SECTION 5

ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

5.0 ANTICIPATED POTENTIAL ENVIRONMENTAL IMPACTS

A comprehensive map shown in **Fig. 5.1** illustrates the environmental sensitive receptor in the area of influence e.g. school, medical center, mosque, graveyards, etc. 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

5.1 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, community tolerance while taking into account the cost benefit and need for involuntary resettlement. To determine the significance of impacts on bio-physical and socio-economic environment of the proposed project, as discussed later in section-6 for construction and operation phase respectively.

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

Environmental matrix for evaluation of anticipated environmental impacts is given in in tabular form is given in **Table 5.1** and **5.2.**

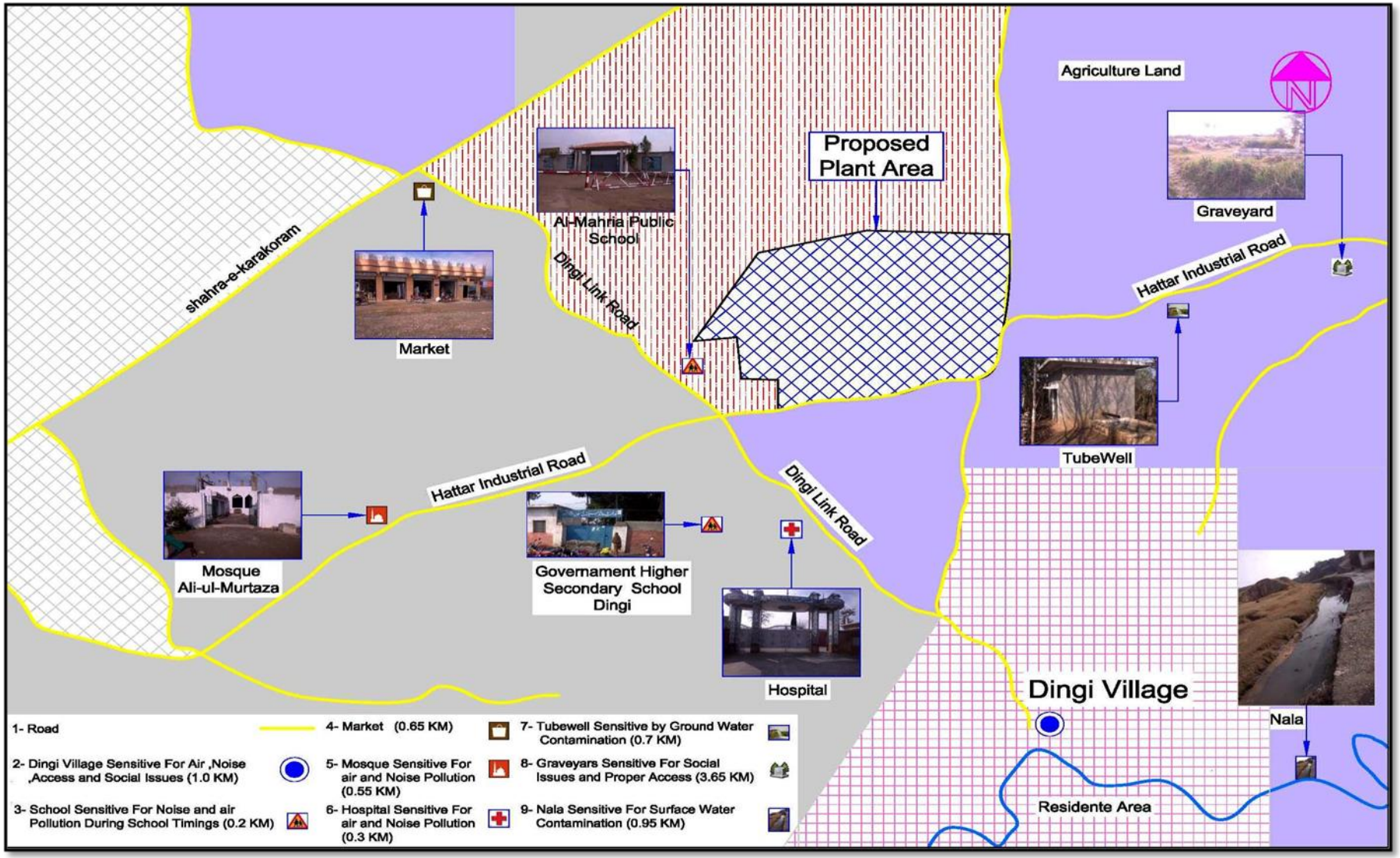

Fig 5.1: Sensitive Receptor around the Project Area

Table 5.1: Environmental Impacts Evaluation Matrix during the Construction Phase

Sr. No.	Environmental Component / Project Activities	Physical Environment										Biological Environment		Socioeconomic Environment						
		Topography	Drainage	Soil Quality	Landscape	Surface Water Quality	Groundwater Quality	Land use	Solid Waste	Air Quality	Noise & Vibration	Flora	Fauna	Worker Health & Safety	Disruption of Public Utilities	Employment	Relocation	Loss of Agricultural activities	Cultural/Religious Values	Breeding grounds for disease vector
1	Removal of Vegetation/tress/crops	-1	O	-1	-1	O	O	-1	-1	-1	-1	-2	-2	-1	-1	2	-1	-2	O	O
2	Construction camps, workshops etc.	-1	-2	-1	O	-1	-1	-2	-1	-1	-1	-1	-1	-1	O	2	O	-1	O	-1
3	Excavation operations	-1	-1	-1	-1	O	O	-2	-1	-1	-1	-1	-1	-1	-1	2	O	O	O	-1
4	Transportation of construction materials	O	O	O	O	O	O	O	-1	-1	-1	-1	-1	-1	O	2	O	O	O	O
5	Dumping of excavated material	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	O	2	O	O	O	O
6	Open storage of construction materials, fuel etc.	-1	-1	-1	-1	-1	-1	O	-1	-1	O	-1	-1	-1	O	2	O	O	O	O
