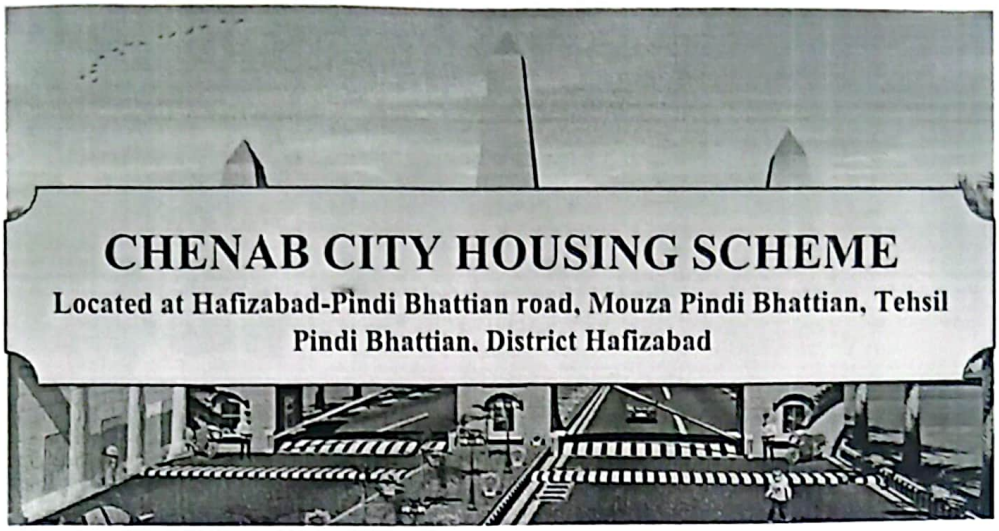
F-154(EIA)-23



CHENAB CITY HOUSING SCHEME

Located at Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad

ENVIRONMENTAL IMPACT ASSESSMENT
(EIA)

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EXECUTIVE SUMMARY

The Proponent intends to establish a housing scheme entitled as "Chenab City Housing Scheme" in the Hafizabad. The proposed project is located at Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad.

The total project area is around 428 Kanal and 9 Marla. The development's proposed land use is predominantly residential and commercial with approximately 202.61 Kanal and 19.34 kanal respectively, dedicated to both units. The remaining area is dedicated to roads, parking community facilities, green open spaces and utilities, and residual land.

Land use in the Chenab City Housing Scheme project is mainly residential dedicated to residential plots, and commercial & community areas. The project consists of five zones: Residential, commercial, and Public Facilities in addition to parking areas, open space, parks and roads and into two sectors (A, B).

At present, the Proponent is initiating its newest project of Chenab City Housing Scheme in Hafizabad with the goal to bring the most luxurious and affordable living address to the people of Hafizabad.

I. TITLE & LOCATION OF PROJECT

Project Name:	Chenab CityHousing Scheme
Project Proponent:	Tahir Mehmood Butt
Head Office:	Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad

II. A BRIEF OUTLINE OF THE PROPOSAL

The project envisages with the construction of a Chenab City housing scheme, at Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad. The total area of the project is 428 Kanal and 9 Marla, while the estimated project cost is 450 million Pak rupees.

To plan and build housing scheme having all types of relevant facilities, services, activities, accessories, this project is open for sale for employees, businessman, and government servants and has been considered as commercial in nature. The proposed area development scheme will facilitate the local population in provision of the standard living place with all luxuries in that selected region and beautiful area. The land is already owned by the project proponent. In accordance with the Punjab Environmental Protection Act 2012 (amended act 2012), the project falls in Schedule–II, which requires the Initial Environmental Examination (EIA) report to submit in Environmental Protection Agency (EPA), Government of the Punjab, Lahore.

II. THE MAJOR IMPACTS AND THEIR MITIGATION MEASURES

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas. Field survey revealed that the impacts of the project due to its location are mostly

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insignificant in nature due to the reason that almost all area in the surrounding is residential in nature. The analysis covers all potential fields of important acts and/ potential receptors:

- Ambient Air Quality.
- Noise and Vibration
- Water resources;
- Soil;
- Biodiversity;
- Waste generation;
- Traffic Congestion
- Socio-economic Impacts; and
- Occupational health and safety.

The construction will also sometimes go round the clock for construction of housing scheme, therefore, during all such construction activities the followings will be the major pollutants/wastes or project related pollution aspects:

- Soil erosion
- Particulate matter/dust and gaseous emissions from construction machinery and vehicles transporting materials.
- Garbage as construction waste including clay, sand, crush stones, paper, plastic, wood pieces, iron and steel as scarp, wires, rags, ropes etc.
- Dust during raw materials unloading and its use in construction
- Sewage and solid wastes from construction camp
- Some social impacts due to accumulation of workers may arise
- Some problems to utilities infrastructure of the area may occur especially due to labor negligence

A number of machinery and equipment is in operation for the construction of building, which includes:

- Batching plants
- Excavators
- Truck
- Transport vehicles
- Concrete mixers
- Vibrators
- Welding plants
- Generators etc.

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Potential Impacts and their mitigation during the Project

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
Planning & Design Phase			
1.	**Site layout planning** Negative impact on the environment of unmanaged and unplanned placement of Infrastructure.	To ensure acceptable impact and management of environmental issues at the main site and storage site during construction by proper planning of layout of infrastructure placement.	▪ Draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure, ▪ The planning for layout must be done in consultation. . ▪ The contractor may not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes; ▪ No servicing of vehicles may be permitted on site, unless for emergency purposes; ▪ Stockpiles must not be situated such that they obstruct pathways; and, ▪ Place infrastructure as far as possible on sites that have already been transformed;
2.	**Construction Program/ Schedule** Order and timing of construction activities and associated impacts.	▪ To provide a clear indication of the order by which key construction activities will transpire.	▪ Draw up and sign off a project schedule with all contributing parties and service providers to commit to a timeline during which time construction milestones will be completed; ▪ Communicate any deviation from this schedule with all parties, so as to provide parties with sufficient opportunity for alternative arrangements to be made; ▪ Establish a risk register to identify and monitor potential factors which may result in setbacks/ delays on tasks within the project schedule;

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ Hold management meetings with representatives of the project manager, contractor, engineer and other contributing parties to monitor and anticipate changes; and, ▪ Should circumstances/ incidents arise which may pose a risk to the project schedule, the construction contractor, and engineer are to keep records of this and the latter communicate this in the Bi-Weekly Audit Checklist.
	Construction Phase		
1.	**Air Quality** ▪ The use of heavy machinery can generate exhaust and dust emissions ▪ Smoke from the burning of waste materials or burning of firewood in the labor camp ▪ Dust resulting from construction work	▪ PEQS to control air pollution	▪ A plan has devised to mitigate the impact of the dust emissions on the **page no. 77** ▪ Sprinkle with water all active construction areas at least twice daily. ▪ Cover all trucks hauling soil, sand, and other loose materials, and maintain at least 60 cm of freeboard. ▪ Pave, to the extent possible, unpaved access roads, parking areas, and staging areas at construction sites. ▪ Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads. ▪ Apply non-toxic soil stabilizers to inactive construction areas (i.e., previously graded areas that are inactive for ten days or more).

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ Enclose, cover, sprinkle with water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.). ▪ Limit traffic speeds on any unpaved roads to 30 km/h. ▪ Install sandbags or other erosion control measures to prevent silt runoff to public roadways. ▪ Limit the area subject to excavation, grading and other construction activity at any one time. ▪ Suspend construction activities that cause visible dust plumes to extend beyond the construction site. ▪ Continual usage of properly designed, maintained and operated equipment/vehicles by the contractor, such as proper engine fuel mixtures, regularly serviced exhaust emission systems and proper engine tuning. ▪ Avoid idling vehicles and equipment engines that are left running unnecessarily; ▪ Maintain and report monthly fuel consumption records; ▪ Waste burning will not be allowed.
2.	**Soil Quality** ▪ The main impacts on the soil, geology and landscape generated by the neighborhood housing project include:	▪ To control soil pollution	▪ Stockpiling the topsoil removed during the excavation works, and using it as cover material when possible. ▪ Determining the location of the topsoil stockpiles before starting the construction activities. ▪ Planning vehicle routing to favor shortest possible routes when feasible.

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
	▪ Physical disturbance of the soil during site leveling and excavation activities; ▪ Soil contamination associated with waste generation/management during construction;		▪ Adopting minimum safe operating width and using existing tracks whenever possible to minimize impacted area size. ▪ Planning and marking access routes. ▪ Upon completion, reuse of excavated soil for site restoration to avoid physical and chemical disturbance of the soil. ▪ The sub-contractor shall supervise the transportation of waste from site to disposal facility.
3.	**Water Quality** ▪ Drainage of wastewater on the ground can contaminate the soil and groundwater ▪ Inappropriate disposal of waste. ▪ Open sewerage water disposal on land can contaminate groundwater and cause the generation of mosquitoes and	▪ Control of groundwater or surface water pollution from construction activities	▪ Proper disposal of waste material on dumping sites to avoid leachate generation and contamination of groundwater/surface water ▪ Prohibit illegal dumping of waste ▪ The contractor will repair/replace/compensate for any damages caused by the Construction activities to the drinking water source/s. ▪ Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water ▪ Furthermore, septic tanks will need to be constructed which will be cemented to prevent the groundwater contamination

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
	various other insects in the area. ▪ Run-off water from the construction area ▪ Leakage of oil and chemical materials from construction activity		
4.	**Waste Generation** ▪ Construction waste from construction activities ▪ Domestic waste from workers' camp ▪ Hazardous waste such as dry batteries, chemicals, etc.	▪ Proper & safe handling and disposal of construction-related waste ▪ Compliance with applicable waste management rules for hazardous and non-hazardous waste disposal ▪ Implementation of the waste management plan	▪ Where possible, surplus materials will be reused or recycled. Oils, fuels and chemicals (including bitumen, bridge deck waterproofing agents and concrete) are substances which are hazardous to human health. They need to be stored properly in correctly labeled containers, both within the construction camp and also at construction sites (e.g. bridges, culverts, etc.). ▪ Waste mixing is avoided and waste segregation is adopted to facilitate recycling, reuse and disposal, and to prevent interaction among various types of waste as follows: ▪ Inert (cleaned soil) ▪ Organic (food remnants), ▪ Non-hazardous (metal, glass, concrete, plastic etc.), ▪ Hazardous (paints, solvents, oils, batteries) ▪ Bitumen, oil and fuel should be stored in tanks with lined bunds to contain spillage.

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ Proper storage and handling of hazardous materials reduces wastage and reduces the risk of spillage which could cause temporary or long-term contamination of the underlying soil and possibly to pollution of groundwater and/or watercourses; some (e.g. concrete) may have serious impacts on freshwater fauna. As well as being a cause of complaints by the local population, this may lead to contravention of local regulations and fines being imposed on the Contractor, Proper storage and management reduces the risk of vandalism and theft. ▪ Disposal of waste materials shall be undertaken by a waste management company contracted by the Contractor. ▪ The waste management company must have the required licenses to transport and dispose of both inert and hazardous waste (including medical) before any such waste is removed from the site. ▪ The Contractor will keep copies of the waste management company's licenses and provide waste transfer manifests at his camp site for routine inspection. ▪ The loads of all waste streams will be recorded and reported monthly by the sub-contractor on an environmental sheet as per the sub-contractor environmental policy. ▪ The Contractor will also keep a record of the types and volumes of waste removed from the site on a weekly basis.

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ The contractor in coordination with the Environmentalist of the Site Engineer will identify the appropriate places for sustainable disposal of asphaltic waste. ▪ To ensure all of the above conditions are met, the Contractor shall be responsible for the preparation of a Waste Management and Recycling Plan. The Plan shall include items relating to the safe handling and management of potential materials and wastes.
5.	**Hazardous Substance** Include; Paints, solvents, glues, sealants, particles, fiber-board, insulation material	▪ Proper & safe handling of the materials & disposal	▪ Hazardous substances/materials are to be transported in sealed containers or bags ▪ Proper handling of the residues.
6.	**Noise** Noise is caused by construction machinery and vehicles used for the mobilization of construction equipment and workers.	▪ Compliance with prescribed PEQS to control Noise pollution	▪ The contractor will strictly follow the PEQS for ambient noise ▪ Control noise through control of working hours and selection of less noisy equipment. ▪ Prohibit the use of pressure horns ▪ Provision of acoustic enclosures (hood and shrouds) on the generator ▪ Proper maintenance of vehicles and construction equipment. ▪ Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery ▪ Personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
7.	**Flora & Fauna** Direct impact on Fauna and Flora as a result of vegetation clearance. During the Construction Phase, the removal of natural vegetation.	▪ Minimal degradation of the floral environment	▪ The project includes a rehabilitation plan through landscaping a large area which will improve vegetative provided on the **page no. 80.** ▪ The cleared proposed site must be surveyed and demarcated prior to construction commencing to ensure no unnecessary loss of natural vegetation outside the approved footprint. ▪ The contractor's staff must not harvest any natural vegetation. ▪ Vehicles and machinery should not encroach into areas outside/surrounding the planned project footprint. ▪ The project area must be monitored for any new growth of invasive plants until completion of construction. ▪ Short-term monitoring for a period of 12 months after construction has been completed must be conducted.
8.	**Materials Management**	▪ Safe and secure environment for construction workers	▪ Stockpiles shall not be situated such that they obstruct natural water pathways ▪ Stockpiles shall not exceed 2m in height unless permitted by Concerned Engineer on site ▪ If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either depending on the duration of the project. Stockpiles may further be protected by the construction of low brick ▪ All substances required for vehicle/ machinery maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ Hazardous substances/materials are to be transported in sealed containers or bags ▪ Spraying of insecticide shall not take place under windy conditions
9.	**Staff Conduct**	▪ Timely completion of project activities	▪ The Contractor must monitor the performance of construction workers to ensure that point relayed during their induction has been properly understood and being followed
10.	**Leakages/ spills/ Paints/ Used oil**	▪ Compliance with standards set forth by "Guide Lines for Oil Spill Waste Minimization and Management" issued by International Petroleum Industry Environmental Conservation Associate[1]	▪ A contractor will apply strict rules on his workers and labor to ensure that no spills or leakages are caused ▪ All fuels, oils, and bitumen will be stored appropriately, with concrete padding and banding for containment in case of leakage ▪ Proper maintenance of vehicles and machinery ▪ Chemical waste will be disposed off at an approved disposal site. ▪ All fuel tanks, chemicals including oil, paints, pesticides, or other hazardous substances will be properly marked to highlight their content ▪ PPE will be enforced to use during the handling and application of chemicals ▪ Used oil/ oil rags will be disposed off through approved recyclable waste vendors

[1]https://www.amn.pt/DCPM/Documents/WasteMgmt.pdf

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ The contractor will employ the general criteria for oil and leakage at construction sites, as per standards
11. .	**Worker's Health & Safety**	▪ Prevention of any possibility of work site accident /impact on worker's health	▪ A plan has devised for worker's health and safety provided on the **page no. 76** ▪ Provision of Personal Protective Equipment to the workers ▪ Provision of a first aid box at the work site to cope with an emergency ▪ Safety training for the workers ▪ Safe driving training for the drivers ▪ Adequate safety signs on site ▪ Provide training regarding proper handling and use of chemicals/ paints ▪ Install fire extinguishers at fire handling places ▪ Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads ▪ Any loss of public/ private property will be compensated by the contractor ▪ Regular checks should be carried out to ensure a contractor is following safe working procedures and practices.
12.	**Socio-economic Impacts**	▪ Prevention of conflicts among locals and making the project socially acceptable ▪ Empowerment of locals to a possible extent	▪ Contractor's activities and movement of staff to be restricted to designated construction areas ▪ The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous all the time

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
		▪ Increase in employment and business opportunities for locals.	▪ Lighting on the construction site shall be pointed downwards and away from oncoming traffic. ▪ Employment opportunities are created during all project phases (site preparation and Construction phase). ▪ The site must be kept clean to minimize the visual impact of the site ▪ Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors ▪ Noisy activities must be restricted to the times given in the Project Specification or General Conditions of the contract ▪ The Contractor is responsible for ongoing communication with those people that are interested in / affected by the projects ▪ Employ residents as much as possible ▪ Promote communication between external workers and local people (e.g. join local events).
13. .	Clearance of site from extra/surplus material and construction equipment	▪ Restoration of the site to a similar condition before the commencement of the work or to a condition agreed with the project management and landscaping of the site	▪ Timely removal of waste from the site to avoid congestion at the workplace. ▪ Construction waste should be collected and disposed of separately from other waste. ▪ Care will be taken during the handling and disposal of waste. ▪ Contaminated soil (if generated) due to accidental spills will be removed and transported to a suitable site for disposal. ▪ Avoid mixing hazardous waste with non-hazardous waste.

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ Safe transportation of construction equipment from the site. ▪ The contractor must ensure that all structures, equipment, materials, and facilities used or created on site for/or during construction activities are removed. ▪ Empty/available space will be covered with grassy lawns.
14.	**Traffic Congestion** Traffic congestion due to transportation of the construction materials	▪ Smooth flow of traffic ▪ Minimum inconvenience to the community	▪ A plan has devised to facilitate the smooth flow of traffic provided on the **page no. 70.** ▪ Proper management of construction traffic ▪ Speed limit of 20 km/hr. will be maintained by all project related vehicles and nighttime (10 pm to 6am) driving of project vehicles will be limited where possible.
Operation Phase			
1.	**Air Quality** ▪ Exhaust gases from stacks of generator ▪ Vehicular Emissions ▪ The operation of the proposed disposal station would potentially result in the increase of emission and odor problems	▪ Compliance With Emission gas standards, Ambient air quality (PEQs) standards, and Prevention of air pollution in the surrounding area;	▪ Access routes will be maintained to minimize traffic dust. ▪ Vehicles and machinery will be regularly maintained and fitted with appropriate exhaust systems and devices. ▪ Odors emitted by the wastewater treatment works may cause potential nuisance to the public. ▪ While selecting the location for the disposal station, the proponent has taken into consideration the distance from the nearest receptors and the wind direction (downwind to receptors) to minimize the effect of odor emissions. ▪ It is recommended to adopt an odor control system inside the disposal station to minimize odor emissions at the main sources, to minimize the impact on occupational Health.

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
			▪ Excessive Planation along the disposal station will be done in order to control the odor.
2.	**Soil contamination from disposal station**	▪ To avoid any soil contamination	▪ Proper design and operation of sludge handling and treatment units. ▪ Provision of adequate storage areas and capacities on-site. ▪ Proper sludge transport by top-covered trucks ▪ Monitoring of sludge quality prior to disposal or reuse.
3.	**Water Quality** Storm water and run-off	▪ Sustainable use of available resources	▪ Drains will be constructed to collect the storm water that can be used for horticulture purposes.
4.	**Waste Generation** Concerning project, the main sources of solid waste generation are: ▪ Plastic bottles, tin cans, glass bottles from the kitchen, bar and restaurant ▪ Paper bags, plastic bags or polyethylene bags from office and house cleaning ▪ Green waste from gardening and landscaping	▪ Compliance with waste management rules ▪ Management of waste ▪ Prevention of inappropriate waste disposal	▪ A Waste management plan has devised for the housing scheme to manage waste in an environment friendly manner provided on the page no. 67 ▪ It is highly recommended that Chenab City Housing Scheme advocates using the principle of the "5Rs" subject to local environmental regulations and availability of resources to handle waste. These "5Rs" are as follows: ▪ Reduce- Generation of less waste in their original form ▪ Reuse- Reuse of materials in their original form ▪ Recycle- Conversion of waste back into a usable material ▪ Recover- Extraction of materials or energy from a waste for other uses ▪ Residue- Implementation of a waste disposal method (landfilling etc.) for the unavoidable waste residue. (In case of landfilling, the landfill should be licensed).

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
	▪ Organic waste from kitchen and restaurant ▪ Scrap metal and wooden boxes from stores		▪ It is also highly recommended to promote sorting at the source practices among residents.
5.	**Wastewater** Wastewater generated will be of domestic type	▪ Management of waste water	▪ Wastewater will be handles through disposal station before its discharge. ▪ Compliance of PEQS for effluents will be ensured. ▪ Monitoring will be conducted as per PEQS and reports should be submitted to EPA.
6.	**Noise & Vibration** ▪ Noise and vibration from generators etc. ▪ Noise is expected during the operation phases ▪ Noise from different types of machinery. ▪ Noise from vehicles ▪ Noise from different types of equipment	▪ Compliance with prescribed PEQs to control Noise pollution	▪ Installation of low noise/ low vibration type equipment ▪ Enhancing the management in and out of the speed limit for vehicles, a ban on vehicle horns, shorten the vehicle's entrance residence time as much as possible to reduce automobile noise and exhaust and its impact on the surrounding environment. ▪ Proper maintenance of equipment ▪ Provision of PPEs to workers like ear muffles ▪ Ensure the use of PPEs by workers ▪ Incorporating low-noise equipment ▪ Locating mechanical equipment in proper acoustically-insulated enclosures ▪ Tree planting around the disposal station

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action
7.	**Work environment (including work safety)** ▪ During the operational phase of the plant, occupational safety is at a higher risk than public safety since they are exposed to toxic air contaminants, malodorous substances, noise and other safety hazards.	▪ Prevention measures against labor accidents and health problems	▪ Restricting unattended public access to the disposal station by proper fencing, gate and guarding. ▪ Use of personal protective equipment (PPE) mainly air masks for workers and/or visitors who intend to occasionally be near the odor control units; ▪ Emphasizing safety education and training for system staff. Enforcing adherence to safety procedures ▪ Providing appropriate safety equipment, fire protection measures, and monitoring instruments ▪ Providing hand railing around all open treatment units, except where sidewalls extend 1.1 meters above ground level. ▪ Properly rating electrical installations and equipment and, where applicable, protecting them for use in flammable atmosphere. ▪ Providing sufficient lighting that should comply with zoning requirements.

