

Lahore Development Authority (LDA)

"Construction of Underpass at
Samanabad Morr, Multan Road, Lahore"

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

March-2022

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QUALITY CONTROL SHEET



DOCUMENT	Environmental Impact Assessment (EIA)			
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NOTES				

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LIST OF ABBREVIATIONS

ASTM	American Standard Test Method
CC	Construction Contractor
GIS	Global Information System
Km / KM	Kilometer
M	Meter
MGD	Million Gallons per Day
MGL	Million Liters per Day
PEQS	Punjab Environmental Quality Standards
PAP's	Project Affected Persons
PEPA	Pakistan Environmental Protection Agency
PEPC	Pakistan Environmental Protection Council
PMD	Pakistan Meteorological Department
SOP	Survey of Pakistan
TOR	Terms of Reference
WHO	World Health Organization
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
MMM	Mitigation Management Matrix
SC	Supervisory Consultants
NOC	No Objection Certificate

EXECUTIVE SUMMARY

S.1.1 Title and Location of the Project

The proposed Project consists of the construction of underpass at Samanabad Mor, Multan Road, Lahore with coordinates 31°32'39.00"N, 74° 17'41.43"E.

S.1.2 Identification of Project and Proponent

The proposed project consists of the design and construction of underpass at Samanabad Mor, Multan Road, Lahore with project and proponent detail is given as under-:

1. Name of proponent	Mazhar Hussain Asif (Chief Engineer) Lahore Development Authority (LDA) Office of the Chief Engineer, Khayaban-e-Firdousi 467 D-II, Johar Town Lahore 042-992622
2. Name of project	Construction of underpass at Samanabad Mor, Multan Road, Lahore
3. Location/ Address of the site	Samanabad Mor, Multan Road, Lahore
4. Road Structure Details	Number of Lane = 2 (Either Side) Lane Width = 3.0m Shoulder = 0.3m (Each side) Barrel Width = 13.2m Vertical Clearance = 5.1m
6. Nature/ Feature of the project	Construction of Underpass
7. Type of Land use Major process during construction	Transport Excavations, Concrete, asphalt, course, Mixing, Elevation, Finishing
8. Estimated cost of project	Rs. 1515.89 million
9. Project start	Right after getting NOC from environmental protection department
10. Project completion duration	06 months

S.1.3 Details of Consultants

ASIAN Consulting Engineers Private Limited (AsCE) is providing their services to conduct environmental assessment for the project. ASIAN Consulting Engineers Private Limited is an independent consulting company working in the field of environment. Asian provides consulting services and sustainable solutions for infrastructure projects, industrial projects and social development projects.

The team of experts are given as under-:

Sr. No.	Team Member	Position Held	Qualifications
1	Aleem Butt	Chief Environmentalist Team Leader- EIA	M.Phil. Environmental Sciences, Government College University (GCU)Lahore M.Sc. Environmental Sciences, Punjab University (PU), Lahore NEBOSH, Lead Auditor
2	Noman Ashraf	Environmental Specialist	M.Phil. Environmental Sciences, Government College University (GCU)Lahore
3	Dilbar Hussain	Chief chemist	M.sc Chemistry university of the Punjab
4	Jahanzaib Malik	Deputy manager	M. Phil. Environmental Sciences University of Agriculture, Faisalabad
5	Abida Hussain	Environmental Engineer	BS Environmental Engineering University of Engineering and Technology (UET) Lahore
6	Huda Rizwan	Environmentalist	BS Environmental Sciences The University of Lahore
7	Maryam	Environmental Engineer	BS Environmental Engineering University of Engineering and Technology (UET) Lahore
8	Asma Butt	Sociologist	M.sc Sociology, University of the Punjab

The contact details for the company are given as under-:

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Address: C-3, Jhelum Block, Green Forts-II, Lahore, Pakistan.

S.1.4 Project Description

The proposed underpass at Samanabad Morrwill be important link between Samananad Main Boulevard and Main Boulevard Gulshan e Ravi. The hospitals, housing schemes, parks, and institutes along the road will be benefitted through this underpass.

Project design is based on national design standards, suitable for the construction of roads and underpass. Moreover, the design will be compatible with the site conditions. The drainage system of project has been designed considering the storm water flows from the underpass. There will be a define alternative path for the diversion of traffic flow.

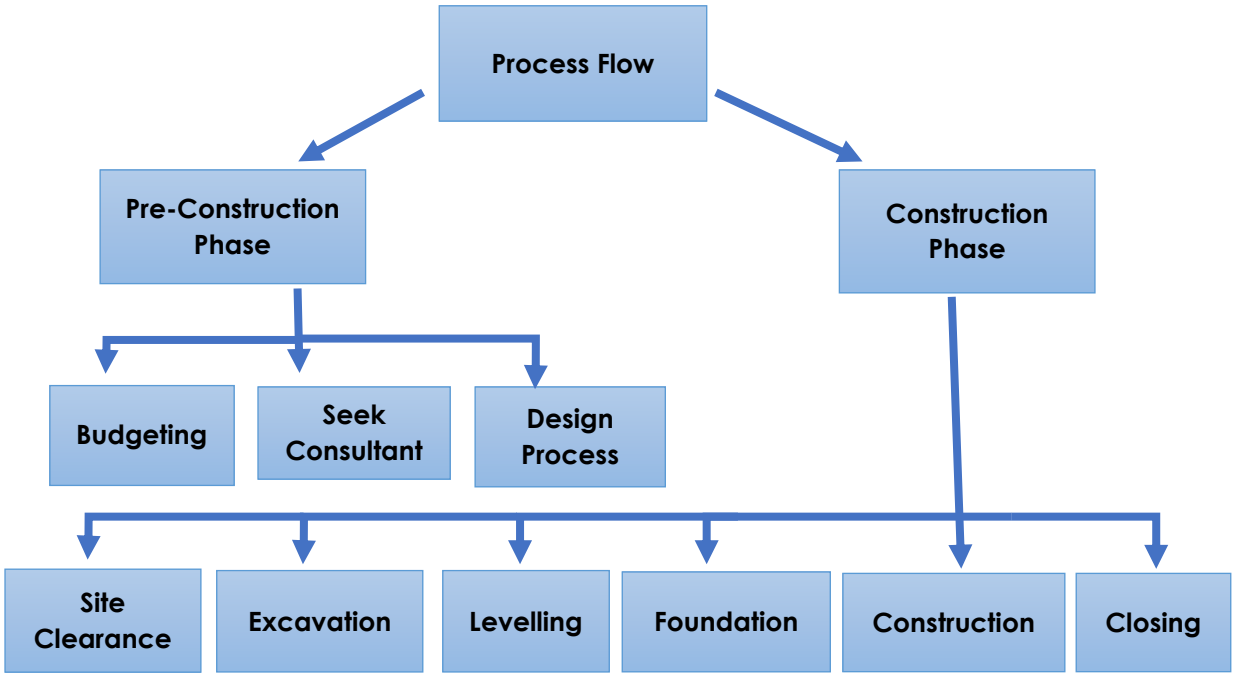
Around 100- 120 skilled, semi-skilled and unskilled workforce will be required for its construction with various types of machinery that include bulldozers,

shovels, dumpers, batching plant, tankers, trucks, vibrator, compactor, cranes, loaders, grader, compressors, generators, roller, bowser etc.

During operational stage, LDA will be responsible for operation and maintenance of the proposed underpass at Samanabad Mor. The cost of project is 1515.89 million and estimated to be completed in 8 months.

The detail master plan for Project Construction of Underpass at Samanabad Morris given in Annexure-1 of the report.

S.1.4.1 Process Flow



S.1.4.2 Technology

The machinery such as bulldozers, shovels, dumpers, batching plant, tankers, trucks, vibrator, compactor, cranes, loaders, grader, compressors, generators, roller, and bowser will be used. The pollution control technology will be used which will ensure minimum environmental impacts on surrounding area. Used generators will be with built in canopy.

Table 0-1, Impact and Possible Mitigation Measures of the Project

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
Project Pre Construction								
Land Acquisition and Resettlement	Direct	Medium term	Local	Reversible	Unlikely	Minor	Low	Most of the land is Govt. owned in the Project Area. There would be resettlement issues, only 2 Kanals will be acquired, which will be compensated as per land acquisition act 1894. The alternative paths are define to resolve the issue of traffic congestion at Samanabad Mor. Traffic Diversion Plan area attached as Annexure-11. About 65-70 Mature trees are present in project area that will be cut or transplanted in nearby area. In

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								case of any tree to be cut, 10 trees will be planted as compensation of one tree.
Construction Phase								
Soil Contamination and Erosion (Construction Phase)	Indirect	Short Term	Regional	Reversible	Likely	Minor	Low	Good engineering practices should be adopted by Contractors, which will help to control soil erosion at the construction sites. Soil contamination can be curtailed by reducing the oil spill from generator and other machinery at project construction areas, proper solid waste management. The Contractor is required to impart proper training to his workforce in the storage and handling of hazardous

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								materials, like oil, diesel and petrol that can potentially cause soil contamination. Proper drainage facility will be Provided to avoid the water accumulation, which will minimize the soil contamination.
Ground Water Contamination (Construction Phase)	indirect	Medium Term	Regional	Irreversible	Unlikely	Moderate	Medium	Construction camps should be established in areas with adequate natural drainage channels in order to facilitate flow of the effluents. Avoid accidental spills of oils and lubricants through good practice. Prepare and implement Emergency Response Procedures in case of any spill hazard.
Air Quality Deterioration (Construction	Direct	Short term	Local	Reversible	likely	Minor	Medium	Maintenance of vehicles should be made mandatory to

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
Phase)								reduce the emissions of NOx, SOx, CO and PM10. Water Sprinkling on roads. Equipment and vehiclesshould be well maintained to minimize particulate emissions. Haul-trucks carrying, sand, and aggregate and other materials should be kept covered during transportation of materials and during storage at site, with tarpaulin.
Noise (Construction Phase)	Direct	Short term	Local	Reversible	likely	Minor	High	Use of silencers Mufflers and proper maintenance of vehicles to control noise. Movements of the trucks and other construction machinery causing

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								high noise levels must be restricted at night time.
Waste Material (Construction Phase)	Direct	Medium	Regional	Irreversible	Likely	Moderate	Medium	A site waste management plan should be made the responsibility of the construction contractor to provide for the designation of appropriate waste storage area on the site and a schedule for the timely collection and removal of construction debris to an approved dump site. The construction waste will be disposed on approved landfill site from Punjab EPA/LWMC The organic waste produced during site clearing should be mechanically

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								mulched and composted at the site and used for landscaping. Arrangements should be made for regular garbage collection from the construction site.
Traffic Disturbance (Construction Phase)	Direct	Short Term	Regional	Irreversible	Likely	Moderate	Medium	During the construction phase traffic control measurement will be implemented. All raw materials will be transported to the site at night time because at night time the traffic flow is very low in the project area. The alternative paths are define to resolve the issue of traffic congestion at Samanabad Mor. Traffic Diversion Plan

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								area attached as Annexure-11.
Loss and Damage of Natural Flora(Construction Phase)	Direct	Medium Term	Regional	Reversible	Likely	Moderate	Medium	About 65-70 Mature trees are present in project area that will be cut or transplanted in nearby area. In case of any tree to be cut, 10 trees will be planted as compensation of one tree. Flora includes bushes and grasses which will be removed during construction. Contractor's staff and labor should be strictly directed not to damage any Flora.
Disturbance to Fauna (Construction Phase)	Indirect	Medium Term	Regional	Reversible	Possibly	Moderate	Medium	The trees plantation will welcome the local avifauna and other associated animals for nesting and shelter.
Loss of Livelihood	Direct	Medium-	Local	Reversible	Likely	Moderate	Medium	Capacity building

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
(Construction Phase)		term						and rehabilitation plans to be implanted for the betterment of Project Affected Persons (PAPs) Project Affected Persons (PAPs) should be given preference for direct and indirect employment opportunities especially in the project.
Issues to Local Population (Construction Phase)	Direct	Medium	Local	Reversible	Possibly	Moderate	Medium	Contractor should select specific timings for heavy machinery operation so as to cause least disturbance to the population considering their peak movement hours. Effective construction controls may be made by the Contractor to avoid inconvenience to the population due to

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								noise, smoke and fugitive dust. Haul-trucks carrying concrete, aggregate and sand fill materials will be kept covered with tarpaulin. The heavy vehicles should not play loud music and horns during transporting materialat night time. The Contractor should warn the workers not to involve in any theft activities.
Labor HSE Issues (Construction Phase)	Direct	Medium	Local	Reversible	Possibly	Minor	Low	Contractor will ensure the provision of medicines, first aid kits, emergency preparedness plan etc. at the work place. Compliance with the safety precautions for construction workers as per International Labor Organization

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								(ILO) Convention No. 62 will be ensured by the Contractor. Heath safety procedure is also prepared and will be implemented. Training of workers in the construction safety procedures, environmental awareness, and equipping all construction workers with safety boots, helmets, gloves, ear plugs, and protective masks, and monitoring their proper and sustained usage.
Operational Phase								
Air Emissions – Operational Phase	Direct	Medium Term	Regional	Reversible	Almost Certain	Moderate	Medium	The appropriate measures would be taken during operational phase to reduce air emissions for which registration of motor vehicles;

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance	Mitigations
								control of motor vehicles; maintenance of motor vehicles would be done. Furthermore, offences and penalty procedures would be implemented to ensure the traffic control and pollution charge for non-tuned rickshaws, motor bikes, buses and cars etc.
Noise	Direct	Long Term	Local	Irreversible	Possibly	Moderate	High	Vehicular horns, and traffic congestion and irregularities should be avoided to reduce noise. Vehicular testing and certification in coordination with the Lahore traffic police.

S.1.5 Proposed Monitoring

The Environmental Monitoring Report shall be submitted on Monthly basis for liquid effluents, ambient air and noise during construction phase of project.

S.1.6 Conclusion

The Project has significant positive impacts during the operation phase. However, there are certain negative impacts during the construction phase, most of which are temporary and can be mitigated by application of proposed mitigation measures. Overall positive impacts overweigh the temporary negative impacts during the construction phase. It may be concluded that the implementation of the environmental mitigation measures, proper monitoring and compliance of the environmental standards/legislations will make the Project environmentally more sustainable and beneficial to the users.

SECTION - 1: INTRODUCTION

1.1 PURPOSE OF REPORT

The purpose of the EIA study is to identify the possible beneficial and adverse environmental impacts of the project as presently envisaged and proposed the applicable mitigation measures to be implemented during the construction and operational stages of the project in order to minimize the negative impacts and preparation of Environmental Management Plan (EMP) to obtain No Objection Certificate (NOC) from Punjab-EPA.

This EIA report has been prepared keeping in view the following regulations and guidelines:

- Pakistan Environmental Protection Act (PEPA), 1997 & Punjab Environmental Protection Act (PEPA), 2012.
- Pakistan Environmental Protection Agency Regulations, 2000 for review of IEE and EIA.
- Pakistan Environmental Impact Assessment procedures, 2000.
- Guidelines for Preparation and Review of Environmental Reports

It is proponent's best effort to prepare and provide the EIA Report which fulfils the requirements of the Guidelines for Preparation and Review of Environmental Reports by EPA, but the report cannot be termed as an 'Ideal one, practically, the report may fall short of the said status of 'ideal'; the Guidelines duly take care of the ground realities.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

The proposed Project consists of the design and construction of underpass at Samanabad Morrwith project and proponent detail is given as under-:

1. Name of proponent	Mazhar Hussain Asif (Chief Engineer) Lahore Development Authority (LDA) Office of the Chief Engineer, Khayaban-e-Firdousi 467 D-II, Johar Town Lahore 042-992622
2. Name of project	Construction of underpass at Samanabad Morr, Multan Road, Lahore
3. Location/ Address of the site	Samanabad Mor, Multan Road, Lahore
4. Road Structure Details	Number of Lane = 2 (Either Side) Lane Width = 3.0m Shoulder = 0.3m (Each side) Barrel Width = 13.2m Vertical Clearance = 5.1m

6. Nature/ Feature of the project	Construction of Underpass
7. Type of Land use Major process during construction	Transport Excavations, Concrete, asphalt, course, Mixing, Elevation, Finishing
8. Estimated cost of project	Rs. 1515.89 million
9. Project start	Right after getting NOC from environmental protection department
10. Project completion duration	06 months

1.3 DETAILS OF CONSULTANTS

ASIAN Consulting Engineers Private Limited (AsCE) is providing their services to conduct environmental assessment for the project. ASIAN Consulting Engineers Private Limited is an independent consulting company working in the field of environment. Asian provides consulting services and sustainable solutions for infrastructure projects, industrial projects and social development projects.

The team of experts are given as under-:

Sr. No.	Team Member	Position Held	Qualifications
1	Aleem Butt	Chief Environmentalist Team Leader-EIA	M.Phil. Environmental Sciences, Government College University (GCU)Lahore M.Sc. Environmental Sciences, Punjab University (PU), Lahore NEBOSH, Lead Auditor
2	Noman Ashraf	Environmental Specialist	M.Phil. Environmental Sciences, Government College University (GCU)Lahore
3	Dilbar Hussain	Chief chemist	M.sc Chemistry university of the Punjab
4	Jahanzaib Malik	Deputy manager	M. Phil. Environmental Sciences University of Agriculture, Faisalabad
5	Abida Hussain	Environmental Engineer	BS Environmental Engineering University of Engineering and Technology (UET) Lahore
6	Huda Rizwan	Environmentalist	BS Environmental Sciences The University of Lahore
7	Maryam	Environmental Engineer	BS Environmental Engineering University of Engineering and Technology (UET) Lahore
8	Asma Butt	Sociologist	M.sc Sociology, University of the Punjab

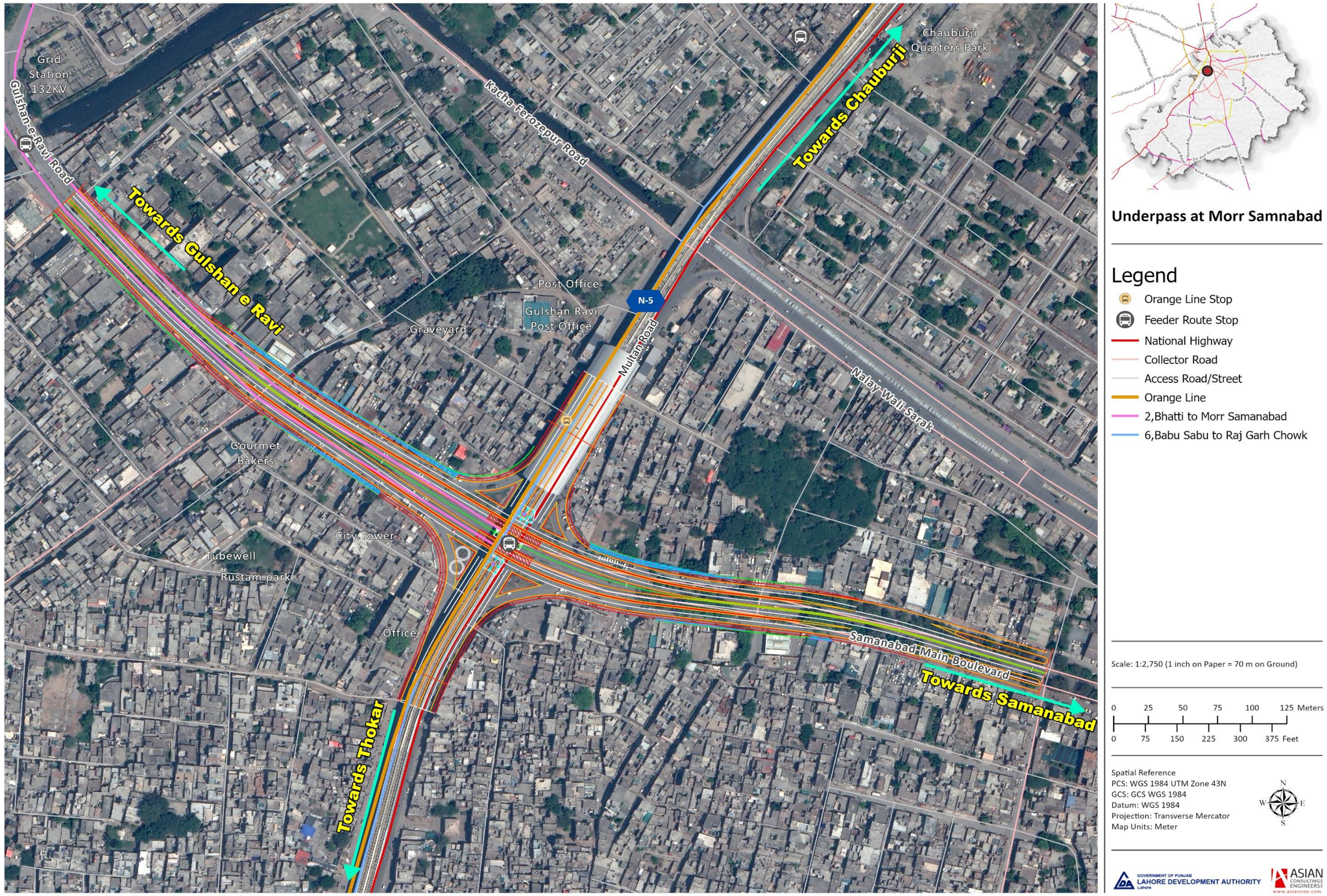
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Address: C-3, Jhelum Block, Green Forts-II, Lahore, Pakistan.

1.4 NATURE, SIZE AND LOCATION OF THE PROJECT

Construction of underpass at Samanabad Morris for transportation purpose. This site is located at Samanabad Mor.

The location plan is included hereunder in **Figure 1-1** & **Figure 1-2**.



Underpass at Morr Samnabad

Legend

- Orange Line Stop
- Feeder Route Stop
- National Highway
- Collector Road
- Access Road/Street
- Orange Line
- 2,Bhatti to Morr Samanabad
- 6,Babu Sabu to Raj Garh Chowk

Scale: 1:2,750 (1 inch on Paper = 70 m on Ground)

0 25 50 75 100 125 Meters
0 75 150 225 300 375 Feet

Spatial Reference
PCS: WGS 1984 UTM Zone 43N
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Transverse Mercator
Map Units: Meter

GOVERNMENT OF PUNJAB LAHORE DEVELOPMENT AUTHORITY Lahore
ASIAN CONSULTING ENGINEERS www.asiancon.com

Figure 1-1, Location Plan



Figure 1-2, Location Plan of Underpass at Samanabad Mor

1.5 SCREENING

The current Project falls under Schedule- II (list of projects requiring an EIA), Section D (Transport), Subsection 2 (Federal or Provincial highways or major roads (except maintenance, rebuilding or re-construction of existing roads) with total cost of Rs.50 million and above) and above of IEE/EIA Regulation as per section 12 of Environmental Protection Act and thus requires Environmental Impact Assessment (EIA).