7	Earthwork operations	-1	-1	-1	-1	-1	-1	2	-1	-1	-1	-1	-1	-1	O	2	O	O	O	-1
8	Building construction	2	O	O	O	-1	O	2	-1	-1	-2	O	-1	-1	-1	2	O	O	O	O
9	Installation of power generators/Construction machinery/ equipment's	O	O	-1	-1	O	O	O	-1	-1	-2	-1	-1	-1	O	2	O	O	O	O
10	Construction of approach road	-1	-1	O	-1	O	-1	2	-1	-1	-2	-1	-1	-1	-1	2	O	-1	O	O

Legend

Insignificant / no impact = O **Low Adverse = -1** **Medium Adverse = -2** **Beneficial = 2**

Table 5.2: Environmental Matrix for Operation Phase

Sr. No.	Environmental Components / Project Activities	Physical Environment										Biological Environment		Socioeconomic Environment	
		Topography	Soil Quality	Landscape	Surface Water Quality	Groundwater	Land use	Solid Waste	Air Quality	Odor	Noise & Vibration	Flora	Fauna	Public Health and Safety	Employment
1	Ground water extraction	O	-1	O	O	-1	O	O	O	-1	-1	-1	-1	-1	O
2	Water treatment	O	O	O	O	O	O	-1	O	O	-1	2	O	2	2
3	Production lines (washing , Filling)	O	-1	O	O	-1	-1	-1	-1	-1	O	O	O	O	2
4	Packing , palletizing, stretch wrapping	O	-1	O	O	-1	O	-1	O	O	-1	O	O	O	2
5	Wastewater Treatment	2	2	2	2	2	2	O	2	2	O	2	2	O	2
6	Generator operations	O	-1	-1	O	-1	-1	-1	-1	-1	-1	-1	-1	O	2
7	Transportation/ Distribution	O	-1	-1	O	-1	O	-1	O	O	-1	-1	-1	2	2

Legend

Insignificant / no impact = O **Low Adverse = -1** **Medium Adverse = -2** **Beneficial = 2**

5.2 POTENTIAL IMPACTS AND MITIGATION MEASURES DURING DESIGN PHASE

5.2.1 Landuse

The Project area is a barren land which was previously used for agricultural purposes. After the construction of the Plant, it will be changed. The remaining land other than the built-up structures and parking areas will be utilized for landscaping and tree plantation. Since the project is being constructed on Hattar Industrial Estate road, Dingi which is already designated for industrial use, and industrial activities are already in progress in this area, therefore landuse is compatible; however, due to use of agriculture and school in the area of influence the impact is anticipated to be low to moderate negative, local, long term and irreversible in nature.

