RAVI URBAN DEVELOPMENT AUTHORITY (RUDA), GOVERNMENT OF THE PUNJAB

INFRASTRUCTURE DEVELOPMENT INDUSTRIAL ZONE PHASE-2 OF RAVI RIVER URBAN DEVELOPMENT PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

VOLUME II: ANNEXURES

NOVEMBER, 2022

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01								
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INFRASTRUCTURE DEVELOPMENT INDUSTRIAL ZONE PHASE-2 OF RAVI RIVER URBAN DEVELOPMENT PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED

INDUSTRIAL ZONE PHASE II

Village Profile Survey of the Project Area

Interviewer's Name _____Date _____

Name of the Respondent _____

Father's Name _____

Age (years) _____

Education _____

Q.1 Name of District: _____

Q.2 Name of Tehsil: _____

Q.3 Name of Union Council: _____

Q.4 Name of the Area/Village: _____

Q.5 Names of Major Casts:

1.	2.
3.	4.

Q.6 Languages Spoken:

1. Urdu	2. Punjabi
3. Other_____	

Q.7 Accessibility from Main Road:

1. Track	2. Unmetalled Road
3. Metalled Road	4. Other

Q.8 Distance from Main Road: _____ (km)

Q.9 Approximate area: _____ (km^2)

Q.10 Approximate population: _____Muslim_____ Non-Muslim ____

Q.11 Total Houses in the Area/Village: _____

Q.12 Educational Facilities Available:

				If yes then reply				
Sr. No.	Facilities	Yes	No	Govt.	Private	Boys (M)	Girls (F)	Co-Education
1	Primary School							
2	Middle School							
3	High School							
4	College							
5	Vocational Training Centers							
6	Madrassa							
7	Others							

Q.13 Institutional Facilities Available:

				If yes then reply		
Sr. No	Facilities	Yes	No	Govt.	Private	Name
1	Hospital					
2	Dispensary					
3	Basic Health Unit					
4	Post Office					
5	Mosque					
6	Banks					
7	Others					

Q.14 Means of Transport Available:

LOCAL	**INTERCITY**
1. Public Transport	1. Public Transport
2. Private Transport	2. Private Transport
3. Pedestrian	3. Pedestrian
4. Others	4. Others

Q.15 Civic Facilities Available:

Sr. No	Facilities	Yes	No	Remarks if Any
1	Lined Drainage System	1	2	
2	Street Lights	1	2	
3	Grocery Shops	1	2	
4	Recreational / Games Facilities (clubs, grounds)	1	2	
5	Medical Stores	1	2	
6	Graveyards	1	2	
7	Electricity	1	2	
8	Telephone	1	2	
9	Public Water Supply, Sewerage	1	2	
10	Others	1	2	

Q. 16 Source of Drinking Water in the Village; _____

Ground Water and its Depth	Canal Water (Name)	Other

Q.17 Drinking Water Quality ☐ Good ☐ Very Good ☐ Poor ☐ Brackish

Q.18 Nature of water supply

1. Public ☐
2. Private ☐

Mode of supply of water:
(a) Self Carried ☐
(b) Tapped ☐
(c) By Channel ☐

Q. 19 Common Diseases: ☐

a. Common cold ☐ b. Diahorrea ☐ c. Typhoid ☐
d. Stomach Worms ☐ e. TB ☐ f. Malaria ☐
g. Goiter ☐ h. Dysentery ☐ i. Hepatitis ☐
j. Other (specify) _____

Q.20 Does a Child Birth Attendant (Dai) Available:

1. Yes ☐ 2. No ☐

Q.21 If Yes: 1 Trained ☐ 2 Untrained ☐

Q. 22 Does any NGO exists: 1. Yes ☐ ☐

Q.23 If Yes:

Sr.No	Name	Status
1		1. Local 2. National 3. International
2		1. Local 2. National 3. International
3		1. Local 2. National 3. International

Q.24 Major Development projects run by different organization:

1. _____
2. _____
3. _____

Q.25 Who has the ownership rights of the pastures, jungles and natural resources of the area?

a. Owner Cast ☐ b. Owner Families ☐ c. Individual ☐

d. Others (Specify) _____

Q.26 What are the preferences to sell the personal immoveable property like houses, agriculture land, shops etc. to?

a. Same Cast ☐ b. Other Casts ☐

c. Immediate Neighbor ☐ d. Anyone ☐

e. Others (Specify) _____

Q.27 Prevalent units of measurement of agricultural land:

a. Marlas ☐ b. Kanals ☐ c. Sq Feet ☐

d. Acres ☐ e. Others (Specify) _____

Q.28 What are the prevalent units of measurement of agricultural products?

a. Kilogram ☐ b. Maunds ☐ c. Others (Specify) _____

Q.29 Who are the influential?

a. Head of the Settlement ☐ b. Councilors ☐

c. Religious Scholars ☐ d. Heads of Families ☐

e. Government Servants ☐ f. Vilage headar ☐

g. Others (Specify) _____

Q.30 How the matters related to property, dispute about the control and consumption of the natural resources of the area are settled?

1. Jirgah ☐ 2. Head of the Settlement ☐

3. Council of Ulamahs ☐ 4. Heads of Families ☐

5. Government Officials ☐ 6. Others (Specify) _____

Q.31 What are the major problems of your area?

Sr. No.	Types of Problems	Proposed Solutions
1		
2		
3		
4		
5		

Q.32 Are there any historical places/monuments exist?

1. Yes ☐ 2. No ☐

Q.33 If yes:

Sr. No.	Name	Number	Location (use codes) Inside = 1 Near = 2
1	Rock Carvings		
2	Historical Ruins		
3	Old Graveyard		
4	Others		

Q.34 Are there markets for grains and livestock?

A. Grains 1. Yes ☐ 2. No ☐

B. Livestock 1. Yes ☐ 2. No ☐

Q.35 If No, where do people sell their agricultural produce and livestock?

A. Grains

1. Nearby Village ☐ 4. Other Cities ☐

B**.** Livestock

1. Nearby Village ☐ 4. Other Cities ☐

Q.36 What type of cottage industry exists?

1. _____
2. _____
3. _____
4. None ☐

Name and Signature:

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED

INDUSTRIAL ZONE PHASE II

Interview Schedule

Name of Interviewer _____ Date _____

Location / Home Town _____ Tehsil & District_____

A- Demographic Characteristics.

1. Name of the Respondent_____ Father Name _____
2. Cell #_____
3. Gender 1 Male_____ Female_____ Age. _____
4. What is your education level?

   I. Illiterate ___ II. Primary___ III. Middle _____IV. Metric _ V. Intermediate ___
   VI. Graduate & above _____

5. Profession _____
6. Marital Status

   1. Married_____ 2. Un-married_____
7. Language Spoken _____
8. Caste / Ethnic Group _____
9. Religion _____
10. What Type of your family system?

    1. Joint_____ 2. Nuclear _____
11. Total number of family members living with you.

    Male _____ Female_____ Total_____

B- Socio-Economic Characteristics.

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

    1. Govt, job_____ 2. Private job---------- 3. Labour _____ 4. Business_____
    5. Student _____ 6. Any other_____
13. What is your average monthly income? (Rs)

    1. Less than 10000 _____
    2. 10,000 – 17,500 _____ _
    3. 17,501 -- 30,000 _____
    4. 30,000 - 40, 000 _____
    5. Above 40,000 _____
14. How much is your average monthly expenditure? (Rs).

    1. Less than 10,000 _____
    2. 10,000 –20,000 _____
    3. 20,000 -30,000 _____
    4. 30,000 -40,000 _____
    5. above 40, 000 _____

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

1. Owner 2.Renter

16. What type of construction of your house (In case of resident)?

1. Pacca _____ 2. Semi Pacca _____ 3. Katcha _____

17. Do you have any livestock? Yes _____ No _____

18. If yes, how much? _____

If yes, what type of livestock do you have?

i. Sheep ____ ii. Goat _____
iii. Cow _____ iv. Poultry_____
v. Donkey____ vi. Horse _____
vii. Bull_____ viii. Buffalo _____

19. Do you have any Land?

i. Yes_____ ii. No_____ Acres_____

20. Major Crops:

i. Wheat _____
ii. Maize _____
iii. Cotton _____
iv. Sugarcane _____
v. Any Other _____

21. Possession of Household Items: ----------

22. Since how long are you living/working in this area?

Period _____

a) From which locality do you come here for business/ job?

Name of place_____ Distance_____

b) Why do you prefer this locality for business, job? _____

C- Civic Amenities.

23. Which of the following facilities available in your area?

1. Electricity__ 2. Water supply___ 3.Gas___ 4. Sewerage system____5. Telephone
6. _____Mobile service_____ 7. Metal Road_____

24. What are the sources of household water being used in the project area?

1. Govt supply _____ 2. Bore hole____3. Hand pumps _____4. Any other_____

25. Are you satisfied with the water quality?

1. Yes _____ 2. No _____

If no, then what are the reasons of dissatisfaction?

1. Odorous water _____ 2. Polluted water_____
3. Saline water _____ 4. No response _____

26. Is your house connected with sewerage system?

1. Yes 2. No

27. Are you satisfied with performance of current sewerage system in this area?

1. Yes 2. No

If no, then reasons _____
_____
_____

28. What is the source of energy for cooking and lightening in this area?

1. _____ 2. _____ 3. _____

29. During last one year did you borrow any money?

1. Yes_____ 2. No_____

a) If yes, then what were Sources of borrowing

I- Bank_____ II- Money Landers_____ III- Private _____

b) If, yes than how much money & what purpose _____

D- Social Institutions (Education & Health).

30. Which of the following Educational Facility is available in or nearby your residential area?

1. Primary 2. Middle 3. Matric 4. Above

Are you satisfied with existing educational facility in your area? 1. Yes 2. No

31. Which of the following Health Facility is present in or nearby your residential area?

1. BHU 2. RHC 3. THQ 4. Any Other Distance_____

Are you satisfied with existing Health facility? 1. Yes 2. No

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

1. _____ 2. _____ 3. _____ 4. _____

33. Currently what mode of transport being used by you?

1. _____ 2. _____ 3. _____

a) Why do you prefer this road for travelling? _____

E- Cultural Characteristics.

34. Is there any shrine/mosque in this area?

1. Yes 2. No

If yes, then

Name_____ Place_____

35. Are there any Protected/ archaeological/historical site in this area?

1. Yes 2. No

If yes, then

Name_____ Place_____

Significance _____

36. Specify the existing Non -Government Organizations (NGOs) in your area and state of their area of work?

Name of Organization _____ Area of interest _____

37. Do you know that duailization and rehabilitation of existing road is going to be constructed? 1. Yes_____ 2. No_____

(If no then tell him about the proposed Project)

F- Assessment of Environmental & Social Impacts.

38. In your opinion should this project be implemented here?

1. Yes 2. No

If yes, then reasons if no, then reasons

39. Perceptions of Respondents for Action Associated With the Project?

Sr. No.	Possible impacts/effects of the Project	1	Increase	2	Decrease
1	Employment opportunities				
2	Industrial Development Opportunities				
3	Living standard				
4	Unemployment				
5	Loss of Land				
6	Resettlement				
7	Income generating activities				
8	Electricity Supply Quality				
9	Mobility (Access to Resources)				
10	Other specify				

40. Will you feel any disturbance during construction/operation of the Project?

i. Yes_____ ii. No_____

i. If yes, then type of disturbance

Sr. No.	Project Impact	Yes	Remarks
1	Loss of Structures		
2	Loss of Commercial Structure		
3	Loss of Land		
4	Trees to be Cut (Nos)		
5	Dust Generation		
6	Noise Pollution		
7	Any Other		

41. What protective measures do you suggest during construction to safeguard your interests?

Protective measures _____

42. In your opinion, what are some of the pressing needs of this area (other than proposed project)? _____

43. Any other observations by Interviewer during site visit? _____

Signature of Interviewer: _____

ANNEX-II
ENVIRONMENTAL MONITORING REPORT

Green Crescent
Environmental Consultants (Pvt) Ltd.

Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

ENVIRONMENTAL MONITORING REPORT

FOR

EIA STUDY OF INDUSTRIAL ZONE PHASE-2A AND 2B OF RAVI RIVER URBAN DEVELOPMENT PROJECT, LAHORE

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED

Prepared By: Green Crescent Environmental Consultants Pvt. Ltd.

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LIST OF ABBREVIATIONS

AA	Ambient Air
DW	Drinking Water
SPL	Sound Pressure Level
dB	Decibels
mg/m^3	Milligram per Cubic meter
mg/l	Milligram per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
CO	Carbon Monoxide
SO_2	Sulfur Dioxide
NOx	Oxides of nitrogen
O_2	Oxygen
SPM	Suspended Particulate Matter
LDL	Lowest Detection Limit
PEQS	Punjab Environmental Quality Standards
LOR	Limit of Reporting
PM	Particulate Matter
SOPs	Standard Operating Procedures
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association

SECTION 1: OBJECTIVES & SCOPE

1.1 STUDY OBJECTIVES

Followings were the main objectives of the study:

- To assess the current conditions of the environment in the surroundings of project area.
- To help the consultant and contractor to develop the strategies for the protection and betterment of environment.

1.2 SCOPE OF SERVICES

Scope of services covered following main components:

- Ambient Air Quality Monitoring
- Meteorological Monitoring
- Noise Level Monitoring
- Drinking Water Sampling & Analysis
- Waste Water Sampling & Analysis

1.3 MONITORING TEAM

Monitoring team of Green Crescent Environmental Consultants involved in the monitoring and sampling is given in below table:

Table 1-1 Monitoring Team

Sr. No.	Name of The Employee	Designation
1.	Mr. Mohsin Raza	Executive Field Officer

SECTION 2: MONITORING SCHEDULE

Detailed Environmental monitoring was conducted at the mutually agreed sites of project area. The monitoring and sampling was conducted from 14th May. 2022 to 16th May. 2022.

Table 2-1: Monitoring Schedule

Sr. #	Intervention Date	Activity	Monitoring Location
1.	**14-05-2022 to 16-05-2022**	• Ambient Air Quality Monitoring • Noise Level Monitoring • Meteorological Monitoring	• **Near Z.A Steel Mill** • **Near Sardar Jutt House** • **Near Masjid Wala Dera**
2.	**15-05-2022**	• Drinking Water	• **Z.A Steel Mill**
3.	**15-05-2022**	• Waste Water	• **Near Marl Mari Village**

SECTION 3: MONITORING LOCATION

Monitoring and Sampling Locations are as per shown in the following figure.

