility to concerned departments
Use of local manpower	Social	Employment Generation	Less / Adjacent area	<ul style="list-style-type: none"> Local people will be hired for less technical work or non-skilled work 	Contractor	Proponent*
Wildlife protection	Biological	Accidents/ dangers to fauna	Less/ Adjacent area	<p>Avoidance</p> <ul style="list-style-type: none"> A 'no-hunting, no trapping, no harassment' policy will be strictly enforced. Trading of wild animals or birds by project personnel will also be prohibited. Wildlife protection rules will be included in the Camp Rules 	Contractor	Proponent*

CONSTRUCTION						
Civil works	Physical, Social, Biological Aesthetical	Soil Erosion, Emissions, Water Contamination, Noise & Vibration, Wildlife affected, Employment, Health & Safety of Workers	None, Adjacent area	<p>Minimization:</p> <ul style="list-style-type: none"> Dust emission from soil piles and aggregate storage stockpiles will be reduced by keeping the material moist by sprinkling of water at appropriate frequency <p>Avoidance:</p> <ul style="list-style-type: none"> Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emission. Noise control measures will be implemented Use of water only from designated wells Wildlife protection rules will be included in the Camp Rules Off-road driving will be minimized in order to avoid accidental killing of fauna. 	Contractor	Proponent*



ECOGREEN COMPANY PVT LIMITED

<p>Movement and fueling of vehicles</p>	<p>Physical & Aesthetical</p>	<p>Soil & Water Contamination due to Fuel Leakages & Spillage, Emissions, Noise & Vibration</p>	<p>Moderate/ at the site</p>	<p>Avoidance:</p> <ul style="list-style-type: none"> • Periodic maintenance and inspection of vehicles • Vehicles with leaks will not be operated. • Vehicles should not be washed or serviced in the field. • No vehicle-related waste, such as oils, filters, old tires or parts, will be left in the field • All vehicles will be maintained in good working condition • All vehicles will have properly functioning silencers (mufflers). 	<p>Contractor</p>	<p>Proponent*</p>
-----------------------------------------	-----------------------------------	-------------------------------------------------------------------------------------------------------------	------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------	-------------------



ECOGREEN COMPANY PVT LIMITED

<p>Transportation of construction material</p>	<p>Bio-physical</p>	<p>Dust and Particulate Emissions, Noise Generation, Safety and Health Effects</p>	<p>Moderate/Adjacent area</p>	<p>Minimization:</p> <ul style="list-style-type: none"> Excessive use of horns will be avoided PPE's will be provided to workers <p>Avoidance:</p> <ul style="list-style-type: none"> Covering of transporting material trucks Nighttime driving of project vehicles will be limited where possible <p>Low speed limit will be maintained on the section of the access road that is adjacent to the community and site.</p> <ul style="list-style-type: none"> The fence surrounding the site will be put in on during the construction to prevent access to the construction site 	<p>Contractor</p>	<p>Proponent*</p>
------------------------------------------------	---------------------	------------------------------------------------------------------------------------	-------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------	-------------------



ECOGREEN COMPANY PVT LIMITED

Construction of campsites	biological and physical	Damage to Topsoil, Drawn of Water from Local Resources	Moderate/at the site	<ul style="list-style-type: none"> • Photographs will be taken to record the conditions before setting-up camp. • Camps will be established in the existing clearings. • Camps will be kept as small as possible. • Water will only be taken from designated wells. 	Contractor	Proponent*
Instrument installation	Physical & Social	Noise & Vibration, Spillage & Leakages, Health & Safety	Moderate/ adjacent area	<p>Reduction:</p> <p>Use of PPE's</p> <p>Avoidance:</p> <ul style="list-style-type: none"> • Proper maintenance and inspection of equipments and machinery. • Warning signs will be provided to assure safety. 	Contractor	Proponent*