Mitigation:

A proper landscape plan will be designed for the proposed action to minimize the impact.

5.2.2 Land Acquisition

There will be no land acquisition involved because area proposed for the construction of the plant is already owned by CCBPL i.e. 29 acres. Therefore, there is no potential adverse impact related to land acquisition.

5.2.3 Flora

The project area is an agriculture land that will be converted to Coca-Cola Plant. No tree cutting is involved for land clearing. The conversion of agriculture land to Industrial use will have moderate negative impact on the floral species and vegetations. The impact will be low to moderate, local, irreversible and long term. After the construction of the Plant, the remaining land other than the built-up structures and parking areas will be utilized for landscaping and tree plantation. However, the impact will be minimized after the landscaping.

Mitigation:

The proposed mitigation measures will include:

- Incorporate technical design measures to minimize removal of these trees, if possible;
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the project area;
- Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.);

- A landscape will be properly designed with provision of new trees/ plantations around the plant boundary, roadside, office buildings and stretches of open land. The vegetation for the attenuation of air pollution would be most needed in the areas where ground level concentrations of the pollutants are expected to rise.

5.2.4 Waste Water Discharge

During the production process effluents will be produced from the plant operations and, sewage from office washrooms. Expected wastewater discharge load will be 30 – 40 m^3/h. However 100 m^3/hr Treatment Plant was proposed considering future expansion and installation. Treated water will be discharged to a tributary of Harrow River. This will be low negative impact, local, short term and reversible in nature. The treated effluent will meet the NEQs for discharge in inland waters. There will be no residual impact after the treatment of wastewater. The Waste Water results of Coca-Cola existing plant already annexed as **(Annexure-IX).**

5.2.5 Seismic Hazard

Dingi is situated in Seismic Zone-2 A which corresponds to peak horizontal ground acceleration of 0.08 to 0.16g (where 'g' is the acceleration due to gravity). The impacts associated with this zone are low-moderate.

Mitigation:

The proposed structure of the CCBPL Plant will be designed and constructed to withstand moderate to large earthquakes. For seismic hazard analysis, updated structural and seismic evaluations will be consulted.

5.2.6 Groundwater Consumption

The construction of CCBPL plant will put load on the groundwater. Water consumption (during different operations) may lower the underground water table in the long run. However, the Ground water Hydrology reveals that enough recharge is available in this area by the rivers, its tributaries and precipitation. The ERS and on site analysis reveals that the ground water quality in the area is fresh. On site testing shows that the concentrations of total dissolved solids (TDS) in groundwater is less than 500 ppm in the vicinity of project area. Tube wells of capacity up to 100-150 m^3/hr -can be installed. Ground water availability survey report is annexed with this document as **(Annexure-XIV).**

Mitigation:

The Proponent will ensure effective project management, efficient use of resources and incorporation of design and infrastructure measures for water conservation and designing of wastewater treatment plant keeping in view the reuse of treated water.

The treated water will be discharged to a tributary of Harrow River will also contribute to recharge the aquifer.

5.2.7 Emergency Response

Disasters such as earthquakes, flooding and other manmade disasters such as fires may occur, which have to be considered for minimizing their impacts. This will be a moderate negative impact.

Mitigation:

The Building Regulations of Peshawar Development Authority (PDA) or any related authority will be strictly adhered to. Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms will be included in the design of the plant. Adequate internal and external water distribution system will be designed, with standby system for sufficient water from tube well, which could also supply adequate quantity for fire fighting during emergency. The structure stability certificate will be obtained.

5.2.8 Fire Fighting System & Storage

Inefficient fire fighting system and insufficient storage of fire water may cause severe damage to the plant's building. This will be a moderate negative impact.

Mitigation:

Storage for firefighting will be provided in water storage reservoir. The fire fighting pump will maintain constant pressure in the system. Fire hose cabinets will also be provided at different locations inside the plant. A separate fire alarm system will also be installed in the shape of smoke detectors/ionization detectors at CCBPL Plant.