Figure 3-1: Map Showing Ambient Air Monitoring Locations (14th May 2022 to 16th May 2022)

Figure 3-2 Map Showing Drinking Water Sampling Locations (15th May 2022)

Figure 3-3 Map Showing Waste Water Sampling Locations (15th May 2022)

SECTION 4: MONITORING & METHODOLOGY

Following is a brief description of the methodology adopted for this Environmental Monitoring, including Ambient Air, Metrological Data, Noise and Water Analysis:

4.1 Onsite Monitoring

Among the environmental parameters selected by the client;

- Ambient Air
- Temperature and pH of water samples

Were monitored onsite. Ambient air monitoring including metrological monitoring and noise level monitoring was conducted using portable digital instruments while temperature and pH of the water samples were monitored manually using thermometer and pH strips. A brief description of each digital instrument used for onsite monitoring is given below;

4.1.1 Vantage Pro2, Davis

The Davis 6152 Wireless Vantage Pro2 Weather Station which was made in 2018 in America which consists of a console unit and an innovative integrated sensor suite that includes a rain collector with self-emptying bucket, temperature and humidity sensors and an anemometer. The sensor suite is housed inside a radiation shield, protecting the sensors against solar radiation and additional sources of reflected and/or radiated heat. It provides accurate weather data in a sophisticated yet easy-to-read format. With Wireless Vantage Pro2 Weather Station we can continuously measure metrological parameters including;

- Temperature
- Wind Direction
- Wind Velocity
- Humidity

- Atmospheric Pressure

Davis wireless weather station Vantage Pro2 was used for the assessment of these parameters according to standard operating procedures and obtained results are presented in **Annex-1** of this report.

Figure 4-1: View of Davis Vintage Pro at Site

4.1.2 Dust Trak II Aerosol Monitor 8530, TSI

The Dust Trak II Aerosol Monitor 8530 is a desktop battery-operated, data-logging, light-scattering laser photometer which was manufactured in 2014, that gives you real-time aerosol mass readings.

It uses a sheath air system that isolates the aerosol in the optics chamber to keep the optics clean for improved reliability and low maintenance. Using this instrument, lead and particulate matters were monitored including;

- Lead
- PM_{10}
- $PM_{2.5}$
- SPM

Figure 4-2: DustTrak II aerosol monitor 8530

4.1.3 Model 407730 Digital Sound Level Meter, Extech

It is a noise measuring instrument used to assess sound levels by measuring sound pressure. Often referred to as a sound pressure level (SPL) meter, decibel (dB) meter, noise meter or noise dosimeter, a sound level meter uses a microphone to capture sound. The sound is then evaluated within the device and acoustic measurement values are displayed. The most common unit of acoustic measurement for sound is the decibel (dBA). Hourly noise level monitoring was done for 24 hours at each point of selected location. Digital Sound meter was manufactured in 2014.

Noise level using portable digital sound meter was monitored at client's mutually agreed sampling points. Noise level measurement was performed according to standard operating procedures and obtained results are presented in **Annex-1** of this report.

Figure 4-3: View of Digital Sound Level Meter

4.1.4 HORIBA

HORIBA, was manufactured in 2017, a Japanese brand which consists of ambient air analyzers and sampling systems for the measurement of regulatory pollutants and air quality control. It offers complete tailored or individual air quality monitoring solutions, in order to meet the requirements and regulatory needs of environmental monitoring.

Figure 4-4: HORIBA

4.1.4.1 AC32M. NITROGEN OXIDES ANALYZER (NO, NOX, NO2)

Chemiluminescence technology based, TÜV & US EPA approved. It is single chambered chemiluminescence technology with ultra-compact and lightweight – rackable 19"/3U. On board web server compatible with any internet browser and user interface with on-line help for the display, configuration, maintenance, diagnostics or software updating of the analyzer, remotely. It is capable to detect low levels of nitrogen oxides (NO-NO_2-NO_X) with standard ranges: 0-0.1/0.2/0.5/1.0 ppm

4.1.4.2 AF22E. NEW E-SERIES SO2 ANALYZER

UV Fluorescent sulfur dioxide analyzer AF22e, TUV certified and US-EPA approved for compliance with ISO 10498, 2008/50/EC, en 14212, EN 15267, 40 CFR part 53 SUB B and SUB C.

It is a light weight eco-friendly & eco-innovative conception unit which detects early signs of trouble, allows predictive maintenance, identifies the service needed and guides the service operations step by step.

It provides real-time calibration graph, animated synoptic, auto-diagnostic, control and maintenance data screens can be displayed while the instrument is operating. It provides superior metrological presentations for SO_2 measurements in the range as low as 0.05 ppm F.S.

4.1.4.3 CO12E. NEW E-SERIES CO ANALYZER

Non dispersive Infra-Red carbon monoxide analyzer CO12e, TUV certified and US-EPA approved for compliance with ISO 4224, EN 14626, EN 15267, 40 CFR part 53 SUB B and SUB C.

It is a light weight eco-friendly & eco-innovative conception unit with breakthrough mechanical design for weight and power saving as well as thermal insulation & reliability. It has automatic or programmable response time adjustment, ensuring efficient monitoring of low concentration levels of carbon monoxide. It provides superior metrological presentations for CO measurements in the range 0-100 ppm.

4.2 Water Sample Collection and Preservation

Water sample was collected from mutually agreed sampling point according to the SOPs based on American Public Health Association (APHA) for water sampling and analysis. Decontaminated glass bottle was used to collect the sample. To prevent air bubbles from being trapped in the bottle, it was filled to the brim. The lid of the sampling bottle was then replaced tightly. The bottle was then labeled and chain of custody forms were filled out and signed to keep track of the collected sample. Collected sample was then preserved in appropriate container as per APHA Preservation Guidelines. A shipping container containing ice packs with maintained temperature was used for transporting the samples from sampling location to GCEC Lahore Branch for testing.

4.2.1 Drinking Water Sampling & Analysis

Sampling for drinking water was carried out at mutually agreed sampling point. Physical and chemical parameters were analyzed afterwards in GCEC labs for drinking water sample. Analytical methods used during the laboratory testing were in line with the American Public Health Association's Standard Methods for the Examination of Water. Analysis Results are presented in **Annex 1** of this report.

4.2.2 Waste Water Sampling & Analysis

Sampling for waste water was carried out at mutually agreed sampling point. Physical and chemical parameters were analyzed afterwards in GCEC labs for waste water sample. Analytical methods used during the laboratory testing were in line with the American Public Health Association's Standard Methods for the Examination of Water. Analysis Results are presented in **Annex 1** of this report.

4.3 Sample Tagging and Chain of Custody

In GCEC Lahore Branch, sample and chain of custody form were handed over by Field Monitoring to the Coordination Staff for in-house tagging and logging according to the company's policy and handed over to the Laboratory Staff for further physical, chemical and microbiological testing. A brief description of each sampling type and further proceedings are also discussed in following section.

SECTION 5: RESULTS & DISCUSSIONS

This section of the report presents the Environmental testing results of noise-level monitoring, ambient air quality, waste water & drinking water analysis.

5.1 Background Noise Level Monitoring

The Noise monitoring activity was carried at the project site and at the surrounding areas of project site. Monitoring schedule is presented in Table 2-1. While a brief description of monitoring session is as below.

Hourly noise monitoring was conducted at 03 selected locations. The results of monitoring location was compared with residential noise standards for Punjab Environmental Quality Standards i.e., 55.0 dB (A) for Day Time and 45.0 dB (A) for Night Time and industrial noise standards for Punjab Environmental Quality Standards i.e., 75.0 dB (A) for Day Time and 65.0 dB (A) for Night Time

Discussion on Noise Results

Noise level Monitoring was conducted at selected monitoring location on 24 hour basis. The monitoring results of the site are complying well with the industrial & residential noise standards of PEQS. Day and Night Time averages for monitoring point are presented in figures below.

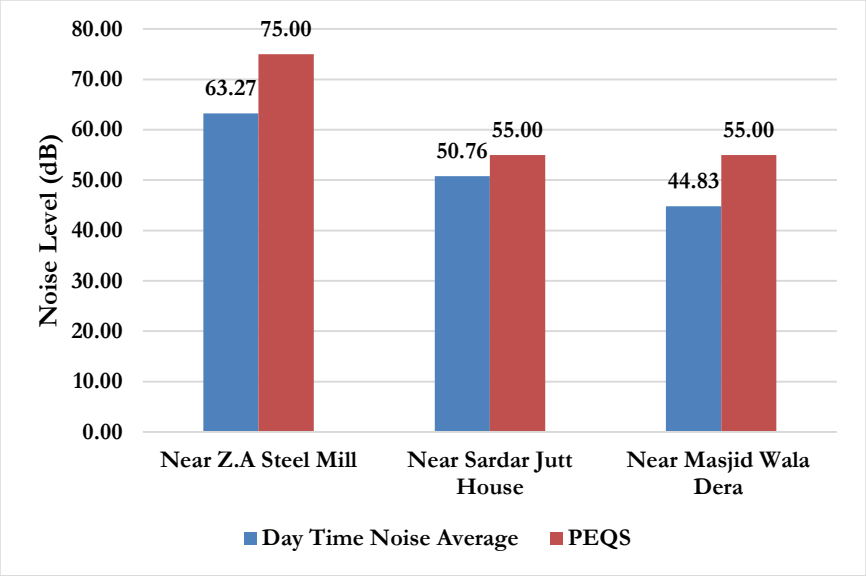

Figure 5-1: Day Time Average Noise Level Value Compared with Respective PEQS (14th May. to 16th May. 2022)

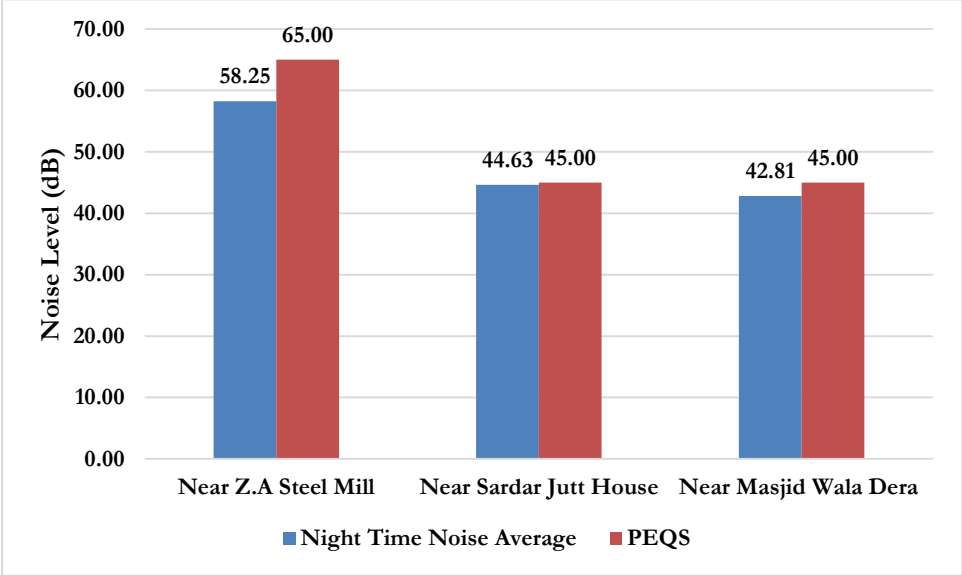

Figure 5-2: Night Time Average Noise Level Value Compared with Respective PEQS (14th May. to 16th May. 2022)

5.2 Ambient Air Quality Monitoring

The activity for monitoring the ambient air conditions was carried out at the project site and its vicinity for 24 hours, starting from **14th May. to 16th May. 2022**. To assess the current quality of ambient air, Carbon Monoxide, Oxides of Nitrogen, Sulphur Dioxide, Ozone, and Particulate

Matter were monitored. Summary of monitoring results is presented in Table 5-1. Detailed result reports are also attached as **Annex 1**.

Discussion of NOx Measurements

The readings of NO, NO_2 and NOx for the project site and its surroundings comply with the Punjab Environmental Quality Standards i.e., 40 µg/m³, 80 µg/m³ and 120 µg/m³ respectively. Sum of NO and NO_2 is termed as NOx. NOx results found at all monitoring locations were within the PEQS limits. Monitoring results, compared with PEQS, are graphically presented in figure below and in Summary Table 5-1.

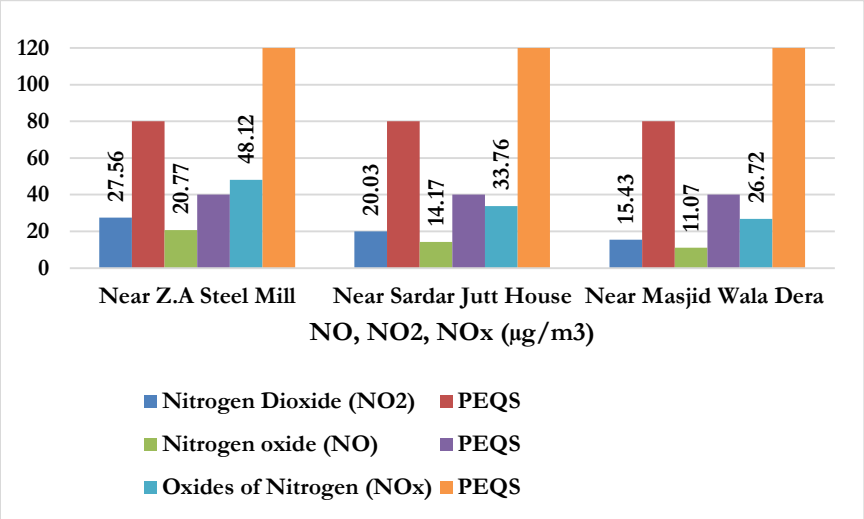

Figure 5-3: Daily Average NOx Measurements Compared with Respective PEQS (14th May. to 16th May. 2022)

Discussion of SO_2 Measurements

The SO_2 readings for all the monitoring locations are presented in the summary table which depicts that the monitoring results are within the prescribed limits of PEQS i.e. 120 µg/m³. SO_2 results found at monitoring location were within the PEQS limits. Monitoring results, compared with PEQS, are also graphically presented in figure below and in Summary Table 5-1.