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IV. PROPOSED MONITORING PLAN

The monitoring program is designed to ensure that the requirements of the environmental approval awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause environmental disturbance. A monitoring plan for the project has been illustrated in table.

Environmental Monitoring Plan

Sr. No	Monitoring Parameter	Monitoring Location	Parameters	Frequency	Responsible Authority
CONSTRUCTION STAGE					
1)	**Noise**	Construction Vehicle/ Machinery/ generators/Welding work	Using noise level meter (minimum dB and maximum dB)	Monthly Basis	Contractor, Approved Monitoring Agency
2)	**Ambient Air Monitoring**	Construction site, camp site, batching plant, Material storage & active sites	PM_{10} SO_x as SO_2, NO_x as NO_2, CO	Monthly Basis	Contractor, Approved Monitoring Agency
3)	**Dust Emissions**	Construction site and camp site	Visual inspection during construction activities, Transportation of materials	Monthly Basis	Contractor, Approved Monitoring Agency
4)	**Water Quality**	Ground Water/ Waste Water	Sampling and laboratory testing will be done as per the PEQS parameters. While the priority	Monthly Basis	Contractor, Approved Monitoring Agency

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Sr. No	Monitoring Parameter	Monitoring Location	Parameters	Frequency	Responsible Authority
			parameters are pH, TDS, TSS, COD, BOD_5, etc, for waste water Coliform, E-coli pH, TDS, TSS, etc, for Drinking water		
5)	**Solid Waste**	Worker Camp/ Construction Site	Collection of solid waste shall be checked regularly by the contractor during construction phase.	Monthly Basis	Contractor, Approved Monitoring Agency
6)	**Traffic Safety**	Construction site and camp site	Visual inspections	Monthly	Contractor, Approved Monitoring Agency
OPERATION STAGE					
1)	**Air quality**	Around disposal station , Residential units	PM_{10} SO_x as SO_2, NO_x as NO_2, CO	Biannual Basis	Approved Monitoring Agency
2)	**Noise level**	Around sensitive receptors	Using noise level meter (minimum dB and maximum dB)	Biannual Basis	Approved Monitoring Agency
3)	**Security**	Housing Scheme Area	Security arrangement will	Daily Basis	Proponent, Approved

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Sr. No	Monitoring Parameter	Monitoring Location	Parameters	Frequency	Responsible Authority
			be made by the project proponent.		Monitoring Agency
4)	**HSE Plan**	Housing Scheme Area	Health, Safety and Environmental will be monitored on daily basis.	Monthly Basis	Proponent, Approved Monitoring Agency
5)	**Water Quality**	Ground Water/ Waste Water	Sampling and laboratory testing will be done as per the PEQS parameters. While the priority parameters are pH, TDS, TSS, COD, BOD_5, etc, for waste water Coliform, E-coli pH, TDS, TSS, etc, for Drinking water	Biannual Basis	Proponent, Approved Monitoring Agency
6)	**Solid Waste**	Housing Units/Parks etc	Collection of solid waste shall be monitored and a specific site shall be defined for the waste storage and disposal	Daily Basis	Proponent, Approved Monitoring Agency

V. STAKEHOLDER CONSULTATIONS

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Public discussions were held with the inhabitant of the surrounding area (Pindi Bhattian Interchange, Gondal Market and residential units). They are quite positive to the project and see the project as growing trends for the provision of the housing units for general public. The people observe strong positive impacts regarding provision of good life styles, new construction trends and structural development due to this project. EIA findings depict that people perceive overall positive social and economic impacts by the project. Their attitude towards the project is highly optimistic. Majority of the people are convinced for development in the area and they correlate this progress with the pace of their social mobility.

VI. CONCLUSION AND RECOMMENDATION

The report provides conclusion based on the impacts assessed and mitigation measures suggested. The report recommends that EMP will be made a part of all contract documents. The design of the scheme should meet the PEQS parameters in all aspects. The contractor will be bound to completely implement relevant mitigation measures set out in the EMP during construction phase while during regular operation of the project proponents will be responsible to ensure all the compliance of PEQS. If there are any changes in the layout, or any other changes in project description then changes should be carried out through amendments in environmental assessment report and EMP of the EIA.

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

The Proponent intends to construct a housing scheme entitled as "Chenab City Housing Scheme" in the Hafizabad. The proposed project is located at Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad.

The total project area is around 428 Kanal and 9 Marla. The development's proposed land use is predominantly residential and commercial with approximately 202.61 Kanal and 19.34 kanal respectively, dedicated to both units. The remaining area is dedicated to roads, parking community facilities, green open spaces and utilities, and residual land.

Land use in the Chenab City Housing Scheme project is mainly residential dedicated to residential plots, and commercial & community areas. The project consists of five zones: Residential, commercial, and Public Facilities in addition to parking areas, open space, parks and roads and into two sectors (A, B).

At present, the Proponent is initiating its newest project of Chenab City Housing Scheme in Hafizabad with the goal to bring the most luxurious and affordable living address to the people of Hafizabad.

1.2 PURPOSE OF REPORT

Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore in compliance with the legal requirement for Punjab Environment Protection Act-2012 (amended act) for obtaining the No Objection Certificate (NOC)/ Environmental Approval (EA) before starting any activity at the project site. The other relevant regulations and guidelines considered while preparing this EIA report include:

1. Policy and procedures for filing, review and approval of environmental assessments.
2. Guidelines for the preparation and review of environmental reports.
3. Guidelines for public participation.
4. Guidelines for sensitive and critical areas.
5. Detailed sectoral guidelines.

Different environmental aspects like social, physical, biological and other related features of the project both during construction and its regular occupancy are highlighted in this EIA report. Measures necessary to be adopted to mitigate negative environmental impacts on any part of the environment around are also described. All the important information is also provided as described under present format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval (EA).

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1.3 IDENTIFICATION PROJECT & PROPONENT

Project Name: Chenab City Housing Scheme

Project Proponent: Tahir Mehmood Butt

Head Office: Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad.

1.4 DETAIL OF CONSULTANT

M/s ***Integrated Environment Consultants*** (IEC) has been entrusted for preparation of EIA report regarding proposed project. The IEC corresponding address is Suite # 11, 2nd Floor, Anwar Tower, 99-Shadman Chowk Lahore, Pakistan.

Phone: (042)-35960091

Email: *inenvconsultants@yahoo.com*

Web: *www.iec-consultants.com*

1.5 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT

The project envisages with the establishment of a Chenab City housing scheme, at Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad. The total area of the project is 428 Kanal and 9 marla, while the estimated project cost is 450 million Pak rupees.

To plan and build housing scheme having all types of relevant facilities, services, activities, accessories, this project is open for sale for employees, businessman, and government servants and has been considered as commercial in nature. The proposed area development scheme will facilitate the local population in provision of the standard living place with all luxuries in that selected region and beautiful area. The land is already owned by the project proponent. In accordance with the Punjab Environmental Protection Act 2012 (amended act 2012), the project falls in Schedule–II, which requires the Environmental Impact Assessment report to submit in Environmental Protection Agency (EPA), Government of the Punjab, Lahore.

1.6 PERSONS PERFORMING THE EIA STUDY (TEAM MEMBERS)

The proponent has assigned the task of preparing EIA report to M/S **Integrated Environment Consultants**, Lahore. The EIA study of the proposed project has been conducted according to Environmental Assessment Procedures, 1997, Review of EIA and EIA Regulation 2000 as prescribed by the Federal Environmental Protection Agency (Pak EPA), Government of Pakistan. The study team of M/S Integrated Environment Consultants which completed the EIA report consists of following experts as mentioned in **Table -1.1.**

Table 1-1 Members Completed EIA Process

Name	Qualification	Status in Project

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Mr. Ahtasham Raza	M.Phil, Ph.D. Scholar, (Environmental Sciences)	Team In-charge
Mr. Adnan Sharif	Postgraduate (Environmental Law)	Project Manager
Mr. Mehmood Amjad	B.S (Environmental Sciences)	Monitoring In-charge
Ms. Gul Naz	Ph.D. (Environmental Science)	Team Member
Ms. Iram Naz	M.Sc. Water Resource Management	Team Member

- Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA studies.

1.7 OBJECTIVE OF THE REPORT

Objectives to conduct this EIA are as following:

1. A legal binding in accordance to Punjab Environmental Protection Act-2012 (amended Act).
2. To identify the potential environmental issues pertaining to the proposed site.
3. To evaluate the ability of the site by keeping in view the social acceptance and environmental soundness.
4. Providing maximum information of the proponent and other stakeholders, regarding existing environmental conditions and the implications of the proposed project.
5. Collection of available data, reports, drawings and other relevant information about the proposed project.
6. Review of applicable existing environmental legislation and Punjab Environmental Quality Standards (PEQS).
7. Propose mitigation measures to eliminate or to reduce the negative impacts to an acceptable level.
8. Development of well-resourced environmental management and monitoring plans to identify mitigation strategies targeted towards avoidance, minimization, and rehabilitation of the impacts.

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2 SCREENING OF PROJECT

According to the review of the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Regulation 2022, this project falls in ***Schedule–II, Section–H "Urban Development and Tourism", Sub–Section–1 "Housing Schemes more than 300 Kanals"*** for which Environmental Impact Assessment (EIA) Report is required.

Therefore, to fulfill the legal requirements of Section–12 of the Punjab Environment Protection Act–1997 (PEPA Amended 2012), the proponent is required to submit the EIA Report in the Environmental Protection Agency, Government of the Punjab, to obtain the required Environmental Approval (EA).

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3 SCOPING OF PROJECT

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

Spatial boundaries for project related to the environmental effects and cumulative effects for Valued Environmental Components. It depends on the Project Development Area and Local and Regional Assessment Area.

The proposed project has already existed in the place where all facilities are available. The Google coordinates of the project are as followings:

Latitude: 32° 4'32.35"N
Longitude: 74°10'57.96"E
The physical aspects are;

- **East Side:** Open Plot
- **South Side:** Open Plot
- **North Side :** Hafizabad-Pindi Bhattian Road
- **West Side:** Open Plot

Temporal boundaries based on timings and duration of project activity that will happen during construction and operational phase. Construction will be done in an environmental friendly manner that will not harm any existing boundaries and surroundings of project area. While during operational phase all the operation the activities will be done in order to meet the PEQS.



Figure 3-1: Location Plan of Project

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

The regular survey and background studies were conducted to identify the stakeholders. People of surroundings were gathered which are likely to be affected, focus group meetings were conducted by the representatives. They were all briefed about the project

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whereabouts in the non-technical and understandable way. Certain issues and suggestion about the project that is included and raised by the locals were filed and recorded.

- Traffic Issues during construction activities
- Environmental Pollution
- Disposal station Operational impacts
- Employment opportunities for local

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

Following impacts are considered to be significant and proper mitigation and maintenance plan of these are made;

- Air and noise pollution
- Top Soil Removal
- Health and safety of workers
- Accidents due to transportation of construction material
- Waste Management
- Record keeping and maintenance

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4 Consideration of alternatives

4.1 NO PROJECT OPTION

The "No Action" Alternative would see the discontinuation of the project plans and designs, by other means, the project area would not be subject to any type of development and the site retained in its existing form. The No Action alternative would result in no additional environmental impacts compared to the proposed project. This alternative would not increase potential impacts associated with soil, water quality, biodiversity, traffic and circulation, air quality, noise, aesthetics and national utilities. However if this alternative would be adopted, it will likely have the greatest implications on the socioeconomic environment. This action would result in the loss of a major direct and indirect employment generating activity and foreign exchange revenue; benefits associated with the construction industry and potentially significant business opportunities for existing and new tourism support businesses. In addition, the site is likely to undergo erosion, which may be a possibility due to natural effects that are already taking place at the site.

4.2 THE PROPOSED DEVELOPMENT

This alternative would see the construction of the development project as proposed by the developers. It would provide positive benefits such as employment during construction and operation. Additionally, the multiplier effect of this type of development would result in noticeable economic benefits for the region. The proposed project will also make a positive contribution to social infrastructure, overall residential development, upkeep and renewal of the residential community while maintaining natural environment in as many areas as possible.

4.3 THE PROPOSED DEVELOPMENT WITH MODIFICATIONS

No other locations could be considered in conjunction with the proposed location for implementation of this project since the present property offers many advantages over any other potential locations to be considered, including land size, view, geographical position, infrastructure and permits.

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5 DESCRIPTION OF PROJECT

Describes type & category of project, its objectives location & layout, features of site related to vegetation, project schedule of implementation and complete description of project related to its process and steps.

5.1 PROJECT'S VISION/OBJECTIVE

Chenab City housing Scheme Project balances between residential/ commercial buildings and open spaces combining them to allow for good quality of living and maintaining a pleasant timeless feeling in one area. The project's vision is to create a modern living environment, offering entertainment, amenities, improved infrastructure consisting of internal and external roads, as well as water, electricity and sewage systems.

Furthermore, the project will stress on protecting and preserving the natural environment.

5.2 LOCATION AND SITE LAYOUT OF PROJECT

The proposed project is located at Hafizabad-Pindi Bhattian road, Mouza Pindi Bhattian, Tehsil Pindi Bhattian, District Hafizabad.

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Figure 5-1 : Proposed Project Area

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5.3 LAND USE ON THE SITE

The project site is open area and already owned by the proponent.

5.4 ROAD ACCESS

The proposed project is accessible through the Hafizabad-Pindi Bhattian road.

5.5 VEGETATION FEATURES OF THE SITE

The land allocated for the proposed project is already owned by the proponent. The project site is open area with minimal vegetation

5.6 COST AND MAGNITUDE OF OPERATION

The project cost has been estimated as 450 Million rupees.

5.7 SCHEDULE OF IMPLEMENTATION

It is planned that the following schedule of project implementation will be adhered to. This is subject to the conditions that everything goes according to planning and no serious bottlenecks are encountered.

The implementation stages of the project activity include:

1st Stage

The stage–1 comprises the onsite contouring studies and soil investigations. This stage has been completed.

2nd Stage

The stage –2 comprises Finalization of Engineering, procurement, and construction (EPC) and the following task:

i. Start of civil, electrical and mechanical work.
ii. Development of basic infrastructure, like roads in society, electric poles etc.

3rd Stage

The stage –3 comprises the following task:

iii. Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The stage –4 comprises the Commissioning and regular commencement.

5.8 DESCRIPTION OF THE PROJECT

5.8.1 Spatial Allocation Summary and Analysis

The entire project aims at securing an urban environment that provides its residents and users with maximum potential opportunities to "live-work-stay and play". It is a mixed-use project that comprises residential, retail, and commercial facilities as well as extensive public spaces.

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The site of Chenab City Housing Scheme entails a land of 428 Kanal 09 Marla and is strategically located at Pindi Bhattian, District Hafizabad.

Land use in the Chenab City Housing project is mainly residential dedicated to apartments, villas, mixed areas and commercial & community areas which are dedicated to schools, commercial facilities, health care center, mosques, open spaces & walkways, roads, and graveyard. The project consists of five zones; apartments buildings, schools, commercial, residential villas, and health center in addition to parking areas, open space, parking and roads.

Table 5-1 Land Use and Surface Areas in Proposed Project

S. no	Land use	%age	Area in kanals
1.	Residential	47.29	202.61
2.	Commercial	4.51	19.34
3.	PB for MC	1.50	6.43
4.	School & Hospital	1.25	5.36
5.	Mosque	0.41	1.78
6.	Parks/ Open spaces	7.00	29.99
7.	Society Office	0.39	1.68
8.	Graveyard	2.00	8.57
9.	Solid Waste	0.14	0.62
10.	OHWT	0.12	0.50
11.	Disposal Station	0.12	0.50
12.	Roads/Parking	35.26	151.07
TOTAL		**100**	**428.45**

5.8.2 PROJECT COMPONENTS

5.8.2.1 Residential Zone

According to the project Master Plan and Land Use map, residential area covers a total area of approximately 202.61 Kanal which is equivalent to the 47.29 % of the total surface area.

Table 5-2 Details of Residential Plots

Sr.no	Plot Size	Block A	Block B	Total Plots
1.	20'×40'	25	133	158
2.	25'×45'	240	154	394

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Sr.no	Plot Size	Block A	Block B	Total Plots
3.	30'×52'-6	6	0	6
4.	32'×9'-55'	0	23	23
5.	30'×60'	34	24	58
6.	35'×65'	26	25	51
7.	50'×90'	10	0	10
8.	25'×135 '-7	9	0	9
9.	Odd size	37	73	110
10.	Total Plots	387	432	819

5.8.2.2 Commercial Zone

According to the project Master Plan and Land Use map, the commercial offices are located in the southern part of the project and cover a total area of 19.34 Kanal, which is equivalent to approximately 4.51 % of the total available surface area.

Commercial areas are planned to satisfy the immediate needs of the population such as trading products and services. This project has its own plots designated for a major shopping center and several shops.

The following criteria were applied during the planning process:

- The selected site for development was strategically located in the center of the development area in order for it to be close to all surrounding residents.
- Accessible from a major road.
- The designated area has adequate size, suitable shape and moderate inclination.

Table 5-3 Details of Commercial Plots

Sr.no	Plot Size	Block A	Block B	Total Plots
1.	15'×30'	0	41	0
2.	20'×40'	17	14	17
3.	Odd size	2	4	2
4.	Total Plots	19	62	81

5.8.2.3 Community Facilities

Community facilities are distributed within the project site, offering a full range of facilities and amenities to residents, including:

- Care, support and education of children;
- Supplying the residents with consumer goods;

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- Personal and home services;
- Ambulance, medical care and pharmaceutical supply for the residents;
- Social and cultural centers for elderly and handicapped people;
- Health centers and gym;

5.8.2.4 Open Spaces and Parks

The total open spaces and walkways have an area of about 29.99 Kanal. Open spaces are created by Chenab City housing scheme in order to:

- Improve the quality of life of the Chenab City Housing residents;
- Provide accessibility to recreational and sports activities;
- Provide green spaces for public enjoyment;
- Protect the natural environment;
- Provide scenic walkways and bikeways;
- Spaces for children playground.
- Create pleasant, attractive yet functional outdoor spaces;
- Maintain balance and harmony while providing both quit and active zones.

5.8.2.5 Parking Areas/Roads

According to the project Master Plan and Land Use map, the parking areas/Roads cover a total area of 151.07 Kanal providing an adequate number of parking spaces for residents and visitors, which is equivalent to approximately 35.26 percent of the total available surface area.

Table 5-4 Detail of Parking

Parking	Area in kanal
Parking A	1.5K
Parking B	3.65 K
Parking C	1.83K
Parking D	1.86K
Total Area	**8.84K**

5.8.2.6 Graveyards

According to the project Master Plan and Land Use map, the Graveyards cover a total area of 8.57 Kanal which is equivalent to approximately 02 percent of the total available surface area.

5.8.2.7 Disposal Station

The proposed disposal station should be designed to comply with the standards and guidelines. The disposal station will dispose off sewerage water in the existing sewerage system of Municipal Committee. The total area for the Disposal Station is 0.50 Kanal.

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5.8.2.8 Solid Waste Management

Solid waste management sector falls under the jurisdiction of the Municipality. The system that is currently in place and that is being implemented in the surrounding area consists of collection of the solid waste and disposal at a non-sanitary landfill. All types of waste are being collected and dumped including municipal, commercial, industrial and medical which are considered a great hazard to the air, soil and groundwater quality in addition to the visual amenity. The total area for the Disposal Station is 0.62 Kanal.

5.9 CONSTRUCTION CAMP

Camp sites will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to local markets, and an appropriate distance from sensitive areas in the vicinity. Final locations will be selected by the contractor within the premises of the project.

The area requirement for construction camps will depend upon the deployed manpower and the type and quantity of machinery mobilized. In view of the area required, the contractors will have to acquire land on lease from private landowners, unless the appropriate area would not be possible to locate camp sites within the project boundary.