Special provisions for fire safety in the plant's building will also be considered during the design phase. These will be:

- The number of emergency exits from the Plant.
- Location of the fire exits.
- Signs required at exits.
- System required detecting fire.
- Alarms required warning people of fire.

- Fire Hydrant to extinguish fires.
- Materials to be used in the construction of the building to slow fire growth.
- Construction to limit fire spread from one area to another.

5.3 POTENTIAL IMPACTS AND MITIGATION MEASURES DURING THE CONSTRUCTION PHASE

5.3.1 Soil

Due to the construction activities, soil erosion and contamination may occur. Soil erosion may occur on plant site or at contractors' camps as a result of uncontrolled run-off from equipment washing yards, excavation of earth/cutting operations and clearing of vegetation at plant's site, whereas contamination of soil may be caused by oil and chemical spills at plant site, equipment washing yards. This impact is low, temporary, local, reversible and minor negative in nature.

Mitigation:

- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered.

5.3.2 Air Pollution

The construction activities produce fugitive and point emissions from different sources. In case of the proposed Project, the sources of air emissions would be excavation operation and exhausts of construction machinery & equipment and vehicles carrying construction material. The air emissions may cause health impacts such as dryness and roughness of the throat; eye, nose, throat irritations and coughing etc to the workers and staff of contractor. These emissions may also affect the bio-physical environment. These impacts would be temporary, local and minor negative in nature.

Mitigation:

The impacts of air pollution shall be mitigated by water sprinkling, provision of dust masks to workers, and the use of well-maintained machinery and equipment. Also, the vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin.

5.3.3 Noise Pollution

The noise may be produced due to the operation of construction machinery and equipment. Exposure to continuous higher noise levels may induce the following

health impacts on the workers such as increase in blood pressure, hypertension etc. However, the impacts of noise pollution would be temporary and minor negative in nature in case of the proposed Project.

Mitigation:

The mitigation measures include: providing ear plugs to workers and use of well-maintained machinery and equipment with reduced noise level ensured by suitable in-built muffling devices.

5.3.4 Noise Modeling

Construction equipment sound levels are the sound levels emitted by equipment under actual field operating conditions. Construction equipments operate under two primary modes – mobile and stationary. Mobile equipment such as dozers, scrapers etc., operate in a cycles in which full power is followed by reduced power. Stationary equipment can be subdivided in two groups: one group such as compressor and generator which operate at constant power while the jack hammers, auger drill, falls in to impact machinery with instantaneous sound levels. Data for the equipments was obtained by direct measurements and current technical publications. The following steps were taken to develop the noise model to predict the hourly equivalent noise levels at the site:

- Identification of main construction operation or phases;
- Equipment used to complete each construction phase;
- Determination of the peak noise levels and minimum noise level for a work cycle of equipments;
- Determination of hourly equipment equivalent noise level at the receptor by
- considering the distance between the receptor and equipment and also the usage factor;
- Determination of cumulative hourly equivalent noise level at the site from different construction operations. Results of the noise modeling are attached as Annexure-v.

Table 5.3: Noise level results of different equipments/machinery (for modeling purpose)

Sr. No.	Machinery Description	Noise Level dB (A)
1	Crane	85.6
2	Batching Plant	57.2

Sr. No.	Machinery Description	Noise Level dB (A)
3	Generator	88.6
4	Electric Saw	89.2
5	Tractor	78.2
6	Roller machine	91.5
7	Loader	77.5
8	Grinder	100.2
9	Generator = Motor	81.4
10	Hammer	91.3
11	Workshop	79.5

5.3.5 Solid Waste

The solid waste may be generated due to different construction activities and it will mainly include surplus excavated and construction material. The indiscriminate disposal of solid waste may cause dust emissions due to wind blowing thereby affecting the health of the workers working or passing in the immediate vicinity of solid waste heaps. The impacts of solid waste would be temporary and minor negative in nature.

Mitigation:

The solid waste shall be reused in construction work where possible and/ or disposed of to officially-designated dumping site outside the plant area.

5.3.6 Health and Safety of Workers

The health and safety issues are associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers. CCBPL has developed its own standards and Plan for Safety, Health and environment (SHE) during construction annexed as (Annexure-VII).