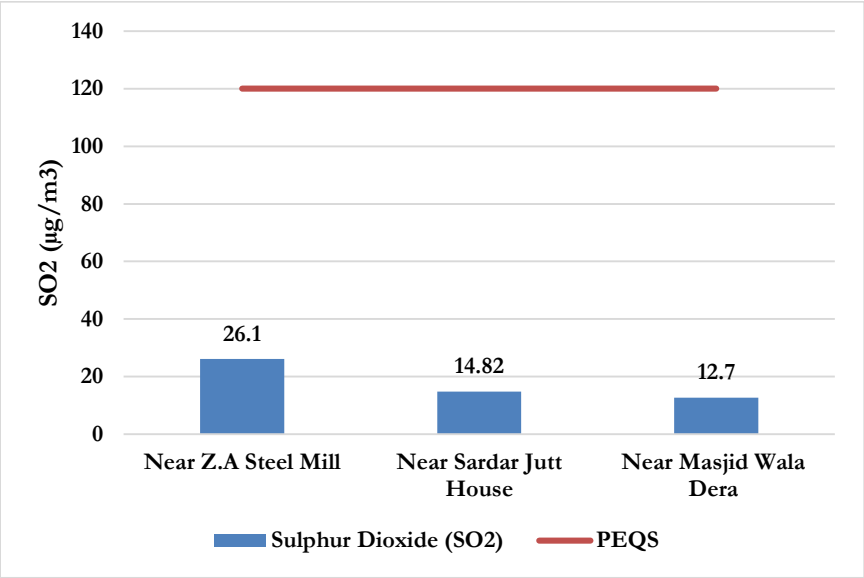

Figure 5-4: Daily Average SO_2 Measurement Compared with Respective PEQS (14th May. to 16th May. 2022)

Discussion of CO Measurements

Carbon Monoxide (CO) was monitored for 24 hours at monitoring location & its value is within the permissible limit of PEQS i.e., 5.0 mg/m³. Monitoring results, compared with PEQS, are graphically presented in figure below and in Summary Table 5-1.

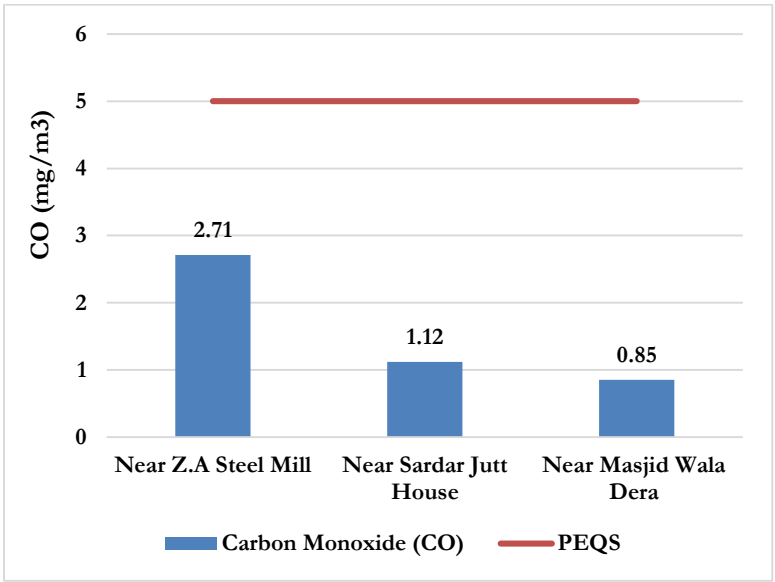

Figure 5-5: Daily Average CO Measurement Compared with Respective PEQS (14th May. to 16th May. 2022)

Discussion of Ozone Measurements

Ozone (O_3) was monitored for 24 hours at monitoring location and the value detected at location is within the permissible limit of PEQS i.e., 130.0 µg/m^3. Monitoring results, compared with PEQS, are graphically presented in figure below and in Summary Table 5-1.

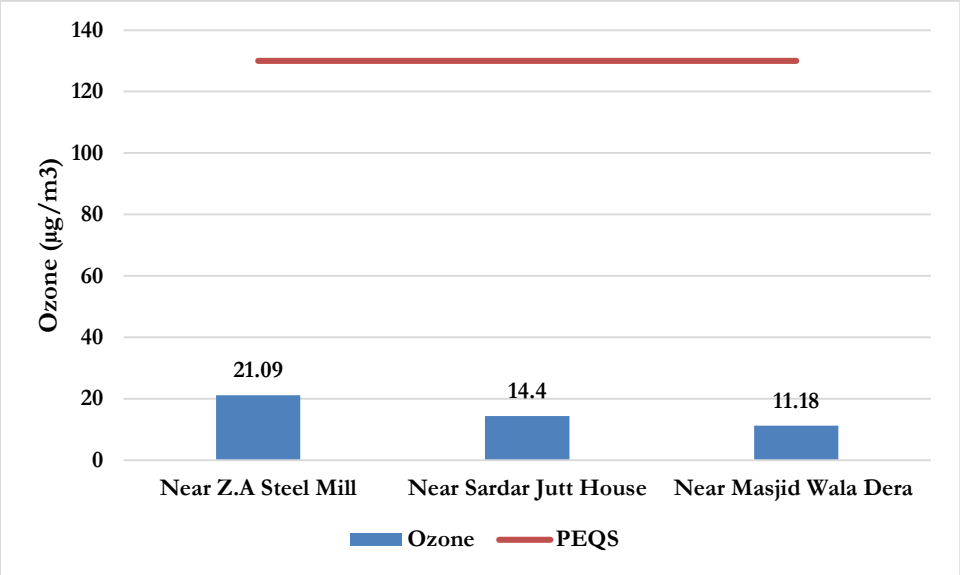

Figure 5-6 Daily Average Ozone Measurement Compared with Respective PEQS (14th May. to 16th May. 2022)

Discussion of Lead Measurements

Lead was monitored for 24 hours at monitoring location and the value detected at selected location is within the permissible limit of PEQS i.e., 1.50 µg/m^3. Monitoring results, compared with PEQS, are graphically presented in figure below and in Summary Table 5-1.

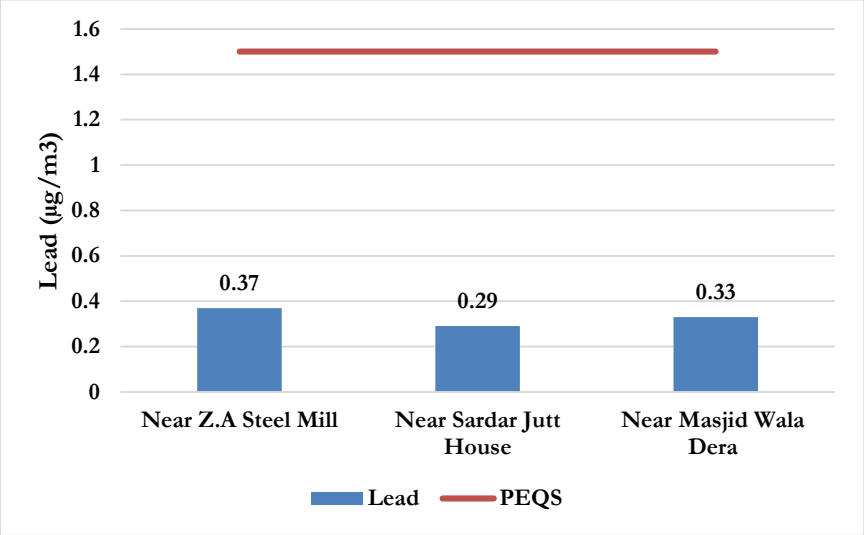

Figure 5-7 Daily Average Lead Measurement Compared with Respective PEQS (14th May. to 16th May. 2022)

Discussion on Suspended Particulate Matter (SPM)

The readings of PM_{10}, $PM_{2.5}$ and SPM for the project site and its surroundings are compared with the Punjab Environmental Quality Standard i.e., 150 µg/m³, 35 µg/m³ and 500 µg/m³ respectively. Suspended Particulate Matter (SPM) is the sum of PM_{10} and $PM_{2.5}$. All of the measured PM were found falling within the prescribed limits of PEQS. Monitoring results, compared with PEQS, are graphically presented in figure below and in Summary Table 5-1.

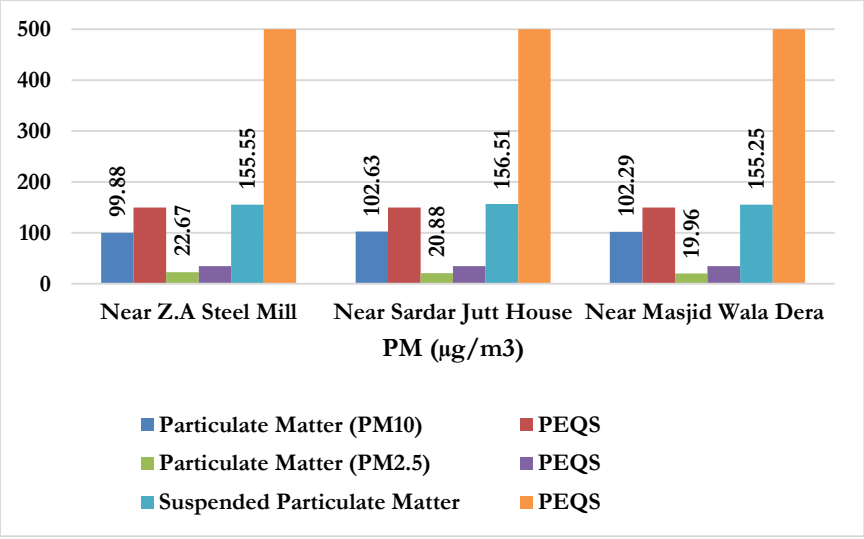

Figure 5-8 Daily Average SPM Measurements Compared with Respective PEQS (14th May. to 16th May. 2022)

Table 5-1 Summary of Ambient Air Quality Monitoring Results

Location Identification			
Monitoring Site:	**01**	**02**	**03**
Monitoring Location:	Near Z.A Steel Mill	Near Sardar Jutt House	Near Masjid Wala Dera
Date:	14-May-2022 to 15-May-2022	15-May-2022 to 16-May-2022	15-May-2022 to 16-May-2022
Coordinates:	31°38'13.0"N 74°25'48.0"E	31°39'05.0"N 74°24'58.0"E	31°38'53.0"N 74°26'07.0"E

Parameter	Unit	Duration	Average obtained Concentration			PEQS
			01	02	03	
Nitrogen Dioxide (NO_2)	µg/m^3	24 hours	27.56	20.03	15.43	80.0
Nitrogen oxide (NO)	µg/m^3	24 hours	20.77	14.17	11.07	40.0
NO_X	µg/m^3	24 hours	48.12	33.76	26.72	120.0
Sulphur Dioxide (SO_2)	µg/m^3	24 hours	26.10	14.82	12.70	120.0
Carbon Monoxide (CO)	mg/m^3	24 hours	2.71	1.12	0.85	05.0*
Ozone (O_3)	µg/m^3	24 hours	21.09	14.40	11.18	130.0**
Particulate Matter (PM_{10})	µg/m^3	24 hours	99.88	102.63	102.29	150.0
Particular Matter ($PM_{2.5}$)	µg/m^3	24 hours	22.67	20.88	19.96	35.0
Suspended Particulate Matter (SPM)	µg/m^3	24 hours	155.55	156.51	155.25	500.0
Lead Airborne Particles	µg/m^3	24 hours	0.37	0.29	0.33	1.5

Abbreviations:

PEQS= Punjab Environmental Quality Standards
(*08 hour standard for CO)
(**01 hour standard for O_3)
µg/m^3= Micrograms per Cubic Meter
mg/m^3= Milligrams per Cubic Meter

5.3 Drinking Water Analysis

Drinking water sample was collected from 01 location on 15-05-2022 which was preserved and submitted in GCEC-Laboratory according to the standard methods. Summary of Analysis Results are given below in **Table 5-2**.

Discussion on Results

The laboratory test results of drinking water are summarized in the table below. It is obvious from the analysis results that all the physical and chemical parameters of drinking water of the project site meets the permissible limits of Punjab Environmental Quality Standards. But the results of microbiological analysis showed that the number of total coliform breaches permissible limits of PEQs i.e. 02 (NEQS=02/100ml) of Z.A Steel Mill

In the light of the above discussion of test results, it is concluded that all drinking water samples are in compliance with the permissible limits of Punjab Environmental Quality Standards.

Table 5-2 Summary of Drinking Water Analysis Results

Sample Marking & Identification			
01	Z.A Steel Mill	**Sampling Coordinates**	31°38'16.1"N 74°25'48.1"E

Parameters	Analysis Method	Unit	LOR	Result 01	PEQS
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-4500H+ B	-	0.01	7.48	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA-2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	162.36	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	274.0	< 1000
Ammonia	APHA-4500-NH_3-B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	7.99	< 250
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F- D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA-4500NO2 B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA-4500NO3 C	mg/l	0.1	<0.1	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		02	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		Absent	0/100ml

Abbreviations:
ND: Not Detected **LOR:** Limit of Reporting **PEQS:** Punjab Environmental Quality Standards

Note:
** Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5C° and humidity at 50±20%.*

Disclaimer: *The results are solely of the sample provided. **All the starred parameters are PNAC accredited.*

5.4 Waste Water Analysis

Waste Water sample was collected from Near Marl Mari Village on 15-05-2022 which was preserved and submitted in GCEC-Laboratory according to the standard methods. Summary of Analysis Results are given below in **Table 5-3**.

Discussion on Results

The laboratory test results of waste water are summarized in the table below. It is obvious from the analysis results that the waste water of the project site meets the permissible limits of Punjab Environmental Quality Standards for all tested parameters except Biological Oxygen Demand (BOD) & Chemical Oxygen Demand (COD).

In the light of the above discussion of the liquid effluent test results, it is concluded that Near Marl Mari Village sample is in compliance with the permissible limits of Punjab Environmental Quality Standards except the above mentioned two parameters.