5.10 SITE RESTORATION AND REHABILITATION

There will be no any matter of rehabilitation as the proposed site is already owned by the project proponent. There will not be any let regarding safety factors as applicable from time to time for such projects on all accounts. Debris or any other wastes resulting from project will be disposed off in environmentally sustainable fashion. The materials capable of recycling/reuse will be either sold in the market or to be reused for other suitable purposes. While dismantling of any structure all Government rules and regulations as applicable to such activities will be strictly adhered to. During entire construction period, necessary precautions will be taken to ensure that no damage is done to the basic infrastructures like sewer system, power transmission lines roads, private or public property and daily human life as well. Safety measures as desired under the code of demolition will be adopted to avoid any harm to humans, property around, or the environment in the project area. Dust to be generated will be minimized by constant sprinkling of water.

After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spillover of these materials will be cleared adequately. The land, if and where pitted will be adequately leveled.

The existing undeveloped land will be transformed into a beautiful landmark providing a complete range of residential, commercial, archaeological and community facilities. On the whole, the project site and the area in its near vicinity will be made neat and clean.

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6 DESCRIPTION OF ENVIRONMENT

This section covenants with the prevailing environmental conditions of the project area. Information that has been collected from different sources, including public literature, reports of other studies conducted in this area, knowledge with the proponent and the concerned government departments and the first-hand surveys and field measurements has been presented in this section. This encompasses all the important aspects of local environment; such as biological resources, socioeconomic development and quality of living values.

Baselines refers to existing physical, environmental and socio-economic status of the project are. On the basis of baseline information, the project interventions are assessed, and mitigation measure are proposed. The baseline information also helps to indicate the specific issues to be monitored during constructional and operational phases. The baseline data (physical, biological and socio-economic parameters) related to the project area is described below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively. This section gives the overview of the topology, geology, seismology and meteorological conditions of whole city whereas, it gives detailed information about the surface water, ground water and air quality of the project area.

6.1 HISTORY OF DISTRICT

Hafizabad City is a historic city as its history goes back to 327 B.C when Alexendar the Great invaded a territory in Hindustan called Sandal Bar (current location of Hafizabad). Later on during Mughal's era, King Akbar ordered his advisor Hafiz Meerak to build a town owing to fulfill the desire of Sarmast who quenched King's thirst. Hafizabad was named after King's advisor Hafiz Meerak. Hafizabad was declared a district in 1993, comprising of two tehsils namely Hafizabad and Pindi Bhattian. Formerly, it was a tehsil of Gujranwala District. Major villages are Sukheke Mandi, JalalpuBhattian and Kot Hassan Khan. The area has a centuries old civilization, glimpses of which can be seen from the history of towns, like Dulla Bhatti and Kolo Tarar. It is also known as city of rice as it has the biggest market of rice in Pakistan[2].

6.2 SPATIAL AND TEMPORAL BOUNDARIES ADOPTED FOR THE VARIOUS ASPECTS OF STUDY

The existing status of the environmental settings around the project site along with future likely trends of development and any change to occur in the land use pattern, especially industrialization trends and associated environmental and socio-economic concerns were the major considerations/spatial and temporal boundaries while taking stock of the existing and expected conditions.

[2] https://www.punjab.gov.pk/hafizabad_history

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6.3 PHYSICAL ENVIRONMENT

6.3.1 Geography

The district of Hafizabad is situated at 800 feet above sea level in central Punjab. The district is located between 32°-20' north latitudes and 73°-12' and 73°-46' east longitude. The river Chenab forms the northern and northwestern boundary of the district. The district spread over an area of 2367 square kilometer. It is surrounded by Gujranwala to the East, Jhang, Sargodha and river Chenab to the West, Faisalabad to the South, Mandi Baha-ud-Din to the North West, and district Sheikhupora to the South East. Location map of Hafizabad city3 is presented in below Figure.

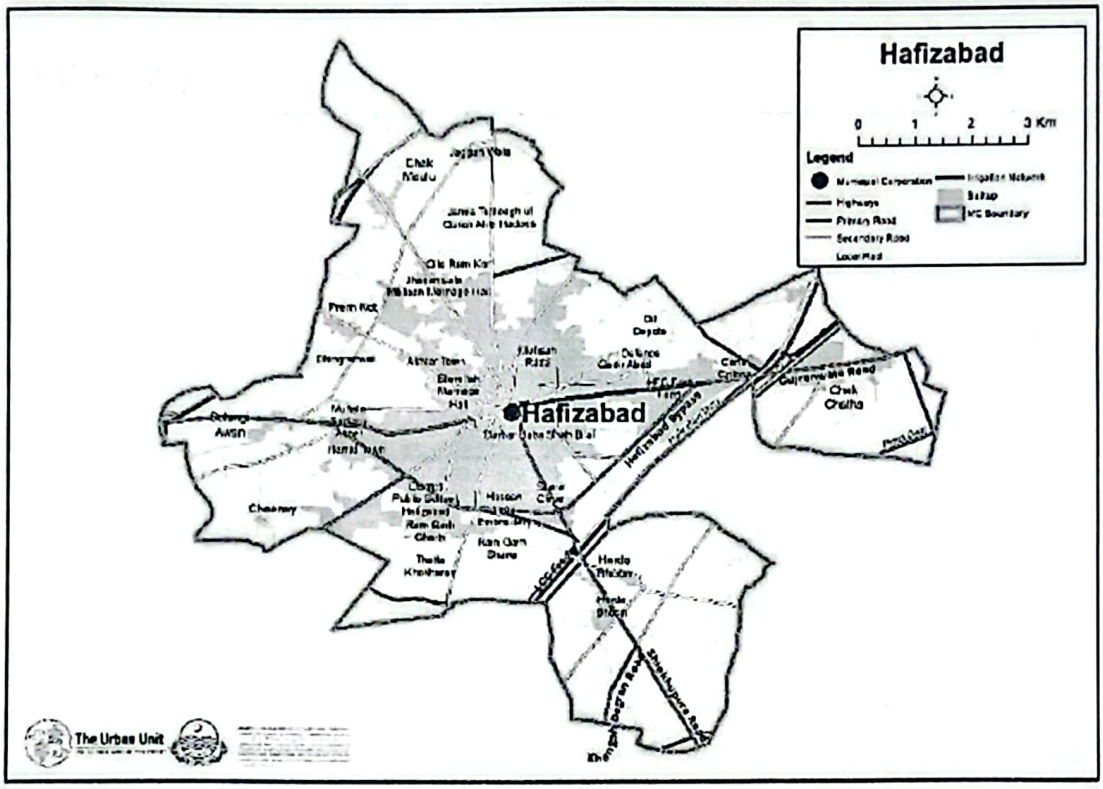


Figure 6-1 Location Map of District Hafizabad

6.3.2 Geology/ Seismology

Pakistan is basically divided into 5 earthquake zones, four of them ranging from zero to four (0-4) and one zone i.e. five which is intensively dangerous ranges from five to ten (5-10). Zone zero describes least earthquake chances and destruction while 5-10 shows most chances of earthquake origination with extensive destruction like 08 October 2005 earthquake across the country. According to the map, district Hafizabad comes under zone 2A and no tectonic or thrust fault line is passing underneath the district Hafizabad thus making it less vulnerable to the destruction due to less seismic activity in the area.

[3] https://hafizabad.punjab.gov.pk/geography

6.3.3 Temperature

The mean maximum and minimum temperature in summer are 39 °C (102 °F) and 27 °C (81 °F) respectively. In winter it peaks at around 17 °C (63 °F) and 12 °C (54 °F) respectively. The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Hafizabad. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days. Wind speeds are not displayed per default but can be enabled at the bottom of the graph. Monthly precipitations above 150mm are mostly wet, below 30mm mostly dry.

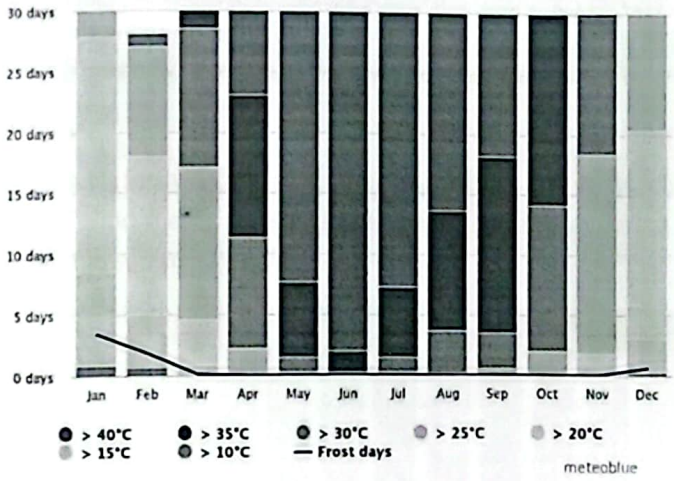


Figure 6-2 Maximum temperature ranges in Hafizabad[4]

6.3.4 Rainfall

The Eastern has proximity of rain fall than western part. The monsoon season is from July to September. Fertile soil allow the cultivation of high quality rice. The average per month rainfall is between 50 and 75 mm.

[4] https://www.meteoblue.com

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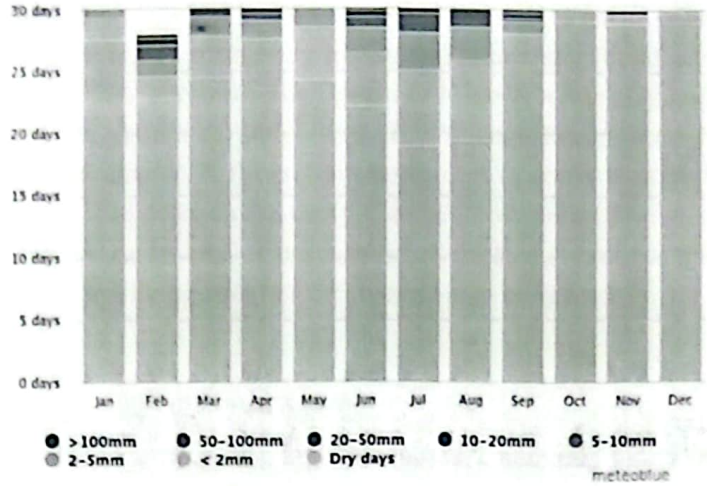


Figure 6-3 Annual Precipitation in Hafizabad[5]

6.3.5 Wind Direction

The diagram for Hafizabad shows the days per month, during which the wind reaches a certain speed. Wind speeds are low during winter picking up during spring season and peaking during the summer months.

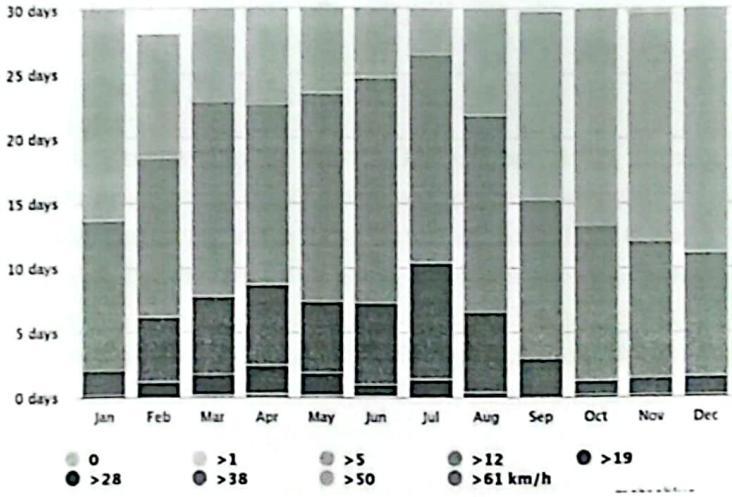


Figure 6-4 Annual average wind speed in Hafizabad[6]

6.3.6 Topography

The whole district is a flat alluvial plain. It can be divided into two parts.

- Hithar
- Uthar

The low lying alluvial lands fringing River Chenab with the upland area lying away from the lowland area of the Chenab. The former is called the Hithar and the latter area

[5] Ibid
[6] Ibid

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is called the Uthar. The soils in the upland area are less fertile. The main soil in the district is Gora a highly manured artificial soil commonly found around villages. The Rohi is the fine dark clay soil. The Dosahi or Missi is a fine clay soil. Canal irrigation has changed the pattern of agriculture. The Chenab River forms the north western boundary of the district. It flows from north east to south west and has a broad and shallow stream. The deposits are sandy, but the floods are extensive, owing to the loose texture of the soil on its bank. Construction of affected the role of river by reducing its usefulness as a fertilizing agent of the riverine area considerably.

6.3.7 Soil

The main types of soil in the district are

(i) Gora, an artificial soil highly manured, commonly found around villages and wells:
(ii) Rohi, the finest natural soil and stiff clay dark/ reddish dark in color;
(iii) Doshair or Missi which is a fine clay soil;
(iv) Maira, which is of less loam with less clay than sand;
(v) Tibba, which is inferior maira;
(vi) Kallar, which is a sour and barren clay unsuitable for cultivation within adequate suitable treatment.
(vii) Bela of the riverain soil is a fine alluvial soil mixed with sand.

6.3.8 Water resources

- **Surface water**

The Chenab is only one river in the district. The Chenab River forming the northern boundary has been described as a broad shallow stream. Its deposits are sandy, but its floods are extensive and owing to the loose texture of the soil on its banks, the moisture percolates for inland, but the weirs at Khanki and Marala have affected the river, and its usefulness as a fertilizing agent for the riverine tract has been reduced considerably. There are several Nallahs in the district which form channels for floodwater in the rains. The most important of them are Palkhu, Aik, Khot, Beghwala and Dek

- **Ground water**

The water requirements for the site for construction work will be extracted from groundwater aquifer by the help of turbines. Groundwater in Hafizabad can be found at various depths ranging from 20 feet in depth in various villages and goes up to hundreds of feet in depth like municipal water supply turbines of Hafizabad extract water from 650 feet.

6.4 BASELINE ECOLOGICAL ENVIRONMENT

The project area neither contain any forest nor falls in protected area or archaeological site and so no jurisdiction on the proposed sire area of the relevant legislations..

6.4.1 Flora

Trees commonly found in the district are Shisham, (*Dalbergia sissoo*), Keekar (*Acacia arabica*), Shareen (*Albizza lebbck*), Bari (*Ziziphus Jujuba*), Guava, citrus etc. in the

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recent past some farmers have started growing mini forest of Popular, eucalyptus, Sumbal etc. There are some marshy areas along the river Chenab where water stagnates. These areas are popularly known as Baila. These are also covered with tall grasses, reeds and spices.

6.4.2 Fauna

There are only few animals like dogs, crows and birds are present.

6.5 BASELINE SOCIO-ECONOMIC ENVIRONMENT

This section describes the key socioeconomic features of the study area like administrative setup, population and communities, education, health, transportation, infrastructure and archaeological sites etc.

6.5.1 Demographic profile of Hafizabad

According to 6th population and housing census 2017 of Pakistan, the total population of Hafizabad District is 1,156,957 whereas the population of two tehsils namely Hafizabad and Pindi Bhattian tehsils is 245,784 and 493,222 respectively. Most of the population dwells in villages and is engaged in agriculture. The major portion of the population belongs to Jatt clan. The main crops of the district are wheat and rice.

Almost 41% of people reside in rural areas of the Hafizabad district. The recent population census indicates an average of 3.05 growth rate in the urban areas of the district since 1998[7].

The information relating to the demographic profile of the people in the project area are described below.

Table 6-1 Urban and Rural Population Growth Rate of Hafizabad District from 1998-2017

Area	Population 1998	Population 2017	Average Annual Growth Rate 1998-2017
Rural	605,865	754,225	1.16
Urban	227,115	402,851	3.05

6.5.2 Major Tribes of the District

The main tribes in Hafizabad inhabited are Awan, Chatha, Tarar, Syed, Khral, Rajput, Ansari and Bhati. Hafizabad District is divided into 8 segments according to the cost and major population of land holders of the area.

6.5.3 Health facilities

The medical facilities are available within city as basic health unit (BHU) and some private hospitals and Clinics which are providing good medical facilities in the area.

[7] PBS (2015). Labor Force Survey of Pakistan 2014-15. Islamabad: Pakistan Bureau of Statistics

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6.5.4 Educational facilities

Government primary school for girls and boys are present near site some private school are present.

6.5.5 Literacy rate

The literacy ratio in Hafizabad district has increased from 19.6% in 1981 to 40.7% in 1998. The literacy ratio for males is 51.8% and 28.7% for females. The ratio is much higher in urban areas when compared with rural areas both for male and female.

6.5.6 Transportation and communication

Motorway

Hafizabad is 30 miles (48 km) away in the west from Gujranwala. Connection with the city is by Gujranwala Road or Hafizabad Road. The distance to the city of Wazirabad is 37 miles (60 km). Basically, it is predominantly an agricultural city. Since the construction of an interchange near Sukheke Mandi, Hafizabad is now just 22 km away from the M2 Motorway.

Railway Network

Hafizabad is also covered with the railroad network in all of its main towns and is linked to the distant parts of the country through railway line. Hafizabad Railway Station operates four trains to different cities of the country. The famous trains operated from the station are Pakistan Express and Rehman Baba Express. On the Wazirabad - Faisalabad Railway Section, Hafizabad is the eighth railway station.

6.5.7 Important Places

The most common places of interest in Hafizabad district are discussed as following;

a) Family Park

Family Park of Hafizabad is a major attraction for visitors and citizens for their recreation on public holidays or leisure time. The park comprises plantation, playgrounds, and recreational facilities for children, and tiled pathways. Citizens of Hafizabad find this park a rejuvenating reprieve and visit it in large number.



This park is one of the oldest ones in the city and has been maintained very well by the administration. It has been renovated recently in order to provide recreational facility and clean and green environment.

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b) Main Bazaar

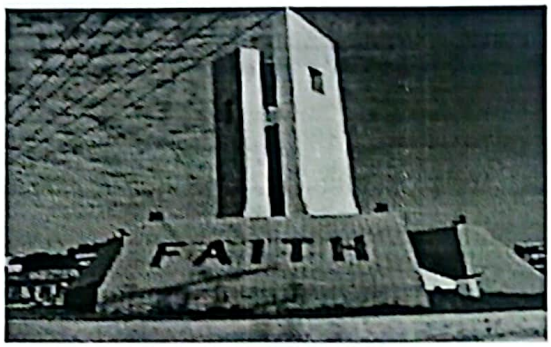
The most populous bazar of the city is called Main Bazar. It has an entrance from Fawara Chowk through the ancient and historical gate called Akbar Darwaza. It is spanned over 335 meters in length and has a number of shops for buying different useful products.



The Main Bazar comprises of jewelry shops, general shops, paan shops, sweet shops, milk shops, meat shops, bangal shops, music and video points, clothing stores, herbal stores, and tailor masters. Main Bazaar has more than ten streets connected to it. Dak Chowki Mail Station

c) Jinnah Chowk

Along the east side of a small reservoir built in the era of Jahangir stands a modest one-story brick mosque. The Pakistani architect and historian Kamil Khan Mumtaz believes that it was constructed in the Lodhi era (1451-1525), suggesting that it is one of the oldest standing mosques in Pakistan. One unique architectural feature is the use of both squinches and pendentives to bridge the gap between the square prayer chamber and the circular dome.



6.6 SUITABILITY OF THE SITE

The consultations demonstrated that goodwill towards the project proponents indeed exists; approval for project activities by the communities was evident. The consultations were considered a good gesture and appreciated. Proposed project will provide better facilities to improve the living standards, so the respondents were positive about the proposed project.

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7 IMPACT ASSESSMENT

7.1 SCOPE AND METHODOLOGY

7.1.1 General Approach

The type, nature (positive, negative, direct, indirect), magnitude, timing (during design, construction, operation or decommissioning), duration (short term/temporary, long term/permanent) and significance e of impacts that could result from the Chenab City Housing scheme are assessed in this section. The evaluation approach implemented in this study is a Receptor-Specific Analysis approach addressing the various sources of impacts from the development project.

The analysis covers all potential fields of imp acts and/ potential receptors:

- Ambient Air Quality.
- Noise and Vibration
- Water resources;
- Soil;
- Biodiversity;
- Waste generation;
- Traffic Congestion
- Socio-economic Impacts; and
- Occupational health and safety.

The general evaluation process will include the following stages:

- **Step 1:** Identification of project activities (sources) and environmental aspects;
- **Step 2:** Identification of potential imp acts to people and the environment;
- **Step 3:** Evaluation and assessment of the related unmitigated impact significance;
- **Step 4:** Identification of Best Practicable Environmental Options (BPEO);
- **Step 5:** Re-evaluation and assessment of the mitigated impact significance

7.1.2 Impact Evaluation Pre-Screening Level

The screening methodology that is adopted for the purpose of this EIA comprises a preliminary screening process followed by a more delicate and detailed secondary screening process.

The pre-screening process includes an intensive literature research and review of community development projects implemented in other parts of the world as well as in Palestine. The pre-screening highlighted some of the major impacts that might be associated with normal operations based on the literature research and the nature of the surrounding environment.