Mitigation:

SHE should be followed strictly during the construction by the workforce and some general measures such as use of well-maintained machinery and equipment and training of the workers in the construction safety shall be taken. Provision of protective clothing for laborers handling hazardous materials, e.g. safety helmet, adequate footwear, protective goggles, gloves etc. A contingency plan in case of major accidents may also be elaborated.

5.3.7 Ground Water

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating it. Also the water for construction and consumption may come in conflict with local water demand. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly.

Mitigation:

Mitigation measures will include; protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality; the solid waste will be disposed off in designated landfill sites to sustain the water quality for domestic requirements and water required for construction may be obtained in such a way that the water availability and supply to nearby communities remain unaffected.

5.3.8 Traffic Management

Due to the proposed construction activities, traffic management may pose some disturbance in the project area of influence and KKH. This may result in traffic jams and cause inconvenience to the people travelling on the road near the Project Area due to movement of vehicles carrying construction materials. This impact is temporary, local, reversible and minor negative in nature.

Mitigation:

Mitigation measures will include; proper traffic management plan will be needed to avoid traffic jams/public inconvenience; movement of vehicles carrying construction materials will be restricted during the daytime to reduce traffic load and inconvenience to the local residents; the executing agency is required to maintain liaison between the traffic police, local residents/ travelers and the contractor to facilitate traffic movement during construction stage.

5.3.9 Wastewater

During the construction stage, the sanitary wastewater will be generated at the workers' camp(s). If this wastewater is allowed to stagnate in water ponds on the site, it can create unhygienic conditions and some of the wastewater may also percolate the soil, thereby, polluting the groundwater. This may pose a minor negative impact.

Mitigation:

The contractor will provide pit latrines, septic tanks for labour camps to treat the sanitary wastewater before its discharge into industrial estate waste water drain/ sewer.

5.3.10 Flora

Construction of the proposed Project does not involve cutting of trees and plants. This will be a minor negative impact.

Mitigation:

Mitigation measures mentioned below will however be adopted to minimize the impacts of the proposed Project on the flora at the Project Site.

- Landscaping by the CCBPL;
- After construction instead of introducing new ornamental plants, local tree and plants species, will be planted for landscaping. In addition to providing a better view to the area, the proposed vegetations will help minimize the excess noise, vehicular emissions and dust pollution.

5.3.11 Fauna

Due to the construction activities of the proposed Project, the free movement of fauna would be disturbed.

Reptiles like snakes and lizards, living in the holes or underground may either get killed or move to the adjacent areas. Similarly, birds like sparrows, mainas, crows, or who frequently visit the Project Area in search of food shall receive a negative impact and shall have to move to adjoining areas. Also, due to the leakages/spills from the construction equipment/machinery the local ponds/water storages from where the animals/birds drink water may get contaminated. This impact is temporary and minor negative in nature.

Mitigation:

- Proper landscaping of the plant
- New and good condition machinery with minimum noise will be used in construction;
- Contractor will ensure that the no hunting, trapping of animal will be carried out during construction;
- The camps will be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly waste of the camps will be properly disposed

off to prevent the chances of eating by wild animals, which may prove hazardous to them.

- Special measures will be adopted to minimize impacts on wild birds such as avoiding noise generating activities during the critical period of breeding.

5.3.12 Impacts of Heavy Vehicles on the Existing Road Network

The plying of heavy vehicles on the existing road network (KKH and Hattar Industrial road) may result in air pollution (if unpaved roads), noise pollution due to tire-road friction especially near sensitive receptors (residential areas, school, mosque, health facility etc.), and damage to roads and traffic congestion. However, the impacts would be temporary and moderate negative in nature.

Mitigation:

- Any vehicle with an open load carrying area used for transport of potentially dust producing materials shall have properly fitted side and tailboards. Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition;
- The Contractor shall not use any vehicles either on or off road with grossly excessive noise pollution. In case of built-up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor;
- The traffic on the existing road shall be managed cooperation with the local traffic police department in order to avoid traffic accidents and congestions causing unnecessary delays;

5.3.13 Social/Cultural Disturbances

Problems for the residents of the area/nearby communities may occur due to increased construction/commercial activity. People might think that their family life and traditional rituals are at jeopardy.