Table 5-3: Summary of Waste Water Analysis Results

Sample Marking & Identification			
01	Near Marl Mari Village	**Sampling Coordinates**	31°38'26.5"N 74°26'33.3"E

Parameters	Analysis Method	Unit	LOR	Result 01	PEQS
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	-	^{0}C	-	2.67	-
pH**	APHA-4500-H$^+$ B	pH unit	0.01	7.29	6-9
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	1391.0	3500
Oil and Grease**	USEPA-1664	mg/l	0.2	2.14	10
Biological Oxygen Demand	APHA-5210 B	mg/l	1.0	154.0	80
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1.0	394.0	150
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	119.0	200
Phenolic Compound	APHA-5530 D	mg/l	0.01	0.07	0.1
Chloride (Cl)**	APHA-4500 B	mg/l	0.24	107.96	1000
Fluoride (F)**	APHA-4500F$^-$ D	mg/l	0.01	<0.01	10
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	1.0
Detergent	APHA-5540 B	mg/l	-	5.96	20
Sulphate**	APHA-4500-SO_4^{-2} C	mg/l	0.41	119.77	600
Sulphide	APHA-4500-S_2-E	mg/l	0.2	<0.2	1.0
Ammonia	APHA-4500-NH_3-B	mg/l	0.002	10.96	40
Silver	APHA-3500Ag-B	mg/l	0.0032	<0.0032	1.0
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.1
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	1.0
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	1.0
Lead**	APHA-3111 B	mg/l	0.013	<0.013	0.5
Mercury	APHA-3500-Hg B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	1.0
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3500As B	mg/l	0.01	0.012	1.0
Barium	APHA-3500Ba B	mg/l	0.031	<0.031	1.5
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	1.5
Iron**	APHA-3111 B	mg/l	0.1	1.3	8.0
Boron	APHA-4500B-C	mg/l	0.1	<0.1	6.0
Total Chlorine	APHA-4500Cl-B	mg/l	0.1	<0.1	1.0
Selenium	APHA-3500Se C	mg/l	-	ND	0.5
Pesticides	APHA-6630 B	mg/l	-	ND	0.15
Total Toxic Metals	-	mg/l	-	0.01	2

Abbreviations:
ND: Not Detected **LOR:** Limit of Reporting **PEQS:** Punjab Environmental Quality Standards
Note:
** Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5C° and humidity at 50±20%.*
Disclaimer: *The results are solely of the sample provided. **All the starred parameters are PNAC accredited.*

SECTION 6: CONCLUSION

Environmental monitoring was performed to assess the environmental conditions of project area and its surroundings.

The results of ambient air monitoring depict that all the tested parameters for air quality were within the permissible limits prescribed by environmental protection agency.

Noise monitoring result of selected site was within the prescribed limits for commercial noise of Punjab Environmental Quality Standards.

From the laboratory test results for drinking it is evident that all of the physical and chemical testing parameters are within the prescribed limits of PEQS except microbiological analysis results for total coliform.

Results of waste water sample showed compliance with permissible limits of Punjab Environmental Quality Standards except Biological Oxygen Demand (BOD) & Chemical Oxygen Demand (COD).

ANNEXURE 1:

Monitoring

&

Analysis Reports

Green Crescent
Environmental Consultants (Pvt) Ltd.

Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Monitoring & Test Report

- **Drinking Water**
- **Waste Water**
- **Ambient Air**
- **Meteorological Data**
- **Noise Monitoring**

NESPAK

24th May. 2022

Job Reference No.: GCEC-PK-129/2022

Green Crescent
Environmental Consultants (Pvt) Ltd.

Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Client Detail:	
Name of Contact Person:	Mr. Muhammad Shariq Ahmed
Designation:	Head Environment, Resettlement and Social Development Section
Contact Number:	-
Telephone Number:	-
Email:	scharique@hotmail.com
Address:	NESPAK House, 1-C Block-N, Model Town Extension Lahore

GCEC Details:	
Director:	Mr. Mian Khurram Usman
Telephone:	+92 42 35962885
Fax:	+92 42 35962884
Email:	manager.operations@gcee.ae
Address	House No. 368-B Block B, Canal View, Lahore

Signatories:

Zara Yousaf

(Coordination Department)

Green Crescent
Environmental Consultants (Pvt) Ltd.

Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Sample Details			
Job Ref. No:	GCEC-PK-129/2022	**Client Name:**	**NESPAK (PVT) LTD.**
No. of Samples:	One	**Sample Matrix:**	Drinking Water Sample
Sample Date:	15-05-2022	**Sampling Method:**	APHA 1060-B & C
Sample Receipt Date:	16-05-2022	**Sampled By:**	GCEC
Sample Identification			
01	Z.A Steel Mill	**Sample Coordinates**	31°38'16.1"N 74°25'48.1"E

Parameters	Analysis Method	Unit	LOR	Result 01	PEQS
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-4500H+ B	-	0.01	7.48	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA-2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	162.36	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	274.0	< 1000
Ammonia	APHA-4500-NH_3-B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	7.99	< 250
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F- D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA-4500NO2 B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA-4500NO3 C	mg/l	0.1	<0.1	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		02	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		Absent	0/100ml

Abbreviations:
ND: Not Detected **LOR:** Limit of Reporting **PEQS:** Punjab Environmental Quality Standards

Note:
** Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5C° and humidity at 50±20%.*

Disclaimer: *The results are solely of the sample provided. **All the starred parameters are PNAC accredited.*

Lab Manager

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Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Sample Details			
Job Ref. No:	GCEC-PK-129/2022	**Client Name:**	**Nespak**
No. of Samples:	One	**Sample Matrix:**	**Waste Water Sample**
Sample Date:	15-05-2022	**Sampling Method:**	APHA 1060 B & C
Sample Receipt Date:	16-05-2022	**Sampled By:**	GCEC
Sample Identification			
01	Near Marl Mari Village	**Sampling Coordinates**	31°38'26.5"N 74°26'33.3"E

Parameters	Analysis Method	Unit	LOR	Result 01	PEQS
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	-	^{0}C	-	2.67	-
pH**	APHA-4500-H$^+$ B	pH unit	0.01	7.29	6-9
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	1391.0	3500
Oil and Grease**	USEPA-1664	mg/l	0.2	2.14	10
Biological Oxygen Demand	APHA-5210 B	mg/l	1.0	154.0	80
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1.0	394.0	150
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	119.0	200
Phenolic Compound	APHA-5530 D	mg/l	0.01	0.07	0.1
Chloride (Cl)**	APHA-4500 B	mg/l	0.24	107.96	1000
Fluoride (F)**	APHA-4500F$^-$ D	mg/l	0.01	<0.01	10
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	1.0
Detergent	APHA-5540 B	mg/l	-	5.96	20
Sulphate**	APHA-4500-SO_4^{-2} C	mg/l	0.41	119.77	600
Sulphide	APHA-4500-S_2-E	mg/l	0.2	<0.2	1.0
Ammonia	APHA-4500-NH_3-B	mg/l	0.002	10.96	40
Silver	APHA-3500Ag-B	mg/l	0.0032	<0.0032	1.0
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.1
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	1.0
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	1.0
Lead**	APHA-3111 B	mg/l	0.013	<0.013	0.5
Mercury	APHA-3500-Hg B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	1.0
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3500As B	mg/l	0.01	0.012	1.0
Barium	APHA-3500Ba B	mg/l	0.031	<0.031	1.5
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	1.5
Iron**	APHA-3111 B	mg/l	0.1	1.3	8.0
Boron	APHA-4500B-C	mg/l	0.1	<0.1	6.0
Total Chlorine	APHA-4500Cl-B	mg/l	0.1	<0.1	1.0
Selenium	APHA-3500Se C	mg/l	-	ND	0.5
Pesticides	APHA-6630 B	mg/l	-	ND	0.15
Total Toxic Metals	-	mg/l	-	0.01	2

Abbreviations:
ND: Not Detected **LOR:** Limit of Reporting **PEQS:** Punjab Environmental Quality Standards

Note:

** Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5C° and humidity at 50±20%.*

Disclaimer: *The results are solely of the sample provided. **All the starred parameters are PNAC accredited.*

Lab Manager

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Islamabad Laboratory

Ambient Air & Noise Monitoring
Location-01

NEAR Z.A STEEL MILL

(Lahore)

Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Z.A Steel Mill
Date of Intervention	14-May-2022 to 15-May-2022
Monitoring Coordinates	31°38'13.0"N 74°25'48.0"E

Sr. #	Time	CO (mg/m^3)	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)
1.	11:00	2.27	21.23	27.55	48.78	22.45
2.	12:00	2.21	18.89	28.33	47.22	23.72
3.	13:00	2.87	22.01	27.33	49.34	25.42
4.	14:00	2.32	20.19	26.08	46.27	25.33
5.	15:00	3.12	19.87	28.66	48.53	26.44
6.	16:00	3.18	21.44	29.19	50.63	24.45
7.	17:00	2.24	18.98	28.98	47.96	26.48
8.	18:00	3.03	20.44	26.44	46.88	27.35
9.	19:00	2.96	17.98	28.19	46.17	22.74
10.	20:00	3.12	20.94	29.14	50.08	23.96
11.	21:00	3.05	18.98	27.21	46.19	26.43
12.	22:00	2.43	20.66	28.05	48.71	23.56
13.	23:00	2.65	21.01	27.01	48.02	24.38
14.	0:00	3.01	22.19	29.14	51.33	26.83
15.	1:00	2.82	19.14	24.29	43.43	26.11
16.	2:00	1.95	21.08	27.05	48.13	28.23
17.	3:00	2.31	19.3	26.03	45.33	28.62
18.	4:00	3.03	21.19	28.01	49.2	26.61
19.	5:00	3.21	19.53	26.12	45.65	25.38
20.	6:00	2.43	22.08	28.01	50.09	27.29
21.	7:00	3.07	22.01	29.23	51.24	28.32
22.	8:00	3.24	21.19	27.01	48.2	27.44
23.	9:00	2.65	19.98	27.23	47.21	26.98
24.	10:00	2.87	21.44	28.89	50.33	28.75
Average Concentration		**2.71**	**20.77**	**27.56**	**48.12**	**26.10**

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Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Z.A Steel Mill
Date of Intervention	14-May-2022 to 15-May-2022
Monitoring Coordinates	31°38'13.0"N 74°25'48.0"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	PEQS
Nitrogen Dioxide (NO_2)	µg/m³	24 Hours	1.00	27.56	80.0
Nitrogen Oxide (NO)	µg/m³	24 Hours	1.00	20.77	40.0
NO_X	µg/m³	24 Hours	1.00	48.12	120.0
Sulphur Dioxide (SO_2)	µg/m³	24 Hours	1.00	26.10	120.0
Carbon Monoxide (CO)	mg/m³	24 Hours	0.01	2.71	05.0*
Ozone (O_3)	µg/m³	24 Hours	-	21.09	130.0**
Particulate Matter ($PM_{2.5}$)	µg/m³	24 Hours	1.00	22.67	35.0
Particulate Matter (PM_{10})	µg/m³	24 Hours	1.00	99.88	150.0
Suspended Particulate Matter (SPM)	µg/m³	24 Hours	1.00	155.55	500.0
Lead Airborne Particles	µg/m³	24 Hours	-	0.37	1.5

Abbreviations:
µg/m³= Micrograms per Cubic Meter
mg/m³= Milligrams per Cubic Meter
LDL= Lowest Detection Limit
PEQS= Punjab Environmental Quality Standards
*08 hour standard for CO
**01 hour standard for O_3

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Meteorological Data

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Z.A Steel Mill
Date of Intervention	14-May-2022 to 15-May-2022
Monitoring Coordinates	31°38'13.0"N 74°25'48.0"E

Time	Ambient Temperature ^{0}C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
11:00	43	NW	2.1	5	752.2
12:00	45	NW	2.3	4	751.2
13:00	46	NW	4.2	3	750.4
14:00	47	NW	4.1	3	758.2
15:00	46	N	4.2	2	751.9
16:00	47	N	4.4	2	752.3
17:00	46	N	2.3	1	753.8
18:00	43	N	2.1	3	750.3
19:00	40	NW	2.4	5	752.4
20:00	38	NW	3.1	6	751.2
21:00	36	NW	3.3	6	749.4
22:00	36	W	2.6	7	751.2
23:00	35	W	1.4	7	753.1
0:00	34	W	2.3	8	750.2
1:00	31	W	2.4	8	749.4
2:00	30	W	2.1	9	748.3
3:00	28	W	2.4	9	749.5
4:00	27	NW	3.1	10	750.4
5:00	26	NW	3.3	11	750.1
6:00	28	NW	4.1	11	749.3
7:00	32	NW	4.3	10	749.4
8:00	35	N	4.1	7	751.3
9:00	37	N	1.9	5	751.8
10:00	39	N	2.4	3	749.5

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Noise Level Monitoring Report

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Z.A Steel Mill
Date of Intervention	14-May-2022 to 15-May-2022
Monitoring Coordinates	31°38'13.0"N 74°25'48.0"E

Sr. #	Time	Method/Technique	Unit	Results LAavg	PEQS (Industrial)
Night Time					
1.	23:00	Noise Meter	dB	53.2	
2.	00:00	Noise Meter	dB	55.1	
3.	01:00	Noise Meter	dB	56.4	
4.	02:00	Noise Meter	dB	55.3	
5.	03:00	Noise Meter	dB	56.2	65.0
6.	04:00	Noise Meter	dB	60.4	
7.	05:00	Noise Meter	dB	63.2	
8.	06:00	Noise Meter	dB	66.2	
Night Time Average			**dB**	**58.25**	**65.0**
Day Time					
9.	07:00	Noise Meter	dB	67.2	
10.	08:00	Noise Meter	dB	61.2	
11.	09:00	Noise Meter	dB	62.4	
12.	10:00	Noise Meter	dB	63.4	
13.	11:00	Noise Meter	dB	66.2	
14.	12:00	Noise Meter	dB	64.2	
15.	13:00	Noise Meter	dB	65.7	
16.	14:00	Noise Meter	dB	67.2	
17.	15:00	Noise Meter	dB	64.3	75.0
18.	16:00	Noise Meter	dB	65.1	
19.	17:00	Noise Meter	dB	61.2	
20.	18:00	Noise Meter	dB	52.3	
21.	19:00	Noise Meter	dB	58.3	
22.	20:00	Noise Meter	dB	58.1	
23.	21:00	Noise Meter	dB	55.4	
24.	22:00	Noise Meter	dB	54.3	
Day Time Average			**dB**	**63.27**	**75.0**

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Ambient Air & Noise Monitoring
Location-02

NEAR SARDAR JUTT HOUSE

(Lahore)

Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Sardar Jutt House
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°39'05.0"N 74°24'58.0"E