SECTION - 2: SCOPING

2.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

Spatial Boundaries	Temporal Boundaries
REGIONAL: Impact could extend to the region surrounding the proposed Project	YEAR ROUND: Significant throughout the year
LOCAL: Impact limited to the local area in close proximity to the proposed Project	SEASONAL: Significant on a seasonal basis, depending on nature of valued environmental component (VEC)

2.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

During the survey, respondents were inquired about their views regarding the proposed project. Almost all respondents showed their concerns about the Proposed Project. Some of the respondents had positive thinking and they were in favour of the project. But few respondents showed their concerns regarding traffic jams during the construction phase, dust and noise issues. They expressed vividly that such projects should be completed in time.

During the survey, respondents were inquired about their views regarding the perceived impacts of the project during construction phase. Almost all respondents express their positive and negative views. The views are:

- There will be noise and dust pollution
- There will be health and safety issues
- There will be traffic annoyance during construction phase
- Their social norms and privacy will be disturbed

2.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

- Soil Contamination and Erosion
- Ground water contamination
- Air quality deterioration
- Noise
- Waste material
- Traffic annoyance
- Loss of Livelihood
- Issues to local population
- Labour HSE issues

SECTION - 3: CONSIDERATION OF ALTERNATIVES

3.1 SITE ALTERNATIVES

It is quite evident that the provision of infrastructural facilities failed to cope with the pace of demand putting city's existing facilities into considerable strain including roadways as well as the vehicular growth. This aspect is directly attributable to phenomenal growth in number of vehicles. Which has put an immense burden on the existing roads facilities that results in heavy traffic blockage in major areas of Lahore. It is a linkage between Samananad Main Boulevard and Main Boulevard Gulshan e Ravi making it a very busy road with all kind of traffic especially emergency traffic.

It is necessary to provide a remedy of this problem which can only be possible by providing an underpass at Samanabad Mor. The route is a short access to the Main Boulevard Gulshan e Ravi and if a grade separated underpass is built this will reduce the unwarranted congestion in the area and serve better connectivity in the city of Lahore.

In the light of above, LDA has already taken a number of initiatives to tackle the massive traffic flows and make an un-hampered flow of traffic. Massive traffic jams at this Point is a routine matter as this point is the main linkage of two major roads.

- Samananad Main Boulevard
- Main Boulevard Gulshan e Ravi

Therefore, based on the above facts, NPO, if exercised, will result in miserable transportation conditions in future. Also, the proposed grade separation facility positive impacts on the nearby community and insignificant negative environmental impacts. In light of above situation, NPO is not acceptable for the Project.

3.2 TECHNOLOGY/DESIGN ALTERNATIVES

As for the technology alternative, State of the art batch plant will be installed with built in water showering system to reduce dust emissions instead of conventional batch system which does not include water sprinkler in it for dust suppression.

As Design alternatives flyover is not considered as at Samanabad Morralready orange line is existed. So, underpass is consider to resolve the issue of traffic congestion.

3.3 ENVIRONMENTAL ALTERNATIVES

Surface water is not available in the close vicinity of the Project Area. Therefore, for the domestic as well as construction purposes groundwater is one alternative. For this purpose, a turbine will be installed in the labour camp.

In addition to that another alternative i.e. water supply by WASA. Finally, it has been decided that for the project construction stage, groundwater is the best available alternative; however, if water supply from the tube well decreases at any time, provision will be made for augmenting the demand from WASA supply through tankers.

Two alternatives' sources were considered for the lighting in the Project Area:

- Using existing power supply of LESCO
- Using Solar Energy

Although the option of lighting through solar panels seems suitable as sun being the most suitable alternate energy source but it was not selected due to the following reasons:

Solar lights can be adopted but, the security of solar lights can be a major issue as these are very expensive and prone to theft. To overcome this problem, the height of the lights can be increased. But increasing height to avoid theft will reduce the light intensity. Apart from security reasons, solar power is inconsistent and not reliable as it depends on the steady delivery of special atoms called photons to keep the electricity generating process going on. As soon as the sun disappears behind thick clouds or falls below the horizon at night, the photons stop striking the solar panels and the power drops. Some solar power can be stored in large battery arrays. Solar power would only be viable with current technology as long as the sun's photon atoms can strike a solar panel directly. The power generation during foggy weather and cloudy days will be reduced. So, the power supply from LESCO will be considered.

3.4 ECONOMIC ALTERNATIVES

Raw material for construction will be purchase from nearby area so that the transportation cost of material might be save. Fuel will also be saved while operation of project as now a days traffic congestion issue causes the excessive usage of fuel.

SECTION - 4: PROJECT DESCRIPTION

4.1 TYPE AND CATEGORY OF PROJECT

Punjab Environmental Protection Act, 2012 (PEPA, 2012) stipulates that an EIA/IEE is mandatory for Development Projects. Therefore, an IEE/EIA is required for projects for policy procedure, filing, review and approval of environmental assessments". The proposed project is to construct underpass at Samanabad Morrto national standards. This project is enlisted in EIA/ IEE regulation 2000 Schedule- II of section D subsection 2 of IEE/EIA Regulation 2000 and thus requires Environmental Impact Assessment- EIA.

4.2 OBJECTIVES OF THE PROJECT

The main objective of the project is to construct underpass at Samanabad Morrto achieve uninterrupted flow of traffic and develop modern transport facilities to locals.

4.3 LOCATION AND SITE LAYOUT

The proposed underpass will be developed at Samanabad Mor.

The Project site is geographically located at 31° 32'39.00"N, 74° 17'41.43"E.

The map location of the project site layout for development of underpass at Samanabad Morris presented in **Figure 4-1**.

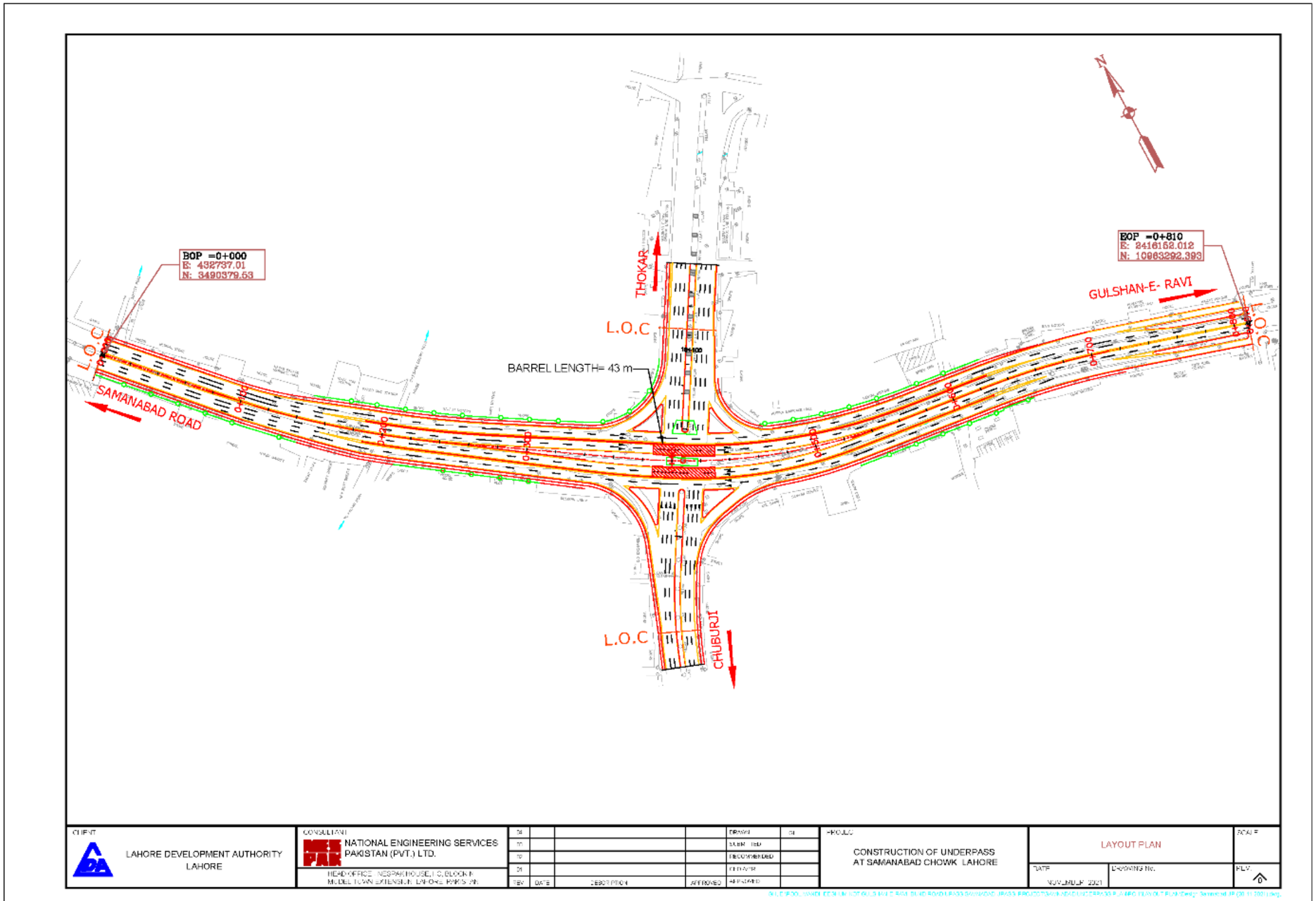


Figure 4-1, Site Layout for Development

The project general layouts and location layouts for construction of underpass at Samanabad Morris presented in large drawings given in Annex I- Master Plan of this report.

4.4 LAND USE PLAN

The proposed project comprises of following feature

4.5 SROAD ACCESS

The proposed Underpass at Samanabad Morrwill be important link between Samananad Main Boulevard and Main Boulevard Gulshan e Ravi. The hospitals, housing schemes, parks, and institutes along the sroad will be benefitted through the construction of Underpass at Samanabad Mor.

4.6 VEGETATION FEATURE ON SITE

Vegetation is naturally occurring plants in a particular region developed, naturalized or existed for many years in an area. It is represented by some common flora of that area. No vegetation is present at project site and within boundaries. However, nearby road side Plantation is present around the project site that has both ornamental and indigenous in nature. The existing flora consists of trees like Eucalyptus, Draic, Poluddar. Pipal (Ficus religiosa), Ber (Zizyphus mauritiana and Z. nummularia), Borh (Ficus bengalensis, F.retusa) Mulberry (Morus Alba), Arjan (Arjuna terminalia).

4.7 COST AND MAGNITUDE OF OPERATION

The project is divided in to three phases, pre-construction phase, construction phase, and operation phase. Time line for overall implementation of the project is 08 months. The development cost of the project is estimated as PKR 1515.89 million.

4.8 SCHEDULE OF IMPLEMENTATION

The completion duration of construction of underpass at Samanabad Morris about 06 months.

4.8.1 Preconstruction Phase

This phase includes:

- Site investigation & Evaluation
- Budgeting
- Design
- Schedules of working
- Obtaining all relevant NOC

4.8.2 Construction Phase

This phase includes:

- Management team& Construction Crew
- Excavation
- Construction of underpass at Samanabad Mor
- Mitigation process
- Amenities and Development
- Managing safety
- Monitoring & Evaluation

4.9 DESCRIPTION OF THE PROJECT

4.10 PROJECT DESCRIPTION

The proposed underpass at Samanabad Morrwill be important link between Samananad Main Boulevard and Main Boulevard Gulshan e Ravi. The hospitals, housing schemes, parks, and institutes along the road will be benefitted through this underpass.

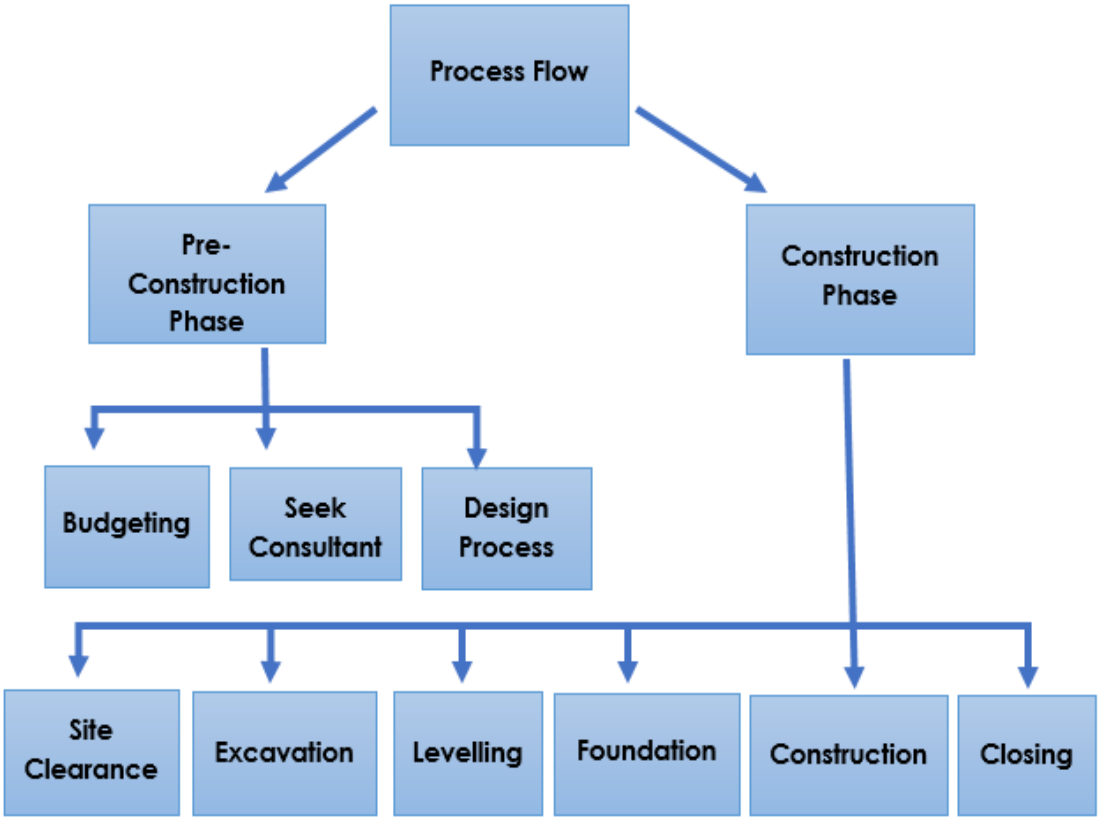
Project design is based on national design standards, suitable for the construction of roads and underpass. Moreover, the design will be compatible with the site conditions. The drainage system of project has been designed considering the storm water flows from the underpass. There will be a define alternative path for the diversion of traffic flow.

Around 120 skilled, semi-skilled and unskilled workforce will be required for its construction with various types of machinery that include bulldozers, shovels, dumpers, batching plant, tankers, trucks, vibrator, compactor, cranes, loaders, grader, compressors, generators, roller, bowser etc.

During operational stage, LDA will be responsible for operation and maintenance of the proposed underpass at Samanabad Mor. The cost of project is 1515.89 million and estimated to be completed in 8 months.

The detail master plan for Project Construction of Underpass at Samanabad Morris given in Annexure-1 of the report.

4.10.1 Process Flow



4.10.2 Technology

The machinery such as bulldozers, shovels, dumpers, batching plant, tankers, trucks, vibrator, compactor, cranes, loaders, grader, compressors, generators, roller, and bowser will be used. The updated technology will be used which will ensure minimum environmental effects.

4.11 RESTORATION AND REHABILITATION PLANS

The main areas to be considered for the site restoration include the construction area along the existing roads. In case of damage to any road, its maintenance will be done. The restoration work comprises the removal of temporary construction works.

Flora species present on proposed site are just small shrubs and grasses which will removed during construction phase of project. In order to enhance the environmental features of the site, the indigenous trees will be planted accordingly.

The main areas to be considered for the site restoration include the construction area along the existing roads, camp site tracks etc. These areas will be restored to the original condition before construction with the maximum possible effort. The restoration work comprises the removal of temporary construction works and removal of any fence installed, levelling of areas (wherever required), etc. The following procedures will be adopted for

the restoration of the site:

- All temporary construction built will be removed after the construction of proposed project.
- All the toxic and hazardous chemicals/materials will be completely removed from the site and properly disposed off. Efforts will be made to completely remove the spills during the construction stage.
- All fencing will be removed.
- Necessary landscaping will be done as required to restore the site as per plantation plan.
- Whole of the site will be covered with the original position after completion of construction process.
- Finally, after the completion of the restoration process, LDA and SC will inspect the site and LDA will give restoration clearance to the Contractor.

SECTION - 5: DESCRIPTION OF ENVIRONMENT

5.1 INTRODUCTION

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

5.2 PHYSICAL RESOURCES

5.2.1 Topography

The project area is a part of the flat plain with very little slope. Hence, the topography is plain, unrelieved by any formations. The natural slope of the land is towards south side. The project site is at the height of 3300 ft from sea level.

5.2.2 Geology

The project site is located in Punjab which is a vast plain of alluvial material, deposited by Indus basin and five main rivers crossing the Punjab Plain. The alluvial deposits underlying the site are deposited by the river Ravi and its tributaries. The thickness of alluvial deposits in Lahore is thought to be more than 300 m which are underlain by the basement rocks of the Indian shield. The alluvial deposits mainly consist of sands, with intercalation of silt and clay layers of varying thickness. The geological structure of Lahore shows the presence of two aquifers aquifer 1 is shallow and aquifer 2 is deeper. The aquifers underlying the Lahore area are separated with an aquitard and are composed of unconsolidated alluvial sediments, with varying proportions of silt, sand and clay.

5.2.3 Seismology

The project site falls in the Punjab plain which shows low to moderate level of seismicity. The project region has also been subjected to severe shaking in the past due to earthquakes in the Himalayas. The epicentres of low to moderate magnitude earthquakes recorded in the Punjab Plain are associated with the subsurface fractures in the basement rocks which are concealed by the thick alluvial deposits. The known main active fault near Lahore is the Main Boundary Thrust (MBT) which passes at a distance of about 180 km towards northeast along the Himalayan front.

Probabilistic seismic hazard assessment recently carried out for Lahore area as part of the revision of seismic provisions of the Building Code of Pakistan shows that the project area falls in Zone 2A. Seismic zone of Pakistan is shown

in figure 5.1. It is therefore recommended that the project structures should be designed to cater the requirements of Zone 2A of Building Code of Pakistan (2007). Based on the evaluation of tectonic setting and seismicity of the project region, it is recommended that the important project structures should be designed to withstand a horizontal peak ground acceleration of 0.15g with 10% probability of exceedance in 50 year; **Figure 5-1.**

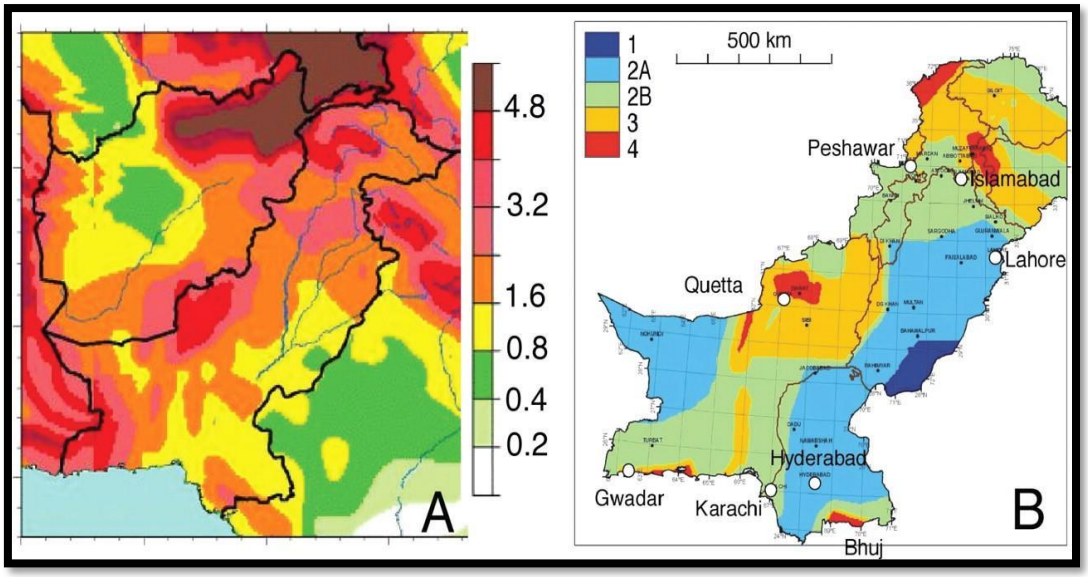


Figure 5-1, Seismic Zone of Pakistan (Geological Survey of Pakistan)

5.2.4 Soil

Subsurface Lithology is composed of Lean Clay/Silt/Silty/Sand/Poorly Graded Sand with Silt up to maximum investigated depth of 30 m below NSL. The topmost soil layer mostly comprises of Lean Clay in very soft to soft state. The thickness of this layer is approximately 3.0 m below NSL. This cover is absent at places.

A 7.0 m thick layer of Silt/ Silty/Sand/Poorly Graded sand with silt material in loose state is present underneath the topmost layer. The water table in the area is shallow in general having water logging and water pounding in some places. The minimum depth of ground water table observed at site is about 3 meters below NSL.

5.2.5 Climate

The project site has mild climate. May, June, July and August are the hottest months. The temperature in summer from May to September is high, but the nights are relatively cool.

The highest temperatures throughout the year are in May and June. December and January are the coldest months. The highest and lowest average temperatures in summer are 41.5℃ and 36.6℃, respectively, and 19.3℃ and 17.9 ℃ in winter, respectively. The rainfall is mainly in July and

August. The average annual rainfall is about 597.6 mm, and the annual relative humidity is 60.1%. The highest rainfall record is in August, with an average of 112 mm. At the end of cold weather, there are occasional thunderstorms and hailstorms. The relative humidity throughout the year is high. The driest month is October, and precipitation difference between the wet and dry seasons is 99 mm.

The average annual rainfall during the last 30 years period from (1987-2017) works out to be 597.6 mm. Nearly 50% of it received in the form of high intensity showers during the monsoon (July, August, September) and other 40% in winter. The yearly variations are considerable.