Mitigation:

Mitigation measures will include: Adequate training of especially for the transitive workforce of the plant (involved both in the construction process and in the commissioning) to regard the rituals of the area so that the locals do not feel insecure and local people will be involved by employing them during the construction process.

5.3.14 Poverty Alleviation

Installation of the proposed CCBPL plant will generate the employment opportunities for the population living in the surrounding areas. This will be a potential Positive

impact about 500 hundred people will be involved in the construction of the plant and this will create the business opportunities for the locals and improve the livelihood of the community.

5.4 POTENTIAL IMPACTS AND MITIGATION MEASURES DURING THE OPERATIONAL PHASE

5.4.1 Water

Wastewater discharged from the proposed plant's operations will include wastewater effluent from process and washrooms.

Mitigation:

Compact treatment plant (CTP) with capacity of 100 m^3/ hr will be installed to treat the wastewater effluent. The sludge generated will be treated with the sludge thickener and sludge will be transported to the farmers. The treated water and sludge will be regularly tested and will meet the NEQS to discharge in to the tributary of Haro River which is at a distance of about 2 Km.

5.4.2 Air Pollution

During the plant operation the quantity of air pollutants (NOx, SOx, CO, CO2 & PM10) may increase due to the power plant operation. This will have adverse affects on the environment of the Project Area and the human health. The potential impacts are permanent and low in nature all the emission generating source will be fitted with emission control devices.

Mitigation:

- Setting up of a system to monitor air quality of the plant in accordance with the NEQS and Self Marketing & Reporting (SMART) Program;
- An air quality monitoring and improvement plan will be developed to keep the air pollution levels to minimum;
- Indoor air quality will be monitored on regular basis for parameters like CO, CO2, NO2, VOC's, etc. and appropriate mitigation measures will be implemented;
- Fresh air will be regulated to maintain the acceptable indoor CO2 level in the space and achieve saving in energy on partial occupancy;
- Vehicles with excessive smoke emissions will not be allowed to enter the proposed plant;
- Plantation of trees inside and outside the boundary of the plant to minimize the effect of air pollution;

- Use of low sulfur fuel in the plant; and
- Use of scrubbers or other modern equipments to minimize the emissions from the stacks.

5.4.3 Noise Pollution

Noise is considered as an interference to and imposition upon comfort, health and the quality of life. Given the conditions like exposure limit and time, noise may have both physiological as well as psychological effects on human health. Physiological effects include dizziness, nausea, unusual blood pressure variation, physical fatigue, loss of hearing, etc. While reduced mental capability and irritations may attribute to psychological effects.

The operations inside plant require attention of the workers all the time; therefore, each worker is expected to be exposed to high noise for at least 8 hours during every 24 hours. This condition may lead to physical and mental fatigue, which consequently may lower their manual and mental dexterity.

Mitigation:

The following are two ways to mitigate or to attenuate the effect of noise caused by different machines/ sections. Either of the following techniques suited to the location or machines can be adopted:

- Apply conventional methods of noise control such as enclosures, noise absorption materials and silencers; and
- Providing personal protection equipment to the workforce.

Noise will be controlled by providing enclosures around high noise level machines and by providing ear plugs/ear muffs to the workers. Enclosures usually give an attenuation of 10 – 30 dBA and are the most satisfactory solution. Furthermore, the generators will be enclosed in canopy to mitigate the impact of noise pollutions. Trees will be planted along the boundary of Plant to further mitigate the impact of pollution.

5.4.4 Solid Waste

The type of Solid waste that will generate from the plant will be paper bags, chemical cans & Empty Drums, discarded material/cardboards and office and kitchen waste. This solid waste if not properly handled, may cause contamination/ pollution, nuisance to the plant workers, deteriorate the aesthetics of the plant and can also become a breeding place of mosquitoes. It is necessary to collect and segregate

solid waste properly before disposal for reusing of valuable resources and to reduce the impact of waste on the environment.

Mitigation:

Coca-Cola has developed waste management plan **(Annexure-X)** for its operation and that should be followed strictly.

Used or discarded bags, paper bags, chemical cans & empty drums will be stored in scrap yard of the plant;

Proper waste storage bins will be provided inside the plant. Adequate measures to reduce the waste and recycle paper waste will be adopted; and

Solid waste management plant will be followed during operation to sort out the waste like municipal solid waste, paper and plastic waste and hazardous waste.