ECOGREEN COMPANY PVT LIMITED

Laying of Transmission lines	Physical	Effects on scenic beauty, Disturbance to birds, noise, safety	More/ adjacent area	<p>Reduction:</p> <ul style="list-style-type: none"> Planting vegetative screens to block views of the transmission lines Provision of proper safety measures and tools Signs for birds protection will be provided 	Contractor	Proponent*
Use of local water resources	Physical, Social & Biological	disturbance to local community	Less/ adjacent area	<p>Avoidance:</p> <ul style="list-style-type: none"> Initiation of water conservation program <p>Reduction:</p> <ul style="list-style-type: none"> Where possible, water should be recycled 	Design engineer & Contractor	Proponent*
POST-CONSTRUCTION/OPERATION						



ECOGREEN COMPANY PVT LIMITED

Heavy equipment operation	physical	Particulate Matter, Emission of GHG, Noise, Vibration	Moderate/ Local	<p>Avoidance:</p> <ul style="list-style-type: none"> • Spill prevention trays provision • Noise control plans No machinery will be left unattended, particularly in running condition • All vehicles and other equipment used during the construction and operation will be tuned and maintained in good working condition in order to minimize emission of pollutants • Reducing equipment noise at source by proper design, maintenance and repair of construction machinery and equipment. • Minimizing noise from vehicles and power generators by use of proper silencers and mufflers • Use noise-abating devices wherever needed and practicable. <p>Reduction:</p> <ul style="list-style-type: none"> • PPE's provision 	contractor	Proponent*
---------------------------	----------	-------------------------------------------------------	--------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------	------------



Solid Waste Generation	Physical, Biological, Social	Soil Contamination, effecting GW Quality, Emission of GHG Biological, Particulate Matter, Health, Economy, Welfare	Severe/ local and global	<ul style="list-style-type: none"> • Separation of recyclable material • Training will be provided to personnel for identification, segregation, and management of waste. • Provision of Separate waste bins • Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register. 	contractor	Proponent*
------------------------	------------------------------	--------------------------------------------------------------------------------------------------------------------	--------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------	------------



ECOGREEN COMPANY PVT LIMITED

Spillage from vehicles and machinery	Physical, Biological	Soil Contamination, Effecting GW Quality, Emission of GHG,	Moderate/local	<p>Avoidance:</p> <ul style="list-style-type: none"> • Spill prevention trays will be provided and used at refueling locations • On-site maintenance of construction vehicles and equipment will be avoided as far as possible • Fuels, lubricants will be stored in covered bounded areas, underlain with impervious lining. • Emergency plan for spill management will be prepared and inducted to the staff for any incident of spill 	Contractor	Proponent*
--------------------------------------	----------------------	------------------------------------------------------------	----------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------	------------



ECOGREEN COMPANY PVT LIMITED

<p>Handling of wastewater</p>	<p>physical, biological, social</p>	<p>soil contamination, effect on GW quality, GHG emission, effect on vegetation, fisheries, health, economy, welfare</p>	<p>severe/ local and global</p>	<p>Reduction:</p> <ul style="list-style-type: none"> • Provision of septic tank. <p>Avoidance:</p> <ul style="list-style-type: none"> • Handling and storage of fuels and lubricants in areas of impervious floors 	<p>contractor</p>	<p>Proponent*</p>
<p>Disaster Planning</p>	<p>physical , social</p>	<p>reduction of biodiversity, community grievance, economy, welfare</p>	<p>severe/local</p>	<p>Avoidance:</p> <ul style="list-style-type: none"> • Proper disaster planning should be done to meet any emergency situation arising due to fire, explosion, sudden leakage of gas etc. • Firefighting equipment and other safety appliances should be kept ready for use during disaster/emergency situation including natural calamities like earthquake/flood 	<p>contractor</p>	<p>Proponent*</p>



ECOGREEN COMPANY PVT LIMITED

<p>Fuel Management</p>	<p>Physical, Biological</p>	<p>Spillage, Soil Contamination, Degradation of Water quality</p>	<p>Severe/local</p>	<p>Avoidance:</p> <ul style="list-style-type: none"> • Proper electrical grounding should be provided for loading and off-loading equipment. • Smoking should not be permitted within 10 m of the fuel storage area. • Fuel storage areas should be clearly marked to ensure that moving vehicles does not damage them. 	<p>contractor</p>	<p>Proponent*</p>
<p>Hazardous waste management</p>	<p>Physical</p>	<p>Safety hazard, spills</p>		<p>Avoidance:</p> <ul style="list-style-type: none"> • Labeling will be placed on all storage vessels/containers as appropriate to national and international standards. The labeling will clearly identify the stored materials • Storage areas for fuels will be designed with secondary containment to prevent spills and contamination of soil and groundwater 	<p>Contractor</p>	<p>Proponent*</p>