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The key issues identified were investigated and evaluated based on planned project operations including proposed activities, time duration, national regulations, and the social and environmental baseline evaluated. Given the data gathered by team conducting EIA, the results were channeled to a secondary screening process.

7.1.3 Impact Evaluation Secondary Screening Level

A secondary screening level systematically screens the wide range of possible sources and potential previously highlighted impacts. This screening level also assesses the impacts in terms of their significance, duration, reversibility, likelihood of occurrence and geographical extent. In the secondary screening level, consequence criteria were ranked into six levels of significance listed in Table 7-1. Then, the likelihood of the occurrence of the impact was rated according to the criteria outlined in Table 7-2. Based on the level of significance, and likelihood of occurrence, the impact severities (risk) are determined.

The assigned impact severity assessment was first undertaken assuming that no project control and mitigations were applied following investigation and presentation of proposed project mitigations and the impact severities for the mitigated project activities are then presented.

Table 7-1 Secondary Screening Consequence Level Criteria

CRITERIA	CONSEQUENCE
Massive impact over a large area resulting in extensive, potentially irreparable damage to a VEC*. Has a measurable effect on the livelihood of those using a resource over a period of years	**5. Catastrophic**
Long term or continuous impact resulting in substantial adverse changes in a VEC, well outside the range of natural variation. Unassisted recovery could be protracted. Area of effect is extensive and/or encompasses an area that supports a statistically significant proportion of a VEC population or ecosystem. Has a measurable effect on the livelihood of those using a resource over a period of months. Significant damage / impact to a site of social and/or cultural importance.	**4. Significant**
Moderate adverse changes in a VEC or area that supports a VEC population. Changes may exceed the range of natural variation though potential for recovery within a few years without intervention is good.	**3. Moderate**

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CRITERIA	CONSEQUENCE
Area of effect encompasses an area that supports either a moderate or minor proportion of a VEC population or ecosystem. Long term (> 5 yrs) changes over an area which is not considered to be a VEC. Has a measurable effect on the livelihood of those using a resource over a period of weeks. Moderate damage to a site of social and/or cultural importance.	
Minor adverse changes in a VEC. Changes will be noticeable but fall within the range of normal variation and be typically short-lived, with unassisted recovery possible in the near term. However, it is recognized that a low level of impact may remain. Medium term impact (1-5 yrs) in an area that does not encompass a VEC or whose impact is highly localized within a VEC. Long term impact over a discrete, small area which does not support a VEC. May be noticed but does not affect the livelihood of those utilizing a resource. Minor impact to a site of social and/or cultural importance.	**2. Minor**
Short term changes in an ecosystem that are unlikely to be noticeable (i.e. fall within the scope of natural variation). Area of effect is restricted to the immediate vicinity of the source. Has no discernible effect on the environmental resource as a whole and is likely to go unnoticed by those who already use it. Negligible impact to a site of social and/or cultural importance.	**1. Negligible**
Changes that result in a net positive impact to an ecosystem, environment or population	**Beneficial**

*VEC means Valuable Ecosystem Component, used to refer to components of the environment that are considered to be of commercial and/or ecological importance.

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Table 7-2 Likelihood Evaluation Criteria

LIKELIHOOD TO OCCUR	CATEGORY	SCORE
Impact is highly likely or certain to occur under normal operating/ construction conditions	High	C
Impact may possibly occur under normal operating/construction conditions.	Medium	B
Impact is unlikely to occur under normal operating/construction conditions but may occur in exceptional circumstances.	Low	A

Table 7-3 Impact Assessment Management Matrix

		LIKELIHOOD		
		A	B	C
CONSEQUENCE RATING	1	1A	1B	1C
	2	2A	2B	2C
	3	3A	3B	3C
	4	4A	4B	4C
	5	5A	5B	5C

KEY

Consequences		Likelihood		Acceptability
1 - Negligible	4 - Significant	A - Low		Negligible with minor mitigation
2 - Minor	5 - Catastrophic	B - Medium		Minimize Impacts
3 - Moderate	6 - Beneficial	C - High		Unacceptable

7.1.4 Listing of Environmental Impact Severity

Having identified and characterized the potential significant impacts during each phase using the screening procedure identified above, a single table (Environmental Impact Severity Matrix) was developed to summarize all identified impacts during each phase of the Project.

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Table 7-4 Impact Summary Table with No Mitigation Measures In Place

ACTIVITY/ SOURCE OF THE IMPACT	Soil quality	Air quality	Noise & Vibration	Odor Emissions	Dust	Groundwater	flora	fauna	Land use	Employment	Visual amenity	Health & Safety
Site Preparation- Construction Phase												
Excavation	3C	3C	3C	3C	3C		3B	3B	2C	6C	2B	4C
Earth filling/Cutting	3C	3C	3C	3C	3C		3B	3B				4C
Equipment operation	3C	3B	3C	3C	3C		3B	1A				4C
Vehicular movement		2C					2A					
Waste generation	4C	4C				4B	3B	3B	4C		4C	2B
Water consumption						1B						
Accidental Spills	4B	3B				4B						
Traffic congestion		3B	3B		3B							
Operation Phase												
Wastewater Generation		3B	3B	3B	3B							
Disposal Station	2A	2A	3B	3B		3B	2B	2C	2B	6C	3C	3C
Traffic Congestion		2A										

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Solid waste generation	2B	2B		3B		1A	2A	2B				
Landscaped zone	6C	6C	6C						6C		6C	6C
Maintenance	3C		2B		2B		3C			6C		

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Table 7-5 Impact Summary Table with Mitigation Measures in Place

ACTIVITY/ SOURCE OF THE IMPACT	Soil quality	Air quality	Noise & Vibration	Odor Emissions	Dust	Groundwater	flora	fauna	Land use	Employment	Visual amenity	Health & Safety
Site Preparation- Construction Phase												
Excavation	2A	1C	2B	1A	1C	2A	1A	1A	2A	6C	2B	2B
Earth filling/Cutting	2A	1C	2B	1A	1C	1A	1A	1A				
Equipment operation	2A	1B	2B	1A	1B		1A	1A				
Vehicular movement		2C	2B				1A					
Waste generation	2B	2B				1A	1B	1B	2B		2B	2B
Water consumption						1B						
Accidental Spills	2A					2A						
Traffic congestion		2A	2A		2A							
Operation Phase												
Wastewater Generation		2A	2A	2A	1A							
Disposal Station	2A	2A	2A			1A	1B	1B	1B	6C	1B	2B

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Traffic Congestion		2A	2A									
Solid waste generation	2B	2B				2A						
Landscaped zone	6C	6C	6C						6C		6C	6C
Maintenance	3C		2A		1A		3C			6C		

REFERENCE TABLE

Likelihood	Acceptance			Significance
A- Low	1 Negligible	4 Significant		Beneficial
B- Medium	2 Minor	5 Catastrophic		Negligible with minor mitigation
C- High	3 Moderate	6 Beneficial		Minimize impacts
				Unacceptable

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8 SCREENING OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

8.1 GENERAL

The potential impacts of the proposed project on the area's geomorphology, surface and groundwater resources, air quality, biological resources, and socio–cultural environment have been discussed in the following sections. Where appropriate, mitigation measures have also been included to reduce the unacceptable impacts. Likely impacts that trigger the Environmental Management Plan (EMP), and accompanied mitigation measures have been identified in this EIA. The organizational structure and responsibilities of various functionaries towards EMP also have been highlighted, indicated generic environmental control measures that need to be applied during the possible implementation of EMP if and when required. The primary objectives are to:

Facilitate the implementation of the mitigation measures required by EPA.

- 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

Accordingly, mitigation measures have also been prepared to manage the environment and for sustainable development.

8.2 ENVIRONMENTAL PARAMETER INCLUDING LOCATION OF PROJECT

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas. The project involves rehabilitation of the existing road and construction of Underpass for the through traffic.

8.3 ENVIRONMENTAL PARAMETER REGARDING DESIGN

The design of project has sought to minimize any environmental potential impacts by ensuring that the project should be in according to the environmental standards. Local aesthetic value is another issue to be considered during project design.

8.4 IMPACT PHASES

This impact assessment and mitigating measures cover the entire cycle of the project activities, from pre–construction to construction, operation and maintenance. The coverage of each of project phases is defined as follows:

- ❖ Planning & Design Phase
- ❖ Site Preparation/Construction Phase
- ❖ Operation Phase

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8.5 PLANNING & DESIGN PHASE

8.5.1 Site layout planning

Negative impact on the environment of unmanaged and unplanned placement of Infrastructure.

Mitigation Measures

- Draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure,
- The planning for layout must be done in consultation. .
- The contractor may not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes;
- No servicing of vehicles may be permitted on site, unless for emergency purposes;
- Stockpiles must not be situated such that they obstruct pathways; and,
- Place infrastructure as far as possible on sites that have already been transformed;

8.5.2 Construction Program / Schedule

Order and timing of construction activities and associated impacts.

Mitigation Measures

- Draw up and sign off a project schedule with all contributing parties and service providers to commit to a timeline during which time construction milestones will be completed;
- Communicate any deviation from this schedule with all parties, so as to provide parties with sufficient opportunity for alternative arrangements to be made;
- Establish a risk register to identify and monitor potential factors which may result in setbacks/ delays on tasks within the project schedule;
- Hold management meetings with representatives of the project manager, contractor, engineer and other contributing parties to monitor and anticipate changes; and,
- Should circumstances/ incidents arise which may pose a risk to the project schedule, the construction contractor, and engineer are to keep records of this and the latter communicate this in the Bi-Weekly Audit Checklist.

8.6 CONSTRUCTION AND OPERATION PHASE

8.6.1 Impact on Ambient Air Quality

The primary sources of air pollutants from the various Project activities consist of:

- Combustion and exhaust emissions from equipment and vehicles for raw materials transport during the construction phase;
- Airborne particulates (dust) from soil disturbance during site clearance and excavations;

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8.5 PLANNING & DESIGN PHASE

8.5.1 Site layout planning

Negative impact on the environment of unmanaged and unplanned placement of infrastructure

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- Draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure,
- The planning for layout must be done in consultation,
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- No servicing of vehicles may be permitted on site, unless for emergency purposes;
- Stockpiles must not be situated such that they obstruct pathways and
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8.6 CONSTRUCTION AND OPERATION PHASE

8.6.1 Impact on Ambient Air Quality

The primary sources of air pollutants from the various Project activities consist of:

- Combustion and exhaust emissions from equipment and vehicles for raw materials transport during the construction phase;
- Airborne particulates (dust) from soil disturbance during site clearance and excavations;

- Combustion and exhaust emissions from vehicular traffic during operation phase; and
- Air pollution and Odor emission from temporary disposal station operation

8.6.1.1 Air Quality Impacts during Construction

Construction is a source of dust emissions and gases that can have temporary impacts on local air quality. Construction emissions would result from earthmoving (fugitive dust) and heavy equipment use (vehicle exhaust). These emissions would be generated from land clearing, ground excavation, cut and fill operations, and the construction of the project facilities in additional to vehicular movement. Dust emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather. In addition to particulate emissions from earth moving, combustion emissions from fuel- powered construction equipment, such as PM $_0$, $PM_{2.5}$, NO_X and CO, may create a temporary impact on local air quality.

Potential combustion emission sources for the construction phase of the Project are listed in Table 8-1. Any electric power needs during the construction phase shall be supplied by Gujranwala Electric Power Company (GEPCO). However, the Project will have an associated generator emissions that is installed for emergency requirement during this phase.

Table 8-1 Sources of Combustion and Exhaust Emissions during Project Construction

Constructions Equipment	Transportation equipment
Loader and truck	Trucks for materials and equipment transport
Excavator	
Mobile crane	
Forklift	Construction worker transportation to the site
Pumps	
Concrete pump and trans-mixer	

Mitigation Measures

It is expected that localized air pollution will occur, and higher levels of pollutants could be noticed close to areas experiencing intensive rates of works. Several mitigation measures can be adopted to reduce air quality impacts from construction activities:

- Sprinkle with water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials, and maintain at least 60 cm of freeboard.
- Pave, to the extent possible, unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.

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- Apply non-toxic soil stabilizers to inactive construction areas (i.e., previously graded areas that are inactive for ten days or more).
- Enclose, cover, sprinkle with water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on any unpaved roads to 30 km/h.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Limit the area subject to excavation, grading and other construction activity at any one time.
- Suspend construction activities that cause visible dust plumes to extend beyond the construction site.
- Install Diesel Particulate Filters on Construction Equipment
- Continual usage of properly designed, maintained and operated equipment/vehicles by the contractor, such as proper engine fuel mixtures, regularly serviced exhaust emission systems and proper engine tuning.
- Avoid idling vehicles and equipment engines that are left running unnecessarily;
- Maintain and report monthly fuel consumption records;
- Purchase diesel fuel with low sulfur content (5% per weight sulfur content) by the contractor whenever available, in order to reduce excessive emissions of sulfur dioxides

8.6.1.2 Air Quality Impacts during Operation

Impact from Vehicular Traffic

During operation, vehicular traffic will be generated by the project. Automobile exhausts typically account for the majority of the CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follows the spatial and temporal distributions of vehicular traffic.

Currently there is not sufficient information on expected traffic volumes to evaluate air quality impacts from traffic. Based on experience with other similar projects, it is however unlikely that impacts will be significant.

The scope of work for the EIA did not account for air quality simulation studies and only professional judgment can be used at this stage.

Mitigation Measures

- Speed limit of 20 km/hr. will be maintained by all project related vehicles and nighttime (10 pm to 6am) driving of project vehicles will be limited where possible

Impact from Disposal Station Air and Odor Emissions

The operation of the proposed Disposal station would potentially result in the increase of emission of toxic air contaminants. A list of typically regulated air contaminants can be found in Table 8.2

Table 8-2 Toxic Air Contaminants of Concern (Source AES, 2006)

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TOXIC AIR CONTAMINANTS OF CONCERN	
Trichloroethylene	Xylenes
Benzene	Chloroform
Chlorine	Hydrogen Sulfide
Dichlorobenzene	Perchloroethylene

Odors emitted by the wastewater treatment works may cause potential nuisance to the public. Inlet works, grit channels, screening and grit handling, aeration tanks, and sludge holding and drying units are the main sources of odor at a wastewater treatment facility

While selecting the location for the Disposal station, the proponent has taken into consideration the distance from the nearest receptors and the wind direction (downwind to receptors) to minimize the effect of odor emissions. It is recommended to adopt an odor control system inside the Disposal station to minimize odor emissions at the main sources, to minimize the impact on occupational Health.

8.6.2 Impact on Soil, Geology and Landscape

The main impacts on the soil, geology and landscape generated by the neighborhood housing project include:

- Physical disturbance of the soil during site leveling and excavation activities;
- Soil contamination associated with waste generation/management during construction;
- Soil contamination from disposal station.

8.6.2.1 Impacts from Physical Disturbance of the Soil

The impacts on soil include physical compaction, erosion, and reduction in productivity and loss of permeability and flow irrigation.

Excavation works would result in direct disturbance of soil including localized alteration of the soil profile within the excavation footprint, soil compaction in the immediate vicinity as a result of vehicle and construction equipment operations.

However since the excavated soil will be reused for leveling/ land re-fills, it will significantly reduce the soil transportation trips and impacts of soil dumping outside the project area.

Mitigation Measures

Mitigation measures to reduce the effect of physical soil disturbance include:

- Stockpiling the topsoil removed during the excavation works, and using it as cover material when possible.
- Determining the location of the topsoil stockpiles before starting the construction activities.
- Planning vehicle routing to favor shortest possible routes when feasible.

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- Adopting minimum safe operating width and using existing tracks whenever possible to minimize impacted area size.
- Planning and marking access routes.
- Upon completion, reuse of excavated soil for site restoration to avoid physical and chemical disturbance of the soil.

8.6.2.2 Impacts from Solid Waste and Liquid Waste Generation during Construction

Soil quality may also be impacted during the construction phase by littering (wood and metal debris, concrete blocks, empty cement bags, empty paint containers and canisters, plastics from extension of electricity cables) that can be avoided by proper housekeeping and behavioral practices. Also, the waste generate during the carpeting of the roads.

Soil pollution may also occur by intentional or accidental leakage of used chemicals, fuel, or oil products (from equipment and vehicles) on construction sites. Such practices should be strictly avoided and the utmost precautions and workmanship performance should be adopted for the disposal of such hazardous products.

Potential soil contamination may also be associated with waste handling and disposal practices during the course of the construction works.

The development area is mainly covered by sedimentary carbonate rocks which are characterized by a high absorption and infiltration rate. Therefore, leaching pollutants will adsorb readily to the soil. Waste spillages might either be entrapped within the surface soil cover, or penetrate to the subsurface formations, with a decreasing viscosity and surface tension.

Mitigation Measures

In general, for the waste management practices, Chenab City Housing Scheme shall ensure that:

- The loads of all waste streams will be recorded and reported monthly by the sub-contractor on an environmental sheet as per the sub-contractor environmental policy.
- The sub-contractor shall supervise the transportation of waste from site to disposal facility.
- Dump trucks will not be fully filled to avoid waste loss during transportation.
- Quantity of waste is reduced at the source by applying waste reduction measures such as purchasing restrictions to ensure the selection of supplies that generate less waste.
- Waste is reused to the maximum extent possible.
- Waste mixing is avoided and waste segregation is adopted to facilitate recycling, reuse and disposal, and to prevent interaction among various types of waste as follows:
    - Inert (cleaned soil)
    - Organic (food remnants),
    - Non-hazardous (metal, glass, concrete, plastic etc.),
    - Hazardous (paints, solvents, oils, batteries, medical waste)

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- All personnel shall be responsible for ensuring that standards of "good housekeeping" are maintained. This will include clearance of all rubbish and work associated debris;
- On site, domestic and general waste shall be segregated into combustible (paper, food, cardboard, and wood) and non-combustible waste (metals, glass, rubble) streams using suitably labeled containers for safe collection, segregation and handling of all waste streams generated.
- Chenab City Management could envisage transporting only the combustible material to the local landfill. Material suitable for recycling such as combustible or non-combustible material such as scrap material identified upon solid waste segregation shall be transported to licensed facilities.
- Non-combustible wastes which are not suitable for recycling (and not hazardous, such as rubble, etc.) shall be collected by a licensed service provider for disposal in a licensed landfill;
- Hazardous waste such as waste oil, solvents, used batteries and medical waste will be sent for recycling or disposal through a licensed service provider.
- No untreated sanitary wastes or wastewaters will be discharged to the land.
- Mixed wastewater shall be stored in holding tanks and the sewage shall be transported out whenever the tanks are filled to avoid wastewater overflow.

8.6.2.3 Impacts from Disposal Station Operation

The main concern during operation of the plant is related to soil quality rather than soil quantity, and is primarily attributed to generated wastewater. However, since the generated liquid waste will be drain out into the main sewerage line with proper monitoring.

Mitigation Measures

To reduce the potential for noise impacts resulting from operation of station, the following measures should be implemented during operation.

- Proper design and operation of waste handling.
- Provision of adequate storage areas and capacities on-site.
- Proper sludge transport by top-covered trucks
- Monitoring of disposal station.

8.6.3 Impacts from Noise Generation

The primary sources of noise impacts arise from the following project activities:

- Construction phase
- Disposal station operation

8.6.3.1 Noise Generation during Construction

The main sources of noise associated with the transportation activities include the delivery of raw material. Noise will also be generated by the equipment associated with the construction activities mainly site leveling and excavation. The impacts are also temporary in nature. Typical sound level pressures recorded from various equipments at a construction site are illustrated in Figure 8.1 for indicative purposes.

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Most construction phases would generate average noise levels that would be about 20 to 50 dBA Leq (h) higher than ambient daytime or nighttime traffic noise when these activities occurred within about 20 meters of an adjacent land use.