Hazardous waste will be marked according Hazardous substance rule 2003 with bone and skull mark on the bin and place of handling

5.4.5 Occupational Health and Safety Issues

The Occupational Health and Safety issues are mostly associated with the operation of machinery and equipment, handling of chemicals etc. The underlying causes of these issues generally involve human errors, operational faults of machinery and unforeseen incidences. Higher noise pollution levels may also cause health-related impacts on the workers.

Mitigation:

The following mitigation measures are proposed for employees/workers health and safety related impacts:

The issues related to operation of machinery and equipment will be overcome by:

- Efficient management, staff training, maintenance of machinery and equipment, and other preventive measures;
- Instructing the workforce on storage and handling of materials and chemicals;
- Higher noise levels will be reduced by keeping the machinery and equipment in good operating condition with in-built muffling devices and also providing Personal Protection Equipments (PPEs) such as ear plugs to the workers;
- Provide basic medical training to the specified work staff and basic medical service and supplies to workers;
- Obligatory insurance of work labourers against accidents;

- Provision of safety measures within the plant such as emergency sirens, firefighting equipment, safe storage of chemicals, first aid, and contingency measures in case of accidents;
- Preparation of a Contingency Plan in case of major accidents;
- Install emergency eye wash and shower equipments at corrosive/hazardous chemical handling places. The distance of these emergency equipments from the chemical handling places should be less than 10 seconds travel time; and
- Mark emergency exits in the Plant and identify assembly areas in case of any emergency.

5.4.6 Emergency Response

The operation of the proposed plant will involve 500 employees and many visitors who may become ill or have work related accidents. In addition, disasters such as earthquakes and fires may occur which have to be considered for minimizing their impacts. This will be a permanent moderate negative impact.

Mitigation:

An Emergency Response Plan for earthquakes and manmade disasters will be developed by the CCBPL Management. Emergency Response Plan will be implemented in close consultation with the Fire Fighting Department, bomb disposal squad and paramedics. In addition, training of the staff/employees regarding the emergency procedures/plans will be regularly conducted.

5.4.6.1 Ammonia leakage

The operation of the proposed plant will involve 500 employees and many visitors who may become ill or have work related accidents. Disasters such as ammonia leakage may occur which have to be considered for minimizing their impacts.

Mitigation:

Ammonia based closed loop refrigeration system will be installed for catering the chilling requirements. Proper contingency plan will be developed to cope up with the situation in case of accidental leakage of ammonia. Coca Cola Beverages has developed strict SOPS and proper training will be provided to the staff on routine basis to ensure safety. In case of Accidental Leakage of Ammonia, following are the steps to be taken immediately

1. Detection
   a. Detection of Ammonia Leakage is either done by ammonia detector (or)

b. Manual (by employee)

2. If detection is done manually then employee who detects the ammonia use the local call point to sound the alarm(continuous alarm). The smell threshold of ammonia is well before its immediate danger to life and health concentration. Therefore a safe way can be taken to exit.
3. Local area evacuation is initiated once the alarm is sounded.
4. Indication of alarm displays on the main emergency panel.
5. Security Guard Informs incident controller, security and emergency response team about the incident.
6. Emergency response team inspect the area and if ammonia leak is major then incident controller instruct the security guard for the declare overall plant emergency(alarm in rising and falling nodes). All employees of facility move to nearest safe assembly point using wind sock (ammonia travel with air, assembly point opposite to wind direction to be used). On declaration of plant wide emergency control room is formed (preset location- Plant Manager office) and HR Manager (or his representative) provide support to incident controller. Local authorities(civil defense/Fire brigade) are informed about the incident.
7. Emergency response team attends the fault (by donning gas mask). If the leakage is in main ammonia tank then containment is done by water. (Using Fire hose). Same is the case if liquid ammonia is spilled in the area. Incident controller can also call in external help (Fire brigade etc) if spill is difficult to control. In that case area Is vacated and emergency team returns to safe assembly point.
8. If leakage is limited to valve or pipeline then emergency team make sure relevant valves are closed to contain the leakage.
9. Few members of Emergency team sweeps the whole plant. Using ammonia gas masks/ SCBA (Self Containing Breathing Apparatus) for anyone left in the plant.
10. In case of any ammonia exposure to any employee/ emergency response member, he/she is immediately moved to first aid room. In case of eye and skin exposure, flush with running quantity of water for 15 minutes. If someone is feeling difficulty in breathing, first aider/ paramedic provide CPR and victim is immediately moved to hospital for further treatment.
11. Once the situation is handled continuous alarm is sounded to signal all clear. Maintenance of Refrigeration system will be carried out after specified duration to avoid worse situations.