ECOGREEN COMPANY PVT LIMITED

7.6 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the environmental management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions. The main objectives of the environmental monitoring are:

- To provide a mechanism to determine whether the project construction contractors are carrying out the project in conformity with the EMP.
- To identify areas where the impacts of the project are exceeding the criteria of significance and, therefore, require corrective actions.
- To document the actual project impacts on physical, biological, and socio-economic receptors, quantitatively where possible, in order to design better and more effective mitigation measures.

Following environmental record should be maintained:

- Periodic inspection reports of the site
- Audit reports
- Incident record of all moderate and major spills and other incidents and accidents.

The record will include:

- ✓ Location of spill or battery limit of the accident
- ✓ Estimated quantity or the amount of injury (as may be reported in LTI or LWI)
- ✓ Spilled material or nature of injury or loss (temporary or permanent)
- ✓ Restoration measures
- ✓ Photographs
- Description of any damage to vegetation, water resource, or community asset.

- Corrective measures taken, if any
- Waste Tracking Register that will hold records of waste generated during the construction period. This will include quantities of waste disposed, recycled, or reused.
- Records of water consumption with use wise breakdown
- Survey reports, in particular, the following:
 - ✓ Vehicle and equipment noise.
 - ✓ Ambient noise survey reports.
 - ✓ Ambient level of PM
 - ✓ Vendor data—all vendors disturbed by the project and compensation paid
 - Public infrastructure: Record of all damages and repair work undertaken.
 - ✓ Employment
 - ✓ Total number of unskilled, semi skilled, and skilled jobs offered during Construction.
 - ✓ Name and domicile of the employed staff.
 - ✓ Project and Community Interface
 - ✓ Record of community complains and the measures taken to address them.
 - ✓ Number of meetings held in various communities and data of persons who attended
 - ✓ Environmental and social training records

Table 11: Environmental Monitoring Plan

Components	Objective of Monitoring	Parameter to be Monitored	Measurement	Frequency	Location	Responsibility
Noise Levels	To determine the effectiveness of the noise abatement measures on the sound level	Noise level on the site and adjacent area on dB(A) scale	Noise level reading will be taken	Twice a year	At least three locations on the unit boundary	Consultant / HSE
Workers safety	To check and evaluate the effectiveness of the workers' safety plan	Injuries and accidents	Recording injuries	daily	Onsite	HSE/contractor
Water conservation	To determine the effectiveness of the Water Conservation Techniques in Practice	leakages, spills and wastages	Visual inspection and record tracking	On monthly basis	at all points of use	Environmental officer/manager

Dust emissions	To confirm the ambient air quality	Air quality at different points	Readings will be taken	Twice a year	At least three points on mine and site	Consultant / Environmental manager
----------------	------------------------------------	---------------------------------	------------------------	--------------	----------------------------------------	------------------------------------

The monitoring of the EMP and the communication and documentation mechanism that will be employed during the operational phase will be based on the Environmental Management System (EMS) of the project proponents and the certification and legal bindings. The management system of the project proponents will be the same as the certified EMS in place at the company. Approximately 2 million PKR per year budget will be reserved for the Environmental Monitoring and measures.



ECOGREEN COMPANY PVT LIMITED

7.7 INSTITUTIONAL CAPACITY OF THE UNIT

The organizational structure for the Environment Management Plan is outlined below:

7.7.1 PRIMARY RESPONSIBILITIES

The primary responsibility for implementing different aspects of the EMP within the company lies with the concerned departments of M/S Maple Leaf Cement Factory Limited.

7.7.2 OPERATION MANAGEMENT & CONTROL

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager; for which he will be trained.

7.7.3 SUPERVISION & MONITORING

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

7.7.4 COMMUNICATIONS AND DOCUMENTATION

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

7.7.4.1 MEETINGS

Two kinds of environmental meetings will take place during the project:

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion industry or a similar industrial unit to investigate its root causes and develop its solutions.