The average monthly maximum and minimum temperatures and annual rainfall of last 30 years (1987-2017) taken from meteoblue is presented in **Figure 5-2**.

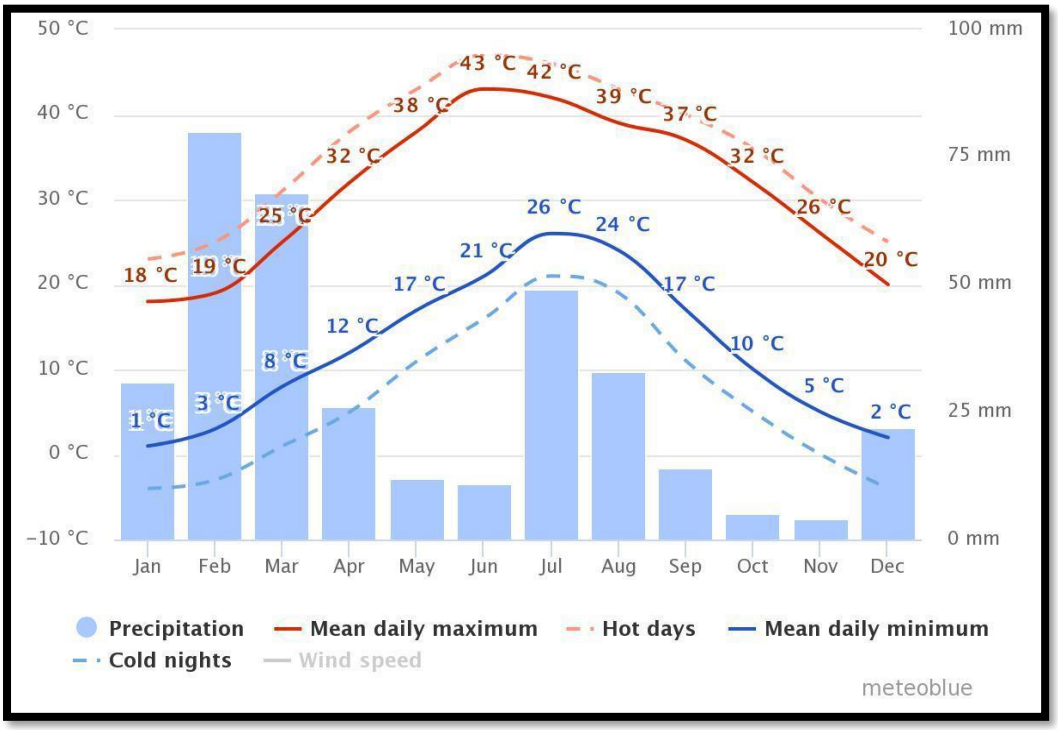
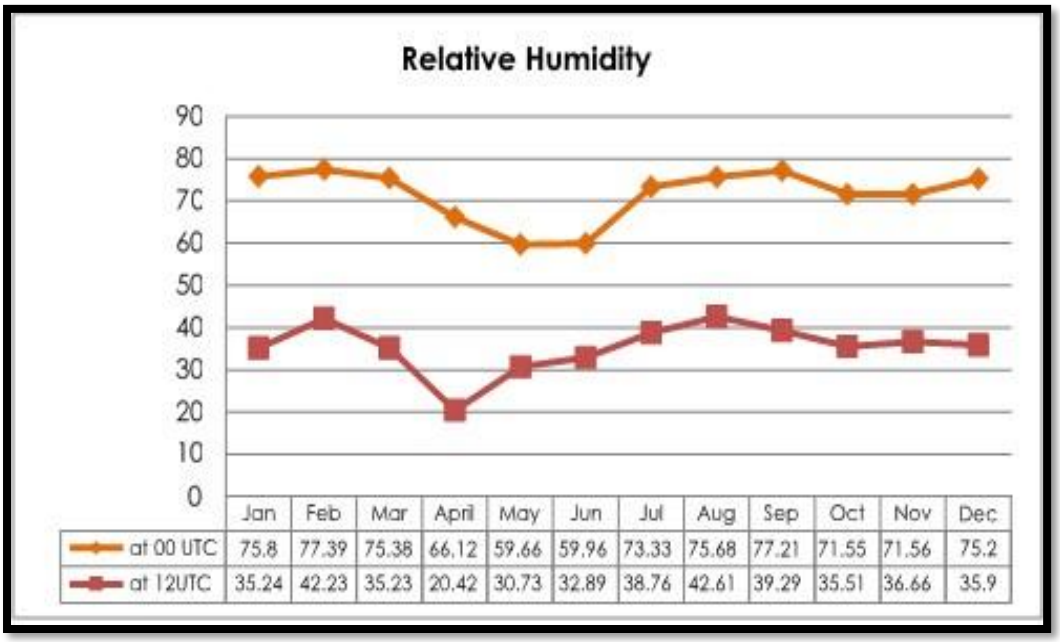


Figure 5-2, Temperature and Rainfall Data (Data Source: Meteoblue)

The most humid period is in month of September with maximum average relative humidity is 77.21 % and minimum average relative humidity 39.29 %. The average relative humidity of Lahore District form last 30 years period from (1987-2017) recorded is shown in **Figure 5-3**.



	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
at 00 UTC	75.8	77.39	75.38	66.12	59.66	59.96	73.33	75.68	77.21	71.55	71.56	75.2
at 12UTC	35.24	42.23	35.23	20.42	30.73	32.89	38.76	42.61	39.29	35.51	36.66	35.9

Figure 5-3, Average Relative Humidity (Data Source: weather online)

The Wind speed usually comes from the northeast to north after the wind has blown strongly and steadily from those quarters for a day or more. In the cold weather the rain clouds come mostly from the north or west. The wind rose for Lahore shows how many hours per year the wind blows from the indicated direction, **Figure 5-4**.

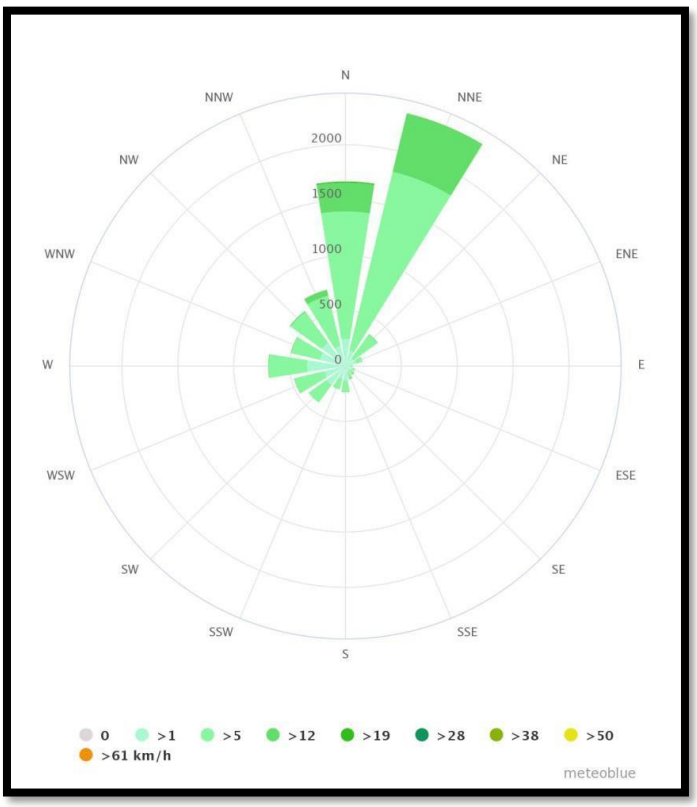


Figure 5-4, Wind Rose for Lahore District (Data Source: meteoblue)

5.2.6 Surface Water

Surface water in the Study Area of the Project is not present in the form of lake, stream or river tributaries (nullah). However, nearest surface water is in the form of artificial pond of model town boating area.

5.3 ECOLOGICAL RESOURCES

In order to develop the ecological baseline of the site, the diverse ecological surveys were conducted given as under-:

5.3.1 Flora

Table 5-1, Tree Species

Sr. No	Scientific Names	Common Names	Families	Total Plants	No. Of Mature Plants
1.	*Alstonia scholaris*	Devil tree	Apocynaceae	20	8
2.	*Azadirachta indica*	Indian lilac	Malvaceae	4	3
3.	*Bauhinia variegata*	Mountain ebony	Fabaceae	19	7
4.	*Bombax malabaricum*	Silk tree	Bombacaceae	9	9
5.	*Cycas revoluta*	Sago palm	Arecaceae	2	-
6.	*Dalbergia sissoo*	Indian rosewood	Fabaceae	2	2
7.	*Eucalyptus camaldulensis*	Eucalyptus	Myrtaceae	9	8
8.	*Ficus benghalensis*	Banyan	Moraceae	5	3
9.	*Ficus religiosa*	Sacred tree	Moraceae	5	3
10.	*Ficus variegata*	Ficus	Moraceae	10	2
11.	*Ficus virens*	Ficus tree	Moraceae	49	-
12.	*Livistona chinensis*	Fan palm	Arecaceae	2	-
13.	*Mangifera indica*	Mango	Anacardiaceae	1	1
14.	*Melia azedarach*	China berry	Malvaceae	4	3
15.	*Mimusops elengi*	Spanish Cherry	Sapotaceae	3	-
16.	*Phoenix dactylifera*	Date	Arecaceae	2	-
17.	*Pongamia pinnata*	Pongam	Fabaceae	3	-
18.	*Putranjiva roxburghii*	Putagin	Euphorbiaceae	4	2
19.	*Roystonea regia*	Royal palm	Arecaceae	3	3
20.	*Syzygium cumini*	Blackberry tree	Myrtaceae	8	1
21.	*Terminalia arjuna*	Arjun tree	Combretaceae	8	8
Total Mature Trees					**66**

Table 5-2, Herbs/Shrubs

Sr. No	Scientific Names	Common Names	Families	Abundance
1.	*Agave tequilana*	Agave	Asparagaceae	O
2.	*Amaranthus viridis*	Slender amaranth	Amaranthaceae	F
3.	*Cestrum diurnum*	Din ka raja	Solanaceae	R
4.	*Convolvulus arvensis*	Convulvulus	Convolvulaceae	O
5.	*Cynodon dactylon*	Dub grass	Poaceae	F
6.	*Dactyloctenium aegyptium*	Egyptian crowfeet	Poaceae	R
7.	*Eragrostis minor*	Lovegrass	Poaceae	O
8.	*Helianthus petiolaris*	Prairie Sunflower	Asteraceae	O
9.	*Jasminum grandiflorum*	Yasmeen	Oleaceae	R
10.	*Lawsonia inermis*	Heena	Lythraceae	R
11.	*Murraya exotica*	Orange jasmine	Rutaceae	O
12.	*Nerium oleander*	Kaner	Apocynaceae	R
13.	*Oxalis corniculata*	Oxalis	Oxalidaceae	F
14.	*Poa annua*	Poa grass	*Poaceae*	O
15.	*Rosa indica*	Rose	Rosaceae	F
16.	*Yucca aloifolia*	Aloe yucca	Asparagaceae	R

5.4 MATURE PLANTS

We may define according to literature (Ricker *et al,* 2020) maturity of trees when a tree that has reached a desired size or age for its intended use. Complete in natural development or growth A tree that has a well-developed canopy and full height but still spreading its crown. **In this survey** we defined mature by following f**ormula is:**

Tree Value = Base Value x Cross-sectional Area x Species Class x Condition Class x Location Class Base Value

5.5 AGE GROUPS OF TREES

Trees were classified according to their height, width and specific types of species. Every species grow to a specific height and width in specific time so by calculating these trees age may be calculated according to (**Table 1.3**). Following age groups exists for our specific project areas;

1. Age < 2 years Premature
2. Age 2-4 years Immature
3. Age>4 years Fully mature

Table 5-3, Trees Age Group Categorization

Sr. No	Scientific Names	Trees Age Groups			
		Age < 2 Years Premature	Age 2-4 Years Immature	Age>4 Years Fully Mature	Total No. Of Plants
1.	*Alstonia scholaris*	09	03	8	20
2.	*Azadirachta indica*	01	-	3	4
3.	*Bauhinia variegata*	08	04	7	19
4.	*Bombax malabaricum*	-	-	9	9
5.	*Cycas revoluta*	02	-	-	2
6.	*Dalbergia sissoo*	-	-	2	2
7.	*Eucalyptus camaldulensis*	01	-	8	9
8.	*Ficus benghalensis*	-	02	3	5
9.	*Ficus religiosa*	01	01	3	5
10.	*Ficus variegata*	06	02	2	10
11.	*Ficus virens*	37	12	-	49
12.	*Livistona chinensis*	-	02	-	2
13.	*Mangifera indica*	-	-	1	1
14.	*Melia azedarach*	01	-	3	4
15.	*Mimusops elengi*	02	01	-	3
16.	*Phoenix dactylifera*	-	02	-	2
17.	*Pongamia pinnata*	03	-	-	3
18.	*Putranjiva roxburghii*	02	-	2	4
19.	*Roystonea regia*	-	-	3	3
20.	*Syzygium cumini*	04	03	1	8
21.	*Terminalia arjuna*	-	-	8	8

5.6 THE DAFOR SCALE

The abundance of species in the project areas was determined using the DAFOR scale. Specifically, the DAFOR scale records the vegetative cover of an area and represents the abundance of species (Hearnshaw *et al* 2010).

Table 5-4, The DAFOR Scale

Abundance (% age)	DAFOR Class	Abbreviation
51 – 100	Dominant	D
31 – 50	Abundant	A
16 – 30	Frequent	F
6 – 15	Occasional	O
1 – 5	Rare	R
0	Absent	X

5.7 RESULTS

There were 169 plants of 21 species belonging to 12 families were found on

the project site of which 66 were mature or fully developed and 103 were premature plants. 16 species of 12 plant families were found consisting of herbs,shrubs and grasses. Frequent (F) 4 species, Occasional (O) 6 and Rare (R) were 6 according to Dafor scale.

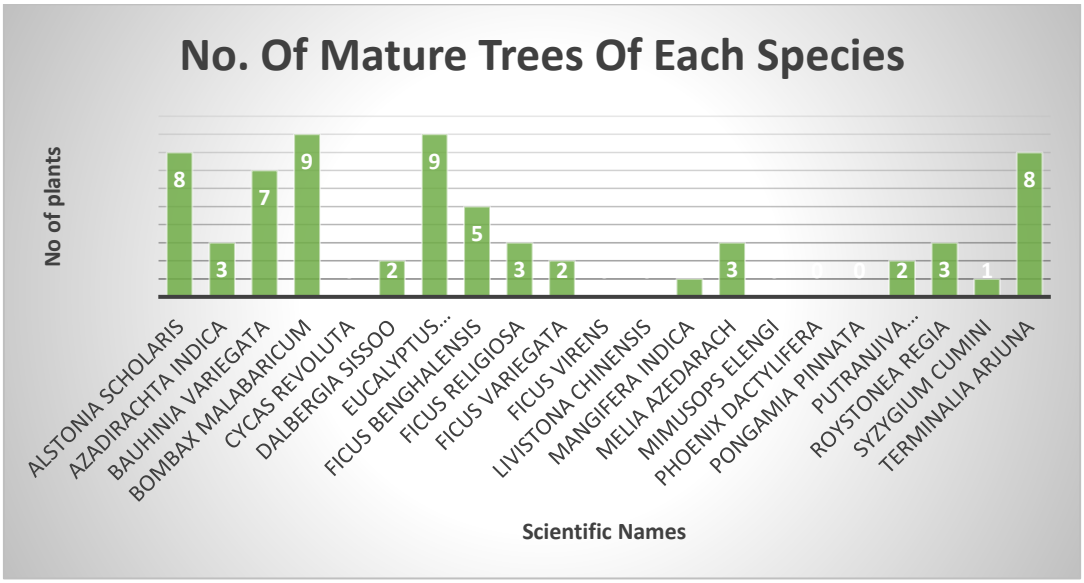


Figure 5-5, Mature Trees

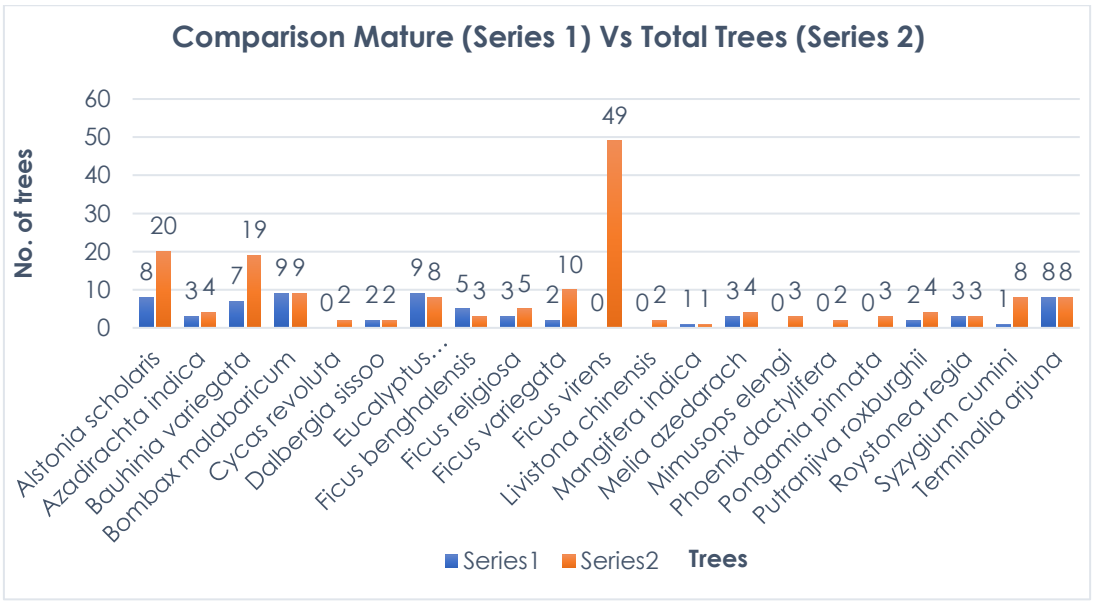


Figure 5-6, Mature trees Vs Total trees

Ficus virens was most abundant tree species (49) but no plant width and height was enough to be categorized as mature. *Alstonia scholaris* total 20 trees out of which 08 were mature. *Bauhinia variegata* 19 trees were found with 7 mature trees. *Ficus variegata* 10 trees with 2 mature ones. *Eucalyptus camaldulensis* 5 mature and 3 immature plants were recorded. *Bombax malabaricum* and *Roystonea regia* all of the 9 and 3 plants respectively were fully mature. *Mimusops elengi, Phoenix dactylifera* and *Cycas revoluta* all of

plants were immature (Table 1.1).



Figure 5-7, A) *Roystonea regia*, B) *Alstonia scholaris*, C) *Melia azedarach*, D) *Putranjiva roxburghii*, E) *Bombax malabaricum*, and F) *Ficus benghalensis*

Table 5-5, Avian fauna of Selected Area

Sr. No	Scientific Names	Common Names
1	Corvus splendens	House crow
2	Passer domesticus	House sparrow
3	Acridotheres tristis	Common myna
4	Turdoides striatus	Jungle babbler
5	Nycticorax	Night heron

Five birds were commonly observed on the tree species of the selected sites which was ***Corvus splendens, Passer domesticus, Acridotheres tristis, Turdoides striatus*** and ***Nycticorax.*** These birds are mainly found inhabited on large and old tree species.

5.8 SOCIO-ECONOMIC AND CULTURAL FEATURES

This section deals with the socio-economic and cultural conditions of the project area. During the desk/ office study, available reports/ documents were comprehensively studied.

A team of experts carried out field visits to the proposed project site and collect the baseline data from direct and indirect affected on socio-economic and cultural aspects.

The basic objectives of the social surveys were to:

- Get the primary data from the various sources.
- Inform people about objective and purpose of the proposed project.
- Identify the potential impacts associated with the implementation of the proposed project.
- Get feedback from community about project related social issues.
- And address the mitigation measures about the social issues in the report.

5.9 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

5.9.1 Ground Water

For the purpose of checking the quality of groundwater, one sample is taken from Tap near Samanabad Morrand analyses for Punjab Environmental Quality Standards. Groundwater samples were tested for 30 different selected parameters as per PEQS.

Based on the laboratory test results, it was found that all the parameters of Groundwater samples are within the permissible limits except Total Coliform. The details of the results have been shown in **Table 5-6**.

Table 5-6, Ground Water Quality of Proposed Project

Ground Water Analysis Results					
Parameter	**Analysis Method**	**PEQS**	**Result**	**MU (CL95%)**	**Remarks**
Lab Analysis					
Color*	SMWW 2120 C	≤ 15 TCU	0.0	N.A.	Optimal
Taste*	SMWW 2160 C	Non-Objectionable	Non-Objectionable	N.A.	Optimal
Odor*	SMWW 2150 B	Non-Objectionable	Non-Objectionable	N.A.	Optimal
Turbidity*	SMWW 2130 B	< 5 NTU	0.0	N.A.	Optimal
Total Hardness (as $CaCO_3$) **	SMWW 2340 C	< 500 mg/L	125	± 0.87	Optimal
Total Dissolved Solids (TDS)**	SMWW 2540 C	< 1000 mg/L	420	± 0.81	Optimal
pH**	SMWW 4500 H^+ B	6.5- 8.5	7.26	± 0.70	Optimal
Aluminum (Al)	SMWW 3111 B	≤ 0.2 mg/L	<0.005	N.A.	Optimal
Antimony (Sb)	SMWW 3114 B	≤ 0.005 mg/L	<0.005	N.A.	Optimal
Arsenic (As)	SMWW 3114 B	≤ 0.05 mg/L	0.021	N.A.	Optimal
Barium (Ba)	SMWW 3113 B	0.7 mg/L	0.0036	N.A.	Optimal
Boron (B)	SMWW 3113 B	0.3 mg/l	<0.02	N.A.	Optimal
Cadmium (Cd)	SMWW 3113 B	0.01 mg/L	0.006	N.A.	Optimal
Chloride (Cl^-) **	SMWW 4500 Cl^- B	< 250 mg/L	58	± 1.23	Optimal
Chromium (Cr)	SMWW 3113 B	≤ 0.05 mg/L	0.004	N.A.	Optimal
Copper (Cu)	SMWW 3111 B	2.0 mg/L	0.167	N.A.	Optimal
Cyanide (CN^-)*	SMWW 4500 CN^- F	≤ 0.05 mg/L	0.0	N.A.	Optimal
Fluoride (F^-)*	SMWW 4500 F^- C	≤ 1.5 mg/L	0.05	± 0.71	Optimal
Lead (Pb)	SMWW 3114 B	≤ 0.05 mg/L	<0.005	N.A.	Optimal
Manganese (Mn)	SMWW 3113 B	≤ 0.5 mg/l	<0.015	N.A.	Optimal
Mercury (Hg)	SMWW 3114 B	≤ 0.001 mg/L	<0.001	N.A.	Optimal
Nickel (Ni)	SMWW 3113 B	≤0.02 mg/L	<0.02	N.A.	Optimal
Nitrate (NO_3^-) *	SMWW 4500 NO_3^- B	≤ 50 mg/L	1.2	N.A.	Optimal
Nitrite (NO_2^-) *	SMWW 4500 NO_2^- B	≤ 3.0 mg/L	0.0	N.A.	Optimal
Selenium (Se)	SMWW 3114 B	0.01 mg/L	<0.01	N.A.	Optimal
Residual Chlorine (Cl_2) *	SMWW 4500 Cl^- B	0.5 mg/L	0.0	N.A.	Optimal

Ground Water Analysis Results					
Parameter	**Analysis Method**	**PEQS**	**Result**	**MU (CL95%)**	**Remarks**
Phenolic Compounds (as Phenols) *	SMWW 5530 D	NGVS	0.0	N.A.	Optimal
Zinc (Zn)	SMWW 3113 B	5.0 mg/L	0.052	N.A.	Optimal
Microbiological Analysis					
Total Coliforms*	SMWW 9222 B	0/ 100 mL CFU	24	N.A.	High
Fecal Coliforms *	SMWW 9222 D	0/ 100 mL CFU	0	N.A.	Optimal

5.9.2 Ambient Air Quality

At present, major sources of air pollution are mobile sources and nearby industries. Ambient air quality was monitored near Samanabad Mor, Lahore for the period of 24 hour.