5.4.7 Fire Disaster Management /Emergency Response Plan:

Fire Fighting Plan:

- After sighting the fire anywhere in the project site, the worker/employee should immediately break the glass of a nearby fire alarm switch;
- In this way, the signal will be indicated in the control room and the Shift In-charge will be informed about the location of fire;
- Shift In-charge will immediately respond and will reach the location along with the landfill site fire fighter and try to control or extinguish the fire with the help of fire extinguisher or fire hydrant;
- In the meantime, the Shift In-charge will also inform the safety officer/ manager;
- The safety department will immediately respond and will actively participate in the fire fighting operation;
- If the fire is uncontrollable, the Safety In-charge or the Shift Manager will immediately call the City Fire Brigade. The security staff will also assist the fire brigade and the safety staff will help/provide them the firefighting equipment present in the plant and will also inform them about the (a) water point, (b) gas point & (c) electric main switch;
- During the fire fighting operation the shift engineer will try to remove all the inflammable material just chemicals, paper, etc.;
- Maintenance staff will assist the Shift In-charge for the following jobs: (a) shutting down the main supply of gas/electricity, (b) fixing of hose pipes for fighting and (c) close the air conditioning system; and
- All the staff/workers of the landfill site will assemble at the designated assembly points during the fire fighting operation until the fire is being extinguished.

5.4.8 Flora

No negative impacts are envisaged on the flora of the area during the operational phase. However, due to landscaping and plantation, the impact on flora would be positive at operational phase of the Project. Approximately 800 trees will be planted along the boundary of Proposed Plant to improve Aesthetics. Tree Plantation Plan is annexed in this report as **(Annexure-XIII).**

5.4.10 Drinking Water Contamination

Water pollution can originate at the internal water network. If the pipes and the overhead water storage tanks are not cleaned properly, they may lead to bacteriological contamination of the potable/drinking water and thus will lead to infectious diseases/health problems to the employees of the plant. This is a moderate negative impact.

Mitigations:

- The Management of CCBPL will provide the safe drinking water meeting the requirement of NEQS and WHO to the employees.;
- Water Quality Monitoring will also be conducted on quarterly basis and the quality will be maintained according to WHO Guidelines for drinking water.

5.4.11 Local Socio-economic Conditions

Groundwater is a natural resource, which may be depleted due to extraction of water for operational purposes in Plant. As a consequence of which, the availability of groundwater may be reduced, which may impact the local communities to meet their needs for drinking and agricultural purposes; however, the hydrological conditions shows that the groundwater aquifer has potential to be recharged. Source Vulnerability Assessment Report is annexed in this report as **(Annexure-XIV).**

Mitigation:

- Efficient use of water with special focus on reuse of water, reduction at source ;
- Most of the people opinioned that due to commissioning of the CCBPL Plant, preference for jobs should be provided to the locals first. They also expressed that CCBPL should provided water filtration units in the surrounding village because people living in the nearby villages do not have access to safe drinking water.

5.4.12 Employment Opportunities

The Project will be very beneficial for the Locals. Proposed Project will create Job opportunities for the locals. Employment opportunities generated by the project include construction labor at the site in the initial stages of setting up of the proposed facility, skilled and unskilled labor and security staff during the Production phase. For Skilled and Semi Skilled workers, Locals will be provided trainings and preference will be given to them for Job. Moreover Bussiness opportunities would be created by distribution of Products, transportation of products, sales of products and maintenance work at Plant like electrical/sanitation/security etc.

Additional employment opportunities are envisaged, such as provision of daily raw materials. Reliance on local markets for provision of construction materials and other supplies will be a significant effect.