The purpose of the weekly meetings will be to discuss the conduct of the operation and

environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

7.7.4.2 **CHANGES-RECORD REGISTER**

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

7.8 **ENVIRONMENTAL TRAINING**

MLCF provides periodic Environmental and HSE trainings to workers working in their existing plants. The management of MLCFL feels HSE is important for moral, legal, and financial reasons. The management of MLCFL has developed strict SOPs (18 Nos.) for the Health and Safety of workers. The management of MLCFL has developed strict SOPs for health and Safety of workers. These SOPs have been uploaded on the website of MLCFL as well and is accessible by each and every employee. These SOPs includes SOP for Personal protective equipments, Risk Assessment, Permit to work, LOTOTO, SOP for work at height, Fire Safety and Prevention, Confined Space entry etc. A comprehensive annual training calendar has also been developed for training on topics of HSE for management as well as labours. In house training Schedule 2015 for Health Safety Environment SOP's awareness is shown below. Same method of training will be followed for Proposed Plant.

Table 12: Training Schedule

Sr. No.	Training Session	IH/ EX	Facilitator	Potential Participant	Month Date	Trg. Duration	Trg. Institute	Venue/ Location	Estimated Cost per session	Remarks (If any)
HSE SOP Awareness Sessions 2015										
1	Personal Protective Equipment (PPEs)	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	June 1st week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
2	Risk Assesment	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	June 2nd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
3	Permit To Work	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	June 3rd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
4	LOTOTO	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	June 4th week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
5	Work at Height	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	July 1st week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
6	Confined Space Entry	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	July 2nd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP

7	Fire safety and Prevention	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	July 3rd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
8	Emergency Planning and Response	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	July 4th week	2 Hours	MLCFL	HR Training Hall MH	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	August 1st week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
10	Road Transport Safety Procedure	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	August 2nd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
11	Cranes Safety	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	August 3rd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
12	Chemical Handling	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	August 4th week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP

13	Tools Safety	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	September 1st week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
14	Machine Guarding	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	September 2nd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP
15	Conveyor Belt Safety	IH	DM HSE	AM & Above(Total 135)Each Batch of 35 participants	September 3rd week	2 Hours	MLCFL	HR Training Hall MH	2000	Total 4 Sessions of each SOP

7.9 EQUIPMENT MAINTENANCE DETAILS

Equipment with high efficiency, good condition and reliability will be purchased by the Proponent. Maintenance of Equipment will be done twice year for the smooth operation of plant.

7.10 ENVIRONMENTAL BUDGET

Approximately 2 million PKR per year budget will be reserved for the Environmental Monitoring and measures



CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

The report presents Environmental Impact Assessment (EIA) of the proposed cement plant of Maple Leaf cement factory. Its main objective is to enhance cement manufacturing capacity of MLCFL.

EIA of Proposed Project is performed according to guidelines of EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these are within acceptable limits. Moreover, no deterioration, depletion or exploitation of resources is expected to be caused by this project.

Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures as identified in this study are implemented.

It is accordingly recommended that Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project.

8.2 RECOMMENDATIONS

The Environmental Impact Assessment study and survey results are finally evaluated to recommend the following:

- Implementation of EMP must be given top priority.
- Proper PPEs including ear plugs, ear muffs, mufflers, goggles, gloves and shoes etc. should be provided to workers
- Train workers to use PPEs
- Advise workers to follow SOPs.
- Equipment maintenance and efficiency must be checked.
- No compromise on public health and environment should be allowed.
- Waste minimization practices should be employed and workers should be encouraged to adopt such methods.
- Wages should be distributed on time
- Proper tree plantation plan should also be developed in order to make the unit environment friendly.
- Small waste storage bins should be installed at different corner for proper waste collection and discharge
- Proper dispensary and first aid box should be provided for workers
- Smoking should be avoided within premises of project site and near fuel storage areas.
- The Security Guards shall also be trained to act in case of all possible emergency situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.
- The proposed Environmental Management & Monitoring Plan should be implemented.