The monitored parameters included Carbon mono-oxide (CO), Nitrogen dioxide (NO2), Sulphur dioxide (SO2), Particulate Matter (PM10) and Particulate Matter (PM2.5). The monitoring was carried out for a period of 24 hours with an interval of 1 hours between consecutive readings at each monitoring point. The detail Environmental Monitoring Report is attached as Annex VIII while the 24 hours average results are presented below-:

Table 5-7, Ambient Air Monitoring Results

Sr. No.	Time	CO (mg/m³)	NO (µg/m³)	NO_2 (µg/m³)	NO_x (µg/m³)	SO_2 (µg/m³)
1	11:00	1.11	36.11	75.83	111.79	43.96
2	12:00	1.08	35.67	75.66	111.18	43.48
3	13:00	1.12	35.29	75.43	110.57	43.13
4	14:00	1.15	35.17	75.07	110.09	43.16
5	15:00	1.07	35.86	75.26	110.97	43.96
6	16:00	1.05	35.30	75.47	110.63	43.85
7	17:00	1.04	35.42	74.87	110.15	43.61
8	18:00	1.06	34.86	75.05	109.77	44.46
9	19:00	1.08	34.83	75.79	110.47	43.90
10	20:00	1.11	35.44	73.10	108.39	43.45
11	21:00	1.07	35.27	73.48	108.60	43.32
12	22:00	1.02	35.63	73.99	109.48	44.06
13	23:00	0.98	35.23	74.11	109.19	43.48
14	00:00	0.99	34.85	73.73	108.43	40.69
15	01:00	1.00	35.04	73.84	108.74	40.84
16	02:00	0.93	35.42	73.54	108.81	40.76
17	03:00	1.02	35.29	73.46	108.60	40.50

Sr. No.	Time	CO (mg/m³)	NO (µg/m³)	NO_2 (µg/m³)	NO_x (µg/m³)	SO_2 (µg/m³)
18	04:00	0.99	35.27	72.90	108.03	41.14
19	05:00	1.06	35.40	74.11	109.37	43.96
20	06:00	1.12	34.85	75.85	110.55	42.87
21	07:00	1.15	34.90	75.20	109.96	43.40
22	08:00	1.14	34.62	74.82	109.29	43.64
23	09:00	1.07	34.90	75.45	110.21	43.45
24	10:00	1.12	35.69	74.82	110.36	42.92
Average Concentration		**1.06**	**35.26**	**74.62**	**109.74**	**43.00**

Parameters	Units	Monitoring Duration	LDL	Average Obtained Concentration	PEQS	Remarks
Nitrogen Dioxide (NO_2) *	µg/m³	24Hours	1.00	74.62	80.0	Optimal
Nitrogen Oxide (NO)*	µg/m³	24Hours	1.00	35.26	40.0	Optimal
NO_x*	µg/m³	24Hours	1.00	109.74	120.0	Optimal
Sulphur Dioxide (SO_2) *	µg/m³	24Hours	1.00	43.00	120.0	Optimal
Carbon Monoxide (CO)*	mg/m³	24Hours	0.01	1.06	05.0	Optimal
Particulate Matter (PM_{10})*	µg/m³	24Hours	1.00	146.00	150	Optimal
Particulate Matter ($PM_{2.5}$) *	µg/m³	24Hours	1.00	68.10	35	High

Sr. No.	Time	Ambient Temperature ^0C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
1	11:00	21	S	4.2	52	761.1
2	12:00	22	S	4.1	53	761.2
3	13:00	19	S	1.8	55	761
4	14:00	20	S	2.5	56	761.3
5	15:00	18	S	2.2	54	761.4
6	16:00	17	S	2.3	53	761.5
7	17:00	15	S	3.6	51	761.2
8	18:00	15	S	3.4	50	762.2
9	19:00	16	S	3.1	52	762.3
10	20:00	14	SW	2.8	54	762.4
11	21:00	13	SW	2.9	56	762.4
12	22:00	14	SW	1.6	53	762.5
13	23:00	14	SW	1.2	51	762.6

Sr. No.	Time	Ambient Temperature ^{0}C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
14	00:00	16	SW	1.5	48	762.6
15	01:00	17	SE	2.2	47	762.3
16	02:00	14	SE	2.0	45	762.3
17	03:00	13	SE	4.3	42	761.5
18	04:00	15	SE	4.4	43	761.5
19	05:00	15	SE	4.8	45	761.8
20	06:00	18	SE	5.1	47	761.8
21	07:00	19	SE	3.5	49	761.8
22	08:00	20	SE	3.1	50	761.9
23	09:00	21	SE	4.3	52	761.9
24	10:00	20	SE	4.4	52	761.9

The above results show that the value of $PM_{2.5}$ for 24 hours average is exceeded above the PEQS during the traffic blockage.

5.9.3 Noise Levels

Major sources of noise generation are operations due to vehicular traffic & neighbouring industrial activities. Noise levels were monitored for the period of 24 hour at proposed underpass at Samanabad Mor. The detail noise level report is attached as Annex VIIII while the results are presented below-:

Table 5-8, Noise Levels at Project Site

Sr. No.	Time	Noise dB(A)*		PEQS
1	11:00	83	Day Time	65
2	12:00	82		
3	13:00	81		
4	14:00	82		
5	15:00	83		
6	16:00	81		
7	17:00	80		
8	18:00	80		
9	19:00	76		
10	20:00	73	Night Time	55
11	21:00	74		
12	22:00	76		
13	23:00	72		
14	00:00	70		
15	01:00	74		
16	02:00	74		

Sr. No.	Time	Noise dB(A)*		PEQS
17	03:00	73		
18	04:00	72		
19	05:00	74	Day Time	65
20	06:00	78		
21	07:00	82		
22	08:00	85		
23	09:00	81		
24	10:00	80		

The results show that the 24 hours noise levels are much higher than the PEQS. The results also show the high noise levels during the traffic blockage.

5.10 TESTING TEAM

All laboratory tests for water, noise and ambient air were conducted by AES (Asian Environmental Services Private Limited) which is certified laboratory form EPA-Punjab. The testing team of expertise is presented in **Table 5-9**.

Table 5-9, Testing Team

1	Dilbar Hussain	Chief Chemist	M.Phil. Analytical Chemistry, University of The Punjab M.Sc. Chemistry, University of The Punjab
2	Sajjad Hussain	Lab Analyst/ Chemist	M.Sc. Applied Chemistry, UET Lahore
3	Ashir Shahbaz	Lab Analyst/ Chemist	Bs. Chemistry (Analytical), University of the Punjab
4	Haider Ali	Microbiologist/Research Analyst	BS Microbiology, University of Lahore
5	Bilal Hameed	Field Environmentalist	M.Sc. Environmental Engineering– National University of Sciences and Technology

5.11 SITE SUITABILITY

The proposed project is in Lahore area where transportation activities are already going on. Due to traffic congestion, there is need to construct underpass at Samanabad Morrwhich divides the traffic of Samananad Main Boulevard and Main Boulevard Gulshan e Ravi. There is no major vegetation cover to clear so land is most suitable for our proposed project. Site will be restored after completion of project. All mitigation measures will be taken and plantation will also be done. Existing plants will be transplanted to some other site.

SECTION - 6: IMPACT ASSESSMENT

6.1 METHODOLOGY FOR IMPACT IDENTIFICATION

The EMP has been divided into the following sections:

- Review of regulatory requirements and applicable standards
- Mitigation Management Matrix (MMM)
- Institutional Arrangements for Implementing the EMP
- Roles and Responsibilities of the different agencies.
- Environmental Monitoring Plan
- Change Management Plan (CMP)
- Site Restoration Plan
- Communication and Documentation
- Traffic Management Plan (TMP)
- Plantation Plan (PP)
- Environmental Management and Monitoring Cost
- Training Program

During the preparation for the project construction phase the future contractors must be notified and prepared to co-operate with the executing agency, project management, supervising consultants and local population in the mitigation of impacts. Furthermore, the contractor must document and implement the EMP in full and be ready to engage trained environmental management staff to audit the effectiveness and review mitigation measures as the project proceeds. The effective implementation of the EMP will be prepared and must be audited and this will be considered as the most important part of planning. In this regard the proponent must fulfil the requirements of the law and guidance prepared by EPA on the environmental aspects of power projects and the recommendations already made for projects in this EIA and under EIA/IEE regulation and Punjab Environmental Protection Act (2012).

For impact identification, various EIA methodologies are available including the checklists, interaction matrices, networks and overlays. Among these four methods, following three are used in EIA of underpass at Samanabad Mor.

- Project Interaction Matrix
- Checklists
- Overlays

Interaction matrix is a two-dimensional matrix wherein the project actions are placed along one axis (i.e. along y-axis) and on the other axis there are different environmental parameters likely to be affected by the proposed

project actions grouped into categories i.e. Physical, Ecological & Socio-economic Environment. Interaction matrix is used in this project due to the following reasons:

- It provides cause-effect relationship between the project actions and resulting consequences impacts.
- It provides nature (+ve or –ve) and weighting of different impacts.
- It provides cumulative impacts of a project.

Matrix grouped project actions into temporal phases. For the impact assessment, project interaction matrix is used by dividing the project action into different phases (Preconstruction, construction and operation). The environmental impacts are divided into three main categories including physical, ecological and socio-economic domains. The environmental impacts of the project actions are identified and weighed into the following categories:

+3 = Extremely Beneficial

+2 = Potentially Positive

+1 = Slightly Positive

0 = Insignificant

-1 = Slightly Negative

-2 = Potentially Negative

-3 = Extremely Negative

The assignment of significance is based on the previous knowledge and professional judgment of EIA team experts. The project impact matrix has been developed and attached in Annexure-III. It may be noted that the environmental parameters, which are not related to the implementation of the projects, have not been considered in the matrix.

6.1.1 Checklist

The assignment of significance is based on the previous knowledge and professional judgment of EIA team experts. The project Checklist has been developed for "without" and "with mitigation" is attached as Annex IV. It may be noted that the environmental parameters, which are not related to the implementation of the projects, have not been considered in the matrix.

6.1.2 Overlays

In order to identify spatial based impacts, overlays were used. An overlay is based on a set of transparent maps, each of which represents the spatial distribution of an environmental characteristic (for example, susceptibility to erosion). Information for an array of variables is collected for the standard geographical units within the study area, and recorded on a series of maps,

typically one for each variable. These maps are overlaid to produce a composite. The resulting composite maps characterize the area's physical, social, ecological, land use and other relevant characteristics, relative to the location of the proposed development.

The existing land use map of the project site has been overlay with the master plan of the proposed underpass at Samanabad Mor. The impacts on social and bio-physical environment have been analysed through the development of new map.

6.2 CHARACTERISTICS OF IMPACTS

The predicted impacts have been characterized; various aspects of the impact characterized include:

- Nature (direct/indirect)
- Duration of impact (Short term, medium term, Long term)
- Geological extend (local, regional)
- Timing (Project phase)
- Reversibility of impact (Reversible/Irreversible)
- Likelihood of the impact (certain, likely, unlikely, rare)
- Impact consequence severity (major, moderate, minor)
- Significance of impact (High, medium, low)

The above aspects of environmental characterization are defined in **Table 6-1**.

Table 6-1, Impact Characterization

Nature	**Direct:** The environmental parameter is directlychanged by the project. **Indirect:** The environmental parameter changes as a result of change in another parameter
Duration of Impacts	**Short-term:** lasting only for the duration of the project such as noise from the construction activities. **Medium-term:** Lasting for a period of few months to a year after the project before naturally reverting to the original condition such as loss of vegetation due to clearing of campsite, contamination of soil or water by fuels or oil. **Long-term:** lasting for a period much greater than medium term impact before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical Extent	Local, regional (spatial dimension)
Timing	Construction and Operation
Reversibility of Impact	**Reversible:** when a receptor resumes its pre-project condition.

	Irreversible: when a receptor does not or cannot resume its pre-project condition.
Likelihood of the Impact	**Almost Certain:** Impact expected to occur under most circumstances. **Likely:** Impact will probably occur under most circumstances. **Possibly:** Impact may possibly occur at some time. **Unlikely:** Impact could occur at some time. **Rare:** Impact may occur but only under exceptional circumstances.
Impact Consequences severity	**Major:** When an activity causes irreversible damage to a unique environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora and fauna: has long term effects (period of years) on socioeconomic activities of significance on regional level. **Moderate:** When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of flora or fauna: have short-term effects (period of years) on socioeconomic activities of significance on regional level. **Minor:** When an activity causes short-term (period of a few months), reversible damage to a unique environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period; has short-term (period of months) effects on socioeconomic activities of local significance. **Negligible:** when no measurable damage to physical, socioeconomic, or biological environment above the existing level of impact occurs.
Significance of Impact	**Categorized as High, Medium, Low** Based on the consequence, likelihood, reversibility, geographical extent, and duration: level of public concern: and conformance with legislative of statutory requirements.

SECTION - 7: POTENTIAL ENVIRONMENTAL IMPACT AND MITIGATIONS

7.1 GENERAL

This Chapter provides an overall approach for managing and monitoring the environmental issues and describes the institutional framework and reporting mechanism to implement the Environmental Management Plan (EMP) for the construction of underpass at Samanabad Mor. The EMP has been prepared with the following objectives:

- Provide the details of the project impacts along with the proposed mitigation measures, and a corresponding implementation schedule.
- Define the roles and responsibilities of the project proponent, contractor, and supervisory consultants in order to effectively communicate environmental issues among them.
- Frame a monitoring mechanism, reporting frequency, auditing mechanism and identifying monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented.
- Define the requirements necessary for documenting compliance with EMP and communicating it to all the concerned regulatory agencies. Chapter identifies the potential impacts related with Preconstruction, construction and operation phases of the Project on the physical, ecological and socio-economic domains of the environment. Accordingly, mitigation measures have been proposed to mitigate the negative impacts and to enhance the positive impacts.

7.2 ENVIRONMENTAL IMPACTS AND THEIR MITIGATION DURING PRE-CONSTRUCTION PHASE

7.2.1 Environmental Impacts Regarding Project Location & Design

As already discussed in the location alternative that most of the current site is already under Govt. control and this location is best suitable with reference to studied dimensions of traffic flow, emergency ambulance service. Therefore, it is established that this location is the best for development of underpass at Samanabad Mor.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Land Acquisition and Resettlement	Direct	long term	Local	Reversible	Unlikely	Minor	Low

Mitigation

As all the land is already under control of Govt. so no mitigatory measures are required to be discussed. There would be resettlement issues, only 2 Kanals will be acquired, which will be compensated as per land acquisition act 1894. Traffic diversion plan will be provided, because the underpass at Samanabad Morrwill disturb the traffic flow.

7.3 ENVIRONMENTAL IMPACT AND THEIR MITIGATION DURING CONSTRUCTION PHASE

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
Construction Stage					
Physical Environment					
1.	▪ Soil erosion may take place in the camp areas as a result of improper runoff drawn from the equipment washing. ▪ Soil contamination may take place due to the generated solid waste at camp site in addition to oil spillage and use of chemicals at site. ▪ Scarified/scraped materials, which are not disposed off properly, may contaminate soil resources.	▪ Good engineering practices should be adopted by Contractors, which will help to control soil erosion both at the construction sites, particularly at camp areas and overhead structures ▪ Soil contamination can be curtailed by reducing the oil spill in the camp as well as at project construction areas, proper solid waste management and placing chemical containers in caissons. ▪ The Contractor is required to impart proper training to his workforce in the storage and handling of hazardous materials, like furnace oil, diesel, petrol and chemicals, etc. that can potentially cause soil contamination.	CC	LDA/SC	▪ Equipment washing method and frequency to be regulated/controlled. ▪ Vegetation to control erosion. ▪ Placement of solid waste storage containers at camp sites. ▪ Collection and disposal into LWMC containers.
2.	▪ Due to construction activities i.e. drilling, excavation and dumping of soil, chemicals, oil, lubricants, detergents, etc. surface water and ground water quality can be slightly deteriorated. ▪ Sewage is generated from	▪ Construction camps should be developed in area having natural drainage and its sewage will be disposed off using septic tank. ▪ Construction should be done only on the required land and with minimum disturbance due to oils and lubricants so that the natural drainage will be	CC	SC	▪ Septic Tanks

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
	the construction camps. This may contaminate surface and groundwater, if not disposed off properly.	prevented. ▪ Avoid accidental spills of oils and lubricants through good practice and develop emergency response plans and procedures.			
3.	▪ A Number of machinery and equipment is in operation for the construction of Underpass at Samanabad Morrlike batching plants, dumping trucks, road rollers, graders, haul trucks etc. generating noise, particulate matter (PM10), smoke, dust, CO, and NOx in the ambient air which may deteriorate the air quality and cause impacts on human health, fauna and flora. ▪ Due to movement of trucks and other vehicles noise and vibration may increases and residents of the nearby settlements may get affected especially at night time.	▪ Maintenance of vehicles should be made mandatory to reduce the emissions of CO, and Hydrocarbons (HC). ▪ Emissions from the batching plants should be controlled with appropriate control equipment such as water sprinkler. Or state of the art batching plant will be installed with built in water showering system. ▪ Equipment and vehicles powered with diesel should be well maintained to minimize particulate emissions. ▪ Haul-trucks carrying, sand, and aggregate and other materials should be kept covered during transportation of materials and during storage on site, with tarpaulin to contain the construction materials being transported within the body of each carrier between the sites. ▪ It will be ensured that equipment is well maintained to avoid excessive vibration.	CC	SC	▪ Regular tuning of construction equipment and vehicles. ▪ Covering of construction material with tarpaulin.

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
6.	▪ The estimated quantity of sewage from each camp is 8160 gallons of sewage per day based on 120 No. of laborers and taking 80 gpcd as water demand. So, total water consumption is about 9600 gallons per day. ▪ Sewer drain is already existing near project site.	▪ The generated sewage is being disposed off in the soakage pit constructed nearby the camp area however; the dept. of the soakage pit should be such that it should not contaminate ground water.	CC	SC	▪ Checking of soakage pit constructed for sewage.
Ecological Environment					
1.	▪ About 65-70 Mature trees are present in project area that will be cut or transplanted in nearby area.	▪ Maximum of these trees will be transplanted to some suitable place. In case of any tree is to be cut, 10 trees will be installed. ▪ Client will communicate to PHA for Plantation. ▪ The shade tolerant plants would be planted to compensate nearby tree damage.	LDA/CC	LDA	▪ LDA should strictly monitor the nearby trees and road side Plantation.
2.	▪ On account of movement of heavy machinery for construction purposes, fauna of the area especially reptiles may either get killed or move to adjoining places. ▪ Avifauna will be disturbed and scared away due to noise created by heavy	▪ Over speeding shall be prohibited and construction machinery, vehicles and equipment should remain confined within their designated areas of movement to avoid and minimize any accidental killing of fauna. ▪ Wastes of the camps should be properly disposed off. ▪ Hunting, poaching and harassing of	CC	LDA/SC	▪ Restriction of use for high noise generating vehicles. ▪ Vehicle speed should be as lower as required for operation. ▪ Regular monitoring of activities of labor staff.