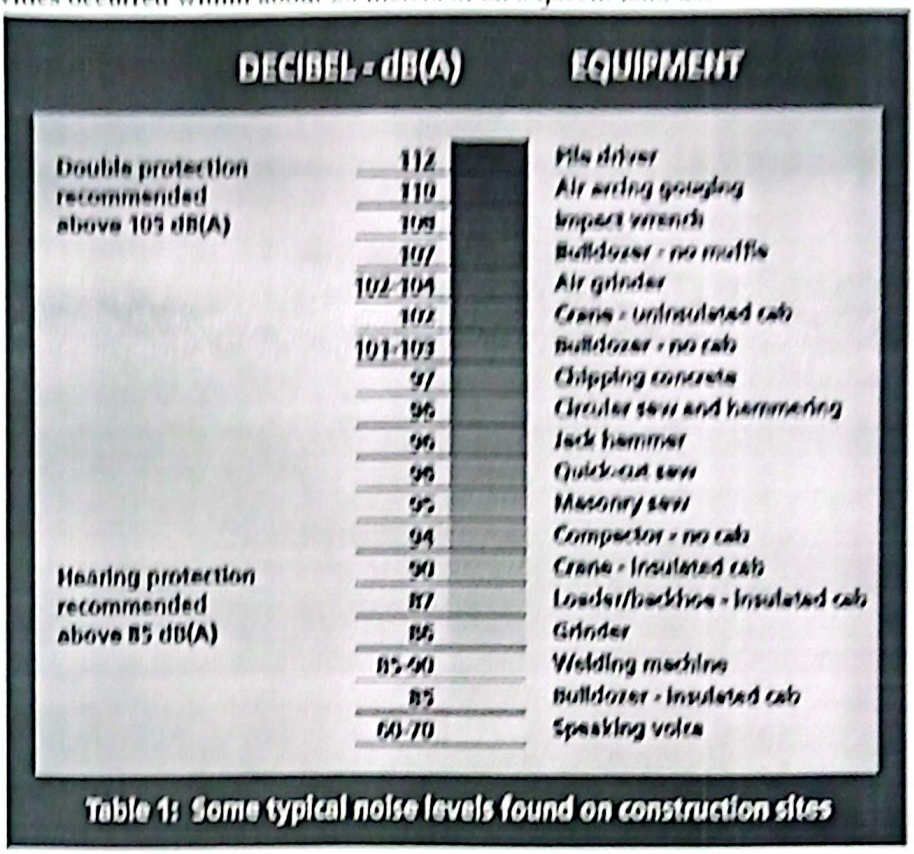


Figure 8-1 Typical Sound Pressure Levels Reported from Construction Equipment

Mitigation Measures

To reduce the potential for noise impacts resulting from project construction, the following measures should be implemented during project construction. The proposed measures should adequately mitigate the noise impact to a less-than significant level to receptors, particularly workers:

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Unnecessary idling of internal combustion engines within 35 meters of residences should be strictly prohibited.
- Avoid staging of construction equipment within 60 meters of residences and locate all stationary noise-generating construction equipment, such as air compressors and portable power generators, as far practical from noise sensitive receptors.
- All construction equipment should be required to conform to any applicable sound control requirements of the project specifications.

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- Avoid nighttime construction work within 150 meters of sensitive land uses where feasible
- Demolition and pile driving activities should be limited to daytime hours only. If nighttime, impulsive work is required, implement a construction noise monitoring program and provide additional mitigation as necessary (in the form of noise control blankets or other temporary noise barriers, etc.) for affected receivers

8.6.3.2 Noise Impacts from Disposal station Operation

Noise is expected during the operation phases of the disposal station with sources of noise generated from the operation of plant machinery such as pumps, and generators. Disposal station that may have potentially hazardous noise levels but it shall serve as a guide for pinpointing areas that may have potentially hazardous noise levels.

Mitigation Measures

To reduce the potential for noise impacts resulting from operation, the following measures should be implemented during operation.

- Incorporating low-noise equipment
- Locating mechanical equipment in proper acoustically-insulated enclosures
- Tree planting around the Disposal station

8.6.4 Impacts due to Waste generation

The identified sources of solid waste generation in the project are:

- Construction phase works
- Households, commercial

8.6.4.1 Waste Generation during Construction

- Construction waste from construction activities
- Domestic waste from workers' camp
- Hazardous waste such as dry batteries, chemicals, etc.

Project will inevitably generate solid and liquid waste products potentially including:

- Inert waste – for example, uncontaminated roads and soil, concrete, masonry and bricks, wood and plastics.
- Hazardous waste – acids and alkaline solutions, waste oils and oily sludge, batteries, asbestos, and bitumen.

In addition, uncontrolled discharges of sewage and 'grey water' (e.g. from washrooms and canteens) from construction sites and worker's camps may also cause odors and pollute local water resources. As well as being a cause of complaints by the local population, this may lead to contravention of local regulations and fines being imposed on the Contractor. The main construction waste produced will be Asphalt.

Mitigation Actions

- Where possible, surplus materials will be reused or recycled. Oils, fuels and chemicals (including bitumen, bridge deck waterproofing agents and concrete) are substances which are hazardous to human health. They need to be stored

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properly in covered labeled containers, both within the construction camp and also at construction sites (e.g. bridges, culverts, etc.).

- Waste mixing is avoided and waste segregation is adopted to facilitate recycling, reuse and disposal, and to prevent interactions among various types of waste as follows:
  - Inert (cleared soil)
  - Organic (food remnants).
  - Non-hazardous (metal, glass, concrete, plastic etc.).
  - Hazardous (paints, solvents, oils, batteries)
- Bitumen, oil and fuel should be stored in tanks with local bunds to contain spillage.
- Proper storage and handling of hazardous materials reduces wastage and reduces the risk of spillage which could cause temporary or long term contamination of the underlying soil and possibly to pollution of groundwater and/or watercourses, some (e.g. concrete) may have serious impacts on freshwater fauna. As well as being a cause of complaints by the local population, this may lead to contravention of local regulations and fines being imposed on the Contractor. Proper storage and management reduces the risk of vandalism and theft.
- Disposal of waste materials shall be undertaken by a waste management company contracted by the Contractor.
- The waste management company must have the required licenses to transport and dispose of both inert and hazardous waste (including medical) before any such waste is removed from the site.
- The Contractor will keep copies of the waste management company's licenses and provide waste transfer manifests at his camp site for routine inspection.
- The loads of all waste streams will be recorded and reported monthly by the sub-contractor on an environmental sheet as per the sub-contractor environmental policy.
- The Contractor will also keep a record of the types and volumes of waste removed from the site on a weekly basis.
- The contractor in coordination with the Environmentalist of the Supervision consultants will identify the appropriate places for sustainable disposal of asphaltic waste.
- To ensure all of the above conditions are met, the Contractor shall be responsible for the preparation of a Waste Management and Recycling Plan. The Plan shall include items relating to the safe handling and management of potential materials and wastes.

8.6.4.2 Waste Generation from Households, Commercial and Roads

Concerning project, the main sources of solid waste generation are:

- Plastic bottles, tin cans, glass bottles from the kitchen, bar and restaurant
- Paper bags, plastic bags or polyethylene bags from office and house cleaning
- Green waste from gardening and landscaping

- Organic waste from kitchen and restaurant
- Scrap metal and wooden boxes from stores

Mitigation Measures

To minimize the impacts, Management should develop a Waste Management Plan and implement it as part of the Environmental Management Plan to control the production and disposal of all wastes.

It is highly recommended that Chenab City Housing Scheme advocates using the principle of the "5Rs" subject to local environmental regulations and availability of resources to handle waste. These "5Rs" are as follows:

- Reduce- Generation of less waste in their original form
- Reuse- Reuse of materials in their original form
- Recycle- Conversion of waste back into a usable material
- Recover- Extraction of materials or energy from a waste for other uses
- Residue- Implementation of a waste disposal method (landfilling etc.) for the unavoidable waste residue. (In case of landfilling, the landfill should be licensed).

It is also highly recommended to promote sorting at the source practices among residents.

Hazardous waste generated from the Hospital should be handled with care to avoid contamination and autoclaved.

Another potential source of solid waste that might end up in the environment comes from littering and windblown waste from inadequate waste containers in the parking lot. Proper sealed waste containers and litter bins should be allocated along the entire project. "No littering" signage should be installed along the entire project site.

8.6.5 Impacts on Water Resources

The identified sources of potential impact on groundwater in the project include:

- Wastewater discharge
- Accidental oil and fuel spills during the construction phase of the project.
- Water consumption during construction

8.6.5.1 Impacts from Accidental Spills during Construction

No major on-site impacts on water resources are anticipated during the construction phase. Care should be exercised when handling fuel and oil (hydraulic, transmission, engine, etc.) to power and maintain the different machinery and equipment on site. Measures should be taken to avoid spillage of such material to the ground, as these contaminants would eventually leach and contaminate the groundwater and are persistent in the environment.

Mitigation Measures

- Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water
- Furthermore, septic tanks will need to be constructed which will be cemented to prevent the groundwater contamination

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8.6.5.2 Impacts from Water Consumption during Construction

Water will be required during the construction phase. Quantities of water required for construction are low and impacts are considered to be small. The required water will be sourced from Lower aquifers in Ramallah district.

Although the construction activities will have a negligible impact on local water resources, the highest possible efficiency of water use shall be ensured by

1) Encouraging water conservation measures by employees
2) By reusing water whenever possible e.g. use of wash water to damp down unsealed roads and reduce airborne dust generation.

8.6.6 Impact on Biodiversity

The main sources of potential impact on biodiversity in the project include:

- Impacts from construction phase
- Impacts from landscaped area

8.6.6.1 Impacts from Construction Phase

Direct impact on Fauna and Flora as a result of vegetation clearance. During the Construction Phase, the removal of natural vegetation creates 'open' habitats that may favor the establishment of undesirable alien plant species which are typically very difficult to eradicate and may pose a threat to neighboring natural ecosystems.

The main construction activities having negative results on the biodiversity are earth-moving activities, construction waste material and effluent discharges.

Table 8-3 Potential Negative Impacts on Biodiversity

Impact	Cause
Habitat loss or destruction	Construction works
Altered abiotic/site factors	Soil compaction, erosion
Disturbance	Due to construction noise, traffic, or presence of people
Vegetation loss	Soil contamination due to disposal of oils and hazardous material

Mitigation Measures

However, the following mitigation measures have been taken in order to reduce the impact on biodiversity:

- The project includes a rehabilitation plan through landscaping a large area which will improve vegetative cover.
- The cleared proposed site must be surveyed and demarcated prior to construction commencing to ensure no unnecessary loss of natural vegetation outside the approved footprint.
- The contractor's staff must not harvest any natural vegetation.

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- Vehicles and machinery should not encroach into areas outside/surrounding the planned project footprint.
- The project area must be monitored for any new growth of invasive plants until completion of construction.
- Short-term monitoring for a period of 12 months after construction has been completed must be conducted.

8.6.6.2 Impact from Landscaped Area

It is planned to retain as much as of the existing vegetation (such as cypresses trees) as possible to maintain the natural character of the project area. Different and divert kinds of plant species have been chosen in the landscaping design of Project for their ecological compatibility which will have a positive impact on the air quality, noise reduction, visual amenity, public health improvement and land use.

Overall impact is positive and long term nature beneficial.

The main sources of impact on occupational health and safety are:

- The site preparation and construction phase
- The Disposal station

8.6.7 Impacts from Health & Safety

8.6.7.1 Impacts during Construction Phase

The main sources of safety and health risk impacts include physical injuries from fire or hazards, in addition to workers' exposure to dust and noise. Labor accidents due to handling heavy loads; working at heights; electric shocks

Mitigation Measures

- Provision of Personal Protective Equipment to the workers
- Provision of a first aid box at the work site to cope with an emergency
- Safety training for the workers
- Safe driving training for the drivers
- Adequate safety signs on site
- Provide training regarding proper handling and use of chemicals/ paints
- Install fire extinguishers at fire handling places
- Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads
- Any loss of public/ private property will be compensated by the contractor
- Regular checks should be carried out to ensure a contractor is following safe working procedures and practices.

8.6.7.2 Impacts during Operation Phase

During the operational phase of the plant, occupational safety is at a higher risk than public safety since they are exposed to toxic air contaminants, malodorous substances, noise and other safety hazards.

Mitigation Measures

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Fortunately, various mitigation measures can be easily adopted to minimize occupational hazards.

Mitigation measures that can significantly suppress the likelihood of impacts on public and occupational safety include:

- Restricting unattended public access to the disposal station by proper fencing, gate and guarding.
- Use of personal protective equipment (PPE) mainly air masks for disposal station workers and/or visitors who intend to occasionally be near the odor control units;
- Ensure that the room doors of the influent lifting station remain closed with a notice warning from high levels of hydrogen sulphide. Workers shall as well wear gas masks prior to entering the room.
- Emphasizing safety education and training for system staff. Enforcing adherence to safety procedures
- Providing appropriate safety equipment, fire protection measures, and monitoring instruments
- Providing hand railing around all open treatment units, except where sidewalls extend 1.1 meters above ground level.
- Properly rating electrical installations and equipment and, where applicable, protecting them for use in flammable atmosphere.
- Providing sufficient lighting that should comply with zoning requirements.

8.7 POTENTIAL POSITIVE IMPACTS

8.7.1 Impact on Land Use and Visual Amenity

The existing undeveloped land will be transformed into a beautiful landmark providing a complete range of residential, commercial, and community facilities (Mosques playgrounds, schools parks).

8.7.2 Creation of New Job Opportunities

Employment opportunities are created during all project phases (site preparation and Construction phase, Disposal station operation, community facilities).

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9 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

This section describes the mitigation and management measures to address the environmental issues during construction, its regular operation, and decommissioning phases of the proposed project.

9.1 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The objectives of the EMP are as follows:

- To outline functions and responsibilities of responsible persons.
- To state standards and guidelines, which are required to be achieved in terms of environmental legislation.
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project to minimize the extant environmental impacts and to manage the environmental impact associated with the proposed project.
- To prevent long-term or permanent environmental degradation
- To identify training requirements at various levels.

9.2 DESCRIPTION OF MITIGATION ACTIONS

During the field survey and consultation, key impacts relating to the project were identified. They were obtained by making physical observations at the project site as well as existing land use in the neighborhood. The mitigation action plan is discussed in EMP.

9.2.1 Mitigation plan for Planning, Construction Phase and Operation Phase

This section of EMP provides management principles for the construction phase of the project. Environmental actions, procedures, and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and therefore, the contractor will be required to comply with the specifications to the satisfaction of the Project Manager and Environmental Control Officer, in terms of the construction contract.

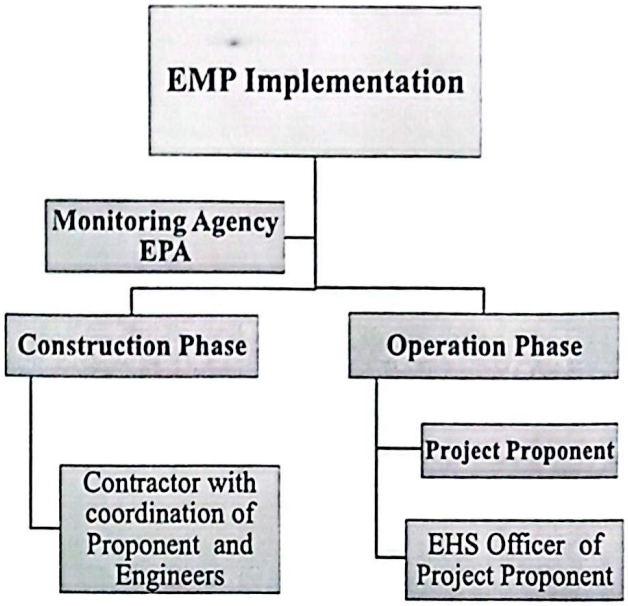
Environmental problems relating to gaseous emissions, PM, and noise (from the stand-by generator) during the operation of the present project on regular basis will be of significance. However, about 20 to 30 gallons/day of sewage will be produced at full occupancy. Solid waste in the form of waste bottles, drums, plastic bags, etc, will be produced in that immediately will be sold to recycling plants.

1. **Water balance**: Underground water in the form of tube wells and electric motors will be used for drinking and domestic use. The storm water will be collected and used for horticulture purposes.
2. **Solid Waste Disposal**: During construction, construction waste material will be backed filled in burrows and paved areas, Offices waste. Fabric Waste shall be sold

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in Local Markets. Domestic Solid waste is to be regularly collected in bins or waste handling receptacles and proper disposal.

The measures are organized under the following environmental aspects of the project activities during the construction phase:



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Table 9-1: Management Plan for Planning, Construction and Operational Phase

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
PLANING & DESIGN PHASE					
1.	**Site layout planning** • Negative impact on the environment of unmanaged and unplanned placement of Infrastructure.	To ensure acceptable impact and management of environmental issues at the main site and storage site during construction by proper planning of layout of infrastructure placement.	▪ Draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure, ▪ The planning for layout must be done in consultation. . ▪ The contractor may not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes; ▪ No servicing of vehicles may be permitted on site, unless for emergency purposes; ▪ Stockpiles must not be situated such that they obstruct pathways; and, ▪ Place infrastructure as far as possible on sites that have already been transformed;	Design Engineer Project Manager	Proponent
2.	**Construction Program / Schedule** • Order and timing of construction activities	▪ To provide a clear indication of the order by which key construction	▪ Draw up and sign off a project schedule with all contributing parties and service providers to commit to a timeline during which time construction milestones will be completed;	Project Manager Contractor	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	and associated impacts.	activities will transpire.	▪ Communicate any deviation from this schedule with all parties, so as to provide parties with sufficient opportunity for alternative arrangements to be made; ▪ Establish a risk register to identify and monitor potential factors which may result in setbacks/ delays on tasks within the project schedule; ▪ Hold management meetings with representatives of the project manager, contractor, engineer and other contributing parties to monitor and anticipate changes; and, ▪ Should circumstances/ incidents arise which may pose a risk to the project schedule, the construction contractor, and engineer are to keep records of this and the latter communicate this in the Bi-Weekly Audit Checklist.		
CONSTRUCTION PHASE					
1.	**Air Quality** • The use of heavy machinery can generate exhaust and dust emissions	▪ PEQS to control air pollution	▪ A plan has devised to mitigate the impact of the dust emissions on the page no. 77 ▪ Sprinkle with water all active construction areas at least twice daily.	During the Construction Phase by the Contractor with	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	• Smoke from the burning of waste materials or burning of firewood in the labor camp • Dust resulting from construction work		▪ Cover all trucks hauling soil, sand, and other loose materials, and maintain at least 60 cm of freeboard. ▪ Pave, to the extent possible, unpaved access roads, parking areas, and staging areas at construction sites. ▪ Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads. ▪ Apply non-toxic soil stabilizers to inactive construction areas (i.e., previously graded areas that are inactive for ten days or more). ▪ Enclose, cover, sprinkle with water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.). ▪ Limit traffic speeds on any unpaved roads to 30 km/h. ▪ Install sandbags or other erosion control measures to prevent silt runoff to public roadways.	the coordination of Proponent staff	

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ Limit the area subject to excavation, grading and other construction activity at any one time. ▪ Suspend construction activities that cause visible dust plumes to extend beyond the construction site. ▪ Install Diesel Particulate Filters on Construction Equipment ▪ Continual usage of properly designed, maintained and operated equipment/vehicles by the contractor, such as proper engine fuel mixtures, regularly serviced exhaust emission systems and proper engine tuning. ▪ Avoid idling vehicles and equipment engines that are left running unnecessarily; ▪ Maintain and report monthly fuel consumption records; ▪ Purchase diesel fuel with low sulfur content (5% per weight sulfur content) by the contractor whenever available, in order to reduce excessive emissions of sulfur dioxides ▪ Waste burning will not be allowed.		