Sr. #	Time	CO (mg/m^3)	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)
1.	10:00	1.23	14.66	21.75	36.41	15.35
2.	11:00	1.24	15.44	20.52	35.96	14.37
3.	12:00	1.19	15.3	21.45	36.75	16.33
4.	13:00	1.13	15.58	21.65	37.23	17.14
5.	14:00	1.21	14.34	20.67	35.01	16.28
6.	15:00	1.12	16.51	21.74	38.25	16.05
7.	16:00	1.16	15.88	21.52	37.4	15.98
8.	17:00	1.14	14.42	20.67	35.09	14.45
9.	18:00	1.28	12.42	17.35	29.77	15.24
10.	19:00	1.06	13.09	18.89	31.98	16.54
11.	20:00	1.02	14.09	18.46	32.55	15.39
12.	21:00	1.04	13.11	16.45	29.56	14.78
13.	22:00	0.99	12.12	17.67	29.79	14.21
14.	23:00	0.97	12.08	16.78	28.86	13.11
15.	0:00	0.89	13.09	17.65	30.74	12.28
16.	1:00	0.98	12.12	18.45	30.57	11.35
17.	2:00	0.96	13.01	18.78	31.79	12.34
18.	3:00	0.89	12.09	16.65	28.74	12.21
19.	4:00	0.94	13.55	17.65	31.2	12.87
20.	5:00	1.02	14.42	18.45	32.87	13.76
21.	6:00	1.05	16.11	22.31	38.42	12.87
22.	7:00	1.21	14.88	20.67	35.55	14.56
23.	8:00	1.18	15.66	21.67	37.33	15.71
24.	9:00	1.15	16.66	21.75	38.41	16.57
Average Concentration		**1.12**	**14.17**	**20.03**	**33.76**	**14.82**

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Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Sardar Jutt House
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°39'05.0"N 74°24'58.0"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	PEQS
Nitrogen Dioxide (NO_2)	µg/m³	24 Hours	1.00	20.03	80.0
Nitrogen Oxide (NO)	µg/m³	24 Hours	1.00	14.17	40.0
NO_X	µg/m³	24 Hours	1.00	33.76	120.0
Sulphur Dioxide (SO_2)	µg/m³	24 Hours	1.00	14.82	120.0
Carbon Monoxide (CO)	mg/m³	24 Hours	0.01	1.12	05.0*
Ozone (O_3)	µg/m³	24 Hours	-	14.40	130.0**
Particulate Matter ($PM_{2.5}$)	µg/m³	24 Hours	1.00	20.88	35.0
Particulate Matter (PM_{10})	µg/m³	24 Hours	1.00	102.63	150.0
Suspended Particulate Matter (SPM)	µg/m³	24 Hours	1.00	156.51	500.0
Lead Airborne Particles	µg/m³	24 Hours	-	0.29	1.5

Abbreviations:
µg/m³= Micrograms per Cubic Meter
mg/m³= Milligrams per Cubic Meter
LDL= Lowest Detection Limit
PEQS= Punjab Environmental Quality Standards
*08 hour standard for CO
**01 hour standard for O_3

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Meteorological Data

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Sardar Jutt House
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°39'05.0"N 74°24'58.0"E

Time	Ambient Temperature ^{0}C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
10:00	35	NW	3.2	5	752.2
11:00	36	NW	3.1	4	751.2
12:00	38	NW	3.3	3	750.4
13:00	41	NW	3.1	3	758.2
14:00	41	W	3.1	2	751.9
15:00	42	SE	2.1	2	753.2
16:00	39	SE	3.2	2	753.8
17:00	38	SE	3.2	3	754.2
18:00	37	SE	3.1	4	754.7
19:00	35	SW	2.3	4	751.2
20:00	34	SW	2.4	5	754.3
21:00	34	SW	2.1	5	751.2
22:00	32	SW	2.5	6	753.2
23:00	30	SW	2.1	6	753.8
0:00	30	S	2.4	7	753.9
1:00	29	S	2.4	7	751.3
2:00	28	S	2.4	8	753.2
3:00	26	W	2.1	8	751.9
4:00	26	W	3.3	8	755.2
5:00	25	W	4.1	9	748.3
6:00	25	W	3.3	9	749.4
7:00	27	NW	2.4	6	751.2
8:00	34	NW	2.3	4	751.8
9:00	35	NW	2.7	3	753.6

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Noise Level Monitoring Report

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Sardar Jutt House
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°39'05.0"N 74°24'58.0"E

Sr. #	Time	Method/Technique	Unit	Results LAavg	PEQS (Residential)
Night Time					
1.	23:00	Noise Meter	dB	42.84	
2.	00:00	Noise Meter	dB	40.94	
3.	01:00	Noise Meter	dB	39.94	
4.	02:00	Noise Meter	dB	41.74	
5.	03:00	Noise Meter	dB	42.84	45.0
6.	04:00	Noise Meter	dB	44.14	
7.	05:00	Noise Meter	dB	52.84	
8.	06:00	Noise Meter	dB	51.74	
Night Time Average			**dB**	**44.63**	**45.0**
Day Time					
9.	07:00	Noise Meter	dB	55.8	
10.	08:00	Noise Meter	dB	51.3	
11.	09:00	Noise Meter	dB	54.8	
12.	10:00	Noise Meter	dB	52.2	
13.	11:00	Noise Meter	dB	51.4	
14.	12:00	Noise Meter	dB	53.9	
15.	13:00	Noise Meter	dB	49.2	
16.	14:00	Noise Meter	dB	55.3	
17.	15:00	Noise Meter	dB	49.7	55.0
18.	16:00	Noise Meter	dB	51.4	
19.	17:00	Noise Meter	dB	53.2	
20.	18:00	Noise Meter	dB	55.9	
21..	19:00	Noise Meter	dB	51.2	
22.	20:00	Noise Meter	dB	44.2	
23.	21:00	Noise Meter	dB	43.2	
24.	22:00	Noise Meter	dB	39.4	
Day Time Average			**dB**	**50.76**	**55.0**

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Ambient Air & Noise Monitoring
Location-03

NEAR MASJID WALA DERA

(Lahore)

Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Masjid Wala Dera
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°38'53.0"N 74°26'07.0"E

Sr. #	Time	CO (mg/m^3)	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)
1.	10:30	0.87	11.56	16.03	28.87	13.23
2.	11:30	0.69	12.34	15.23	28.42	12.25
3.	12:30	0.96	12.2	15.98	29.21	14.21
4.	13:30	0.76	12.48	16.04	29.69	15.02
5.	14:30	0.97	11.23	16.23	27.46	14.16
6.	15:30	0.89	13.43	16.45	30.73	13.93
7.	16:30	0.93	12.78	17.08	29.86	14.36
8.	17:30	0.91	11.32	16.23	27.55	11.21
9.	18:30	0.89	9.32	14.91	24.23	10.23
10.	19:30	0.88	9.99	14.45	24.44	11.23
11.	20:30	0.83	10.99	15.01	25.01	12.21
12.	21:30	0.81	10.01	15.01	25.02	11.05
13.	22:30	0.74	9.02	14.04	22.25	9.99
14.	23:30	0.77	8.98	12.34	21.32	10.99
15.	0:30	0.75	9.99	13.21	21.22	10.16
16.	1:30	0.81	9.02	14.01	22.47	9.23
17.	2:30	0.78	9.34	15.02	23.68	13.02
18.	3:30	0.76	8.99	12.21	25.22	12.03
19.	4:30	0.69	10.45	16.21	26.66	13.15
20.	5:30	0.92	11.32	17.01	28.33	14.45
21.	6:30	0.99	13.01	16.04	30.88	14.23
22.	7:30	0.87	11.78	16.23	28.01	15.43
23.	8:30	0.89	12.56	17.23	29.79	14.68
24.	9:30	0.96	13.56	18.01	30.87	14.45
Average Concentration		**0.85**	**11.07**	**15.43**	**26.72**	**12.70**

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Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Masjid Wala Dera
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°38'53.0"N 74°26'07.0"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	PEQS
Nitrogen Dioxide (NO_2)	µg/m³	24 Hours	1.00	15.43	80.0
Nitrogen Oxide (NO)	µg/m³	24 Hours	1.00	11.07	40.0
NO_X	µg/m³	24 Hours	1.00	26.72	120.0
Sulphur Dioxide (SO_2)	µg/m³	24 Hours	1.00	12.70	120.0
Carbon Monoxide (CO)	mg/m³	24 Hours	0.01	0.85	05.0*
Ozone (O_3)	µg/m³	24 Hours	-	11.18	130.0**
Particulate Matter ($PM_{2.5}$)	µg/m³	24 Hours	1.00	19.96	35.0
Particulate Matter (PM_{10})	µg/m³	24 Hours	1.00	102.29	150.0
Suspended Particulate Matter (SPM)	µg/m³	24 Hours	1.00	155.25	500.0
Lead Airborne Particles	µg/m³	24 Hours	-	0.33	1.5

Abbreviations:
µg/m³= Micrograms per Cubic Meter
mg/m³= Milligrams per Cubic Meter
LDL= Lowest Detection Limit
PEQS= Punjab Environmental Quality Standards
*08 hour standard for CO
**01 hour standard for O_3

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Meteorological Data

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Masjid Wala Dera
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°38'53.0"N 74°26'07.0"E

Time	Ambient Temperature ^{0}C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
10:30	43	N	2.1	5	752.2
11:30	44	N	2.3	4	751.2
12:30	45	W	4.2	3	750.4
13:30	46	W	2.3	3	758.2
14:30	45	W	2.5	2	751.9
15:30	46	NW	2.1	2	752.3
16:30	45	NW	2.3	2	753.8
17:30	44	NW	2.6	3	750.3
18:30	39	NW	3.1	4	752.3
19:30	35	W	3.3	4	751.2
20:30	35	W	3.3	5	750.4
21:30	34	W	3.1	5	751.2
22:30	34	NW	3.2	6	751.5
23:30	33	NW	3.1	6	751.6
0:30	29	NW	2.6	7	749.4
1:30	27	NW	2.1	7	748.3
2:30	27	N	2.4	8	751.5
3:30	26	N	3.1	8	752.4
4:30	26	N	3.3	8	750.1
5:30	27	N	4.1	9	752.5
6:30	29	N	3.3	9	751.6
7:30	31	W	3.1	6	751.3
8:30	32	W	3.1	4	751.8
9:30	36	W	2.7	3	753.6

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Noise Level Monitoring Report

Job Reference Number	GCEC-PK-129/2022
Monitoring Point	Near Masjid Wala Dera
Date of Intervention	15-May-2022 to 16-May-2022
Monitoring Coordinates	31°38'53.0"N 74°26'07.0"E

Sr. #	Time	Method/Technique	Unit	Results LAavg	PEQS (Residential)
Night Time					
1.	23:00	Noise Meter	dB	40.1	
2.	00:00	Noise Meter	dB	41.2	
3.	01:00	Noise Meter	dB	40.8	
4.	02:00	Noise Meter	dB	42.3	
5.	03:00	Noise Meter	dB	44.3	45.0
6.	04:00	Noise Meter	dB	45.6	
7.	05:00	Noise Meter	dB	43.1	
8.	06:00	Noise Meter	dB	45.1	
Night Time Average			**dB**	**42.81**	**45.0**
Day Time					
9.	07:00	Noise Meter	dB	40.3	
10.	08:00	Noise Meter	dB	41.2	
11.	09:00	Noise Meter	dB	45.1	
12.	10:00	Noise Meter	dB	43.3	
13.	11:00	Noise Meter	dB	44.4	
14.	12:00	Noise Meter	dB	45.2	
15.	13:00	Noise Meter	dB	49.2	
16.	14:00	Noise Meter	dB	43.2	
17.	15:00	Noise Meter	dB	47.6	55.0
18.	16:00	Noise Meter	dB	39.4	
19.	17:00	Noise Meter	dB	46.4	
20.	18:00	Noise Meter	dB	37.5	
21.	19:00	Noise Meter	dB	45.9	
22.	20:00	Noise Meter	dB	42.3	
23.	21:00	Noise Meter	dB	43.2	
24.	22:00	Noise Meter	dB	39.4	
Day Time Average			**dB**	**44.83**	**55.0**

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End of Report

ANNEX-III
DETAILS OF THE PARTICIPANTS

LIST OF PARTICIPANTS OF PUBLIC CONSULTATIONS

Sr. No.	Date	Village	Name	Occupation	Contact Number
1	24-03-21	Near Turkey Road Mari Mari	Muhammad Shafiq	Farmer	0300-8182510
			Wajid	Accountant	0307-4913061
			Javaid Iqbal	SB Steel (owner)	0321-4397575
			M. Javaid	Farmer	0347-9509510
			Main Farooq	Land Owner	------
			Allah Dita	Farmer	------
			Shamsher Ahmad	Farmer	0344-4433656
			Ghulam Sarwar	Farmer	0309-7896202
			Muhammad Usman	Tea Stall	0307-9931762
			Muhammad Amin	Farmer	0321-6828325
			Nawaz Ali	Farmer	0300-4231910
			Muhammad Shakeel	Farmer	0306-4001881
			Mian Liaqat	Farmer	0300-8184478
			Muhammad Saleem	Farmer	0321-4474915
			Muhammad Zaheer	Private Job	0309-4906017
			Tayab Ali	Student	------
2	24-03-21	Maral Par, Awan Tai Wala	Yousaf	Farmer (Numderdar)	------
			M, Shahid	Farmer	0323-4274295
			M. Abbass	Farmer	----------
			Iqbal	Farmer	----------
			M. Nazir	Farmer	----------
			Tanvir	Farmer	----------
			Abdul Hameed	Farmer	----------
			M. Malik	Farmer	0307-5003423
			Sardar Ali	Farmer	0322-4054166
			M. Shahid	Farmer	--------
			M. Safdar	Farmer	--------
			Liaqat Ali	Farmer	0344-4152337
			Ghulam Bahadur	Farmer	0324-4708197
			M. Akmal	Farmer	0343-4101500
3	01-04-21	Raat Garh	Tanzeer Ahmad	Farmer	0321-4900854
			M. Waseem	Farmer	0344-1045050
			Malik Zafar Ali	Farmer	0300-4373052
			M. Iqbal	Farmer	0342-9906904

ANNEX-IV
RESOURCE CONSERVATION PLAN

RESOURCE CONSERVATION PLAN

1. INTRODUCTION

The most of the resources in this world are finite and non-renewable in nature. We are completely dependent on these resources to fulfill all our daily requirements. Therefore, sustainable development calls for the need to conserve resources in a way that meet our needs of present generation as well as future generation, especially the non-renewable resources.

2. OBJECTIVE OF THE PLAN

The Resource Conservation Plan is intended to make an effort towards achieving sustainable development. The objective of the resource conservation plan is to:

- Minimize the use of natural resources; and
- Mitigate and prevent pollution contaminating the natural resources.