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
	cranes, trucks, trolleys and excavators. ▪ Eatables and refuse goods of the contractor's camps may attract wildlife, that might be hunted by the workers or staff employed by the Contractor,	wild animals and birds should be strictly prohibited.			
Social Environment					
1.	▪ The project construction may result in lot of indoor and outdoor dust and breathing problems		CC	LDA/SC	▪ Proper monitoring of the disturbed structures and actions to be taken.
2.	▪ During the construction phase, the general mobility of the population using the roads in and around the Project Area will be hindered. ▪ People will face the noise and dust problems during the construction phase especially for the nearby residents.	▪ Effective construction controls may be made by the Contractor to avoid inconvenience to the population due to noise, smoke and fugitive dust. ▪ Temporarily, the Contractor should select specific timings for heavy machinery operation so as to cause least disturbance to the population considering their peak movement hours.	CC	LDA/SC	▪ Sprinkling of water in dust affected areas as per schedule
3.	▪ Construction activities, particularly excavation and movement of haul trucks and machinery may prove dangerous for safety of the	▪ Contractor will ensure the provision of medicines, first aid kits, emergency vehicles, etc. at the work place. ▪ Training of workers in the construction safety procedures, environmental	CC	LDA/SC	▪ Instruct Staff of the Contractor to strictly follow the HSE policies of the company

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
	workers as well as for the residents. ▪ Contractor's staff while working on the high-rise columns, transoms, etc. may slip and get injured.	awareness, equipping all construction workers with safety boots, helmets, gloves, ear plugs, and protective masks, and monitoring their proper and sustained usage.			
Operation Stage					
Ecological Environment					
1.	▪ With the improved flora of the tract, due to raising of additional plants and raising of ornamental trees and shrubs within the loops of the project and space between the loops, the fauna and especially the avi-fauna shall be attracted to the area, adding to the scenic beauty of area. ▪ The birds which were scared away due to noise and degradation of their habitat shall return or start visiting the area again so there will be a positive effect on fauna.	▪ Extensive planting will be carried out in the Project Area, after completion of the project to compensate nearby tree stomata damage earlier. ▪ With the increased vegetation and improved habitat, the fauna, especially the avifauna, which had migrated to adjoining areas, shall return to their old dwellings.	LDA	Pak-EPA	Tree Plantation

7.3.1 Physical Impacts

A) Soil contamination

- Soil Construction activities such as excavation, filling and disposal of materials (both solid and liquid) will affect the existing soil conditions in the Project Site and in its nearby surroundings. Spillage from the generator or from moving vehicle will cause contamination of soil at construction sites.
- Construction Camp site will generate about 0.5 kg/person/day solid wastes from site camps and construction debris from construction activities. Although quantity of waste is much less, inappropriate disposal methods will have a negative impact on the physical environment of the project area.
- During the construction stage of the project, large quantity of waste materials, chemicals, fuel and lubricants will be used apart from the generation of solid waste and liquid waste from the construction camps. Fuels and chemicals will be stored at the site for their immediate use, which will contaminate the soil.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Soil Contamination and Erosion (Construction Phase)	Direct	Short Term	Local	Reversible	Likely	Minor	Low

Mitigation

Good engineering practices will help in controlling soil erosion at construction sites. Following measures will be adopted as per site conditions:

- Soil contamination can be curtailed by reducing the oil spill at project construction areas by well maintaining the construction vehicles as well as generators.
- The Contractor is required to impart proper training to his workforce in the handling and proper disposal of solid waste.
- Proper drainage facility will be provided to avoid the water accumulation, which will minimize the soil contamination.
- Ground shall be levelled to avoid slopes.
- Proper solid waste management plan should be developed by the Contractor and implemented to avoid the litter and any other waste problems.

7.3.2 Contamination of Surface and Groundwater Resources

- Sewage is generated from the construction camps. This may contaminate surface water, if not disposed off properly.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Ground Water Contamination (Construction Phase)	Direct	Medium Term	Regional	Irreversible	Unlikely	Moderate	Medium

7.3.3 Mitigation Measures of Impacts on Water Resources

Sewage from construction camp will be disposed off using septic tank which has been designed properly keeping in view the following parameters:

- Soil stratigraphy at site
- Depth of groundwater table
- Discharge of sewage from construction camp

The septic tank has been designed by the Design Consultant according to the relevant standards. The example of the septic tank is shown in **Figure 8-1**.

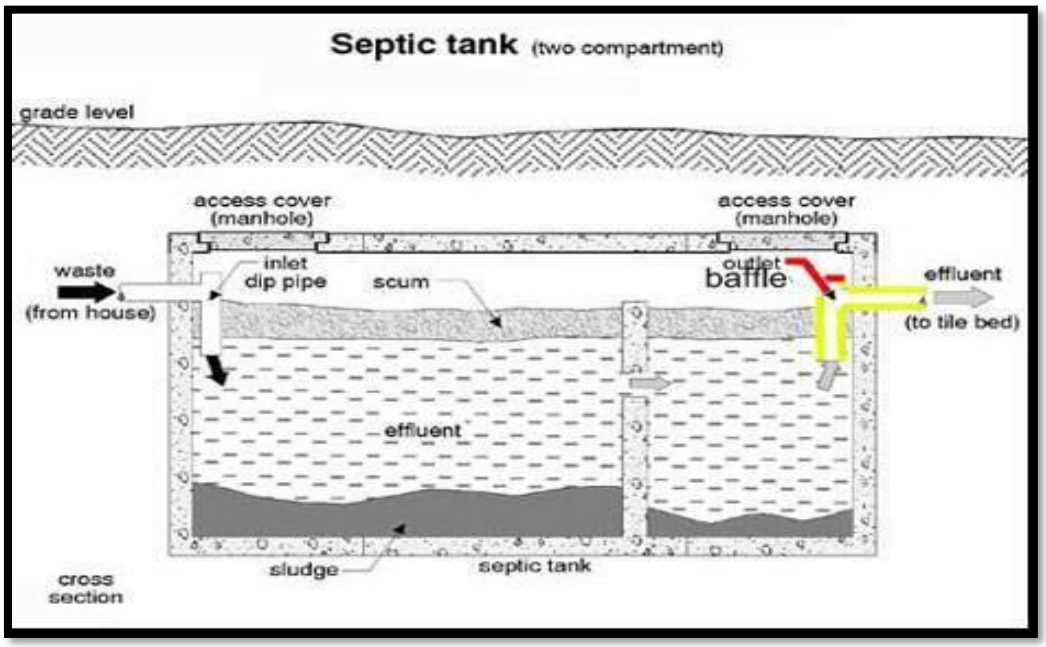


Figure 8-1, Septic tank

- During the construction of underpass at Samanabad Mor, the Contractor should instruct its staff not to throw any of the waste and

the other scarified/scrapped materials directly into the nullah or canal passing from or nearby project area in order to avoid contamination.

- Construction camps should be established in areas with adequate natural drainage channels in order to facilitate flow of the effluents.
- Avoid accidental spills of oils and lubricants through good practice. Prepare and implement Emergency Response Procedures in case of any spill hazard.

7.3.4 Impact on Ambient air quality

Due to the construction activities like excavation, clearing, levelling and compaction with the use of machinery like batching plants, excavators, dump truck and other transport vehicles etc. Most of these are using diesel engines that generate noise and exhaust emissions. The possibility of exhaust emissions increases when old vehicles/plants are utilized for the execution purposes. Generally, the above activity is generating particulate- matter (PM10), smoke, dust, CO and NOx in the ambient air, which is deteriorating the air quality and resulting in impacts on human health, road side fauna and flora. The movement of heavy machinery and vehicles on the dirt tracks is also causing dust emissions. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Air Quality Deterioration (Construction Phase)	Direct	Short term	Local	Reversible	likely	Minor	Medium

Mitigation Measures of Impacts on Ambient Air Quality

- Tuning of vehicles should be made mandatory to reduce the emissions of NOx, SOx, CO and PM10.
- Equipment and vehicles powered with diesel should be well maintained to minimize particulate emissions.
- Haul-trucks carrying, earth, sand, aggregate and other materials should be kept covered during transportation of materials and during storage at site, with tarpaulin.

- The fugitive dust emission will not be a problem because the roads are paved but for the precautionary measure sprinkling of water by water sprinklers will be done.

7.3.5 Impact on Ambient Noise Levels & Vibration

During the implementation of the project a large amount of equipment and construction machinery will be utilized for construction. The equipment would include excavators, concrete mixer, trucks and other machinery and vehicles. The operation and movement of such equipment will increase the noise and vibration in the Project Area and Neighbourhood residential may be disturbed by the noisy activities. The impact will be significant when compared to the without project situation.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Noise (Construction Phase)	Direct	Short term	Local	Reversible	likely	Minor	Medium

Mitigation Measures of Impacts on Noise & Vibration

- For the construction machinery generating noise level in excess of that prescribed in PEQS and WHO limits, Contractor will make arrangements to bring the noise level within applicable limits (including proper tuning of vehicles and mufflers/silencers). Movements of the trucks and other construction machinery causing high noise levels must be restricted at night time to avoid disturbance to the nearby locality. Truck drivers should be instructed not to play loud music especially at night and stop use of horn.

7.3.6 Disposal of Construction Debris & Garbage

During construction phase of the Project, construction waste will produce, the disposal of which, if not managed properly could have negative impacts on the site and surrounding areas. Clearing of shrubs and grass could pose a fire hazard on location and affect air quality if burned. Construction materials including concrete waste, steel, plastics etc. could be dispersed that may result in the blockage of drainage channels if not disposed off at approved disposal sites.

Mitigations

- A site waste management plan should be made the responsibility of the construction contractor to provide for the designation of appropriate waste storage area on the site and a schedule for the

timely collection and removal of construction debris to an approved dump site.

- The construction waste will be disposed on approved landfill site from Punjab-EPA
- The organic waste produced during site clearing should be mechanically mulched and composted at the site and used for landscaping.
- Arrangements should be made for regular garbage collection and removal of sewage from the construction site.

7.3.7 Traffic annoyance

Due to construction activities, there is an increase in traffic flow on link roads for regular income and outgoing of construction vehicles. Due to increase in the traffic flow the locals may be affected in respect of traffic delays in and around the project site

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Traffic Annoyance (Construction Phase)	Direct	Short Term	Regional	Irreversible	Likely	Moderate	High

Mitigation

During the construction phase traffic control measurement will be implemented. All raw materials will be transported to the site at night time due to at night time traffic flow comparatively less in the project area.

7.4 ECOLOGICAL ENVIRONMENT

7.4.1 Impact on Flora

- As there are some trees present at the project site, however, nearby trees can be affected due to dust emissions. About 65-70 Mature trees are present in project area that will be cut or transplanted in nearby area.
- Traffic congestion during construction activities, people usually find ways towards the nearby green belt areas especially people at motor bicycles. The vegetation along road side and green belts will be vulnerable at that stage.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Impact on trees	Direct	Medium Term	Regional	Irreversible	Likely	Moderate	High

Mitigation

Plantation in nearby areas should be monitored and revived in case of damage to trees. Furthermore, shade tolerant plants would be planted. The plants which will be cut, transplanted in nearby area.

7.4.2 Indirect effect on wild plants and birds

No vegetation is present at the project site, nearby green belt and trees along road side around construction area would be indirectly affected.

7.5 SOCIO-ECONOMIC ENVIRONMENT

7.5.1 Influx of Construction Workers

For the construction of proposed project, the contractors are likely to use unskilled labour drawn from local community but use of specialized construction equipment will require trained personnel not likely to be found locally. Therefore, sudden and relatively short-lived influxes of construction skilled workers to communities near the project site may have the potential to skew certain demographic variables, privacy and the traditional social coherence.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Influx of Construction Workers	Direct	Medium	Local	Reversible	Possibly	Minor	Low

Mitigation Measures

- Preference to be given to locals for construction work
- Local suppliers for machineries and construction materials to be given preference
- Local transporters to be preferred for transportation of machinery/ material
- To train unskilled local workers, short term skill development courses to be organized in the area

7.5.2 Heritage Structures

There is no heritage, historical, cultural or archaeological structure in the area around the project site. Therefore, no impact is anticipated due to construction of underpass at Samanabad Mor. Hence, no mitigation measures is required.

7.5.3 Protected Areas

Based on the social surveys and GIS maps it has been identified that there is no protected site exists in the proposed project. Therefore, no mitigation measures is required.

7.5.4 Impacts on Local Population

The population residing in and the surroundings of the Project Area will be affected during the construction phase as follows:

- Insecurity problems may arise for the local population due to the Contractor's workers during the construction phase
- Community may face the noise and dust problems during the construction activities.
- Theft problems to the community by the Contractor's workers and vice versa.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Issues to Local Population	Direct	Medium	Local	Reversible	Possibly	Moderate	Medium

Mitigations Measures of Impacts on Local Population/Workforce

- Contractor should select specific timings for heavy machinery operation so as to cause least disturbance to the population considering their peak movement hours.
- Effective construction controls may be made by the Contractor to avoid inconvenience to the population due to noise, smoke and fugitive dust.
- Haul-trucks carrying concrete, aggregate and sand fill materials will be kept covered with tarpaulin to help contain the construction materials being transported to the specific site.
- The heavy vehicles should not play loud music and horns during transporting material at night time

- The Contractor should warn the workers not to involve in any theft activities and if anyone would involve in such type of activities, he will have to pay heavy penalty and would be handed over to police. Similarly, at the time of hiring labour/workers, Contractor has to ensure that the workers should be of good repute/character.

7.5.5 Impacts on Public Health and Safety Hazard

- Construction activities, particularly excavation and movement of haul trucks and machinery may prove dangerous for the safety of the workers as well as for local residents.
- Contractor's staff while working on the high-rise columns, transforms, etc. may slip and get injured. Similarly, working at excavated areas may also cause injuries due to the failure of side slopes of excavation.
- The storage of all solid waste shall be practiced so as to prevent the attraction, harbourage or breeding of insects or rodents, and to eliminate conditions harmful to public health or which create safety hazards, odours, unsightliness or public nuisance.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Labor HSE Issues	Direct	Medium	Local	Reversible	Possibly	Minor	Low

Mitigation Measures of Impacts on Public Health and Safety Hazards

- Contractor will ensure the provision of medicines, first aid kits, emergency vehicles, etc. at the work place. Compliance with the safety precautions for construction workers as per International Labour Organization (ILO) Convention No. 62 will be ensured by the Contractor.
- Heath safety procedure is also prepared and will be implemented. Training of workers in the construction safety procedures, environmental awareness, and equipping all construction workers with safety boots, helmets, gloves, ear plugs, and protective masks, and monitoring their proper and sustained usage.

7.5.6 Positive Impacts

Following are the positive social impacts of the proposed project:

A) Impact on Traffic

The project intends to provide safe, speedy and uninterrupted traffic flow.

Lahore's infrastructure needs are mounting with growing population and increased urbanization. The increasing population has much traffic flow which needs sophisticated traffic management system and road infrastructure. The project is identified as underpass at Samanabad Morrfacility the route is a short access to the Samananad Main Boulevard and Main Boulevard Gulshan e Ravi, if underpass at Samanabad Morris built this will reduce the unwarranted congestion in the area and serve better connectivity in the city of Lahore.

B) Impact on travel time and fuel consumption

Furthermore, it will save the travel time and fuel consumption thereby saving valuable foreign exchange on fuel and spare parts.

Other positive impacts:

- Reduce the environmental pollution and improve the quality of life of the citizens.
- Accelerate development in business, education, social and general community services.
- Provide employment opportunities during the construction of the project.

C) Impact on Standard of Living

Standard of living means good living condition, happiness and satisfaction of people living near the proposed project. People living in the community will experience gradual changes brought about by the construction and full operation of the proposed underpass at Samanabad Mor. The experiences will have great impact on the quality of life of the people. Completion and operation of the proposed project will increase the transportation facility towards hospitals, institutes and nearby areas.

7.6 ENVIRONMENTAL IMPACTS AND MITIGATIONS MEASURES DURING THE PROJECT OPERATION

7.6.1 Air Emissions

- There are various key air emission sources due to vehicles.
- The dominant pollutant emissions to air associated above include Nitrogen Oxides (NOx), Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Carbon di oxide (CO_2), Sulphur di oxide (SO_2) and Particulate matter (PM). These pollutants may be increased in ambient condition due to operation of the project.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Air Emissions – Operational Phase	Direct	Medium Term	Regional	Reversible	Almost Certain	Moderate	Medium

Mitigation

In order to reduce the air emissions due to operation of the project following mitigation measures will be adopted.

- Banned all substandard fuel import, production and sale for vehicles.
- Regular monitoring on all emission sources should be done and measures will be taken if found non-compliance with PEQS.

With above mitigation measures it is also recommended that ambient air quality monitoring station should be installed at busy signal of proposed site in order to provide continuous monitoring of pollutants and generate the annual ambient air quality data. The data will be useful in analysing the ambient quality that should not be deteriorating in such a way that the pollutants may exceed the standard limit against the PEQS. If that happen then the emergency measures with the advice of the environmental experts should be implemented.

7.6.2 Noise

Noise has been identified as one of the most significant environmental aspects of project operations. People/workers, who are often exposed to or work in areas at traffic signals like traffic police more than 60 dBA may have health issues such as reduced learning capacity in children, sleep disturbance, psychological effects like irritation etc.

Impact	Nature	Duration	Geo Extend	Reversibility	Likelihood	Consequence	Impact Significance
Operational Phase – Noise	Indirect	Long Term	Local	Irreversible	Possibly	Moderate	High

Mitigation

Traffic police personnel will check and charge penalties for annoying horn and beep from vehicles (buses, cars, rickshaws, trucks etc.)

7.7 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

Besides the concrete measures to be adopted as described above, the quality of environment will further be enhanced through the running of project in complete accordance with the 5RS Principles- Reduce, Reuse, Recycle, Refurbish and Retrofit. Good waste management practices will be the order of the day. Some other environmental enhancement measures are as follow:

- Proper SOPs will be followed
- Machinery will be properly maintained
- Safety board will be properly placed
- PPEs will be issued to workers

SECTION - 8: ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

8.1 ENVIRONMENTAL MANAGEMENT PLAN

This Chapter provides an overall approach for managing and monitoring the environmental issues and describes the institutional framework and reporting mechanism to implement the Environmental Management Plan (EMP) for the Underpass at Samanabad Mor. The EMP has been prepared with the following objectives:

- Provide the details of the project impacts along with the proposed mitigation measures, and a corresponding implementation schedule.
- Define the roles and responsibilities of the project proponent, contractor, and supervisory consultants in order to effectively communicate environmental issues among them.
- Frame a monitoring mechanism, reporting frequency, auditing mechanism and identifying monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented.
- Define the requirements necessary for documenting compliance with EMP and communicating it to all the concerned regulatory agencies.

8.2 SCHEDULE OF IMPLEMENTATION

The completion duration of underpass at Samanabad Morris about 08 months.

8.2.1 Preconstruction phase

This phase includes:

- Site investigation & Evaluation
- Budgeting
- Design
- Schedules of working

8.2.2 Construction phase

This phase includes:

- Management team & Construction Crew
- Excavation
- Construction of Underpass at Samanabad Mor
- Mitigation during construction process
- Amenities and Development
- Managing safety
- Monitoring & Evaluation

8.2.3 Operational phase

This phase includes:

- Implementation of mitigation plan
- Implementation of safety plan
- Security management

8.3 ENVIRONMENTAL BUDGET

Environmental monitoring cost related to the mitigation measures of environmental parameters related to the location of construction site and activities, borrow materials, etc. will be the sole responsibility of the Contractor and he will take care of cost implications. All the measures related to environment will be taken from the cost defines for contingency.

8.4 INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATION OF EMP

The main institutions involved in the implementation and management of EMP will be as follows:

- Lahore Development Authority (LDA)
- Supervisory Consultants (SC)
- Construction Contractor (CC)
- Punjab Environmental Protection Agency (Punjab-EPA)

8.5 ROLES AND RESPONSIBILITIES

The key organizations will have the following roles and responsibility during the construction and operation stages:

8.6 CONSTRUCTION STAGE

During the construction stage, Construction Contractor (CC) will be mainly responsible for the execution of the mitigation measures. Supervisory Consultants (SC) will be responsible for the monitoring of the compliance with top supervision by the LDA designated staff as defined in MMM.

8.7 OPERATION STAGE

During the operational stage of the project, role of CC and SC will gradually decrease. During this phase of the project, implementation of recommendations of EMP and its supervision will be the responsibility of LDA with top supervision of PUNJAB-EPA as defined in MMM.

8.8 MITIGATION MANAGEMENT MATRIX (MMM)

This matrix identifies the environmental impacts of Underpass at Samanabad Morralong Samananad Main Boulevard and Main Boulevard Gulshan e Ravi during the construction and operation stages and establishes the linkages

between the environmental and social impacts, mitigation strategy and the agencies responsible for execution. The MMM presented in **Table 8-1** identifies the following:

- The mitigation measures recommended in EIA.
- The person/organization directly responsible for adhering to or executing the required mitigation measures.
- The person/organization responsible for ensuring and monitoring adherence to the mitigation measures.
- The parameters which will be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.

Table 8-1, Mitigation Management Matrix

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
Construction Stage					
Physical Environment					
1.	▪ Soil erosion may take place in the camp areas as a result of improper runoff drawn from the equipment washing. ▪ Soil contamination may take place due to the generated solid waste at camp site in addition to oil spillage and use of chemicals at site. ▪ Scarified/scraped materials, which are not disposed off properly, may contaminate soil resources.	▪ Good engineering practices should be adopted by Contractors, which will help to control soil erosion both at the construction sites, particularly at camp areas and overhead structures ▪ Soil contamination can be curtailed by reducing the oil spill in the camp as well as at project construction areas, proper solid waste management and placing chemical containers in caissons. ▪ The Contractor is required to impart proper training to his workforce in the storage and handling of hazardous materials, like furnace oil, diesel, petrol and chemicals, etc., that can potentially cause soil contamination.	CC	LDA/SC	▪ Equipment washing method and frequency to be regulated/controlled. ▪ Vegetation to control erosion. ▪ Placement of solid waste storage containers at camp sites. ▪ Collection and disposal into LWMC containers.
2.	▪ Due to construction activities i.e. drilling, excavation and dumping of	▪ Construction camps should be developed in area having natural drainage and its sewage will be	CC	SC	▪ Septic Tanks

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
	soil, chemicals, oil, lubricants, detergents, etc. surface water and ground water quality can be slightly deteriorated. ▪ Sewage is generated from the construction camps. This may contaminate surface and groundwater, if not disposed off properly.	disposed off using septic tank. ▪ Construction should be done only on the required land and with minimum disturbance so that the natural drainage will be prevented. ▪ Avoid accidental spills of oils and lubricants through good practice and develop emergency response plans and procedures			
3.	▪ A Number of machinery and equipment is in operation for the construction of underpass like batching plants, excavators, dumping trucks, road rollers, graders, haul trucks etc. generating noise, particulate matter (PM10), smoke, dust, CO, and NOx in the ambient air which may deteriorate the air quality and cause impacts on human health, fauna and flora. ▪ Due to movement of trucks and other vehicles noise and vibration may increases and residents of the nearby	▪ Maintenance of vehicles should be made mandatory to reduce the emissions of CO, Hydrocarbons (HC) and PM. ▪ Emissions from the batching plants should be controlled with appropriate control equipment such as water sprinkler. Or state of the art batching plant will be installed with built in water showering system. ▪ Equipment and vehicles powered with diesel should be well maintained to minimize particulate emissions. ▪ Haul-trucks carrying, sand, and aggregate and other materials should be kept covered during	CC	SC	▪ Regular tuning of construction equipment and vehicles. ▪ Covering of construction material with tarpaulin.

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
	settlements may get affected especially at night time.	transportation of materials and during storage on site, with tarpaulin to contain the construction materials being transported within the body of each carrier between the sites. ▪ It will be ensured that equipment is well maintained to avoid excessive vibration.			
4.	▪ The estimated quantity of sewage from each camp is 8160 gallons of sewage per day based on 120 No. of laborers and taking 80 gpcd as water demand. So, total water consumption is about 9600 gallons per day.	▪ The generated sewage is being disposed off in the soakage pit constructed nearby the camp area however; the dept. of the soakage pit should be such that it should not contaminate ground water.	CC	SC	▪ Checking of soakage pit constructed for sewage.
Ecological Environment					
1.	▪ About 65-70 Mature trees are present in project area that will be cut or transplanted in nearby area.	▪ Every possible effort shall be made to minimize the number of trees to be cut during construction stage. ▪ LDA will communicate with PHA for Transplantation of existing trees and also for planting new trees. ▪ The 10 trees will be planted in case of any tree to be cut.	LDA/CC	LDA	▪ LDA should strictly monitor the transplantation of the trees.
2.	▪ On account of movement of heavy machinery for	▪ Over speed shall be prohibited and construction machinery,	CC	LDA/SC	▪ Restriction of use for high noise generating vehicles.