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
2.	**Soil Quality** • The main impacts on the soil, geology and landscape generated by the neighborhood housing project include: • Physical disturbance of the soil during site leveling and excavation activities; • Soil contamination associated with waste generation/management during construction;	▪ To control soil pollution	▪ Stockpiling the topsoil removed during the excavation works, and using it as cover material when possible. ▪ Determining the location of the topsoil stockpiles before starting the construction activities. ▪ Planning vehicle routing to favor shortest possible routes when feasible. ▪ Adopting minimum safe operating width and using existing tracks whenever possible to minimize impacted area size. ▪ Planning and marking access routes. ▪ Upon completion, reuse of excavated soil for site restoration to avoid physical and chemical disturbance of the soil. ▪ The sub-contractor shall supervise the transportation of waste from site to disposal facility.	During the Construction Phase by the Contractor with the coordination of Proponent staff	Proponent
3.	**Water Quality** • Drainage of wastewater on the ground can contaminate the soil and groundwater	▪ Control of groundwater or surface water pollution from construction activities	▪ Proper disposal of waste material on dumping sites to avoid leachate generation and contamination of groundwater/surface water ▪ Prohibit illegal dumping of waste ▪ The contractor will repair/replace/compensate for any damages	During the Construction Phase by the Contractor with the coordination of Proponent staff	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	• Inappropriate disposal of waste. • Open sewerage water disposal on land can contaminate groundwater and cause the generation of mosquitoes and various other insects in the area. • Run-off water from the construction area • Leakage of oil and chemical materials from construction activity		caused by the Construction activities to the drinking water source/s. ▪ Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water ▪ Furthermore, septic tanks will need to be constructed which will be cemented to prevent the groundwater contamination		
4.	**Waste Generation** • Construction waste from construction activities • Domestic waste from workers' camp	▪ Proper & safe handling and disposal of construction-related waste ▪ Compliance with applicable waste management rules for hazardous and	▪ Where possible, surplus materials will be reused or recycled. Oils, fuels and chemicals (including bitumen, bridge deck waterproofing agents and concrete) are substances which are hazardous to human health. They need to be stored properly in correctly labeled containers, both within the construction camp and	During the Construction Phase by the Contractor with the coordination of Proponent staff	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	• Hazardous waste such as dry batteries, chemicals, etc.	non-hazardous waste disposal ▪ Implementation of the waste management plan	also at construction sites (e.g. bridges, culverts, etc.). ▪ Waste mixing is avoided and waste segregation is adopted to facilitate recycling, reuse and disposal, and to prevent interaction among various types of waste as follows: ▪ Inert (cleaned soil) ▪ Organic (food remnants), ▪ Non-hazardous (metal, glass, concrete, plastic etc.), ▪ Hazardous (paints, solvents, oils, batteries) ▪ Bitumen, oil and fuel should be stored in tanks with lined bunds to contain spillage. ▪ Proper storage and handling of hazardous materials reduces wastage and reduces the risk of spillage which could cause temporary or long-term contamination of the underlying soil and possibly to pollution of groundwater and/or watercourses; some (e.g. concrete) may have serious impacts on freshwater fauna. As well as being a		

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	• Hazardous waste such as dry batteries, chemicals, etc.	non-hazardous waste disposal ▪ Implementation of the waste management plan	also at construction sites (e.g. bridges, culverts, etc.). ▪ Waste mixing is avoided and waste segregation is adopted to facilitate recycling, reuse and disposal, and to prevent interaction among various types of waste as follows: ▪ Inert (cleaned soil) ▪ Organic (food remnants), ▪ Non-hazardous (metal, glass, concrete, plastic etc.), ▪ Hazardous (paints, solvents, oils, batteries) ▪ Bitumen, oil and fuel should be stored in tanks with lined bunds to contain spillage. ▪ Proper storage and handling of hazardous materials reduces wastage and reduces the risk of spillage which could cause temporary or long-term contamination of the underlying soil and possibly to pollution of groundwater and/or watercourses; some (e.g. concrete) may have serious impacts on freshwater fauna. As well as being a		

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			cause of complaints by the local population, this may lead to contravention of local regulations and fines being imposed on the Contractor. Proper storage and management reduces the risk of vandalism and theft. ▪ Disposal of waste materials shall be undertaken by a waste management company contracted by the Contractor. ▪ The waste management company must have the required licenses to transport and dispose of both inert and hazardous waste (including medical) before any such waste is removed from the site. ▪ The Contractor will keep copies of the waste management company's licenses and provide waste transfer manifests at the camp site for routine inspection. ▪ The loads of all waste streams will be recorded and reported monthly by the sub-contractor to the environmental team as per the sub-contractor environmental policy.		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ The Contractor will also keep a record of the types and volumes of waste removed from the site on a weekly basis. ▪ The contractor in coordination with the Environmentalist of the Supervision consultants will identify the appropriate places for sustainable disposal of asphaltic waste. ▪ To ensure all of the above conditions are met, the Contractor shall be responsible for the preparation of a Waste Management and Recycling Plan. The Plan shall include items relating to the safe handling and management of potential materials and wastes.		
5.	**Hazardous Substance** • Include; Paints, solvents, glues, sealants, particles, fiber-board, insulation material	▪ Proper & safe handling of the materials & disposal	▪ Hazardous substances/materials are to be transported in sealed containers or bags ▪ Proper handling of the residues.	During the Construction Phase by the Contractor with the coordination of Proponent staff	Proponent
6.	**Noise** • Noise is caused by construction	▪ Compliance with prescribed PEQs	▪ The contractor will strictly follow the PEQS for ambient noise	During the Construction Phase by the	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	machinery and vehicles used for the mobilization of construction equipment and workers.	to control Noise pollution	▪ Control noise through control of working hours and selection of less noisy equipment. ▪ Prohibit the use of pressure horns ▪ Provision of acoustic enclosures (hood and shrouds) on the generator ▪ Proper maintenance of vehicles and construction equipment. ▪ Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery ▪ Personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory	Contractor with the coordination of Proponent staff	
7.	**Flora & Fauna** • Direct impact on Fauna and Flora as a result of vegetation clearance. • During the Construction Phase, the removal of natural vegetation.	▪ Minimal degradation of the floral environment	▪ The project includes a rehabilitation plan through landscaping a large area which will improve vegetative cover. ▪ The cleared proposed site must be surveyed and demarcated prior to construction commencing to ensure no unnecessary loss of natural vegetation outside the approved footprint. ▪ The contractor's staff must not harvest any natural vegetation.	During the Construction Phase by the Contractor with the coordination of Proponent staff	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ Vehicles and machinery should not encroach into areas outside/surrounding the planned project footprint. ▪ The project area must be monitored for any new growth of invasive plants until completion of construction. ▪ Short-term monitoring for a period of 12 months after construction has been completed must be conducted.		
8. .	**Materials Management**	▪ Safe and secure environment for construction workers	▪ Stockpiles shall not be situated such that they obstruct natural water pathways ▪ Stockpiles shall not exceed 2m in height unless permitted by Concerned Engineer on site ▪ If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either depending on the duration of the project. Stockpiles may further be protected by the construction of low brick ▪ All substances required for vehicle/ machinery maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site ▪ Hazardous substances/materials are to be transported in sealed containers or bags	The contractor with coordination of the proponent and Engineer	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ Spraying of insecticide shall not take place under windy conditions		
9.	**Staff Conduct**	▪ Timely completion of project activities	▪ The Contractor must monitor the performance of construction workers to ensure that point relayed during their induction has been properly understood and being followed	Contractor	Proponent
10.	**Leakages/ spills/ Paints/ Used oil**	▪ Compliance with standards set forth by "Guide Lines for Oil Spill Waste Minimization and Management" issued by International Petroleum Industry Environmental Conservation Association	▪ A contractor will apply strict rules on his workers and labor to ensure that no spills or leakages are caused ▪ All fuels, oils, and bitumen will be stored appropriately, with concrete padding and banding for containment in case of leakage ▪ Proper maintenance of vehicles and machinery ▪ Chemical waste will be disposed of in an approved disposal site. ▪ All fuel tanks, chemicals including oil, paints, pesticides, or other hazardous substances will be properly marked to highlight their content ▪ PPE will be enforced to use during the handling and application of chemicals ▪ Used oil/ oil rags will be disposed off through approved recyclable waste vendors	Contractor	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ The contractor will employ the general criteria for oil and leakage at construction sites, as per standards		
11. .	**Worker's Health & Safety**	▪ Prevention of any possibility of work site accident /impact on worker's health	▪ A plan has devised for worker's health and safety provided on the **page no. 76** ▪ Provision of Personal Protective Equipment to the workers ▪ Provision of a first aid box at the work site to cope with an emergency ▪ Safety training for the workers ▪ Safe driving training for the drivers ▪ Adequate safety signs on site ▪ Provide training regarding proper handling and use of chemicals/ paints ▪ Install fire extinguishers at fire handling places ▪ Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads ▪ Any loss of public/ private property will be compensated by the contractor ▪ Regular checks should be carried out to ensure a contractor is following safe working procedures and practices.	Contractor	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
12.	Socio-economic Impacts	▪ Prevention of conflicts among locals and making the project socially acceptable ▪ Empowerment of locals to a possible extent ▪ Increase in employment and business opportunities for locals.	▪ Contractor's activities and movement of staff to be restricted to designated construction areas ▪ The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous all the time ▪ Lighting on the construction site shall be pointed downwards and away from oncoming traffic. ▪ Employment opportunities are created during all project phases (site preparation and Construction phase). ▪ The site must be kept clean to minimize the visual impact of the site ▪ Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors ▪ Noisy activities must be restricted to the times given in the Project Specification or General Conditions of the contract ▪ The Contractor is responsible for ongoing communication with those people that are interested in / affected by the projects	A contractor with coordination of proponent staff	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ Employ residents as much as possible ▪ Promote communication between external workers and local people (e.g. join local events).		
13. .	Clearance of site from extra/surplus material and construction equipment	▪ Restoration of the site to a similar condition before the commencement of the work or to a condition agreed with the project management and landscaping of the site	▪ Timely removal of waste from the site to avoid congestion at the workplace. ▪ Construction waste should be collected and disposed of separately from other waste. ▪ Care will be taken during the handling and disposal of waste. ▪ Contaminated soil (if generated) due to accidental spills will be removed and transported to a suitable site for disposal. ▪ Avoid mixing hazardous waste with non-hazardous waste. ▪ Safe transportation of construction equipment from the site. ▪ The contractor must ensure that all structures, equipment, materials, and facilities used or created on site for/or during construction activities are removed. ▪ Empty/available space will be covered with grassy lawns.	Contractor	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
14.	**Traffic Congestion** • Traffic congestion due to transportation of the construction materials	▪ Smooth flow of traffic ▪ Minimum inconvinence to the community	▪ A plan has devised to facilitate the smooth flow of traffic provided on the **page no. 70** ▪ Proper management of construction traffic ▪ Speed limit of 20 km/hr. will be maintained by all project related vehicles and nighttime (10 pm to 6am) driving of project vehicles will be limited where possible.	Contractor	Proponent
▪	**OPERATIONAL PHASE**				
1.	**Air Quality** ▪ Exhaust gases from stacks of generator ▪ Vehicular Emissions ▪ The operation of the proposed Disposal station would potentially result in the increase of emission and odor problems	▪ Compliance With Emission gas standards, Ambient air quality (PEQs) standards, and Prevention of air pollution in the surrounding area;	▪ Access routes will be maintained to minimize traffic dust. ▪ Vehicles and machinery will be regularly maintained and fitted with appropriate exhaust systems and devices. ▪ Odors emitted by the wastewater treatment works may cause potential nuisance to the public. ▪ While selecting the location for the Disposal station, the proponent has taken into consideration the distance from the nearest receptors and the wind direction	EHS officer of Project Proponent	Project Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			(downwind to receptors) to minimize the effect of odor emissions. ▪ It is recommended to adopt an odor control system inside the Disposal station to minimize odor emissions at the main sources, to minimize the impact on occupational Health. ▪ Excessive Planation along the Disposal station will be done in order to control the odor.		
2.	**Soil contamination from Disposal station**	▪ To avoid any soil contamination	▪ Proper design and operation of WW handling and treatment units. ▪ Provision of adequate storage areas and capacities on-site. ▪ Monitoring of WW prior to disposal into the Municipal line. .		
3.	**Water Quality** Storm water and run-off	▪ Sustainable use of the available resources	▪ Drains will be constructed to collect the storm water that can be used for horticulture purposes.	EHS officer of Project Proponent	Project Proponent
4.	**Waste Generation** Concerning project, the main sources of solid waste generation are: ▪ Plastic bottles, tin cans, glass bottles	▪ Compliance with waste management rules ▪ Management of waste	▪ A Waste management plan has devised for the housing scheme to manage waste in an environment friendly manner (provided on the **page no. 67**). ▪ It is highly recommended that Chenab city Housing Scheme advocates using the	EHS officer of Project Proponent	Project Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	from the kitchen, bar and restaurant ▪ Paper bags, plastic bags or polyethylene bags from office and house cleaning ▪ Green waste from gardening and landscaping ▪ Organic waste from kitchen and restaurant ▪ Scrap metal and wooden boxes from stores	▪ Prevention of inappropriate waste disposal	principle of the "5Rs" subject to local environmental regulations and availability of resources to handle waste. These "5Rs" are as follows: ▪ Reduce- Generation of less waste in their original form ▪ Reuse- Reuse of materials in their original form ▪ Recycle- Conversion of waste back into a usable material ▪ Recover- Extraction of materials or energy from a waste for other uses ▪ Residue- Implementation of a waste disposal method (landfilling etc.) for the unavoidable waste residue. (In case of landfilling, the landfill should be licensed). ▪ It is also highly recommended to promote sorting at the source practices among residents.		
5.	**Wastewater** Wastewater generated will be of domestic type	▪ Management of waste	▪ Wastewater will be handled through Disposal station before its discharge. ▪ Compliance of PEQS for effluents will be ensured.	Project Manager	Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			▪ Monitoring will be conducted as per PEQS and reports should be submitted to EPA.		
6.	**Noise & Vibration** ▪ Noise and vibration from generators etc. ▪ Noise is expected during the operation phases of the Disposal station ▪ Noise from different types of machinery. ▪ Noise from vehicles ▪ Noise from different types of equipment	▪ Compliance with prescribed PEQs to control Noise pollution	▪ Installation of low noise/ low vibration type equipment ▪ Enhancing the management in and out of the speed limit for vehicles, a ban on vehicle horns, shorten the vehicle's entrance residence time as much as possible to reduce automobile noise and exhaust and its impact on the surrounding environment. ▪ Proper maintenance of equipment ▪ Provision of PPEs to workers like ear muffles ▪ Ensure the use of PPEs by workers ▪ Incorporating low-noise equipment ▪ Locating mechanical equipment in proper acoustically-insulated enclosures ▪ Tree planting around the Disposal station	EHS officer of Project Proponent	Project Proponent
7.	**Work environment (including work safety)** During the operational phase of the plant, occupational safety is at	▪ Prevention measures against labor accidents and health problems	▪ Restricting unattended public access to the Disposal station by proper fencing, gate and guarding. ▪ Use of personal protective equipment (PPE) mainly air masks for Disposal station	EHS officer of Project Proponent	Project Proponent

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Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	a higher risk than public safety since they are exposed to toxic air contaminants, malodorous substances, noise and other safety hazards.		workers and/or visitors who intend to occasionally be near the odor control units; ▪ Emphasizing safety education and training for system staff. Enforcing adherence to safety procedures ▪ Providing appropriate safety equipment, fire protection measures, and monitoring instruments ▪ Providing hand railing around all open treatment units, except where sidewalls extend 1.1 meters above ground level. ▪ Properly rating electrical installations and equipment and, where applicable, protecting them for use in flammable atmosphere. ▪ Providing sufficient lighting that should comply with zoning requirements.		

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9.3 SOLID WASTE MANAGEMENT PLAN

Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue. Waste management is all about how solid waste can be changed and used as a valuable resource.

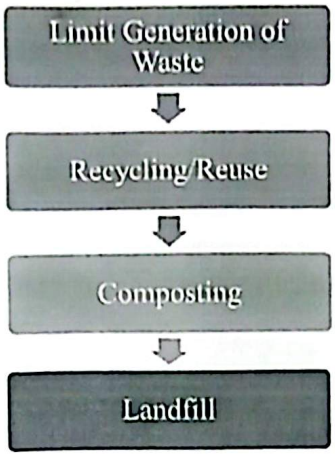


Figure 9-1 Solid Waste Management Hierarchy

9.4 SOLID WASTE MANAGEMENT PLAN FOR CHENAB CITY HOUSING SCHEME, PHASE-II:

Chenab City Housing Scheme, is located at Main G.T road, District Hafizabad. This area is predominantly middle income area with planned settlement.



Figure 9-2 Project Site Location

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9.4.1 Solid Waste Generation:

Estimated solid waste generation will be 25 tons per day @ waste generation rate of 0.65 kg/person/day.

9.4.2 Solid Waste Management Practices

M/S Chenab City Housing Scheme has planned their own arrangements for SWM which are as follows:

9.4.2.1 Block Cleanliness Schedule

Chenab City Housing Scheme consists of different blocks. The areas of the blocks having main roads, commercial markets, public buildings (schools, colleges, mosques) will be swept on daily basis (details given in beat list), and By keeping in mind the characteristics of the remaining area (didn't need sweeping on daily basis), a weekly plan of cleanliness of blocks has been devised and being summarized in the following table.

Table 9-2 Weekly Plan of Cleanliness of Blocks

Sr. no	Attended Area	Frequency of Cleanliness Activity
1.	Market area	Daily
2.	Residential blocks	Daily(different block each day)
3.	Parks	Daily
4.	School area	Daily
5.	Main road	Daily
6.	Public buildings	Daily

- All workers after cleaning there designated beats at 11am will be deployed in blocks as per requirement.
- Solid waste is collected by sanitary workers from streets & households and hauled to container by wheelie bins/ hand carts.
- Waste bags will be distributed to all the blocks on monthly basis.
- Waste bags also used for roads sweeping

9.4.2.2 2nd Shift Arrangement- 2 PM to 10 PM

Table 9-3 Manual Sweeping –Special Group

MANUAL SWEEPING –SPECIAL GROUP	
Shift In-charge	1
Sanitary Workers	9
Driver	1
Note: *For taking care of whole Zone, attending major roads, markets, complaints and to coordinate compactors and ensure containers collection.*	

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9.4.3 Solid Waste Storage

9.4.3.1 Waste Storage Facility

- Around 22 waste storage containers will be placed at 5 different points.
- Storage capacity is 25.6 tons in one time lifting
- Lifting will be done twice a week

9.4.3.2 Door To Door Waste Collection

- 1 Pickup for door to door waste collection
- Waste collected by pickup will be unloaded into nearby Compactor or transfer station
- Compactors will also be collecting waste if found in waste bags on road or in front of home or shop
- Waste segregation:
- All the collected waste will be segregated on the basis of their composition (biodegradable/non-biodegradable) and recyclable/ non-recyclable waste.
- All the recyclable waste will be sold out to the third party for recycling purposes.
- Rest shall be composted or/otherwise will be dumped to the dumping site. The process aims at reducing energy loss, consumption of new material and reduction of landfills

9.4.3.3 Composting:

- Composting is a waste disposal or treatment method which is the controlled aerobic decomposition of organic waste materials by the action of small invertebrates and microorganisms
- Due to lack of adequate space for landfills, biodegradable yard waste will be allowed to decompose in a medium designed for the purpose.
- Only biodegradable waste materials will be used in composting.
- Good quality environmental friendly manure is formed from the compost and will be used for agricultural purposes (parks, green belts etc.)

9.4.3.4 Dumping:

- Simple, cheap, and effective
- A deep trench (3 to 5 m) will be excavated
- Bottom of the landfill will be covered with an impervious liner which is usually made of several layers of thick plastic and sand
- Refuse will be laid in layers
- Layers will be compacted with some mechanical equipment and covered with soil or plastic foam, leveled, and compacted.

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9.5 TRAFFIC MANAGEMENT PLAN

9.5.1 Introduction

The purpose of the plan is to ensure that traffic management to be undertaken in a safe and efficient manner. As such, the management of traffic in terms of this plan will be intended to avoid and minimize traffic risks to (and impacts on) the health and safety of the local community and any personnel on site during the Project, under both routine and non-routine circumstances. The requirements of this Plan shall apply to all construction personnel including any Subcontractor appointed to provide vehicles, machinery or drivers for the Project.

For the proper implementation of traffic management plan (TMP), Contractor will communicate the details of this plan to all personnel on site during the construction phase. The training will be provided to operators and staff personnel. All activities and project works excluding the arrival and departure of loaded vehicles from or site shall be carried between the hours of 6 a.m. to 6 p.m. except in emergency basis or other situation depending on site conditions.

This TMP addresses the following key issues:

- Safety and amenity of road users and the public.
- Site security, site access and signage.
- Project identification, including advertising and site signage.
- Traffic and road and streets user delay and inconvenience management.
- Speed limit signage.
- Procedures and Arrangement to divert traffic (if required).
- Maintenance during Construction.
- Traffic and Safety Management Responsibilities.
- Construction staging including detailing the intersection layout and cap areas for each and every construction stage.
- Impact of construction traffic on local roads.

9.5.2 Objectives and Targets

The objectives and targets include but not limited to the following:

- Keep traffic delays to a minimum.
- Minimize disruption to businesses.
- Maintain satisfactory property access.
- Minimize disturbance to the environment.
- Traffic impacts are within the permitted scope.
- Ensure the safety of Employees, contractors, the general public, pedestrians, cyclists and traffic;
- Design temporary roadways, crossings and detours where necessary.
- Progress against the nominated objectives will be continually assessed during the course of the project.

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9.5.3 Key Traffic Management and Safety Issues

Safety and Amenity for General Roads and Streets Users and Public

Throughout the project, safety will be considered based on the specific nature of the works. The measures to providing public safety include:

- Providing separation between the public and the construction workers. This is a key element to providing safety to road users and the construction team. This will be done through the use of barriers, barricading Tape, making of service roads for contractor's machinery, and availability of flagmen to provide sufficient separation and safety measures to minimize the impact of the works.
- Implementing specific traffic management measures only where absolutely necessary to reduce traffic speed, volumes and alignment to provide safety to both construction crews and the public and instruct the vehicle drivers to use service road and approaching streets.
- Limiting the working hours of works that could pose substantial impact on road users and the public.
- Minimizing disruption during peak traffic periods, public holiday weekends and school holidays by limiting the extent of traffic management undertaken during these times.
- Implementation of visual barriers to reduce potential distraction of road users.
- Community consultation and notification to keep roads and streets users and the public up to date regarding traffic management measures or restrictions.

Safety and Amenity for Pedestrians

While planning construction activities, safety control measures for pedestrians will be developed. For this purpose, number of pedestrians, type of their work activity like office, residential, recreational etc., origin and destination points of the pedestrians, number of vulnerable pedestrians like young persons, elderly, vision impaired, disabled persons and Proximity of pedestrian generation developments, such as schools, shopping centers, railway stations, bus terminals.