3. PLANNING

Careful estimations of quantities of material, fuel, water and energy required directly or indirectly shall be done to avoid excessive or unnecessary wastage of these materials. In addition to this, pollution prevention strategies shall also be devised to prevent contamination of resources.

- The estimations include the following:
  - Estimation of construction material required for the project;
  - Estimation of fuel consumption for construction machinery, construction vehicles and generators;
  - Estimations of the energy requirements during all the stages of the project; and
  - Estimations of water consumption for construction activities and construction camp sites.
- Strategies shall be planned to reduce loads on the identified resources to be consumed;
- Best management practices shall be devised to control or reduce pollution resulting from the activities during different stages of the project; and
- An inspector shall be assigned responsibility to oversee the ongoing activities to check the compliance of the planned strategies.

4. EXECUTION OF THE PLAN

The planned strategies shall be implemented to conserve the natural resources including but not limited to the following:

Material

- Material supplied shall be in conformance with the estimated quantities and excess material shall be returned to the supplier;
- Material wastage shall be avoided by using best management practices;
- Waste produced during the project execution shall be disposed off safely to the designated disposal sites through approved contractors; and
- Reuse of the materials shall be appreciated.

Energy

- Reduce trips and optimize routes to and from the construction site for all kinds of activities;
- Regular maintenance of equipment and vehicles to avoid leaks and sustain efficient fuel consumption;

- Switch off idle equipment and vehicles to avoid wastage of fuel;
- Minimize warm up time, unnecessary acceleration and deceleration of the construction equipment and vehicles;
- Avoid unnecessary burning of fuel for cooking in construction camps;
- Avoid unnecessary use of heating and cooling systems during extreme weathers events;
- Construction shall start in early hours of the day to avoid heat in summers and utilization of day light; and
- Alternate energy sources shall be considered for electricity generations during construction and operation to conserve fossil fuel as it is non-renewable resource.

Water

- Avoid using potable water for sprinkling, curing and washing of equipment and vehicles. Surface water or treated effluent can be used instead;
- Wastage of water should be controlled through providing proper valves and through controlling pressure of the water;
- Unnecessary equipment washings should be avoided;
- Awareness amongst workers shall be raised to conserve water and immediately report for any leaks detected; and
- Ensure protection of canal water from contamination resulting from construction activities.

Pollution

- Emissions shall be reduced and controlled as far as possible and direct discharges to air shall be avoided by strictly adhering to the mitigation measures outlined in EIA report;
- Waste water shall not be discharged directly and must be managed as per the recommendations presented in EIA; and
- Construction and demolition waste, and municipal solid waste shall not be dumped and burnt openly, and shall be handled according to the preventative measure given in EIA study.

5. CHECKING AND CORRECTIVE ACTIONS

The Client shall bind the construction contractor through contract agreement to comply with the strategies outlined in the Resource Conservation Plan. The Environmental Committee shall also appoint an Inspector who shall monitor the daily onsite activities and shall report any issues and concerns raised in relation to Resource Conservation Plan. The inspector shall recommend adequate corrective actions to mitigate the issues raised.

ANNEX-V
WASTE MANAGEMENT PLAN

CONSTRUCTION WASTE MANAGEMENT PLAN

1. GENERAL INTRODUCTION

Construction work refers to a wide range of materials depending on their origin; they are categorized as excavation material, demolition materials and worksite waste material. Construction waste material of the proposed project consists mainly of concrete, bentonite, masonry, limestone, sandstone, metal, and wood. In addition to this, significant amount of municipal waste will also generates from the construction camps.

2. ORIGINS AND CAUSES OF CONSTRUCTION WASTE

Origins of Waste	Causes of Waste
Contractual	▪ Errors in contract documents; and ▪ Contract documents incomplete at commencement of construction.
Design	▪ Design changes; ▪ Design and detailing complexity; ▪ Design and construction detail errors; ▪ Unclear and unsuitable specifications; and ▪ Poor coordination and communication (late information, last minute client requirements, slow drawing revision and distribution).
Procurement	▪ Ordering errors (i.e. ordering items not in compliance with specification); ▪ Over allowances (i.e. difficulties to order small quantities); and ▪ Supplier errors.
Transportation	▪ Damage during transportation; ▪ Difficulties for delivery vehicles accessing construction sites; ▪ Insufficient protection during unloading; and ▪ Inefficient methods of unloading
On-Site Management and Planning	▪ Lack of on-site waste management plans; ▪ Improper planning for required quantities; ▪ Delays in passing information on types and sizes of materials and components to be used; ▪ Lack of on-site material control; and ▪ Lack of supervision.
Material Storage	▪ Inappropriate site storage space leading to damage or deterioration; ▪ Improper storing methods; and ▪ Materials stored far away from point of application.
Material Handling	▪ Materials supplied in loose form; ▪ On-site transportation methods from storage to the point of application; and ▪ Inadequate material handling.
Site Operation	▪ Accidents due to negligence; ▪ Unused materials and products; ▪ Equipment malfunction;

Origins of Waste	Causes of Waste
	▪ Poor craftsmanship; ▪ Use of wrong materials resulting in their disposal; ▪ Time pressure; and ▪ Poor work ethics.
Residual	▪ Waste from application processes (i.e. over preparation of mortar); ▪ Off-cuts from cutting materials to length; ▪ Waste from cutting uneconomical shapes; and ▪ Packaging.
Other	▪ Weather ▪ Vandalism ▪ Theft

3. CONSTRUCTION WASTE MANAGEMENT PLAN

i) Waste Management Goals

The contractor established goal that this project will generate at least 50 percent less waste into landfills and the processes shall be employed to ensure that this goal is met. These shall include prevention of damage to materials to be incorporated into the work due to mishandling, improper storage, contamination, inadequate protection, minimizing poor quantity estimation, and through design.

ii) Responsibility

a) The Contractor shall be responsible for the implementation of the administrative portions of this program, including the notification of subcontractor management, the training of the site supervisor and the onsite posting of this plan.

b) The site supervisor shall be responsible for the implementation of the onsite portions of this program including the training of subcontractor personnel.

iii) Waste Prevention Planning

a) In addition to other requirements specified herein it is a requirement for the work of this project that the contractor comply with the applicable city waste disposal requirements.

b) Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling where practical and possible. Waste disposal in landfills shall be minimized as much as possible.

c) Project Construction Documents: The Contractor will contractually require all subcontractors to comply with the Construction Waste Management Plan (WMP)". A copy of the WMP will accompany all subcontractor agreements and require subcontractor participation.

d) The "Construction Waste Management Plan" shall be implemented and executed as follows and as on the chart:

   i) Salvageable materials will be diverted from disposal where feasible;
   ii) There will be a designated area on the construction site reserved for materials that can be recycled;
   iii) Areas shall be marked to designate what recycle materials are to be stored there; and
   iv) Hazardous waste shall be managed by a licensed hazardous waste vendor.

iv) Communication and Education Plan

a) This Waste Management Plan will be posted onsite;
b) Each subcontractor will be made aware of the intent of this project with respect to reduction of waste and recycling. Onsite recycling containers and/or areas will be plainly marked;
c) The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan;
d) All recycling containers and areas will be clearly marked;
e) Lists of acceptable and unacceptable materials will be posted at the site; and
f) All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.

v) Motivation Plan

The Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review project goals and requirements with the project team. Attendance will be a prerequisite for award of subcontracts. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the job site.

vi) Expected Project Waste, Disposal, and Handling

The following chart identifies waste materials expected on the proposed project, their expected disposal methods and handling procedures. New items may be added as needed.

Material	Disposal Method	Handling Procedure
Land Clearing Debris	Keep separate for reuse and or wood sale. Suitable materials may be delivered to a composting site. Separate topsoil and rock for future landscaping use.	Keep separated in designated areas onsite.
Clean Dimensional Wood and Palette Wood	Keep separate for reuse by on-site construction or by site employees for either heating stoves or reuse in home projects. May be offered to public.	Keep separated in designated areas onsite.
Painted or Treated Wood	Reuse, off site recycle, and landfill.	Keep separated in designated areas onsite. Place in “Trash” container.
Concrete	Recycle when possible.	Keep separated in designated areas onsite.
Concrete Masonry Units	Keep separate for re-use by on-site construction or by site employees	Keep separated in designated areas onsite
Metals	Recycle off site when possible. Separate copper wire when possible.	Keep separated in designated areas onsite. Place in “Metals” container.
Gypsum drywall (unpainted)	Recycle with supplier when possible.	Keep scraps separate for recycling – stack on pallets in provided onsite. All scrap drywall should be taken back by contractor to drywall supplier
Paint	Reuse onsite; donate to Habitat for Humanity Restore.	Keep separated in designated areas onsite
Insulation	Reuse and landfill.	Keep separated in designated areas onsite.
Glass	Recycle locally.	Keep separated in designated areas onsite.
Plastics	Plastic Bottles: recycle locally; be aware of plastics that are acceptable to recycle facility.	Keep separated in designated areas onsite.

vii) Waste Disposal Company:

a) Lahore Waste Management Company
b) Local Government

viii) Recycle Hauler

a) To be determined;
b) Contact Address; and
c) Some or all recycle may be hauled by the authorized representative.

ix) Possible Recycle Locations and Acceptable Materials

a) Coordinate with companies in Lahore or which are registered with LWMC that accept materials for recycle; and
b) Using the above as a resource, a list will be kept indicating local opportunities for recycle of expected materials. New locations should be added as needed.

ANNEX-VI
TRAFFIC MANAGEMENT PLAN

GUIDELINE TRAFFIC MANAGEMENT PLAN

1. Need for Plan

During the construction period of the project, considerable vehicular movement carrying large amounts of material and machinery is expected. This will definitely interrupt the local traffic and is therefore important to manage the traffic to avoid the nuisance to local residents in terms of noise, dust, congestion and inconvenience.

2. The plan

The objective of Traffic Management Plan (TMP) is to define the requirements that should be implemented to mitigate any potential negative risks to the environment, workers or the community resulting from construction traffic.

The TMP will advise and inform site Contractors and external suppliers of equipment and materials of access and entry points along with other key information such tipping areas and wash-out areas. It is intended to compliment and work alongside relevant EMP. The TMP will be classed as “live” and therefore be subjected to updates as required.

The Contractor, at the time of the execution of the project, will prepare a comprehensive TMP in coordination with local traffic police department, RUDA, emergency services and local administrative department. RUDA and CSC will review and approve the Contractor’s TMP. The Contractor’s TMP shall include following mitigation measures during its preparation:

- Undertake a road conditions assessment prior to and following the peak construction period, to assess any damage to road infrastructure that can be attributed to Project development.
- Repair damage as appropriate or enter into a voluntary agreement with the relevant roads authority to reimburse the cost of any repairs required to the public road network as a result of the Project.
- Spoil dumpsites located close to project site to minimize journey distance and limit movements to site access roads.
- Construction of worker accommodation on site to reduce light vehicle movements relating to travel to/ from the site.
- Provision of bus/minibus services for personnel living in nearby settlements.
- Movements of construction workers will be planned to avoid the busiest roads and times of day when traffic is at its greatest.
- Schedule deliveries and road movements to avoid peak periods.
- Driver training for HGV drivers and refresher course every six months for project drivers.
- Speed restrictions for project traffic travelling through communities (to be agreed with National Highway Authority and Client).
- Run a safety campaign to improve the people’s knowledge of the traffic hazard on their roads, public information and other activities to address the issues.

- Run a pedestrian awareness programme.
- Temporary signage

The traffic management plan for the project corridor is provided below.

3. Other Recommendations

It is important to manage public access routes during construction because it can cause delay to local traffic and create a safety hazard both on and offsite. People working and living near the tower sites would be annoyed by the emissions, noise and visual intrusion of queuing vehicles. Some important factors involved in access routes and site traffic are as follows:

3.1. Public Access Routes

The use of public road for site access may be restricted in terms of:

- Vehicle size, width and type of load
- Time limits
- Parking
- Pedestrian conflicts

Contractor should have consultation with the local police or local authority to address these issues and to effectively manage them before the beginning of the construction.

3.2. Site Workers Traffic

Site personnel should not be permitted to park vehicles right on the road; this will lead to disruption in material deliveries. Designated parking areas with appropriate parking space will be needed for this purpose; any plain area near construction site can be used for this purpose.

3.3. Site Rules

- Access to and from the site must be only via the specified entrance.
- On leaving the site, vehicles must be directed to follow the directions given.
- Drivers must adhere to the site speed limits.
- All material deliveries to site must keep allocated time limits.
- No material or rubbish should be left in the loading-unloading area.
- Develop a map for alternate routes showing material delivery services.
- Assign designated personnel on site to receive deliveries and to direct the vehicles.
- Monitor vehicle movement to reduce the likelihood of queuing or causing congestion in and around the area.
- Project vehicles should have a unanimous badge or logo on windscreen displaying that they belong to the project.

4. Contractor’s Obligation

The traffic management plan of the Contractor should be safe enough and widening of any access roads and construction of the detours (as applicable and practical) must be completed

prior to start of project construction activities so that heavy vehicular transportation for construction activities do not hinder the normal course of traffic lanes. Contractor must ensure that road closures are carried out by a competent person. The Contractor obligation must include the display of traffic signs according to the need to divert the traffic volume and to guide the road users in advance. The traffic sign, traffic light should be placed from any diverting route or road marking.

The Contractor should consider the environmental and social impacts of the traffic during construction. It will be sole responsibility of the Contractor to implement a plan which produces minimum nuisance to the local people and to the environment. Safety of the people should be given due importance. It will be under Contractor obligation to notify the traffic management plan and its later changes to CSC, RUDA, emergency services and Traffic Police, and also publish weekly programme in the local newspaper.

ANNEX-VII
GUIDELINES TO COMBAT WITH COVID-19

PRECAUTIONARY ACTION AGAINST THE POTENTIAL RISK OF NOVEL CORONAVIRUS

INTRODUCTION

On February 11, 2020 the World Health Organization announced an official name for the disease that is causing the 2019 novel coronavirus outbreak, first identified in Wuhan China. The new name of this is coronavirus disease 2019, abbreviated as COVID-19. In COVID-19, 'CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease. Formerly, this disease was referred to as "2019 novel coronavirus" or "2019-nCoV".

Coronaviruses are a large family of viruses. Some cause illness in people, and others, such as canine and feline coronaviruses, only infect animals. Rarely, animal coronaviruses that infect animals have emerged to infect people and can spread between people. This is suspected to have occurred for the virus that causes Coronavirus Disease 2019 (COVID-19). Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) are two other examples of coronaviruses that originated from animals and then spread to people.