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
	construction purposes, fauna of the area especially reptiles like Lizards and Snakes may either get killed or move to adjoining places. ▪ Avifauna will be disturbed and scared away due to noise created by heavy cranes, trucks, trollers and excavators. ▪ Eatables and refuse goods of the contractor's camps may attract wildlife, that might be hunted by the workers or staff employed by the Contractor,	vehicles and equipment should remain confined within their designated areas of movement to avoid and minimize any accidental killing of fauna. ▪ Wastes of the camps should be properly disposed off. ▪ Hunting, poaching and harassing of wild animals and birds should be strictly prohibited.			▪ Vehicle speed should be as lower as required for operation. ▪ Regular monitoring of activities of labor staff.
Social Environment					
1.	▪ During the construction phase, the general mobility of the population using the roads in and around the Project Area will be hindered. ▪ People will face the noise and dust problems during the construction phase especially for the nearby residents	▪ Effective construction controls may be made by the Contractor to avoid inconvenience to the population due to noise, smoke and fugitive dust. ▪ Temporarily, the Contractor should select specific timings for heavy machinery operation so as to cause least disturbance to the population considering their peak movement hours.	CC	LDA/SC	▪ Sprinkling of water in dust affected areas as per schedule

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
2.	▪ Ambulance service would be hindered and patients life threat in case of not to get to Govt. Samanabad hospital in time due to traffic jam	▪ LDA should compensate the households losing their livelihood and also provide an alternative site for their business.	CC	LDA/SC	▪ Alternative routes shall be defined with the help of LDA and traffic police staff.
3.	▪ Construction activities, particularly excavation and movement of haul trucks and machinery may prove dangerous for safety of the workers as well as for the residents. ▪ Contractor's staff while working on the high-rise columns, transoms, etc. may slip and get injured.	▪ Contractor will ensure the provision of medicines, first aid kits, emergency vehicles, etc. at the work place. ▪ Training of workers in the construction safety procedures, environmental awareness, equipping all construction workers with safety boots, helmets, gloves, ear plugs, and protective masks, and monitoring their proper and sustained usage.	CC	LDA/SC	▪ Instruct Staff of the Contractor to strictly follow the HSE policies of the company
Operation Stage					
Ecological Environment					
1.	▪ With the improved flora of the tract, due to raising of additional shade loving plants within the loops of the Samanabad Morrand space between the loops, adding to the scenic beauty of area.	▪ About 100 trees are present at project site. Shade loving planting will be carried out in the Project Area, after completion of the project to enhance the ethnicity and Oxygen O2. The detail of plantation is provided in Plantation Plan.	LDA	Punjab-EPA	▪ Shaded Plantation

Sr. No.	Anticipated Impacts	Mitigation Measure	Responsibility		Action/Monitoring Parameter/Monitoring Method
			Execution	Monitoring	
		▪ With the increased vegetation and improved habitat, the invertebrates like snails, insects and pigeons, especially the avifauna, which had migrated to adjoining areas, shall return to their old dwellings. Project can act as a nesting and resting place for pigeons.			

8.9 INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATION OF EMP

The main institutions involved in the implementation and management of EMP will be as follows:

- Lahore Development Authority (LDA)
- Supervisory Consultants (SC)
- Construction Contractor (CC)
- Punjab Environmental Protection Agency (Punjab-EPA)

8.10 ROLES AND RESPONSIBILITIES

The key organizations will have the following roles and responsibility during the construction and operation stages:

8.11 CONSTRUCTION STAGE

During the construction stage, Construction Contractor (CC) will be mainly responsible for the execution of the mitigation measures. Supervisory Consultants (SC) will be responsible for the monitoring of the compliance with top supervision by the LDA designated staff as defined in MMM.

8.12 OPERATION STAGE

During the operational stage of the project, role of CC and SC will gradually decrease. During this phase of the project, implementation of recommendations of EMP and its supervision will be the responsibility of LDA with top supervision of PUNJAB-EPA as defined in MMM.

8.13 ENVIRONMENTAL MONITORING PLAN

8.13.1 Objectives

The objectives of the environmental monitoring during the construction and operation stages are as follows:

- To check compliance with the requirements of the EMP by monitoring activities of the project contractors. This will be called Activity Monitoring.
- To monitor actual impacts of the project activities on physical, ecological and socioeconomic receptors of the Project Area so that any impacts not anticipated in the EMP or impacts which exceed the levels anticipated in the EMP can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through effects monitoring.
- To achieve these objectives, the following monitoring program will be implemented.

8.14 MONITORING STAGE

8.14.1 Activity Monitoring

Activity monitoring will be carried out to ensure compliance with the requirements of the EMP.

The MMM will be used as a management and monitoring tool. Activity monitoring will be the responsibility of all organizations involved in the operation, i.e., LDA, Project Consultants and the Contractors and hence it will be done at three levels:

- Activity Monitoring by LDA
- Activity Monitoring by Consultant's field monitors
- Activity Monitoring by the Contractor's officers

The Contractors will report compliance with the MMM to SC and LDA for verification. At least one field monitor from LDA/SC will remain on-site for activity monitoring during the construction period. Any non-compliance observed by SC will be recorded on non-compliance recording forms.

8.14.2 Effects Monitoring

Effect's monitoring will be the responsibility of LDA. Monitoring requirements have been outlined in the EMP. However, a detailed monitoring program is attached as **Table 8-2**. The monitoring program describes in detail the resources and methodology that will be adopted for the purpose of Effects Monitoring.

Physical Environment will target at identifying project impacts on:

- Water
- Noise
- Air monitoring

Protocol is provided in the matrix given in **Table 8-3**.

8.14.3 Ecological Environment

Effects on ecological environment such as flora and fauna will be monitored. Plantation will be welcome in case of any damage to nearby tree.

8.14.4 Socio-economic Environment

Effects on the socio-economic environment will be monitored by the consultants who will conduct survey both during construction and operation stage. The surveys will be structured to ascertain the level of impacts during the course of the project and the implementation of mitigation measures prescribed in the EMP such as health and safety of communities.

Table 8-2, Recommended Activity Monitoring Protocol for Physical, Ecological and Social Environment

Parameter/Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Water Quality	▪ At existing Nullah ▪ Concrete preparation plants ▪ Worker's camp ▪ Disposal areas of earth fill or solid waste ▪ Fuel (Petrol. Oil and Grease) products storages ▪ Vehicle and machine repairing and servicing yards.	Discrete grab sampling and laboratory testing of water samples.	▪ Sampling and laboratory testing should be done on Monthly basis during the construction and annually during the operational stage. ▪ Discharges from the construction sites should be tested for temperature, pH and turbidity. ▪ Treated effluent discharges from the worker's camp to be tested for pH, TSS and BOD5. ▪ Outlet and drains from the mechanical repair units should include testing for pH, turbidity, lead, hydrocarbons, oil and grease.
Dust Emissions	▪ Tracks along the earth roads i.e. slip roads and loops during construction period.	Visual checks	▪ Daily visual monitoring during routine monitoring by activity monitors and reported on a monthly basis during the construction period.
Noise Levels	▪ Camp sites, ▪ Selected locations along the access track.	Noise meter	▪ Quarterly during the operational stage.
Stack emission	▪ Silencers of heavy machinery, trucks and other vehicles. ▪ Stack monitoring of Asphalt Plants.	Monitoring of ambient air quality in ppb.	▪ Monthly monitoring of air pollution parameters including PM, NOX, SOX, CO, Hydrocarbons during the construction period, and annually during the operation stage only for ambient air

Parameter/Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Ecological Environment			
Nearby vegetation along road side	▪ In all Project Area i.e. for preparation of underpas during the construction stage and Project Area during the operation stage	Periodic visits at site to ensure that only those trees should be cut, which are demarcated for cutting and ensure that trees to be relocated are properly handled.	▪ Weekly during routine monitoring and reported on monthly basis during the construction period, and once in a year monitoring and reporting during the operation period.
Health of transplanted trees	▪ Entire Study Area and Areas of Transplantation.	Frequent visits of the site to record these five characteristics: new leaves and buds, leaf size, twig growth, trunk deformity, crown dieback.	▪ Weekly monitoring and reporting during the construction period, and once in a month monitoring and reporting during the operation period.
Socio-cultural Environment			
Inconvenience to community	▪ All around the Project Area	Consultations with community to get feedback about inconvenience due to the construction activities to perform their daily routine chores.	▪ Monthly monitoring and reporting during the construction period.

Table 8-3, Recommended Effects Monitoring Protocol

Parameter/Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Water Quality	▪ Sampling from the points located at a greater distance from the construction sites to ensure that they show the influence on a wider range of receiving body.	Sampling and laboratory testing of water samples.	▪ Sampling and laboratory testing should be done on monthly basis during the construction stage and annually during the operation stage.

Parameter/Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Air Quality	▪ Existing residential colonies and hospital near project site	Ambient air quality monitoring in ppb.	▪ Monthly air quality monitoring for NOX, SOX, CO, PM10 during the construction stage. ▪ Once a year during the operation stage.
Flora	▪ Cutting at Construction sites and near Labor camp site at construction stage and plantation sites during the operation stage	▪ Visual checking and consultations with locals ▪ Visual observations of the plant leaves at construction site and near vicinity to check possibility of stomata blockage due to dust and emissions deposition on the leaves of plants	▪ Monthly during construction and once a year during operation stage.

8.15 PROPOSE EMP REPORTING AND REVIEWING PROCEDURE

All the precautionary measures are suggested in EMP to minimize the pollution creating by construction and operation of project. Reporting and reviewing procedure is following:

- EIA Report & File Submission
- SIR Letter
- Review of EIA Report
- Issuance of Query letters by EPA
- Submission of satisfactory replies of Query Letter
- Public hearing
- Expert committee meeting and presentation
- DG EPA meeting and Presentation
- NOC issuance
- Proper Follow up of case from submission to Issuance of NOC

8.16 TRAINING PROGRAM

Environmental training for construction period will form part of the environmental management system. The training will be directed towards all personnel for general environmental awareness.

8.16.1 Objectives

The key objective of the training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the Project.

8.16.2 Roles and Responsibilities

SC will be responsible for conducting environmental training to all the Project personnel on potential environmental issues of the Project through Contractor, who will be responsible to arrange training and ensure the presence of targeted staff. SC will prepare a Project specific training manual for this purpose. Contractors on their part will be required to provide induction training/briefing to all their staff at the time of their recruitment and before the start of any activity in the Project Area. This will be followed by training arranged by the SC to all the targeted staff.

8.16.3 Training Log

A training log will be maintained by the SC. The training log will include;

- Topic
- Date, time and location
- Trainer

- Participants

8.16.4 Training Material

SC will develop and prepare training material regarding the environmental awareness, EIA and EMP. Training for the operation period will be planned by LDA in future. Separate training material will be prepared for each targeted staff and training program provided in Table 8-4 will be followed:

Table 8-4, Training Program

Staff	Trainers	Contents	Timing
Selected Management Staff of LDA, and CC	SC	▪ Environmental Sensitivity of the Project Area ▪ Plantation and community issues and related mitigation ▪ EMP communication, documentation and monitoring requirements	Prior to the start of any Project activity
All site personnel (including locally hired staff)	SC and CC	▪ Environmental Sensitivity of the Project Area ▪ Plantation and community issues ▪ Communication of environmental problems to appropriate officers ▪ Waste disposal	Prior to the start of Project activities
Construction supervisors and survey crew	SC and CC	▪ Environmental Sensitivity of the Project Area ▪ Vegetation and community issues and related mitigation ▪ EMP communication, documentation and monitoring requirements ▪ Good construction practices ▪ Community relations	Before the start of construction activities, monthly during construction period
Drivers	SC	▪ Road safety ▪ Road restrictions ▪ Vehicle restrictions ▪ Waste disposal ▪ Defensive driving	Before start of construction
Mechanics and Vehicle Repair Personnel	SC and CC	▪ Environmental control of vehicles and equipment ▪ Waste disposal	Prior to the start of construction
Restoration and Cleaning- up Team	SC and CC	▪ Restoration requirements	Prior to the start of restoration activity

SECTION - 9: STAKEHOLDERS' CONSULTATION

9.1 GENERAL

Public consultation is a systematic process, which provides an opportunity for planners, citizens, managers and selected representatives to share their experience, knowledge and concerns and perceptions about any proposed development. The objectives of the public consultation for the proposed Project are to:

- Share information with the stakeholders on the proposed Project works and their expected impact on the socio-economic environment of the Study Area.
- Understand the stakeholder's concerns regarding the various aspects of the Project, including the existing condition of the Study Area, upgrade requirements, and the likely impacts of the construction related activities and operation of the Project.

9.2 PROPONENTS ENVIRONMENTAL MANAGEMENT TEAM

Chief engineer will be taking charge of the proposed project. He will be managing health and safety issues as well as issues to locals.

9.3 RESPONSIBLE AUTHORITY

The LDA shall be the responsible authority for reviewing, site inspection and provision of environmental approval for the project.

9.4 MAIN VIEWS AND CONCERNS OF THE STAKEHOLDERS

During consultations, the people of the Study Area expressed their views and concerns about the Project. Findings of the consultations and main views and concerns about the construction of Underpass at Samanabad Morrare summarized below:

A) Views and Concerns of the Community residing in LDA Society

- Sprinkling of water should be done to reduce the dust.
- Noise of machinery may affect our health during the construction stage of the project.
- Travel time will ultimately be decreased in the operation stage of the project.
- This project is highly beneficial and it should be completed as early as possible.

B) Views and Concerns of Rickshaw and Wagon Drivers

- This project will help in reducing travel time resulting into saving of fuel cost.

- Provision of bus and Rickshaw Stand should be kept in the near vicinity of this project

C) Views and Concerns of nearby residents

- Traffic jams will be decreased.
- In order to reduce the dust problem, sprinkling of water should be done twice a day.

D) Views and Concerns of the people of Model town extension block-Q

Such kind of projects should be launched in the country as these projects play a major role in the development of the country.

We have no concern related to the project; however, some concerns regarding the poor situation of our locality are expressed hereunder:

During consultations, views of local stakeholders were assessed. Findings of the consultations and main views and concerns about the construction of Underpass at Samanabad Morrare summarized in **Table 9-1**.

Table 9-1, Views of the Local Stakeholders

Sr. No.	Name of Respondent	Father's Name	Concerns
1.	Akram Khan	Mukarram Khan	People will be facilitated by the project and the respondent was in favor of the project.
2.	Majeed Iqbal	Muhammad Iqbal	The respondent was agreed with the project only if proper diversion plans should be followed for the traffic.
3.	Sulman Amjad	Waqar Amjad	The respondent was in favor of the project. It will save time of local people as well as ambulance drivers, rickshaw drivers, bankers and students as well.
4.	Muhammad Sohail	Ghulam Rasool	The respondent was against the project. He expressed those kinds of projects always delayed and resulted in more traffic related problems during construction.
5.	Rana Imran	Imran Munir	The respondent is against the project due the expected traffic diversion issued.
6.	Bilal Nazir	Muhammad Nazir	The respondent was strongly in favor of the project because of job creation for labors during construction phase.

Sr. No.	Name of Respondent	Father's Name	Concerns
7.	Dilbar Hussain	Muhammad Hussain	Did not know much about the project but if the project will facilitate the local people then it will be extremely beneficial.
8.	Amir Ameen	Ameen ul haq	The project will cause air and noise pollution therefore not in favor.
9.	Saeed Amaad	Amaad Tallat	Respondent was a rickshaw driver and extremely in favor of project as this underpass would be a time saver for the traffic blockage.
10.	Irfanullah	Muhammad Ali Khan	If the project would be completed in under predetermined time then it is beneficial in long terms.
11.	Shahwaiz Ahmad	Ahmad Ali	Did not know about the impacts of the project.
12.	Muzamil Munir	Munir	The respondent was against the project because of noise pollution.
13.	Fatima Waqas	Waqas Sohaib	The respondent was in favor of the project.
14.	Bilal Qureshi	Anwar Qureshi	The respondent was enthusiastic about the project because it will decrease death rates due to ambulance stuck.
15.	Qalb-e-Momin	Nadeem Ashraf	If project will facilitate the local community, then it will be highly favorable.

9.5 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

Team of Asian Consulting Engineer visited the project site, had discussion with stakeholders and consulted with the local people of nearby to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably. People provide the massive information about the project and have positive remarks regarding the project development.

The Asian team have endeavoured to hold consultative sessions with a number of prominent stakeholders (Project Proponent, Government departments, line agencies, NGOs and affected persons of the Project Area) to evince their views on the project and their opinions, suggestions, understanding on various issues and concerns. The consultations aimed

specifically at:

- Dissemination of Project information through discussions, education and liaison.
- Eliciting the comments and feedback on the project.
- Documentation of information narrated by the stakeholders.
- Documentation of mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their addresses in the EIA/ EMMP.

9.6 AFFECTED AND WIDE COMMUNITY

A summary of the key issues raised by stakeholders and how these are being addressed by Project Proponent is provided in **Table 9-2** below.

Table 9-2, Summary of Issues and Commitments by Proponent

Issue	Aspect/ Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for herders as they generally have less skills and training.	Employment is the main priority of the project. Mostly locally skill and unskilled labours will be prioritized. Max. Persons according to the requirement will be employed.
Health & safety	Health and safety issues may be arising due to construction activity.	All possible safety measures will be taken during construction phase. Proponent will designate a person for HSE concern a.k.a. Emergency Response Teams (ERTs) and emergency equipment like spill kits, water hydrant system, effective use of PPEs and first aid are already well managed.
Local economy and business development	Local service providers are keen to participate in providing services to provide raw material and expect to receive in order to adjust their businesses to meet specific needs.	Proponent has main focus that they will all the material regarding construction to buy from the local market. This will help the local and small business and to people who are keen interested to become suppliers.
Environmental Issues	Dust and noise impacts, particularly from the construction activities are of concern to nearby areas. Environmental	Implementation of controls under the Environmental Management Plans, including on and off-site dust and noise monitoring. A Participatory Environmental

Issue	Aspect/ Concern raised by Stakeholders	Project Proponent Commitments
	degradation during construction.	Monitoring Program will be initiated to spread awareness.
Water quantity and quality	Water quality and quantity, and impacts from the wastewater disposal are all key concerns for nearby community.	Implementation of consultation in relation to water use and development of the Participatory Environmental Monitoring Program.

SECTION - 10: CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSION

EIA Study was conducted for the proposed Underpass at Samanabad MorrLahore which included field surveys, establishment of baseline conditions, possible quantification of anticipated impacts (positive and negative) together with mitigation measures and development of EMP.

It can be concluded that by implementation of the proposed Underpass at Samanabad MorrFacility, there will be a relief for people daily using the road and facing traffic jams at the main circular diversions. The project will mostly have positive impacts during operations, but some short term insignificant negative impacts due to the construction of the project are also envisaged. These impacts can be easily mitigated as described in the report. The phase wise impacts and mitigations are summarized below:

10.2 CONSTRUCTION STAGE

The potential impacts during construction stage are summarized below. Majority of these impacts are of temporary nature and can be mitigated as described below:

1) The construction camp will result in generation of solid waste. It is estimated that about 120 labourers were employed at construction site. The estimated quantity of sewage from each camp is 8160 gallons of sewage per day based on 120 No. of laborers and taking 80 gpcd as water demand. So, total water consumption is about 9600 gallons per day of solid waste for camp site (i.e., 0.5 Kg of solid waste per capita per day generation rate). This waste can contaminate the surface, ground water and soil. Proper solid waste management plan should be developed by the Contractor and implemented to avoid the littering and any other waste problems. Adequate number of solid waste containers should be placed at various locations for ease in storage and collection/disposal of solid waste by LWMC.
2) Soil Construction activities such as excavation, filling, development of road, construction camps will affect the existing soil conditions in the Project Area and in its nearby surroundings. In addition, such work is likely to lead to changes in the existing drainage pattern and may have a significant adverse impact on the environment that can be mitigated by good engineering practices. The proper drainage facility will be provided at the camp areas to avoid the water accumulation, which will minimize the soil contamination
3) Soil contamination may take place due to the generated solid waste at camp site in addition to oil spillage and use of chemicals at site which can be curtailed by reducing the oil spill in the camp as well as

at project construction areas, proper solid waste management and placing chemical containers in caissons.

4) During construction phase of the project, there are trivial traffic problems. In order to minimize the traffic problems during construction stage, a three-stage traffic management plan will be developed by supervisory consultant in consultation with traffic police department.
5) During construction stage, dust problem can affect the health of the community belonging to nearby residential, Commercial and hospital areas. However, proper mitigation measures will remedy the impacts and in order to avoid dust problems during the construction stage, contractor should sprinkle water at least twice a day during the construction activities.
6) Construction machinery using diesel engines will generate noise and exhaust emissions. Generally, the above machinery will generate particulate matter (PM), smoke, and dust, CO in the ambient air, which can deteriorate the air quality and result in impacts on human health, fauna and flora. The movement of heavy machinery and vehicles on the dirt tracks can also cause fugitive dust emissions. Periodic tuning of vehicles should be made mandatory to reduce the emissions of CO, Hydrocarbons (HC) and PM. Emissions from the batching plants should be controlled with appropriate control equipment.
7) Relocation/disturbance of the existing utilities like electric poles, telephone poles, etc. should be properly managed by the Contractor so that it will not affect the routine life of the community. Development camp will result in generation of solid waste. This waste can contaminate the surface, ground water and soil. Proper solid waste management plan should be developed by the Contractor and implemented to avoid the littering and any other waste problems. Adequate number of solid waste containers should be placed at various locations for ease in storage and collection/disposal of solid waste by the contractor

10.3 OPERATION STAGE

The project during its operation will definitely have long term positive and beneficial impacts, which include the following:

1) Traffic conditions will improve a lot due to the development of this Underpass at Samanabad MorrFacility.
2) Boost in local business and commercial activities, prompted by swift and fast clearance of multi directional traffic at the Samanabad Road.
3) Promotion of an easy accessibility to main roads in the city with reduced traveling cost, shorter time and escaping traffic holds-up.