To provide a safe environment for pedestrians:

- The contractor will clearly define the boundaries of all work areas, and provide defined walking paths, where require.
- Hazardous areas will be barricaded to restrict physical access.
- Appropriate safety awareness sign boards will be installed.
- Pedestrian's pathways will be free of the trip hazards.

Safety and Amenity for Public Transport

Local roads and streets or property accesses used by public transport will be reviewed to ensure safe alternative or temporary stop locations during the execution of the project. The locations of any alternative or temporary stop locations, including school bus stops, will be confirmed in conjunction with affected transport services and regular users. Accordingly, safety control measures will be developed for the safe movement of the vehicles especially during peak hours.

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Managing Construction Vehicular Movement

The effective management of construction vehicle movements on site and throughout the road and streets network is critical to the success of all projects. Construction vehicle movements will be planned with the aim to minimize the risk to other road and streets users and keep the traffic generated by the project to minimum.

Driver's Responsibilities

It will be required to ensure that drivers Employed on the Project, whether direct Employees or subcontractors, understand a responsibility to drive safely. Moreover, the credibility of drivers will be assessed on the basis of past experience, reviews from previous Employees, license, knowledge and trainings etc.

Hazardous Movements

When planning construction vehicle movements, the following movements are considered hazardous:

- Entering and exiting work sites to and from adjacent travel lanes.
- U-turns movements across travel lanes.
- Reversing maneuvers within the work area and in the adjacent travel lane.
- Traveling through the work area.
- Transit of trucks through school zones when the school zone periods are in effect.
- Right-turn and Left-turn movements at high speed.
- All entry and egress to and from construction sites.
- Over-dimensioned vehicle movements.
- Hazardous goods vehicles using unapproved routes.

The safety control measures to mitigate the risk of these hazardous movements include, but not limited to:

- Installation of deceleration facilities like stud's humps etc.
- Installation of safety awareness and warning sign boards.
- Installation of warning devices on vehicles.
- Training of drivers.
- Restricting the movement of Contractor's vehicles on service roads where possible.
- Regular inspection of vehicles.
- Provision of flagmen to control traffic.

Traffic Control Devices

The devices used to control traffic include but not limited to:

Safety Barriers

Safety barrier will be used especially in areas where traffic is diverted from one route to another. To enhance the visibility of safety barriers, reflecting tapes are used.

Signage

Sign boards also play a very important role in traffic management as they provide road safety information to the road users. Different types of sign boards will be used during

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the execution of the project like Existing information signage, speed limit signage, safety information signage, directional signage for local roads and advance warning signage etc.

Safety Cones

Safety cones will also be placed on site to temporarily redirect traffic in a safe manner. They shall be used for traffic redirection or advance warning of hazards or dangers, or the prevention of traffic.

Studs

A large number of studs will be used throughout the project site to control vehicle speed.

High profile and low-profile studs will be used at places according to their requirement. They shall be used to reduce vehicle speed, segregate lanes, at diversions, at access and egress routes, near schools and public places and near construction sites.

Traffic Triangles

Traffic triangles will be used to alert other drivers to issues ahead of them on the road.

Commonly it is used when a vehicle is parked or is disabled near moving traffic; it alerts other drivers at a safe distance for them to slow down.

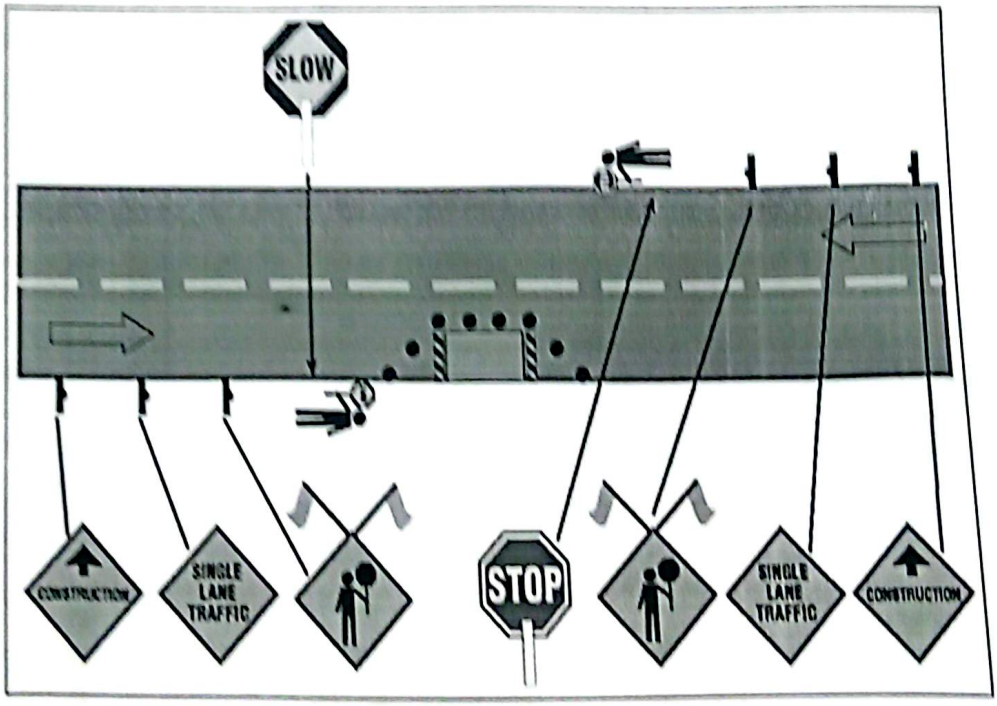


Figure 9-3 Proposed Schematic Diagram for Traffic Diversion

Review and Improvement

Continuous improvement of this plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement:

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The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of traffic management.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non- conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Make comparisons with objectives and targets.

Maintenance

All vehicles and machinery used during the Project shall be regularly maintained and repaired where necessary. In this regard, all construction vehicles used during the Project shall be inspected by an appropriately qualified mechanic at regular intervals following the commencement of the Project. The Project Managers shall ensure that regular inspections are undertaken of construction vehicles to ensure that they are in good working order and are not overloaded. Gravel roads shall be sprayed with water to limit the generation of dust (where economically viable and environmentally acceptable).

Any potential road hazard or vehicle defect which may render a vehicle or road unsafe for use shall be immediately reported to the Project Managers who shall ensure that the vehicle/road is not used until the necessary repairs have been undertaken.

It will responsibility of contractor to maintain the road and any part of damaged road will be rehabilitated by the contractor.

Transport of Equipment and Materials

It will the responsibility of the Contractor to ensure that all equipment and/or materials transported to or from Site shall be appropriately secured to, or contained in, vehicles. No construction vehicles shall be loaded in excess of its manufacturer-specified weight bearing capacity. All vehicles used during the Project shall have the appropriate load-bearing capacity for the materials and/or equipment intended to be transported. Drivers shall be appropriately trained in driving techniques applicable to specific loads where necessary.

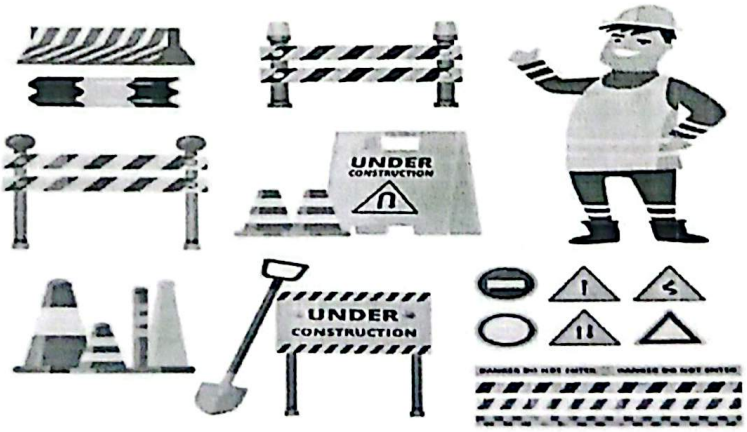


Figure 9-4 Proposed Signs or Traffic Diversion Equipment

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9.6 EMERGENCY RESPONSE PLAN & EVACUATION/EXIT PLAN

9.6.1 The objective of the Emergency Response Plan

Emergency preparedness helps to minimize the human suffering and economic losses that can result from emergencies. It should be understood that the size and density of projects, as well as their access and location, have a bearing on the degree of planning necessary for emergencies. It is therefore strongly recommended that the constructor ensure that a member of staff on-site assists in developing the emergency response plan.

9.6.2 Scope of Emergency Response Plan

This plan assesses risk, assign role and responsibilities and give the major steps to be followed in any emergency. It increases the understanding of workers and officials in handling different emergencies which may occur in the project area.

9.6.3 Emergency Situations

Following emergencies may occur at workplaces:

- Fire
- Gas leaks
- Explosions
- Injury from machinery and equipment
- Fall, climbing accident
- Emergency as a result of environmental conditions (e.g., heat, cold, wet, snow, wind, lightning, bushfires, floods) emergencies requiring evacuation
  - Internal emergencies such as loss of power or water supply and structural collapse
- Serious injury events or medical emergencies
- Bomb threats
- Civil disorder or criminal acts such as robberies and shootings

9.6.4 General Evacuation Procedure

It is not always necessary to evacuate a unit/plant during an emergency. A power outage, for instance, does not necessarily call for the evacuation of a unit. The overall safety of the unit must first be evaluated: lighting, hazardous materials, ventilation systems, and other hazardous operations. If the unit can be safely occupied, evacuation is not necessary. In the case of evacuation, the workers in the affected zone receive instructions from their supervisor or designated person. As per instruction the workers will immediately leave their places of duty and assemble at the assembly point.

- The area supervisor should roll call the employees to ensure all are out of the danger zone.
- On receiving the first information of an emergency the administrative head should contact the Security Officer to ensure that the alarm system is activated or not.

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- After assessing the emergency Security Officer or designated person instructs through telephone to initiate the emergency response procedure and call the responsible person at the site.
- The administrative Head may also call external help like the fire brigade, police, bomb disposal squad, ambulance, etc., and communicate with them.
- Security Officer after consulting the Administrative Head may order the evacuation of workers from the affected area.
  If evacuation is ordered, follow these procedures:

- Stay calm, do not rush, and do not panic.
- Safely stop your work.
- Gather your personal belongings if it is safe to do so.
- If safe, close your door and window but do not lock them.
- Use the nearest safe stairs and proceed to the nearest exit. Do not use the elevator.
- Wait for any instructions from emergency responders.
  Do not re-enter the building or work area until you have been instructed to do so by the emergency responder

9.7 HEALTH AND SAFETY PLAN

9.7.1 Introduction

This Health and Safety Plan (HASP) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the environmental services being conducted at the site. HASP Supplements will be generated as necessary to address any additional activities or changes in site conditions which may occur during field operations.

9.7.2 Health & Safety Rules of the Site

All site personnel shall adhere to General Safety Rules, during site operations. In addition, the housekeeping and personal hygiene requirements will also be observed.

(i) **Safety Training Program :** A Safety Training Program is required and shall consist of:

- **Initial Safety Induction Course:** All workmen shall be required to attend a safety induction course within their first week on Site.

(ii) **Periodic Safety Training Courses:** Period safety course shall be conducted not less than once every six months. All Subcontractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works. Training courses for all workmen on the Site and at all levels of supervision and management.

(iii) **Safety Meetings:** Regular safety meetings will be conducted on a monthly basis and shall require attendance by the safety representatives of Sub/contractors unless otherwise agreed.

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(iv) **Safety Inspections :** The Contractor shall regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs shall be kept clear of obstructions and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, shall be repaired or replaced immediately.

(v) **Safety Equipment and Clothing:** Safety equipment and protective clothing are required to be available on the Site at all material times and measures for the effective enforcement of proper utilization and necessary replacement of such equipment and clothing, and all construction plant and equipment used on or around the Site shall be fitted with appropriate safety devices. These shall include but not be limited to :

- Effective safety catches for crane hooks and other lifting devices, and
- Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists

9.8 DUST MANAGEMENT PLAN

9.8.1 General

The purpose of this plan is to describe the measures that the project shall take to ensure that the risk of emissions from dust generated by site operations during construction are minimized and that best practice measures are implemented.

Dust emissions from construction can cause ill health effects to Contractor staff along with nuisance and annoyance to members of the local community. Dust will be controlled through:

- Elimination
- Reduction/Minimization
- Control

9.8.2 Methodology

The following methodology will be undertaken for each project section:

9.8.2.1 Identify the Dust Generating Activities

Construction activities that are likely to produce dust will be identified. The activities that will be taken into account are:

- Haulage Routes, Vehicles and Concrete Batching Plant
- Roads, surfaces and public highways
- Static and mobile combustion plant emissions
- Tarmac laying, bitumen surfacing and coating
- Materials Handling, Storage, Spillage and Disposal
- Storage of material
- Stockpiles
- Spillages
- Storage of Waste

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- Site Preparation and Restoration after Completion
- Earthworks, excavation and digging
- Storage of spoil and topsoil
- Demolition
- Construction and Fabrication Processes

9.8.2.2 Identify Sensitive Receptors

Sensitive receptors have already been identified. The nature and location of the sensitive receptors will be taken into account when implementing control measures.

9.8.2.3 Implement Best Practice Measures to Control

Based on the nature of the activity producing the dust, the likelihood of dust being produced and the possible consequence of dust based on the sensitive receptors, the most effective control measure will be identified and implemented.

9.8.2.4 Monitor effectiveness of control

Supervision consultant will have the responsibility to ensure that dust control measures are being implemented and are effective.

9.8.2.5 Record and report result of monitoring

All inspections, audits and results of monitoring will be recorded and kept as part of the site filing system.

9.8.2.6 Optimum site layout

- Dust generating activities to be conducted away from sensitive receptors
- Supply of water for damping down.
- Good housekeeping and management
- All employees will be briefed on the Risk Assessment and Method Statement before starting work.

9.8.3 Training

All Contractor staff will be required to attend training seminars as already mentioned in the EMP document.

A site-specific induction will also be required before being allowed to work on site. These will include site-specific sensitive receptors and details regarding dust control measures to be taken.

Toolbox talks on air pollution and minimizing dust emissions will be provided on a regular basis to contractor staff.

Table 9-4 Identification of Dust Generating Sources and Control Methods

Haulage Routes, Vehicles and Concrete Batching Plant	
Dust Source	**Dust Control Methods**
Major haul roads and traffic routes	Haul roads will be dampened down via a mobile bowser, as required.

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Public Roads	Road sweeper will be used to clean public roads as required.
Site traffic management	Site traffic will be restricted to constructed access roads as far as possible. Site speed limit will be set at 10 mph as this will minimize the production of dust.
Road Cleaning	A mechanical road sweeper will be readily available and used.
Handling, Storage, Stockpiling and Spillage of Dusty materials	
Material handling operations	The number of times a material will have to be handled will be kept to a minimum to prevent double handling and ensure dusty materials are not handled unnecessarily.
Transport of fine dusty materials and aggregates.	Closed tankers will be used or sheeted vehicles.
Vehicle loading/unloading materials on to vehicles and conveyors.	Dusty materials will be dampened down Drop heights will be kept to a minimum and enclosed where possible.
Storage of Materials	
Bulk cement, bentonite etc.	Bentonite will be delivered in tankers and stored in dedicated enclosed areas. Bulk cement will be transported through tractor trollies or trailers.
Fine dry materials	These will be protected from the weather and by storing in appropriate containers and indoors, where necessary.
Storage location	Material will be stored in dedicated lay-down areas.
Storage of Stockpiles	
Stockpile location	Stockpiles will be placed so as to minimize double handling and facilitate the site restoration.
Building stockpiles	Stockpiles, tips and mounds will not be stored at an angle greater than an angle of repose of the material.
Small and temporary stockpiles	Where possible, stockpiles will be placed under sheeting. Dusty material will be damped down. Wind barriers (protective fences) of a similar height to the stockpile will be erected, if required.

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Large and long term stockpiles	Long-term stockpiles will be vegetated and stabilized as soon as possible. Stock piles will be dampened down until stabilized, where necessary. Wind barriers (protective fences) of a similar height to the stockpile will be erected, if required.
Waste Material from Construction	
Disposal method	A dedicated lay-down area will be available for waste. Waste will not be allowed to build up and will be disposed of at the designated locations as per EMP.
Site Preparation and Restoration	
Earthworks, excavation and digging	These activity areas will be kept damp where required and if possible, will be avoided during dry and windy periods.
Completed earthworks	Surfaces will be stabilized by re-vegetation as soon as possible, where applicable.
Construction and Fabrication Process	
Crushing of material for reuse, transportation and disposal	Authorization will be obtained from supervision consultant before using any mobile plant on site for activities such as crushing and screening. Any crushing or screening activities will be located away from sensitive receptors.
Cutting, grinding, drilling, sawing, trimming, planning, sanding	These activities will be avoided wherever possible. Equipment and techniques that minimize dust will be implemented. Water will be used to minimize dust.
Cutting roadways, pavements, blocks	Water sprinkling to be used.
Angle grinders and disk cutters	Best practice measures will be used such as dust extraction.

9.9 LANDSCAPE MANAGEMENT AND MAINTENANCE PLAN

The Landscape Management and Maintenance Plan is part of a standard requirement for the planning application process and relate to the management proposals for open space / external landscape areas.

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The Management Plan sets out the management aims and objectives for the site along with the specific management objectives for each landscape component, and the associated maintenance works required on an Annual and Occasional basis. Annual Works are those works that will be required every year, such as watering, weeding and cleaning. Occasional Works are those that will be required on an irregular or cyclical basis, such as repairs and renewals.

Table 9-5 Landscape Works and Types Summary

LANDSCAPE WORKS AND TYPES SUMMARY	
Summary description of external landscape treatments, areas and components	**Soft Landscape Areas include the following elements:** • Amenity Grass • Green Belts • Groundcover and shrub planting; • Tree planting; • Buffer Planting; • Parks
	Hard Landscape Areas include the following elements: • Footpaths; • Walls and copings; • Fencing and boundary provision; • Lighting; • Play areas, sports fitness equipment and areas;

9.9.1 Ground Preparation

Prior to cultivation, planted areas shall be cleared of all loose debris, rubbish, stones over 25mm in diameter, roots, and other extraneous matter. Grass and weeds shall be sprayed with approved herbicide.

Topsoil Depths: spread over prepared subsoil in layers not exceeding 150 mm, each layer firmed before spreading the next. Top soils shall comply with multipurpose grade within BS 3882:2015: Specification for Top Soil. Overall minimum depths after firming and settlement to be: -

- Shrub / Hedgerow areas 500 mm
- Lawn and Grass areas 150mm

Planted areas to be cultivated to a depth of 300mm by hand or rotovator, incorporating planting compost, soil improver and fertilizer base dressing of the types. The topsoil shall have been reduced to a fine tilth on completion of the cultivation works.

9.9.2 Timetable for Landscape Works

The landscape works shall be undertaken by the end of the next available planting season and during the following periods:

- Deciduous trees and shrubs: Late October to late March;
- Conifers and evergreens: September/ October or April/ May; and

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- Container grown plants: At any time if ground and weather conditions are favorable.

9.9.3 Proposed Standard Tree Planting

Planation plan has been devised for the enhancement of the aesthetic beauty of the society ensuring horticulture work in the green belts, parks and open spaces as per the approved plan.

Trees and shrubs play a major role in improving the urban landscape and helping protect the city environment. Trees and shrubs meet different needs for food, shelter, energy and aesthetics in the city. Urban woodlands and forest areas beyond the city offer respite if only for a while, from the pressure of daily life. The skillful choice of trees and shrubs together with manipulation and design of space in urban development and land management for people or wildlife leads to the creation of a stimulus environment.\

Trees growing in their natural environment survive without our help but trees grown near buildings or roads need a skillful selection of species and good care to make them worth and safe for life and property. The following are the green sites in the project area.

- Greenbelts
- Median Strips
- Parks/Playfields
- Nullahs/Drains –

Tree pits shall be excavated to suitable dimensions to accommodate roots or root-balls or baskets with bases and sides broken up to a minimum depth of 150mm to assist drainage and root penetration. Any unsuitable material such as large clay lumps, bricks, concrete, timber and sand shall be removed off-site. All tree pits shall be backfilled, after planting, with a 3:1 volume mixture of topsoil and mulching compost/manure or similar approved.



Figure 9-5 General Layout for Green Belts

9.9.4 Establishment Maintenance Operations – Planting operations

- **Weed Control:** All planted areas shall be kept entirely weed free throughout the establishment maintenance period, using approved residual and translocated herbicides, or mechanical means, or a combination of both.

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- **Wind Firming:** All plants shall be inspected at monthly intervals for wind firmness, and re-firmed, as necessary.
- **Stakes & Tree Ties Checking:** Stakes shall be checked monthly for firmness, and re-firmed as necessary, and all tree and plant ties inspected and loosened as required.
- **Pruning:** Shall be carried out on a monthly basis and will include the removal of minor dead wood or damaged wood. Formative pruning shall be undertaken at the appropriate time of the year for the species involved in order to enhance the plants best feature e.g., flowering, stem color etc.
- **Inorganic Fertilizer:** All shrub-planting areas shall receive a fertilizer top dressing
- **Watering:** All plants shall be watered as required during the establishment maintenance period to ensure survival of all plant material.