The risk of exposure to COVID-19 is no different for employees of Employer, Engineer, Contractor, and suppliers than for the general population. Contractor, therefore, must consider the physical well-being and safety of all the persons entitled to be on the Site and follow reasonable guidelines and recommendations of Government authorities and healthcare professionals. As experience has shown in other countries, confirmed cases of COVID-19 expand exponentially if health and safety controls are left unheeded.

Contractor should enforce all health and safety procedures at Site including sanitary protocols, proper hygiene, social distancing, use of personal protective equipment (PPE), toolbox talks on special COVID-19 requirements, and prompt reporting of health issues related to COVID-19. Contractors must put safeguards in place to keep workers exposed to COVID-19 away from Site for at least 14 days after the last potential exposure.

WHO declared the COVID-19 as a Public Health Emergency of International Concern (PHEIC) in January 2020 and afterwards announced the COVID-19 outbreak as pandemic on 11th March 2020 due to the widespread of the disease in 114 countries at that time. WHO Director General urged the countries to take action now to stop the disease.

The rapid spread of COVID-19 hits all the provinces of Pakistan Sindh, Balochistan, Punjab & Khyber Pakhtunkhwa including the Gilgit Baltistan and Azad Jammu & Kashmir. The prevailing virus creates the menacing and distressing situation when it arrived around the closed proximities of the Project Area.

Government of Pakistan has launched the National Action Plan for COVID-19 Pakistan to combat the challenge of prevailing virus, also available at https://www.nih.org.pk/wp-content/uploads/2020/03/COVID-19-NAP-V2-13-March-2020.pdf. The Government of Pakistan has launched the real-time data portal for COVID-19 http://covid.gov.pk/. These measures are mostly relating to the containment and awareness and capacity building. Besides this COVID-19 daily situation report is also available at https://www.nih.org.pk/wp-content/uploads/2020/04/COVID-19-Daily-Updated-SitRep-03-April-2020.pdf.

All the stakeholders are on board to jointly prevent/ limit/ control the spread of COVID-19. All of the staff is required to take precautionary measures as well as maintain social distances. The

use of thermal guns for checking every single person body temperature, placement of relevant flyers and disinfection spray inside of all the containers are few of the measures to combat COVID-19.

OBJECTIVE

Following are the objectives of this report to jointly prevent / limit/ control the spread of COVID-19 at Site that can hamper the progress of proposed Project:

1. To enhance understanding of the evolving COVID-19;
2. To share knowledge on COVID-19 and preparedness measures being implemented at Site;
3. To generate recommendations for adjusting COVID-19 containment and response measures; and
4. Outline the measures taken at Site. The advised measures will help all the stakeholders to plan their work continuity in response to the COVID-19.

Due to the evolving situation of the COVID-19, this document should be read in conjunction with the latest relevant advisories issued by WHO (especially "Getting your workplace ready for COVID-19, 3 March 2020") and Government of Pakistan.

WHAT IS CORONA VIRUS (COVID-19)

The COVID-19 belongs to a family of viruses known as the Coronaviruses, which can cause illnesses ranging from the common cold to more severe diseases, such as the Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)[1].

SYMPTOMS

The symptoms of the COVID-19 are similar to that of regular pneumonia. Typical symptoms include;

- Fever;
- Cough;
- Difficulty in breathing;
- Pneumonia;
- Runny nose;
- Sore throat; and
- Feeling of being unwell.

MODE OF SPREAD

Infected person – person transmission; Infected people can spread COVID-19 through their respiratory secretions via droplets produced when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread. The spread from person-to person is most likely among close contacts (about 6 feet);

- Infected animals' dead or Alive;

[1] Source: World Health Organization

- Air by coughing and sneezing;
- Close personal contact, such as touching or shaking hands;
- Touching an object or surface with a virus on it; and
- Touching your mouth nose or eyes before washing your hands.

GENERAL STANDARDIZED PRECAUTIONARY MEASURES

Following measures/recommendations are suggested as a general guidance to be followed for the protection of potential impacts of COVID-19:

Since, there is no vaccine available to protect against human Coronavirus infections. Therefore, transmission can be prevented through following measures:

- Cover your mouth while cough or sneeze;
- Avoid close contact with people who are sick;
- Avoid the use of hard soap;
- Wash your hands often with liquid soap and water for at least 20 seconds;
- All the employees should ensure sanitization of hands at appropriate time;
- Avoid touching your eyes, nose, and mouth with unwashed hands;
- If you are concerned about your symptoms you should see your health care provider at site or in office;
- Use of Personal Protective Equipment (PPE) according to risk (a surgical or N95 mask);
- Do not spit, wrap your oral and nasal secretion with tissue and throw it in a covered dustbin;
- Balance your nutrition and exercise moderately;
- Sterilization / disinfection of medical devices at Site dispensaries; and
- Do not touch, buy or eat wild animals (gamey). Try to avoid visiting markets that sell such animals.

PROJECT SITE SPECIFIC PRECAUTIONARY MEASURES

Measures for protecting staff and labour from exposure to, and infection with, the COVID-19 depend on the type of work being performed and exposure risk, including potential for interaction with infectious people and contamination of the work environment. Regardless of specific exposure risks, following are the main actions that have been jointly taken at Site to combat the COVID-19:

Employer's Side

Employer should issue the notification containing the precautionary measures in the light of GoPb guidelines to be implemented at Site. Upon receiving the Employer notification all the mentioned precautionary measures will be communicated to Engineer staff for compliance. Employer technical staff is also complying with the GoPb guidelines and Contractor suggestion to control the spread of COVID-19 at Site in the best interest of the Project and country.

Consultant's Side

Consultant's top management will issue the orders in the light of GoPb guidelines containing the precautionary measures to control the spread of COVID-19 for the staff working at Site.

Consultant staff at Site will fully complying with the orders including photographic evidence. Considering the severity of the prevailing virus Engineer devised the Standard Operating Procedure (SOP) containing precautionary action against the potential risk of novel corona virus.

Besides, above Consultant will ensure the following precautionary measures at Site.

- Adequate signage and information at all entrances and exits showing what is Corona Virus, how it spreads, what are the symptoms, standard precautions;

- The awareness session for the Contractor staff is equally important as of Consultant staff to combat the COVID-19 at Site. The Consultant will ensuring that Contractor is arranging such session at Site from time to time to reduce the potential risk of COVID-19. Further, all the newly inducted and existing staff have been given HSE training by the Consultant & Contractor.

Contractor's Side

Contractor will communicate various precautionary measures to Employer and Engineer through letters to control the spread of COVID-19 at Site. Following are the major steps to be taken by the Contractor:

- Contractor will convey the instructions and requirements of its superior unit for the prevention and control of COVID-19 epidemic at Site.
- Contractor will establish a special organization for epidemic prevention and control on the Project Site that is responsible for arranging, implementing, publicizing and supervising the epidemic prevention and control measures.
- Launch the plan for epidemic prevention and control on the project Site that includes:
    - All personnel in temporary camp are required to wear masks;
    - Contractor personnel incharge of Site to wear masks;
    - Arranged special personnel to measure and record the temperature of all personnel when entering or leaving the temporary camp;
    - If any person with fever, cold and other symptoms are found, they will be admonished to go home for isolation and asked about the development of the disease every day; and
    - Propagate and implement the epidemic prevention measures for the staffs and labours and warn them not to go outside and home as much as possible.
- All these meetings should carried out through video conference.

Contractor is not limited to the above precautionary measures but practicing and implementing the following;

- Contractor will prepare a pamphlet for the awareness of Site staff to combat the COVID-19. It will also place/posted at strategic points at Site.
- Launch awareness campaign to inform all the staff and labour about the coronavirus, to use facemask, hand hygiene, cough etiquette, and avoidance of close contact with animals and consumption of their raw products.
- Everyday awareness speech in English and Urdu in the temporary camp.
- All the employees are not allowed to go outside of the Project Area or on vacation to their homes and on daily basis visit to sites;

- Contractor will provide medical masks and antibacterial liquid hand wash to all personnel.
- Contractor will prepare the isolation facility at Site and provided three isolated rooms for such patients inside the temporary camp. Each room have three beds, oxygen cylinder, sanitizers, isolation kit, hand wash.
- Thermal scanning will be carried out continuously in the morning for everybody at the main gate of temporary camp.
- Record will be maintained for everyone that includes the temperature value of each person with their names, every morning and afternoon go to each department for scanning separately and noted down their name with temperature values.
- Contractor carry out disinfectant spray on daily basis morning and afternoon in each office and rooms and all the area of the camp.
- SSWMB and Consultant staff will also requested by Contractor to do not interact physically rather through electronically by emails or video conferencing.

RECOMMENDATIONS FOR THE CONTROL OF COVID-19 AT SITE

To Avoid Transmission

For all personnel at Site, it is always a good to practice the following precautionary measures:

- Workers to remain at least two meters apart from each other at all times (social distancing) – i.e. spread out and reduce the number of people working together in one area of the site;
- Avoid eating lunch in the form of group in available mess/canteens at Site;
- Close site canteens/ food preparation and eating areas (avoid gatherings) – workers to bring their own prepared lunch to site and eat alone e.g. in their van, car, or in an open space;
- Avoid in-person meetings if possible. In the case that an in-person meeting is unavoidable, make sure to have it in a well-ventilated area with sufficient space for attendees to distance themselves from one another. For meetings such as toolbox talks, consider breaking them up into smaller group meetings versus one large meeting;
- Introduce enhanced cleaning procedures across the Site and touch points e.g. office equipment, plant and machinery controls, taps/toilet/washing facilities, handrails;
- Stagger start times on site to avoid congestion in entrance areas;
- Reduce the number of people on site inductions at any one time and hold them outdoors if possible;
- Stop workers moving across various sites (potential for cross contamination);
- No outsiders should be at the Project Site;
- Contractor, Consultant and Employer personnel are advised to avoid travelling and in case traveling is unavoidable, prior approval from the management should be essential. In case of travelling, the above mentioned measures need to be strictly followed by the traveller;
- Prompt identification and isolation of potentially infectious individuals is a critical first step in protecting workers and other Site staff. An isolated area should be available at Site to immediately isolate suspected person, as it is most important to stop its spread at Site.
- Rapid Response Team should be formed and be informed immediately in case of suspect and confirmed case of COVID-19.

- Medical team at Site should separate the suspected person displaying fever, cough or difficulty breathing from other personnel; and
- If a person has had close contact with an individual that has confirmed COVID-19, that person will not be allowed to return to the Site until he/she has been symptom free for 14 days.
- Clean and fumigate all the workplaces at Site on daily basis;
- Ask people to stay at home if they have fever, cough, difficulty in breathing, runny nose, sore throat as per organizational rules;
- An immediate replacement of solid soap with liquid anti-bacterial soap bottles may be appropriate.
- Provision of alcohol-based hand sanitizer need to available for all staff;
- Clean the religious places carpets and rugs. Have them washed in place over the weekend and then do regular cleaning;
- Have the cleaners/ maintenance crews regularly clean surfaces that are touched frequently by personnel with disinfectants such as in and out doors;
- Fresh medical tests of staff working should be carried out at Site;
- Dispose of all contaminated waste (gloves, paper, swab handles, etc.) into biohazard waste bags for disposal;
- Ensure that panic is not created. In fact the posters should start with statements such as do not panic and fear the virus but know and prevent; and
- Ensure proper ventilation system for all the personnel at Site.

Use of Personal Protective Equipment (PPEs)

- Necessary PPE should be available at Site all the times and are being issued to each personnel at Site;
- Practice of using masks is also being ensured by all parties at Site (a surgical or N95 masks);
- Re-usable PPE should be thoroughly cleaned after use and not shared between workers. Single use PPE should be disposed of so that it cannot be reused;

Outside Visitors

- Visitors should enter with strictly wearing visitors card;
- Ensure sanitization of hands;
- All parties should ensure that the sick persons should be wearing a surgical or N95 masks;
- Note down the complete information of outsiders before entrance;
- Proper screening should be carried out before entering the Site;
- Refrain from handshakes. Rather than shaking hands, visitors may explain why handshakes can contribute to the risk of spread;
- Attempt to maintain a general six (6) feet distance between themselves. This will be challenging to follow at all times but it is Engineer recommendation to follow;
- Refrain from and/or limit touching of workplace surfaces; and
- In addition to these on-site procedures, it is advised to follow their respective organizational instructions related to Site visits.

ANNEX-VIII
CHANCE FIND PROCEDURE

ARCHAEOLOGICAL 'CHANCE FIND' PROCEDURE

1. BACKGROUND

The purpose of this document is to address the possibility of archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required.

The Antiquities Act, 1975, protects archaeological sites, whether on Provincial Government owned or private land. They are non-renewable, very susceptible to disturbance and are finite in number. Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public and local communities. Impacts to archaeological sites must be avoided or managed by development proponents. The objectives of this 'Archaeological Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

2. POTENTIAL IMPACTS TO ARCHAEOLOGICAL SITES

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits.

3. RELEVANT LEGISLATION

It ensures the protection, preservation, development and maintenance of antiquities in the provinces of Pakistan. The Act defines "antiquities" as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the relevant provincial governments to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, any archaeological discovery made during the course of the project.

4. REMEDIES AND PENALTIES

The Antiquities Act, 1975 provides for heritage inspection or investigation orders, temporary protection orders, civil remedies and penalties to limit contraventions. These powers provide:

''A contravention of any provision of this Act or the rules shall, where no punishment has been specifically provided be punishable with rigorous imprisonment for a term which may extend to two years, or with fine up to rupees ten hundred thousand, or with both. ''

5. ARCHAEOLOGICAL 'CHANCE FIND' PROCEDURE

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below:

The following 'chance-find' principles will be implemented by the contractor throughout the construction works to account for any undiscovered items identified during construction works:

i. Workers will be trained in the location of heritage zones within the construction area and in the identification of potential items of heritage significance.
ii. Should any potential items be located, the site supervisor will be immediately contacted and work will be temporarily stopped in that area.

iii. If the site supervisor determines that the item is of potential significance, an officer from the Department of Archaeology (DoA) will be invited to inspect the site and work will be stopped until DoA has responded to this invitation.
iv. Work will not re-commence in this location until agreement has been reached
v. between DoA and NTDC as to any required mitigation measures, which may include excavation and recovery of the item.
vi. A precautionary approach will be adopted in the application of these procedures.