4) The operation of the interchange will improve the scenic beauty and environmental get-up of the locality.
5) The project will be a positive step towards facilitating the systematic development of Lahore.
6) The geometric standards and design parameters prescribed for construction of the interchange will ensure better driving conditions and comfortable environments to the road users. Therefore, swift clearance on the site will have negligible effects on the density of polluted air and atmosphere.
7) The proposed Underpass at Samanabad Morrinclude drainage works, which will ensure its durability as well as allow easy flow of rainwater. Therefore, the drainage of the existing adjoining urban area will improve.
8) Before the commissioning of the proposed project, there is a traffic congestion occurrence. This situation results in idling of vehicles, which emit VOC, CO, and PM. The commissioning of the proposed project will result in the smooth flow of traffic and reducing these emissions within permissible limits.

Based on the EIA report, it can be concluded that the project will result in the improvement of the traffic situation at Samanabad Road Lahore. Further, the implementation of the environmental mitigation measures, proper monitoring and compliance of the environmental standards/legislations will make the Project environmentally more sustainable.

10.4 RECOMMENDATION

Based on the EIA report, it can be concluded that the project will result in the improvement of the traffic situation at Samanabad Boulevard Road. Furthermore, the ambulances stuck in traffic for long durations causing danger to patient's life can be minimized. Further, the implementation of the environmental mitigation measures, proper monitoring and compliance of the environmental standards/legislations will make the Project environmentally more sustainable.

ANNEXURES

ANNEXURE – 1: GLOSSARY

Words	Dictionary
Mitigation	The action of lessening in severity or intensity
Legislation	law enacted by a legislative body
Compliance	Acting according to certain accepted standards
Flora	All the plant life in a particular region or period
Fauna	All the animal life in a particular region or period
Demarcated	Separate clearly, as if by boundaries
Screening	The display of a motion picture
Substitutions	An event in which one thing is substituted for another
Regulations	An authoritative rule
Stakeholders	A person or organization with an interest or concern in something

ANNEXURE – 2: LIST OF ABBREVIATIONS

Words	Abbreviation
PEPA	Punjab Environmental Protection Act
NEQS	National Environmental Quality Standards
PEQS	Punjab Environmental Quality Standards
WAPDA	Water and Power Development Authority
EMP	Environmental Management plan
WWTF	Waste Water Treatment Facility
Pak-EPA	Pakistan Environmental Protection Agency
W.H.O	World Health Organization
PET	Punjab Environmental Tribunal
SWM	Solid Waste Management
CSR	Corporate Social Responsibility
MSWs	Municipal Solid Wastes
TMA	Town Municipal Authority
KVA	Kilo Volt Ampere
PPEs	Personal protective equipment's
PM	Particulate matter

ANNEXURE – 3: LIST OF INDIVIDUALS CONSULTED

Sr. No.	Name of Respondent	Father's Name	Concerns
1.	Akram Khan	Mukarram Khan	People will be facilitated by the project and the respondent was in favor of the project.
2.	Majeed Iqbal	Muhammad Iqbal	The respondent was agreed with the project only if proper diversion plans should be followed for the traffic.
3.	Sulman Amjad	Waqar Amjad	The respondent was in favor of the project. It will save time of local people as well as ambulance drivers, rickshaw drivers, bankers and students as well.
4.	Muhammad Sohail	Ghulam Rasool	The respondent was against the project. He expressed those kinds of projects always delayed and resulted in more traffic related problems during construction.
5.	Rana Imran	Imran Munir	The respondent is against the project due the expected traffic diversion issued.
6.	Bilal Nazir	Muhammad Nazir	The respondent was strongly in favor of the project because of job creation for labors during construction phase.
7.	Dilbar Hussain	Muhammad Hussain	Did not know much about the project but if the project will facilitate the local people then it will be extremely beneficial.
8.	Amir Ameen	Ameen ul haq	The project will cause air and noise pollution therefore not in favor.
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15.	Qalb-e-Momin	Nadeem Ashraf	If project will facilitate the local community, then it will be highly favorable.

ANNEXURE – 4: REFERENCES

References:

1. Project Underpass at Samanabad MorrFeasibility Report.
2. Rainfall and Other Data from Pakistan Metrological Department, Regional office Lahore.
3. Topographic Surveys
4. Master Plan of Underpass at Samanabad Mor
5. Punjab-EPA Guidelines
6. Schedule I of Punjab Environmental Protection Act 1997 (Amended 2012)
7. section 12 of Punjab Environmental Protection Act 1997 (Amended 2012)
8. Pakistan Environmental protection act 1997
9. Punjab Environmental Protection Act 1997 (Amended 2012)

ANNEXURE – 5: TERM OF REFERENCES (TORS)

TERMS OF REFERENCE

(TORs)

for

APPOINTMENT OF CONSULTING FIRMS FOR ENVIRONMENT IMPACT ASSESMENT FOR CONSTRUCTION OF UNDERPASS AT SAMNABAD ROAD MULTAN ROAD LAHORE

Address:467-DII,M. A Johar Town,Lahore

TERMS OF REFERENCE (TORs) FOR APPOINTMENT OF CONSULTING FIRMS FOR CONSTRUCTION OF UNDERPASS AT SAMNABAD ROAD MULTAN ROAD LAHORE

1- GENERAL:

Lahore Development Authority (LDA) intends to construct the Underpass on Samnabad Road Multan Road for improvements in traffic flow.

2- SCOPE OF WORK

ENVIRONMENT IMPACT STUDIES

Standard Environment Impact Assessment of the projects will be carried out by the consultant in the light of guidelines/rules/regulations issued by the Govt. of Punjab Environmental Protection Act 2012

The consultant shall discharge the following obligations (but not limited to) meet with statutory requirements of EIA.

- Consultant shall examine essential baseline conditions, foreseeable or impact to the prevailing conditions for suggesting mitigation measures.
- All the data collection/surveys/questionnaires/interviews / should be well coordinated for the proper assessment of baseline conditions and providing the foundation for further studies and recommendations.
- All the project activities during the construction phase to keep the pollutants within Punjab Environment Quality standards (PEQS)
- Examine all the project activities and list the detail of activities likely to cause the negative impact during and after the construction phase. Consultant shall suggest mitigation measures for all such activities during construction and post-construction periods.
- Prepare a Balance Sheet of some total of all possible/likely Environmental Impacts of the project for its further analysis to establish the viability of the project.
- Identify / investigate and prepare a comprehensive profile of the likely project Impacts on the physical (water, soil, air, noise, etc). Biological (Flora and Fauna)

and socio-Economic (likely hood of effected out of R.O.W and accessibility constraints for the local people conditions}.

- Preparation of detailed management for enhancing Environmental conditions such as plantation, stability of slopes, leveling of borrows areas. Management of surface runoff/wastewater during construction and operational periods besides preparations of budget estimates and implementation arrangement.

  Consultant shall submit EIA report according to the requirements of Environmental Protection Department (EPD) with soft copy. The Consultant shall remain under obligation to comply with the observations/objections till the final clearance of EIA and issuance of NOC.

3- QUALIFICATION & EXPERIENCE:

- **Environmental Impact Assessment (EIA):**
  - The firm should be a relevant professional body/organization registered with PEC and operating under regulations of the Government of Pakistan.
  - The Consultant must have completed at least 05 EIA/IEE studies in the last 10 years.
  - Core team should have at least 01 Environmental Specialist with M.Sc Environmental Sciences with 12 years of experience and 01 Sociologist with M.Sc. Sociology with 10 years' experience and there related support staff

4- DOCUMENTS TO BE SUBMITTED:

Interested consultant firms must submit their technical and financial Proposals including all the taxes with their detailed profile and relevant experience & CVs as required in Qualification & Experience Section.

Incomplete or late proposals will not be evaluated.

5-METHOD OF SELECTION:

The award of contract shall be made to the consultant for the short consultancy as per PPRA rules 2014 amended up to-date.

Proposals without financial proposal shall not be considered.

6- DURATION:

The duration of the assignment is 1 month.

7- NOTE:

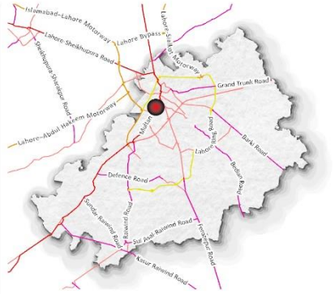
Any instructions are given by the Engineer in charge from time to time during the course of Consultancy.

ANNEXURE – 6: EIA TEAM

Sr. No.	Team Member	Position Held	Qualifications
1	Aleem Butt	Chief Environmentalist Team Leader- EIA	M.Phil. Environmental Sciences, Government College University (GCU)Lahore M.Sc. Environmental Sciences, Punjab University (PU), Lahore NEBOSH, Lead Auditor
2	Noman Ashraf	Environmental Specialist	M.Phil. Environmental Sciences, Government College University (GCU)Lahore
3	Dilbar Hussain	Chief chemist	M.sc Chemistry university of the Punjab
4	Jahanzaib Malik	Deputy manager	M. Phil. Environmental Sciences University of Agriculture, Faisalabad
5	Abida Hussain	Environmental Engineer	BS Environmental Engineering University of Engineering and Technology (UET) Lahore
6	Huda Rizwan	Environmentalist	BS Environmental Sciences The University of Lahore
7	Maryam	Environmental Engineer	BS Environmental Engineering University of Engineering and Technology (UET) Lahore
8	Asma Butt	Sociologist	M.sc Sociology, University of the Punjab

ANNEXURE – 7: MAPS OF PROJECT SITE





Underpass at Morr Samnabad

Legend

- Orange Line Stop
- Feeder Route Stop
- National Highway
- Collector Road
- Access Road/Street
- Orange Line
- 2,Bhatti to Morr Samanabad
- 6,Babu Sabu to Raj Garh Chowk

Scale: 1:2,750 (1 inch on Paper = 70 m on Ground)

0 25 50 75 100 125 Meters
0 75 150 225 300 375 Feet

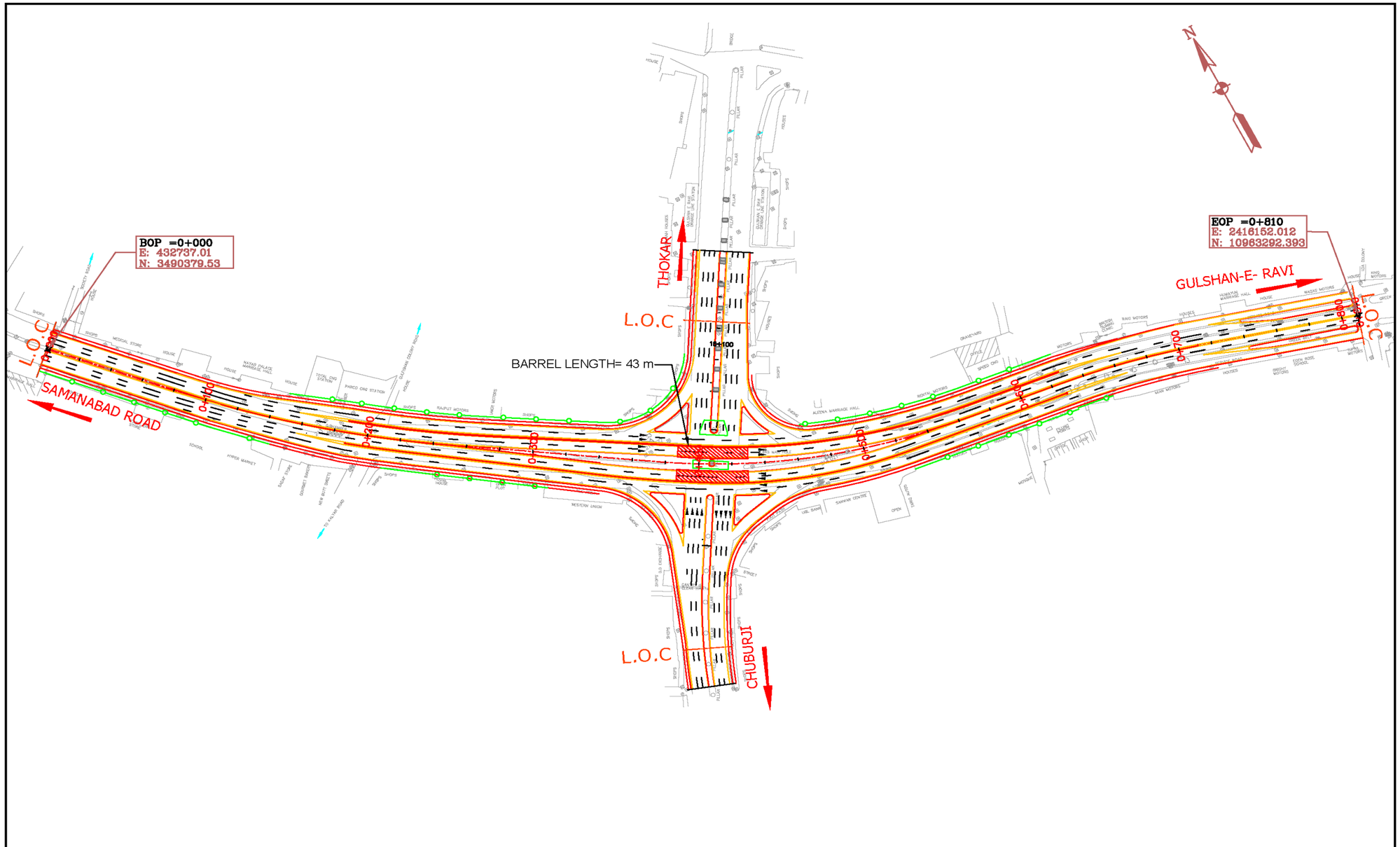
Spatial Reference
PCS: WGS 1984 UTM Zone 43N
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Transverse Mercator
Map Units: Meter

GOVERNMENT OF PUNJAB LAHORE DEVELOPMENT AUTHORITY Lahore
ASIAN CONSULTING ENGINEERS www.asiancon.com

Location Plan



Location Plan of Underpass at Samanabad Mor



CLIENT: LAHORE DEVELOPMENT AUTHORITY LAHORE	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04			DRAWN	GH	PROJECT: CONSTRUCTION OF UNDERPASS AT SAMANABAD CHOWK LAHORE
		03			SUBMITTED		
		02			RECOMMENDED		
		01			CHD./VER.		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

LAYOUT PLAN | SCALE | DATE: NOVEMBER, 2021 | DRAWING No. | REV. 0

GH, E:\POOL MANDI BEGHUM KOT GULSHAN-E-RAVI BUND ROAD UPASS SAMNABAD UPASS PROJECTS\AMNABAD UNDERPASS PLAN\PC-1\LAYOUT PLAN\Design Samnabad UP (20-11-2021).dwg,

Layout Plan

ANNEXURE – 8: 3D VIEW OF PROJECT


SAMANABAD UNDERPASS


SAMANABAD UNDERPASS



ANNEXURE – 9: BASE LINE ENVIRONMENTAL MONITORING

BASELINE ENVIRONMENTAL MONITORING & ANALYSIS REPORT

UNDERPASS AT SAMANABAD MOR

- Ambient Air Monitoring
- Noise Level Monitoring
- Ground Water Analysis

Reference No. AES-12A-SA/2022 | Dated: 25 February, 2022

Asian Environmental Services Pvt. Ltd.
has prepared this report as per prerequisites of client.
Any other individual using the content of this document shall do so at their own liability.
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Document No. AES/LMS/FRM-110, Date of Issue 22 June, 2020, Revision No. 00

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Location for Ambient Air Monitoring

SAMANABAD MOR MULTAN ROAD

Lahore



Page 1 of 5

Document No. AES/LMS/FRM-110, Date of Issue 22 June, 2020, Revision No. 00

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Ambient Air Monitoring Report

Monitoring Details			
Reference Number	AES-12A-SA/2022-AA-01	**Sampling Point**	Samanabad Mor, Multan Road, Lahore.
Date of Monitoring	17-Feb-2022 to 18-Feb- 2022	**Sampling Coordinate**	31°32'37"**N** 74°17'49"**E**

Sr. No.	Time	CO (mg/m³)	NO (µg/m³)	NO_2 (µg/m³)	NO_x (µg/m³)	SO_2 (µg/m³)
1	11:00	1.11	36.11	75.83	111.79	43.96
2	12:00	1.08	35.67	75.66	111.18	43.48
3	13:00	1.12	35.29	75.43	110.57	43.13
4	14:00	1.15	35.17	75.07	110.09	43.16
5	15:00	1.07	35.86	75.26	110.97	43.96
6	16:00	1.05	35.30	75.47	110.63	43.85
7	17:00	1.04	35.42	74.87	110.15	43.61
8	18:00	1.06	34.86	75.05	109.77	44.46
9	19:00	1.08	34.83	75.79	110.47	43.90
10	20:00	1.11	35.44	73.10	108.39	43.45
11	21:00	1.07	35.27	73.48	108.60	43.32
12	22:00	1.02	35.63	73.99	109.48	44.06
13	23:00	0.98	35.23	74.11	109.19	43.48
14	00:00	0.99	34.85	73.73	108.43	40.69
15	01:00	1.00	35.04	73.84	108.74	40.84
16	02:00	0.93	35.42	73.54	108.81	40.76
17	03:00	1.02	35.29	73.46	108.60	40.50
18	04:00	0.99	35.27	72.90	108.03	41.14
19	05:00	1.06	35.40	74.11	109.37	43.96
20	06:00	1.12	34.85	75.85	110.55	42.87
21	07:00	1.15	34.90	75.20	109.96	43.40
22	08:00	1.14	34.62	74.82	109.29	43.64
23	09:00	1.07	34.90	75.45	110.21	43.45
24	10:00	1.12	35.69	74.82	110.36	42.92
Average Concentration		**1.06**	**35.26**	**74.62**	**109.74**	**43.00**

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Ambient Air Monitoring Report

Monitoring Details			
Reference Number	AES-12A-SA/2022-AA-01	**Sampling Point**	Samanabad Mor, Multan Road, Lahore.
Date of Monitoring	17-Feb-2022 to 18-Feb- 2022	**Sampling Coordinate**	31°32'37"N 74°17'49"E

Parameters	Units	Monitoring Duration	LDL	Average Obtained Concentration	PEQS	Remarks
Nitrogen Dioxide (NO_2) *	µg/m³	24Hours	1.00	74.62	80.0	Optimal
Nitrogen Oxide (NO)*	µg/m³	24Hours	1.00	35.26	40.0	Optimal
NO_x*	µg/m³	24Hours	1.00	109.74	120.0	Optimal
Sulphur Dioxide (SO_2) *	µg/m³	24Hours	1.00	43.00	120.0	Optimal
Carbon Monoxide (CO)*	mg/m³	24Hours	0.01	1.06	05.0	Optimal
Particulate Matter (PM_{10}) *	µg/m³	24Hours	1.00	146.00	150	Optimal
Particulate Matter ($PM_{2.5}$) *	µg/m³	24Hours	1.00	**68.10**	35	High

*Parameters are approved from Punjab Environment Protection Agency.

Abbreviations:
LDL= Lower Detection Limit PEQS= Punjab Environmental Quality Standards µg/m³= Micro Gram per Meter Cube

Remarks:
Optimal = Compliance with Permissible Range Marginal = Close to Extreme Edge High = Exceeds from Permissible Range
Low = Less Than Permissible Range

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Ambient Air Monitoring Report

Monitoring Details			
Reference Number	AES-12A-SA/2022-AA-01	**Sampling Point**	Samanabad Mor, Multan Road, Lahore.
Date of Monitoring	17-Feb-2022 to 18-Feb- 2022	**Sampling Coordinate**	31°32'37"**N** 74°17'49"**E**

Sr. No.	Time	Ambient Temperature °C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
1	11:00	21	S	4.2	52	761.1
2	12:00	22	S	4.1	53	761.2
3	13:00	19	S	1.8	55	761
4	14:00	20	S	2.5	56	761.3
5	15:00	18	S	2.2	54	761.4
6	16:00	17	S	2.3	53	761.5
7	17:00	15	S	3.6	51	761.2
8	18:00	15	S	3.4	50	762.2
9	19:00	16	S	3.1	52	762.3
10	20:00	14	SW	2.8	54	762.4
11	21:00	13	SW	2.9	56	762.4
12	22:00	14	SW	1.6	53	762.5
13	23:00	14	SW	1.2	51	762.6
14	00:00	16	SW	1.5	48	762.6
15	01:00	17	SE	2.2	47	762.3
16	02:00	14	SE	2.0	45	762.3
17	03:00	13	SE	4.3	42	761.5
18	04:00	15	SE	4.4	43	761.5
19	05:00	15	SE	4.8	45	761.8
20	06:00	18	SE	5.1	47	761.8
21	07:00	19	SE	3.5	49	761.8
22	08:00	20	SE	3.1	50	761.9
23	09:00	21	SE	4.3	52	761.9
24	10:00	20	SE	4.4	52	761.9

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Noise Monitoring Report

Monitoring Details			
Reference Number	AES-12A-SA/2022-AA-01	**Sampling Point**	Samanabad Mor, Multan Road, Lahore.
Date of Monitoring	17-Feb-2022 to 18-Feb- 2022	**Sampling Coordinate**	31°32'37"N 74°17'49"E

Sr. No.	Time	Noise dB(A)*	PEQS	
1	11:00	83		
2	12:00	82		
3	13:00	81		
4	14:00	82		
5	15:00	83	Day Time	65
6	16:00	81		
7	17:00	80		
8	18:00	80		
9	19:00	76		
10	20:00	73		
11	21:00	74		
12	22:00	76		
13	23:00	72		
14	00:00	70	Night Time	55
15	01:00	74		
16	02:00	74		
17	03:00	73		
18	04:00	72		
19	05:00	74		
20	06:00	78		
21	07:00	82		
22	08:00	85	Day Time	65
23	09:00	81		
24	10:00	80		

*Parameters are approved from Punjab Environment Protection Agency.

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GROUND WATER ANALYSIS REPORT

Sample Detail

Reference No.	AES-12A-SA/2022-GW-01	**Reporting Date**	25-02-2022
Nature of Sample	Ground Water	**Sampling Method Reference**	AES/LMS/QSP-014
Grab/Composite	Grab	**Sample Collected by/Sent By**	AES
Sampling Date	18-02-2022	**Sample Receiving Date**	18-02-2022
Analysis Completion Date	25-02-2022	**Lab Temp & Humidity**	22.6°C & 52%
Ambient Temperature & Humidity at the Time of Sampling			18°C & 53%
Sample ID	AES-GW-172/2022	**Sampling Location**	Tap Near Site
Client Detail	Asian Consulting engineers Pvt Ltd., Lahore.		