9.10 MONITORING ARRANGEMENTS

Monitoring will be conducted at sensitive receptor locations in the project area as provided in the EMP. Furthermore, at locations where PM levels are exceeding applicable guidelines, additional stringent measures will be implemented at the respective location(s) in the project area to ensure dust levels are controlled as far as possible

9.11 ENVIRONMENTAL BUDGET

The total cost for environmental management is estimated as 05 Million Pak Rupees. Details are given in Table 9.6

Table 9-6 Environmental Budget

Environmental Component	Quantity	Amount in Million PKR
(i) Tree Plantation	1800	2
(ii) Health and Safety Measures and Provision of PPEs	L.S.	1
(iii) Air and Water Quality & Noise Monitoring	L.S.	1.5
(iv) Environmental Training	L.S	0.5
Total Environmental Management and Monitoring Cost		**5 Million PKR**

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9.12 ENVIRONMENTAL MANAGEMENT TEAM ALONG WITH THEIR ROLES AND RESPONSIBILITIES

Project Proponent will be responsible for the project activities. Based on the need proponent will hire the personnel for environmental management at the site during the construction and operational phase of the project.

Table 9-7 Roles and Responsibilities in EMP Implementation

Role	Environmental Responsibilities
Owner Representative (OR)	▪ Responsible to enforce EMP implementation to contractors
HSE Manager	▪ Implement, review and update the EMP. ▪ Ensure all reporting and monitoring required under EMP is undertaken, documented and distributed as needed ▪ Conduct environmental site training (tool box talks) and inductions with the support of an environmental consultant. ▪ Conducts environmental audit at work site with the support of environmental consultant. ▪ Close out all non-conformances. ▪ Ensure materials being used on site are environmental friendly and safe
The Environmental Authority	▪ Approve the EMP and any amendments to the EMP. ▪ Approve reports of environmental issues and non-conformances as issued. ▪ Review and approve environmental reports submitted as part of EMP implementation
Environmental consultant	▪ Conduct and monitor actions required by the EMP if required ▪ Conduct environmental site training (tool box talks) and inductions if assistance is required ▪ Conducts environmental audit at work site ▪ Ensure materials being used on site are environmental friendly and safe.
Site Engineers	▪ Control and monitor actions required by the EMP. ▪ Report all environmental issues to HSE Manager. ▪ Ensure documented procedures are followed and records kept on site.

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	▪ Ensure any complaints are passed onto the management within 24 hours of receiving the complaint.
Workers	▪ Follow requirements as directed by site engineers. ▪ Report any potential environmental issues to site engineer/project manager, indicating spilt oil, excess waste, excessive dust generation, dirty water running off the site and other possible non-conformances

9.13 ENVIRONMENTAL MANAGEMENT TEAM

The proponent has assigned the task of preparing the EIA report to M/S Integrated Environment Consultants, Lahore. The EIA study of the proposed project has been conducted according to Environmental Assessment Procedures, 1997(amended 2012), Review of IEE and EIA Regulation 2022 as prescribed by the Punjab Environmental Protection Agency (EPA), Government of Pakistan. The study team of M/S Integrated Environment Consultants which completed the EIA report consists of the following experts as mentioned in the Table below

Table 9-8 Members Completed EIA Process

Name	Qualification	Status In Project
Mr. Ahtasham Raza	M.Phil, Ph.D. Scholar, (Environmental Sciences)	Team In-charge
Mr. Adnan Sharif	Postgraduate (Environmental Law)	Project Manager
Mr. Mehmood Amjad	B.S (Environmental Sciences)	Monitoring In-charge
Dr. Gulnaz Malik	Ph.D. (Environmental Science)	Team Member
Ms. Iram Naz	M.Sc. Water Resource Management	Team Member

* Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA studies

9.14 ENVIRONMENTAL MONITORING PROGRAM

It will be in the fitness of the things to operate this project under the Environmental Management Plan (EMP). The EMP will ensure that even all type of pollutants from the project is within the prescribed limiting values of the PEQS. Thus, the environment and human health around the project will be safeguarded. Regular monitoring of all the significant environmental issues is essential to check the compliance status of EMP.

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The main objective of the monitoring will be;

- To verify the results of the environmental study concerning the proposed project.
- To estimate the trends of concentrated values of the issues, which have been identified as critical, and then plan the mitigating measures.
- To assess the efficiency of pollution control mechanisms.
- To ensure that any additional parameters, other than those identified in the EIA report, do not turn critical after the commissioning of the proposed project.

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Table 9-9 Environmental Monitoring Program

Sr. No	Monitoring Parameter	Monitoring Location	Parameters	Frequency	Responsible Authority
CONSTRUCTION STAGE					
1)	**Noise**	Construction Vehicle/ Machinery/ generators/Welding work	Using noise level meter (minimum dB and maximum dB)	Monthly Basis	Contractor, Approved Monitoring Agency
2)	**Ambient Air Monitoring**	Construction site, camp site, batching plant, Material storage & active sites	PM_{10}, SO_x as SO_2, NO_x as NO_2, CO	Monthly Basis	Contractor, Approved Monitoring Agency
3)	**Dust Emissions**	Construction site and camp site	Visual inspection during construction activities, Transportation of materials	Monthly Basis	Contractor, Approved Monitoring Agency
4)	**Water Quality**	Ground Water/ Waste Water	Sampling and laboratory testing will be done as per the PEQS parameters. While the priority parameters are pH, TDS, TSS, COD, BOD_5, etc, for waste water	Monthly Basis	Contractor, Approved Monitoring Agency

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Sr. No	Monitoring Parameter	Monitoring Location	Parameters	Frequency	Responsible Authority
			Coliform, E-coli pH, TDS, TSS, etc, for Drinking water		
5)	**Solid Waste**	Worker Camp/ Construction Site	Collection of solid waste shall be checked regularly by the contractor during construction phase.	Monthly Basis	Contractor, Approved Monitoring Agency
6)	**Traffic Safety**	Construction site and camp site	Visual inspections	Monthly	Contractor, Approved Monitoring Agency
OPERATION STAGE					
1)	**Air quality**	Around Disposal station , Residential units	PM_{10} SO_x as SO_2, NOx as NO_2, CO	Monthly Basis	Approved Monitoring Agency
2)	**Noise level**	Around sensitive receptors	Using noise level meter (minimum dB and maximum dB)	Monthly Basis	Approved Monitoring Agency
3)	**Security**	Housing Scheme Area	Security arrangement will be made by the project proponent.	Daily Basis	Proponent, Approved Monitoring Agency

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Sr. No	Monitoring Parameter	Monitoring Location	Parameters	Frequency	Responsible Authority
4)	**HSE Plan**	Housing Scheme Area	Health, Safety and Environmental will be monitored on daily basis.	Monthly Basis	Proponent, Approved Monitoring Agency
5)	**Water Quality**	Ground Water/ Waste Water	Sampling and laboratory testing will be done as per the PEQS parameters. While the priority parameters are pH, TDS, TSS, COD, BOD_5, etc, for waste water Coliform, E-coli pH, TDS, TSS, etc., for Drinking water	Monthly Basis	Proponent, Approved Monitoring Agency
6)	**Solid Waste**	Housing Units/Parks etc.	Collection of solid waste shall be monitored and a specific site shall be defined for the waste storage and disposal	Daily Basis	Proponent, Approved Monitoring Agency

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9.15 PROPOSED EMP REPORTING AND REVIEWING PROCEDURES

This section will specify institutional responsibilities for contractors, borrowers, local authorities, and EPA, with the roles that prepare, submit, receive, review, and approve the reports. An implementation schedule detailing the timing, frequency, and duration of mitigation measures, monitoring, and reporting of the progress will be prepared, showing phasing and coordination with procedures in the project operations manual and loan agreement. Recipients of such reports will include those with responsibility for ensuring the timely implementation of mitigation measures and for undertaking remedial actions. In addition, the structure, content, and timing of reporting will be specified to facilitate supervision, review, and approval (if necessary) by EPA.

The implementation of the EMP will be the prime responsibility of the project proponents who designate responsibilities and obligations to their selected contractors and staff. Monitoring, documentation, and reporting the compliance components of the EMP will be the responsibility of the proponent.

9.16 ANY TRAINING NEEDS

To effectively operate the EMP all the staff to be engaged in this activity will be trained extensively.

The person to monitor gaseous emissions, PM, and noise levels will be extensively trained to handle his job capably. The training program should include the use of monitoring instruments, data generation, processing, interpretation, recording, and presentation. Training of the workers should be done quarterly.

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10 STAKEHOLDER CONSULTATION

The following chapter includes detailed information on the process and parties that depicts the involvement and consultation of the important stakeholders that are conducted by the Integrated Environment Consultations. The consultation is carried out to resolve any kind of issues that are involved and can be potentially affected by the proposed project. The activity plays an important role in decision-making and keeps in view the concerns of stakeholders. The parties that are involved in the process are as follows:

- Local government
- Local community
- Affected community (directly and indirectly)
- General public
- Service providers
- Proponents

10.1 PROPONENT ENVIRONMENT MANAGEMENT TEAM

Chenab City Housing management will hire staff for the operation phase of the project. While Environment Management Team includes the following members for the smooth operation of the project.

- Project Manager
- Site Supervisor
- Emergency Respondent

The above members will be hired after the completion of construction activities.

10.2 THE RESPONSIBLE AUTHORITY

The Area Manager of the project will be the responsible authority to take all measures before starting the project and during operation.

10.3 OTHER DEPARTMENTS AND AGENCIES

For the impact analysis detailed with the management, local community, educational institutes, health institutes, hospitals, and NGOs have been shared. All details were discussed related to the implementation of the project. Scoping sessions, focused group discussions, and wayside consultations were held with the relevant stakeholders in the area.

10.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

A team of Integrated Environment Consultants visited the project site, had a discussion with stakeholders, and consulted with the local people of nearby and other villages to evaluate the project's socio-economic impacts. People of the area belong to different professions mostly belong to employment, own businesses, some abroad, teaching, agriculture, etc. women were also consulted for their point of view regarding the betterment of the area through this project, some of them communicated but according to the social value of the area, they mostly hesitate to communicate comfortably and

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get pictured. People provide a massive information about the project and have positive remarks regarding the project development.

10.5 AFFECTED AND WIDER COMMUNITY

There is no affected community present in the area of the proposed project. The consultant's team has consulted with the inhabitants of neighboring areas. The remarks of people are positive regarding the project and people foresee positive impacts like employment opportunities, business, development of the area, etc.

10.6 PUBLIC CONSULTATION

The consultation was done at or near the proposed project site. During the fieldwork public consultation were carried out by the team members of the Integrated Environment Consultant (IEC) to brief the people of nearby areas about the Project. The participants included residents, workers, students, and others concerned. The majority of people are having positive comments/concerns regarding the Project.

Table 10-1 List of individuals Consulted along with their written feedback

Sr. No	Individuals Names	Address	Date	Feedback
1	Tanveer Ahmed	Cashier/ Pindi Bhattian Interchange, Wazirabad Rd	05-05-2023	This is good step taken by the company it will have some fruitful outcomes
2	M Abrar	Worker/ Pindi Bhattian Interchange, Wazirabad Rd	05-05-2023	This is good step taken by the company it will have some fruitful outcomes
3	Hafiz Mehrban	Worker/ Pindi Bhattian Interchange, Wazirabad Rd	05-05-2023	May this project will not affect the natural resources
4	M. Shahbaz	Worker/ Pindi Bhattian Interchange, Wazirabad Rd	05-05-2023	Better initiative to provide facilities to the community.
5	Munawar Ali	Wazirabad Rd , Pindi Bhattian	05-05-2023	Good step towards the sustainable development of the society
6	Israr Ahmed	Gondal Market, Pindi Bhattian	05-05-2023	Hopeful this project proved to have positive impact

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Sr. No	Individuals Names	Address	Date	Feedback
7	Farooq Zulfiqar	Gondal Market, Pindi Bhattian	05-05-2023	This project will create jobs for the local
8	Abdul Rehman	Gondal Market, Pindi Bhattian	05-05-2023	This is the good step taken by company it will have some fruitful out comes
9	Malik Riaz	Gondal Market, Pindi Bhattian	05-05-2023	Help most of the local residence to get jobs
10	Sarfaraz Khan	Gondal Market, Pindi Bhattian	05-05-2023	Good Initiative towards the development of the country
11	Mati-ul-Hassan	Gondal Market, Pindi Bhattian	05-05-2023	This will provide job placement to poor
12	M. Akeel	Gondal Market, Pindi Bhattian	05-05-2023	This is good step taken by the company it will have some fruitful outcomes
13	Altaf Hussain	Gondal Market, Pindi Bhattian	05-05-2023	This is good step taken by the company it will have some fruitful outcomes
14	Anwar Maqsood	Gondal Market, Pindi Bhattian	05-05-2023	This is good step taken by the company it will have some fruitful outcomes
15	Haziq Ali Shahbaz	Gondal Market, Pindi Bhattian	05-05-2023	This project will play role in development of the area. .

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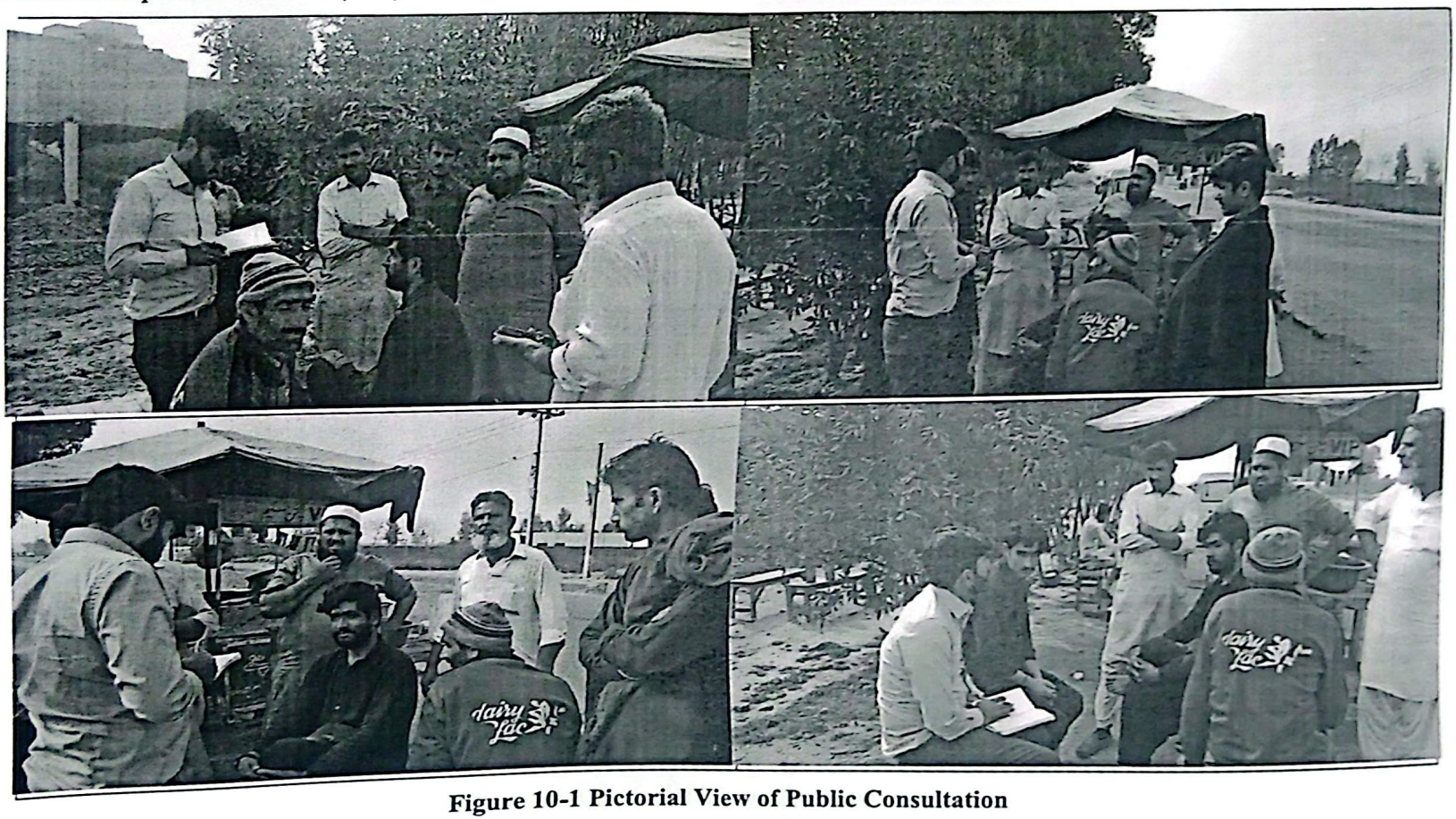


Figure 10-1 Pictorial View of Public Consultation

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11 CONCLUSION AND RECOMMENDATIONS

11.1 CONCLUSIONS

Based on the overall impact assessment, more specifically, the nature and magnitude of the residual environmental impacts identified during the present EIA, it is concluded Environmental Impact Assessment of Chenab City Housing Scheme can mitigate potential negative issues provided that the project activities are carried out as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented. There are no remaining issues that warrant further investigation. This EIA is considered adequate for the environmental and social justification of the project.

Also, Quarterly monitoring of all-out environmental pollution sources by a third party would be required who will also certify that the project is running in accordance with legal requirements.

11.2 RECOMMENDATIONS

It is thus recommended that the proposed project proponent be allowed to go ahead provided the outlined mitigation measures are implemented as outlined in the EMP. The EMP should be shared with the Contractor and the Management Committee

The duty bearers will also be required to employ a qualified Environmental and Social Safeguards specialist as well as Safety and Health officer to oversee implementation of the EMP.

On approval, it is recommended that the proponent should implement the proposed project based on the proposed plans and if alterations are necessary, advice should be sought from the project manager; share the EMP with the Contractor and other responsible stakeholders.

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ANNEXURES

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GLOSSARY

Air Quality	Measurement of the pollutants in the air; a description of the healthiness and safety of the atmosphere.
Area	The area is the quantity that expresses the extent of a two-dimensional figure or shape, or planar lamina, in the plane.
Consultation	Consultation refers to the two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates **Contaminate**	Each group of numbers is used to indicate the position of a point, line, or plane to make impure, pollute
Environmental Management	Attempt to control human impact on and interaction with the environment to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Geology	A science that studies rocks, layers of soil, etc., to learn about the history of the Earth and its life
Ground Water	Aquifers are currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers, or carriers during transportation
Impact	Effect on someone or something
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Occupational Health	Maintenance of the highest degree of physical, mental, and social well-being of workers in all occupations by preventing departures from health, controlling risks, and adaptation of work to people, and people to their jobs

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Project Area	The area specified by the funding and/or implementing agency according to the Official Gazette Notification and includes the areas within the administrative limits of the Federal or Provincial Government.
Proponent	A person who advocates a theory, proposal, or course of action.
Recycling	The action or process of converting waste into reusable material.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.
Resettlement	This means all measures taken to mitigate all adverse impacts, resulting due to execution of a project on the livelihood of the project-affected persons, and their property, and includes compensation, relocation, and rehabilitation.
Social Environment	It includes the culture that the individual was educated or lives in and the people and institutions with whom they interact.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOs, host communities, and EPA.
Topography	Details of the surface features of the land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

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REFERENCES

Listed below are some of the documents, reports and other references consulted during the preparation of this report:

- Information and data provided by project proponents;
- Project Pre-feasibility Study Report;
- Technical Design Data related to the project.
- Information gathered through discussions with the project related persons of the project proponent;
- Information collected from the Technical documents of various suppliers of machinery/equipment.
- Punjab Environment Quality Standards for Ambient
- Punjab Environment Quality Standards Noise Levels
- Punjab Environment Quality Standards for Drinking Water
- Pakistan Environmental Protection Act, 1997;
- The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:
    - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
    - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
    - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.
    - Environment-related Laws in Pakistan and the Province of Punjab;
    - Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review, and Approval of Environmental Assessment, 2022;
    - Guidelines for Public Consultations –
    - These guidelines cover:
    - Consultation, involvement, and participation of Stakeholders
    - Techniques for public consultation (Principles, levels of involvements, tools, building trust)
    - Effective public consultation (planning, stages of EIA where consultation is appropriate)
    - Workplace safety and health act 2011
    - Land Acquisition Act (LAA) of 1894
    - Pakistan Penal Code, 1860

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TERM OF REFERENCES

- The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection (Amendment) Act 2012.
- The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincials laws & regulations including but not limited to:
  - Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as wastewater and sludge etc in accordance with Punjab Environmental Quality Standards (PEQS).
  - Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.
  - The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab.

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