Ground Water Analysis Results

Parameter	Analysis Method	PEQS	Result	MU (CL95%)	Remarks
Lab Analysis					
Color*	SMWW 2120 C	≤ 15 TCU	0.0	N.A.	Optimal
Taste*	SMWW 2160 C	Non-Objectionable	Non-Objectionable	N.A.	Optimal
Odor*	SMWW 2150 B	Non-Objectionable	Non-Objectionable	N.A.	Optimal
Turbidity*	SMWW 2130 B	< 5 NTU	0.0	N.A.	Optimal
Total Hardness (as $CaCO_3$) **	SMWW 2340 C	< 500 mg/L	125	± 0.87	Optimal
Total Dissolved Solids (TDS)**	SMWW 2540 C	< 1000 mg/L	420	± 0.81	Optimal
pH**	SMWW 4500 H^+ B	6.5-8.5	7.26	± 0.70	Optimal
Aluminum (Al)	SMWW 3111 B	≤ 0.2 mg/L	<0.005	N.A.	Optimal
Antimony (Sb)	SMWW 3114 B	≤ 0.005 mg/L	<0.005	N.A.	Optimal
Arsenic (As)	SMWW 3114 B	≤ 0.05 mg/L	0.021	N.A.	Optimal
Barium (Ba)	SMWW 3113 B	0.7 mg/L	0.0036	N.A.	Optimal
Boron (B)	SMWW 3113 B	0.3 mg/l	<0.02	N.A.	Optimal
Cadmium (Cd)	SMWW 3113 B	0.01 mg/L	0.006	N.A.	Optimal
Chloride (Cl^-) **	SMWW 4500 Cl^- B	< 250 mg/L	58	± 1.23	Optimal
Chromium (Cr)	SMWW 3113 B	≤ 0.05 mg/L	0.004	N.A.	Optimal
Copper (Cu)	SMWW 3111 B	2.0 mg/L	0.167	N.A.	Optimal
Cyanide (CN^-)*	SMWW 4500 CN^- F	≤ 0.05 mg/L	0.0	N.A.	Optimal
Fluoride (F^-)*	SMWW 4500 F^- C	≤ 1.5 mg/L	0.05	± 0.71	Optimal
Lead (Pb)	SMWW 3114 B	≤ 0.05 mg/L	<0.005	N.A.	Optimal
Manganese (Mn)	SMWW 3113 B	≤ 0.5 mg/l	<0.015	N.A.	Optimal
Mercury (Hg)	SMWW 3114 B	≤ 0.001 mg/L	<0.001	N.A.	Optimal
Nickel (Ni)	SMWW 3113 B	≤0.02 mg/L	<0.02	N.A.	Optimal
Nitrate (NO_3^-) *	SMWW 4500 NO_3^- B	≤ 50 mg/L	1.2	N.A.	Optimal
Nitrite (NO_2^-) *	SMWW 4500 NO_2^- B	≤ 3.0 mg/L	0.0	N.A.	Optimal
Selenium (Se)	SMWW 3114 B	0.01 mg/L	<0.01	N.A.	Optimal
Residual Chlorine (Cl_2) *	SMWW 4500 Cl^- B	0.5 mg/L	0.0	N.A.	Optimal

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GROUND WATER ANALYSIS REPORT

Sample Detail

Reference No.	AES-12A-SA/2022-GW-01	**Reporting Date**	25-02-2022
Nature of Sample	Ground Water	**Sampling Method Reference**	AES/LMS/QSP-014
Grab/Composite	Grab	**Sample Collected by/Sent By**	AES
Sampling Date	18-02-2022	**Sample Receiving Date**	18-02-2022
Analysis Completion Date	25-02-2022	**Lab Temp & Humidity**	22.6°C & 52%
Ambient Temperature & Humidity at the Time of Sampling			18°C & 53%
Sample ID	AES-GW-172/2022	**Sampling Location**	Tap Near Site
Client Detail	Asian Consulting engineers Pvt Ltd., Lahore.		



Ground Water Analysis Results

Parameter	Analysis Method	PEQS	Result	MU (CL95%)	Remarks
Phenolic Compounds (as Phenols) *	SMWW 5530 D	NGVS	0.0	N.A.	Optimal
Zinc (Zn)	SMWW 3113 B	5.0 mg/L	0.052	N.A.	Optimal
Microbiological Analysis					
Total Coliforms*	SMWW 9222 B	0/ 100 mL CFU	**24**	N.A.	High
Fecal Coliforms *	SMWW 9222 D	0/ 100 mL CFU	0	N.A.	Optimal

*Parameters are approved from Punjab Environment Protection Agency.
**Parameters are accredited from Pakistan National Accreditation Council.

Abbreviations:

PEQS = Punjab Environment Quality Standards **SMWW** = Standard Methods for the examination of Water and Wastewater
TCU = True Color Unit **N.A.** = Not Available **CFU** = Colony forming Unit
NTU = Nephelometric Turbidity Unit **MU** = Measurement Uncertainty **NGVS** = No Guideline Value Set

Remarks:

Optimal = Compliance with Permissible Range Marginal = Close to Extreme Edge High = Exceeds from Permissible Range
Low = Less Than Permissible Range

Report Disclaimer

- The remaining portion of the sample (s) will be disposed off after 07 days after the issuance date of report from the laboratory unless otherwise instructed (Condition Apply).
- This report shall not be reproduced in part/parties.
- The provided results relate only to the sample provided/collected.
- Values reflect the testing results; decision for usage of report totally depends on client.

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----------End of Report----------

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ANNEXURE – 10: SCREENING CHECK LIST

SCREENING CHECKLIST

Adverse Impact -, Significant Adverse --, Beneficial Impact +, Highly Beneficial ++, No Impact 0

Sr. No.	Main Environmental Parameters	Baseline Conditions	With Project			
			During Construction without Mitigation	During Operation without Mitigation	During Construction with Mitigation	During Operation with Mitigation
1	**Atmosphere**					
a	Ambient Air	0	--	--	-	-
b	Primary Pollutants	0	--	--	-	-
c	Secondary Pollutants	0	-	--	0	-
d	Noise	0	--	--	-	-
e	Vibration	0	-	0	-	0
2	**Climate**					
a	Temperature	0	0	-	0	-
b	Precipitation	0	0	0	0	0
c	Relative Humidity	0	0	0	0	0
e	Evaporation	0	0	0	0	0
3	**Water Resources**					
a	Surface Water	0	0	0	0	0
	Rivers	0	0	0	0	0
	Streams	0	0	0	0	0
	Springs	0	0	0	0	0
	Wetland	0	0	0	0	0
	Flow	0	0	0	0	0
	Quality	0	0	0	0	0
	Usage	0	0	0	0	0
	Sediments	0	0	0	0	0
	Chemicals	0	0	0	0	0
	Pollution	0	0	0	0	0
	Erosion	0	0	0	0	0
b	**Ground Water**					
	Sources	0	-	-	0	0
	Depth	0	-	0	-	0
	Quantity	0	--	-	-	0
	Potential Extraction	0	-	-	-	-
	Usage	0	-	-	-	-

Sr. No.	Main Environmental Parameters	Baseline Conditions	With Project			
			During Construction without Mitigation	During Operation without Mitigation	During Construction with Mitigation	During Operation with Mitigation
	Domestic Supply	0	0	0	0	0
	Industrial Water Supply	0	0	0	0	0
	Irrigation	0	0	0	0	0
	Hydropower Generation	0	0	0	0	0
	Quality	0	-	0	0	0
4	**Land Resources**					
a	Topography	0	-	0	0	0
b	Soil	0	-	0	0	0
c	Major Land use	0	0	0	0	0
5	**Ecological Environment**					
a	Terrestrial Ecology					
	Flora	0	--	0	-	+
	Fauna	0	--	0	-	+
b	**Aquatic Ecology**					
	Aquatic Flora	0	0	0	0	0
	Aquatic Fauna	0	0	0	0	0
	Fisheries	0	0	0	0	0
c	Wildlife	0	0	0	0	0
d	Forestry	0	0	0	0	0
e	Beneficial Plants and Animals	0	0	0	0	0
f	Endangered Species	0	0	0	0	0
6	**Socio-economic Environment**					
a	Institutional and Administrative Setup	0	0	0	0	+
b	Demography	0	0	0	0	0
c	Gender issues	0	0	0	0	0
d	Social Equity	0	0	0	0	0
e	Settlement Patterns	0	-	0	0	0
f	Land Holdings & Titling	0	-	0	0	++
g	Common Resource Rights	0	0	0	0	0
h	Fish	0	0	0	0	0
i	Wood	0	0	0	0	0
j	Grazing	0	0	0	0	0

Sr. No.	Main Environmental Parameters	Baseline Conditions	With Project			
			During Construction without Mitigation	During Operation without Mitigation	During Construction with Mitigation	During Operation with Mitigation
k	Fodder	0	0	0	0	0
l	Domestic Energy and Fuel	0	0	0	0	0
m	Domestic Water Supply	0	0	0	0	0
n	Sanitation	0	-	0	0	0
o	Health	0	-	--	0	-
p	Waterborne Disease	0	0	0	0	+
q	Common Diseases	0	0	0	0	0
r	Mental Health	0	0	0	0	++
s	Human Nutrition	0	0	0	0	0
t	Education & Literacy	0	0	0	0	+
u	Cultural & Historical Sites	0	0	0	0	0
v	Religious Sites	0	0	0	0	0
w	Aesthetics	0	-	-	0	+
x	Landscape	0	-	-	0	++
y	Livelihood	0	--	0	0	++
z	Agriculture	0	-	0	-	0
	Livestock	0	0	0	0	0
	Forestry	0	0	0	0	0
	Fisheries	0	0	0	0	0
	Industry	0	0	0	0	0
	Other Cash Income	0	+	+	+	++
7	**Transport, Infrastructure & Communication**					
a	Roads	0	-	+	0	++
b	Tracks	0	-	+	0	++
c	Bridges	0	0	0	0	++
d	Pedestrian Tracks	0	-	+	0	++
e	Navigation	0	0	0	0	0
f	Energy and Power	0	-	0	0	0
g	Telecommunication	0	0	0	0	0
8	**Natural Risks and Hazards**					
a	Earthquake	0	0	0	0	0
b	Landslides	0	0	0	0	0
c	Storms	0	0	0	0	0

Sr. No.	Main Environmental Parameters	Baseline Conditions	With Project			
			During Construction without Mitigation	During Operation without Mitigation	During Construction with Mitigation	During Operation with Mitigation
d	Floods	0	0	0	0	0
e	Erosion	0	0	0	0	0
f	Drought	0	0	0	0	0
g	Human Disease	0	0	0	0	0
h	Pollution	0	--	--	-	-
i	Social Instability	0	0	0	0	+
j	Economic Instability	0	+	+	0	++
k	Political Instability	0	0	0	0	0

ANNEXURE – 11: SOCIO-ECONOMIC SURVEY PROFORMA

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)
SOCIO-ECONOMIC BASE LINE SURVEY

1. Name of Interviewer: _____ 2. Date: _____

3. Village Name: _____

DEMOGRAPHIC PROFILE

4. Union Council/Tehsil: _____

5. Name of Respondent: _____

6. Respondent's Father Name: _____

7. Gender of Respondent: _____ a. Male _____b. Female 8. Age of Respondent: a. 15-25 b. 26-35 c. 36-45 d. 46 & Above

9. What is your Education Level? a. Illiterate b. Primary c. Middle d. Matric e. Intermediate f. Bachelors g. Above Bachelors

10. What is your Occupation?

a. Business b. Government job c. Private job d. Farmer e. Unemployed

11. What is your Marital Status? a. Married b. Unmarried

12. What is your primary Language (i.e., the one you speak most of the time)?

_____

13. What is your Caste? _____

14. What is your Religion? _____

15. What type of your family system? _____ a. Joint _____ b. Nuclear _____

16. Total number of Family Members (Adult) living with you?

_____

a. Male _____

b. Female _____

c. Total _____

17. How many Children's you have (upto 10 years)?

_____

a. Male _____

ECONOMIC PROFILE

b. Female _____

c. Total _____

18. What are the major sources of your household income?

a. Service

b. Agriculture

c. Business

d. Labor

e. Livestock f. Any other

19. What is distance of your office/work place from your house?

a. 1-10 Km _____ b. 11-20 Km _____ c. 21-30 Km _____ d.30 Km& Above _____

20. Approximately what is your Family Monthly Income?

a. Less than Rs. 20,000 b. Rs. 21,000-40,000 c. Rs. 41,000-60,000 d. Rs. 61,000-80,000 e. More than Rs. 80,000

21. Approximately how much is your Family Monthly Expenditure?

a. Less than Rs. 20,000 b. Rs. 21,000-40,000 c. Rs. 41,000-60,000 d. Rs. 61,000-80,000 e. More than Rs. 80,000

22. How many of your family members are in age (16-65)?

23. How many of your family members in age (16-65) are employed?

24. Status of ownership (In case of shop keeper/business owner)?

a. Owner b. Renter

25. Respondent per day income

26. What are your normal working hours?

HOUSING PROFILE

27. Status of Ownership: a. Resident Owner b. Resident Tenant

28. Total Area of the House: a. Kanal _____

29. Total Living Rooms (No.): _____

b. Marla _____

30. Type of Construction: a. Katcha b. Semi Pacca c. Pacca

31. Present Value Rs. _____

32. SOCIAL AMENITIES PRESENT IN HOUSE (Tick)

Social Amenities	Available	Satisfactory	Non-Satisfactory	No Access
Electricity	☐	☐	☐	☐
Sui Gas	☐	☐	☐	☐
Water Supply	☐	☐	☐	☐
Telephone	☐	☐	☐	☐
Sewerage/Drainage	☐	☐	☐	☐

33. What are the sources of water for your domestic use?

a. Public Water Supply/Tube-well b. Hand Pumps / Electric Motor _____

c. Bore Hole d. Any other _____

34. What is your land holding in acres?

_____

35. What is the source of water used for irrigation purpose?

a. Tube well _____

b. Canal _____

c. Any Other _____

36. Are you satisfied with the water quality and quantity? a. Yes b. No

37. What are the major crops in this area?

_____

a. _____

b. _____

c. _____

d. _____

38. What are the major common diseases in the area?

a. _____

b. _____

c. _____

d. _____

39. Facilities in or nearby the proposed project area

_____

Facilities	Yes	No	No. of Institutions	Name	Distance from Proposed Project
Education Institutions					
Health Institutions					
Religious Place (Mosque / Shrine / Graveyard)					
Recreational Place					
Historical /Archeological Monument					

40. Is there any protected site in this area? a. Yes b. No

If yes, then Name _____

Place _____

Significance _____

41. Specify the existing Non -Government Organizations (NGOs) in your area and state of their area of work? Name of Organization _____ Area of interest _____

42. WOMEN PARTICIPATION AND DECISION MAKING IN DIFFERENT ACTIVITIES (Tick)

Activities	Participation	Decision Making
Household activities		
Child caring		
Farm/crop/Livestock rearing		
Working woman		
Sale & Purchase of properties		

Social obligations (marriage, birthday & other functions)		
Local representation (council political gathering		

RESPONDENT'S VIEWS ABOUT PROJECT

43. PERCEPTIONS OF RESPONDENTS FOR ACTION ASSOCIATED WITH THE PROJECT Possible impacts/effects of the Project (Tick)

	Increase	Decrease
Employment opportunities		
Recreational facilities		
Living standard		
Income generating activities		
Other specify		

44. Do you know about the proposed project? a. Yes b. No

45. Is your land or any asset being acquired due to the implementation of this proposed project?

a. Yes b. No If yes, please give details _____

46. In your opinion, should this Project be implemented here? a. Yes b. No

47. In your opinion, how will you be affected by construction of this project?

_____

48. In your opinion, how will you be affected by operation of this project?

49. Would you like to be associated with the project as a worker?

a. Yes b. No

50. What protective measures do you suggest to safeguard your interests?

Protective Measures	Response
Project should complete well in time	
If any private land is acquired then proper compensation should bepaid	
Harmful effects on local residents during construction should be minimize	
Implementation of HSE plan for a safe working environment	
Local residents should be given priority of jobs	

Provision of basic facilities in project area (please specify)	
Any Other (Please Specify)	
No Response	

51. Contact #

Interviewer Views:

Name & Signature of Interviewer:

ANNEXURE – 12: TRAFFIC MANAGEMENT PLAN



N

LEGEND:

- RAVI TO CHAUBURJI
- RAVI TO SAMANABAD
- RAVI TO TOKHAR NIAZ BAIG
- CONSTRUCTION ZONE

NOTE:

1. "NALA WALA ROAD" WILL BE RESTRICTED FOR ONEWAY FOR TRAFFIC FROM THOKAR NIAZ BAIG, SAMANABAD & CHAUBURJI TOWARDS GULSHAN-E-RAVI AS MARKED IN PLAN
2. FOR THIS PHASE OF CONSTRUCTION ONE SLIP LANE WILL BE CLOSED FOR THOKAR NIAZ BAIG TO GULSHAN-E-RAVI AND TRAFFIC WILL BYPASS THE INTERSECTION AND MAKE A RIGHT TURN FROM " NALA WALA ROAD"



N

LEGEND:

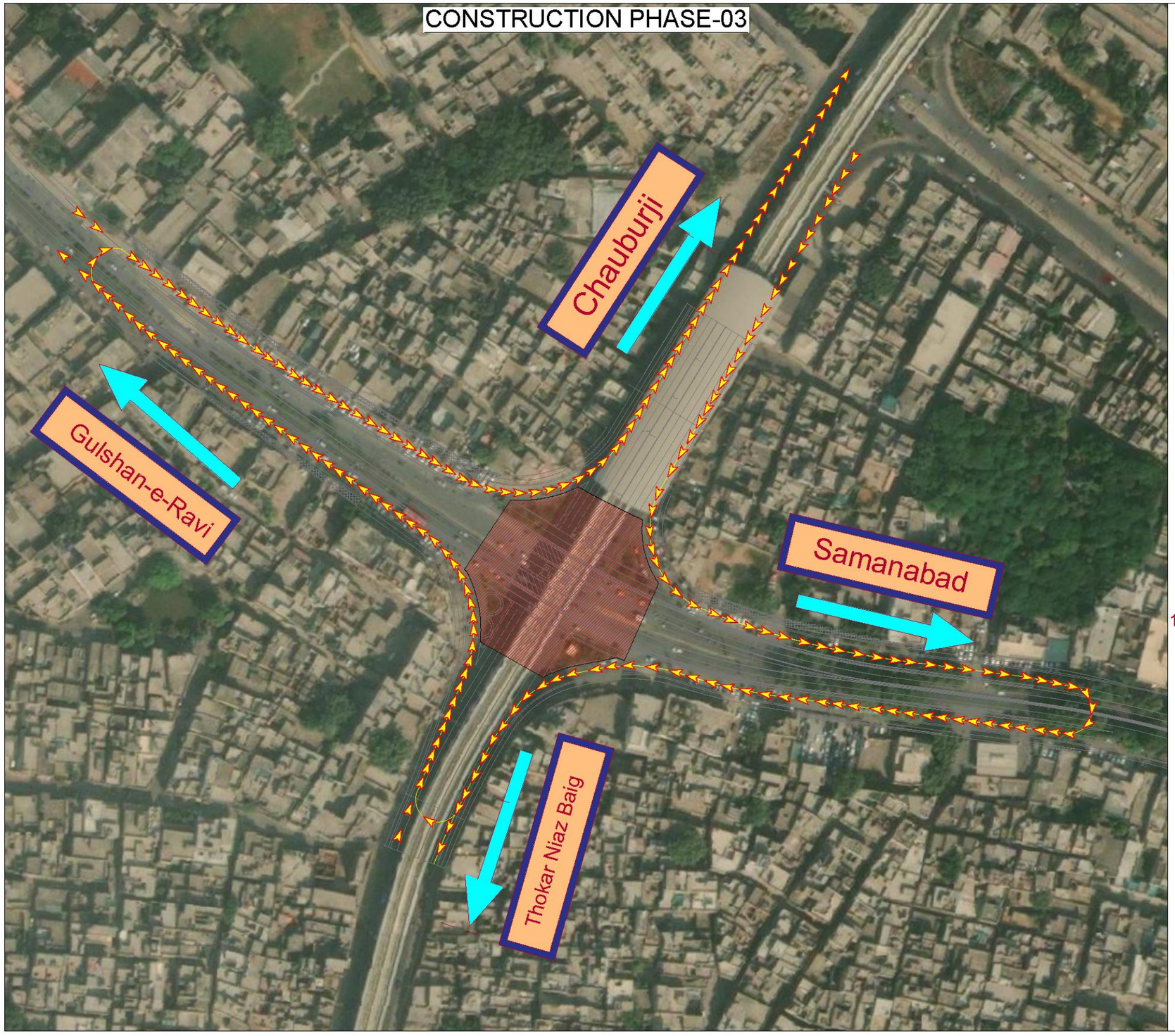
TOKHAR NIAZ BAIG
TO SAMANABAD

RAVI TO SAMANABAD

CONSTRUCTION ZONE

NOTE:

1. TRAFFIC FROM SAMANABAD TO THOKAR NIAZ BAIG, GULSHAN-E-RAVI & CHUBURJI WILL GO THROUGH FIRST ROUND ABOUT AND LINK FEROZPUR ROAD AS SHOWN IN PLAN
2. TRAFFIC FROM THOKAR NIAZ BAIG, GULSHAN-E-RAVI & CHUBURJI WILL USE SLIP LANE INDICATED WITH ARROWS IN THA PLAN



N

LEGEND:

- CHAUBURJI TO RAVI
- CHAUBURJI TO TOKHAR NIAZ BAIG
- RAVI TO SAMANABAD, RAVI TO CHAUBURJI
- RAVI TO TOKHAR NIAZ BAIG
- TOKHAR NIAZ BAIG TO CHAUBURJI
- TOKHAR NIAZ BAIG TO SAMANABAD
- CONSTRUCTION ZONE

NOTE:

1. TRAFFIC FROM SAMANABAD TO GULSHAN-E-RAVI & THOKAR NIAZ BAIG WILL GO THROUGH FIRST ROUNDABOUT TO "LINK FEROZPUR ROAD" FOR THIS PHASE.

ANNEXURE – 13: PICTORIAL EVIDENCE


31°32'37"N 74°17'49"E
31 Samanabad Main Boulevard
Samanabad Town
Lahore
Punjab


31°32'37"N 74°17'49"E
Samanabad Town
Lahore
Punjab




Auto Rickshaw