6. DETAILED PROCEDURAL STEPS

- If the Director, department of Archaeology receives any information or otherwise has the knowledge of the discovery or existence of an antiquity of which there is no owner, he shall, after satisfying himself as to the correctness of the information or knowledge, take such steps with the approval of the Government, as he may consider necessary for the custody, preservation and protection of the antiquity.
- Whoever discovers, or finds accidentally, any movable antiquity shall inform forth with the Directorate within seven days of its being discovered or found.
- If, within seven days of his being informed, the Director decides to take over the antiquity for purposes of custody, preservation and protection, the person discovering or finding it shall hand it over to the Director or a person authorized by him in writing.
- Where the Director decides to take over an antiquity, he may pay to the person by whom it is handed over to him such cash reward as may be decided in consultation with the Advisory Committee.
- If any person, who discovers or finds any movable antiquity contravenes the provisions of the Act, he shall be punishable with imprisonment for a term which may extend to five (05) years, or with fine not less than fifteen hundred thousand rupees or with both and the Court convicting such person shall direct that the antiquity in respect of which such contravention has taken place shall stand forfeited to Government.
- The Director or any officer authorized by him with police assistance may, after giving reasonable notice, enter into, inspect and examine any premises, place or area which or the sub-soil of which he may have reason to believe to be, or to contain an antiquity and may cause any site, building, object or any antiquity or the remains of any antiquity in such premises, place or area to be photographed, copied or reproduced by any process suitable for the purpose.
- The owner or occupier of the premises, place or area shall afford all reasonable opportunity and assistance to the Director.
- No photograph, copy of reproduction taken or made shall be sold or offered for sale except by or with the consent of the owner of the object of which the photograph, copy or the reproduction has been taken or made.
- Where substantial damage is caused to any property as a result of the inspection, the Director shall pay to the owner thereof reasonable compensation for the damage in consultation with the Advisory Committee.
- If the Director after conducting an inquiry, has reasonable grounds to believe that any land contains any antiquity, he may approach the Government to direct the Revenue Department to acquire such land or any part thereof and the Revenue Department shall thereupon acquire such land or part under the Land Acquisition Act, 1894 (I of 1894), as for a public purpose.

ANNEX-IX
EMERGENCY RESPONSE PLAN

GUIDELINE EMERGENCY PREPAREDNESS AND RESPONSE PLAN

1.1 PURPOSE

The purpose of this Emergency Response Procedure is to provide measures and guidance for the establishment and implementation of emergency preparedness plans for the project. The aim of the Emergency Response Procedure is to:

i. Ensure all personnel and visitors to the office/job sites are given the maximum protection from unforeseen events.
ii. Ensure all personnel are aware of the importance of this procedure to protection of life and property.

1.2 EMERGENCY PREPARATION AND RESPONSE MEASURE SCOPE

The emergency management program is applied to all Project elements and intended for use throughout the Project life cycle. The following are some emergencies that may require coordinated response.

i. Construction Accident
ii. Road & Traffic Accident
iii. Hazardous material spills
iv. Structure collapse or failure
v. Trauma or serious illness
vi. Sabotage
vii. Fire
viii. Environmental Pollution
ix. Loss of person
x. Community Accident

1.3 RESPONSIBILITIES

The detailed roles and responsibilities of certain key members of the Emergency Response team available to assist in emergency are provided in **Table 1** below.

Table 1: Emergency Response Team

Action Group	Responsibility
Emergency Coordinator	▪ Overall control of personnel and resources. ▪ The Emergency Coordinator will support and advise the Site Safety Supervision as necessary. ▪ Serves as public relations spokes persons, or delegates to some staff member the responsibility for working with news media regarding any disaster or emergency. Also assure proper coordination of news release with appropriate corporate staff or other designated people.
Site Safety Supervision (Emergency Commander)	▪ Overall responsibility for activating emergency plan and for terminating emergency actions. ▪ Be alternative of emergency response chairpersons. ▪ Disseminates warnings and information as required to ensure all people in the immediate area have been warned and evacuated either by alarms or by word of mouth. ▪ Supervise the actions of the Emergency Response Team to ensure all persons are safe from the danger. ▪ Notify outside authorities if assistance is required. ▪ Carries the responsibility for coordinating actions including other organizations in accordance with the needs of the situation.

Action Group	Responsibility
	▪ Ensure maximum co-operation and assistance is provided to any outside groups called to respond to an emergency. ▪ Establish and appoint all emergency organization structure and team. ▪ Assures adequate delegation of responsibilities for all key positions of assistants on the Project to assist with any foreseeable emergency. ▪ Ensure resources available to purchase needed emergency response equipment and supplies. ▪ Assures that all persons on the Emergency Response Team aware and fully understand their individual responsibilities for implementing and supporting the emergency plan. ▪ Establish the emergency drill schedule of all identified emergency scenarios, track the status and evaluate the emergency. ▪ The Emergency Commander shall ensure that senior management personnel have been reported of the emergency as soon as practical after the event.
Security Team	▪ Ensure that the exit route is regularly tested and maintained in good working order. ▪ Maintain station at the security gate or most suitable location to secure the area during any emergency such that only authorized personnel and equipment may enter, prevent access to the site of unauthorized personnel. ▪ Assist with strong/activation of services during an emergency. ▪ Ensure vehicles and obstructions are moved to give incoming emergency vehicles access to the scene, if ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct any incoming emergency service to the site of emergency.
Rescue & Medical Team	▪ Protect the injured from further danger and weather. ▪ Provide treatment to the victim(s) to the best of their ability by first aid and then transfer to hospital. ▪ Remain familiar with the rescue activities and rescue apparatus. ▪ Assist outside medical services personnel when they arrive
General Administration Team	Response to support any requested general facilities for assisting Emergency Response Team in their work.
Government Relation Team	▪ Coordinate with local government on a matter of concerned in the emergency response plan to liaise with local officers in their affair for support Emergency Response Team. ▪ Coordinate emergency plan with the government authorities, local community.
Environment Team	In case of emergency related to the environmental pollution such as the chemical spill, oil spill into the ambient, the environment team will support the technical advice to control and mitigate the pollution until return to the normal situation.
Department Heads	▪ Call up of personnel into the safe location for protective life and property. ▪ Take immediate and appropriate action while Emergency Response Team is being mobilized. ▪ Keep in touch with the Emergency Commander ▪ Control and supervise operators and contractors on the implementation of this procedure, with consultation with Safety Team as necessary. ▪ Provide and maintain emergency equipment of their responsible areas.

Action Group	Responsibility
Other Staff and Employees	▪ All other staff and employees will remain at their workstations or assembly point unless directed otherwise from Emergency Response Team. ▪ Each supervisor will ensure that all members of his work group are accounted for and keep in touch with each of their Department Head.

1.4 PROCEDURE

Emergency situation and injuries to person can occur at any time or place either on Project site or elsewhere. The most two common types of emergencies on site are fire and serious accident.

Figure 3.1 Emergency Procedures for Fire

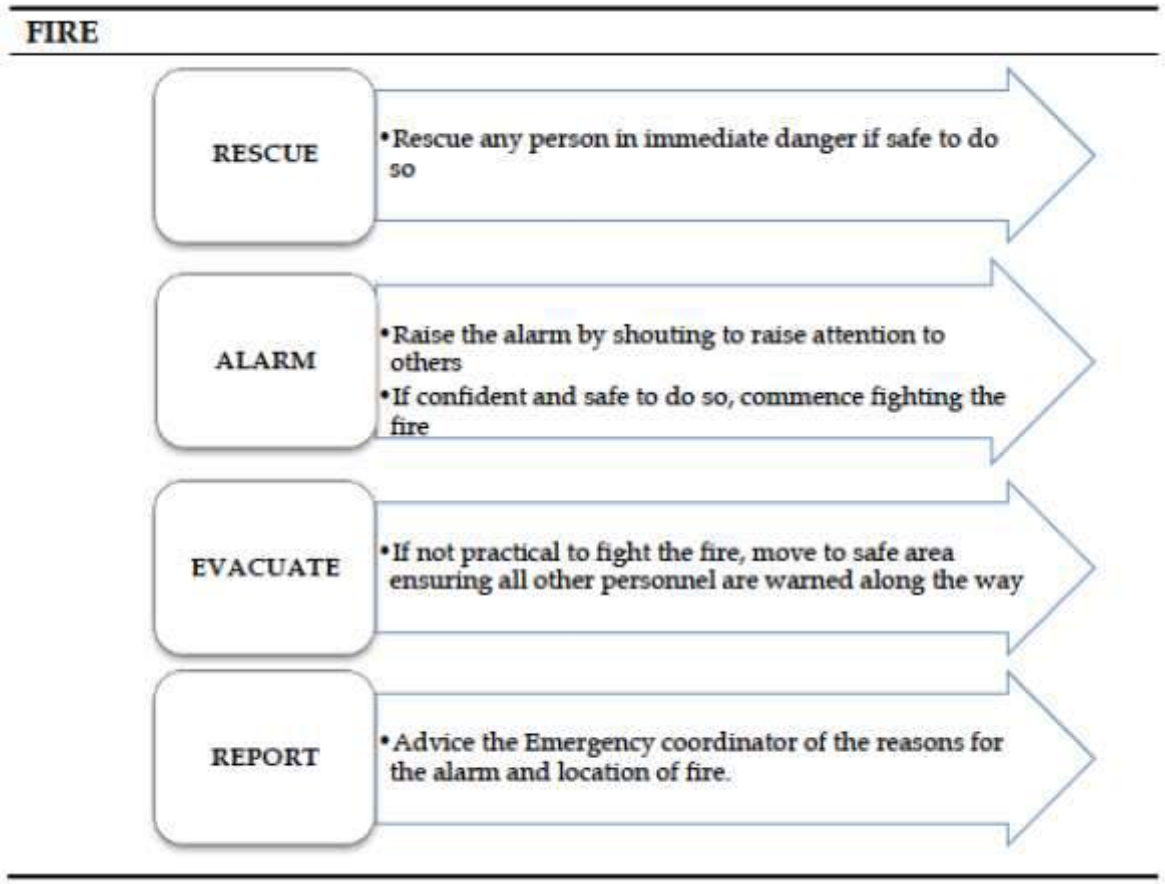
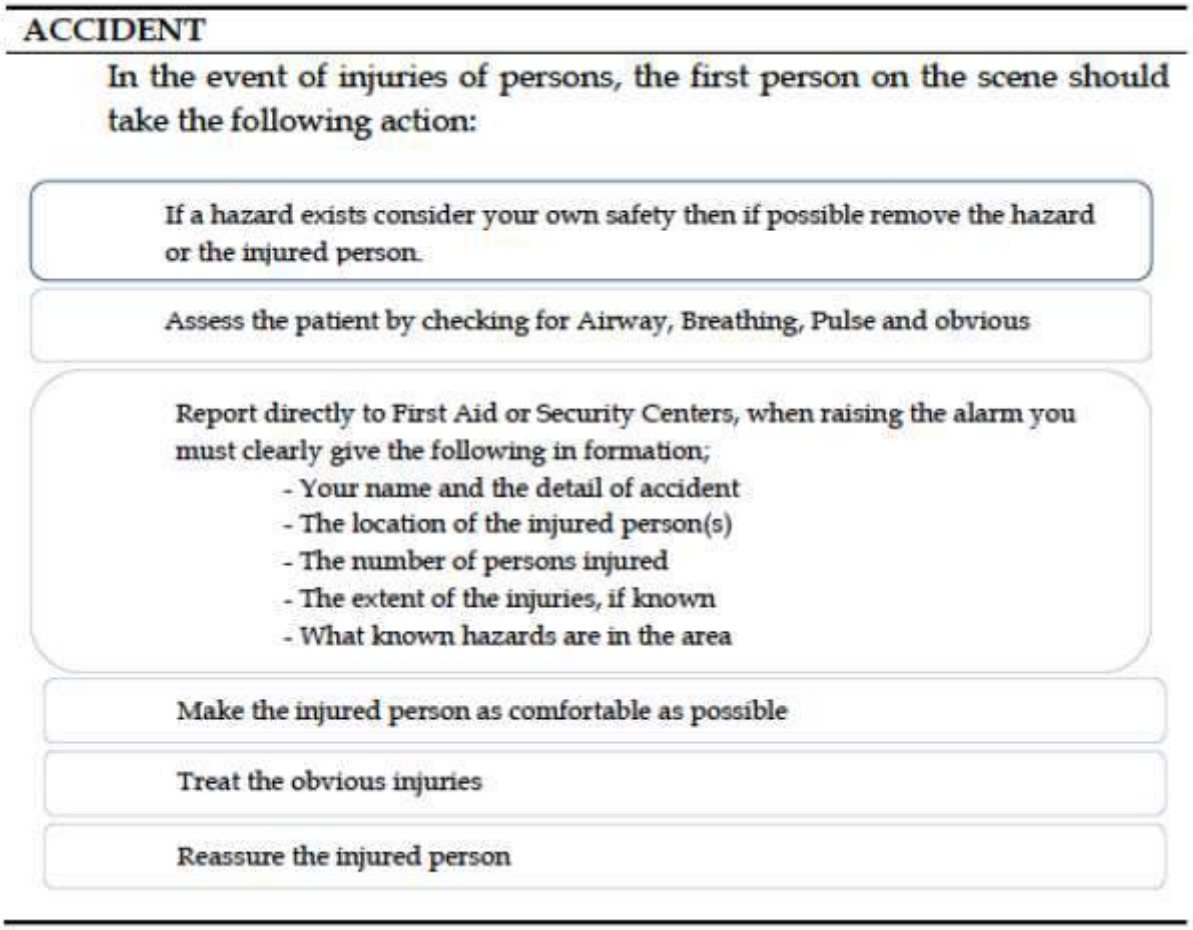


Figure 3.2 Emergency Procedures for Serious Accident



3.5 COMMUNICATION WITH AUTHORITIES / PRESS AT SITE

In the event of an accident or incident, only senior staff is permitted to give factual information to the authorities for resource of liability exposure. The press must be avoiding politely, at all costs, with the terse comment that “the matter is under investigation and relevant information when available will be provided by our Head Office” Do not ever give your opinion or story.

1.5 FIRST AID PERSONS

Upon advice of medical emergency, make immediate assessment to response required and if necessary, advise security to summon ambulance or medical assistance, the qualified first aid attendant should also,

- Provide treatment to the victim(s) to the best of his/her ability.
- Ensure the safety of victims by ceasing any work activity in the area.
- Protect the injured from further danger and weather.
- Assist medical services personnel when they arrive.

1.6 GENERAL ADMINISTRATION TEAM

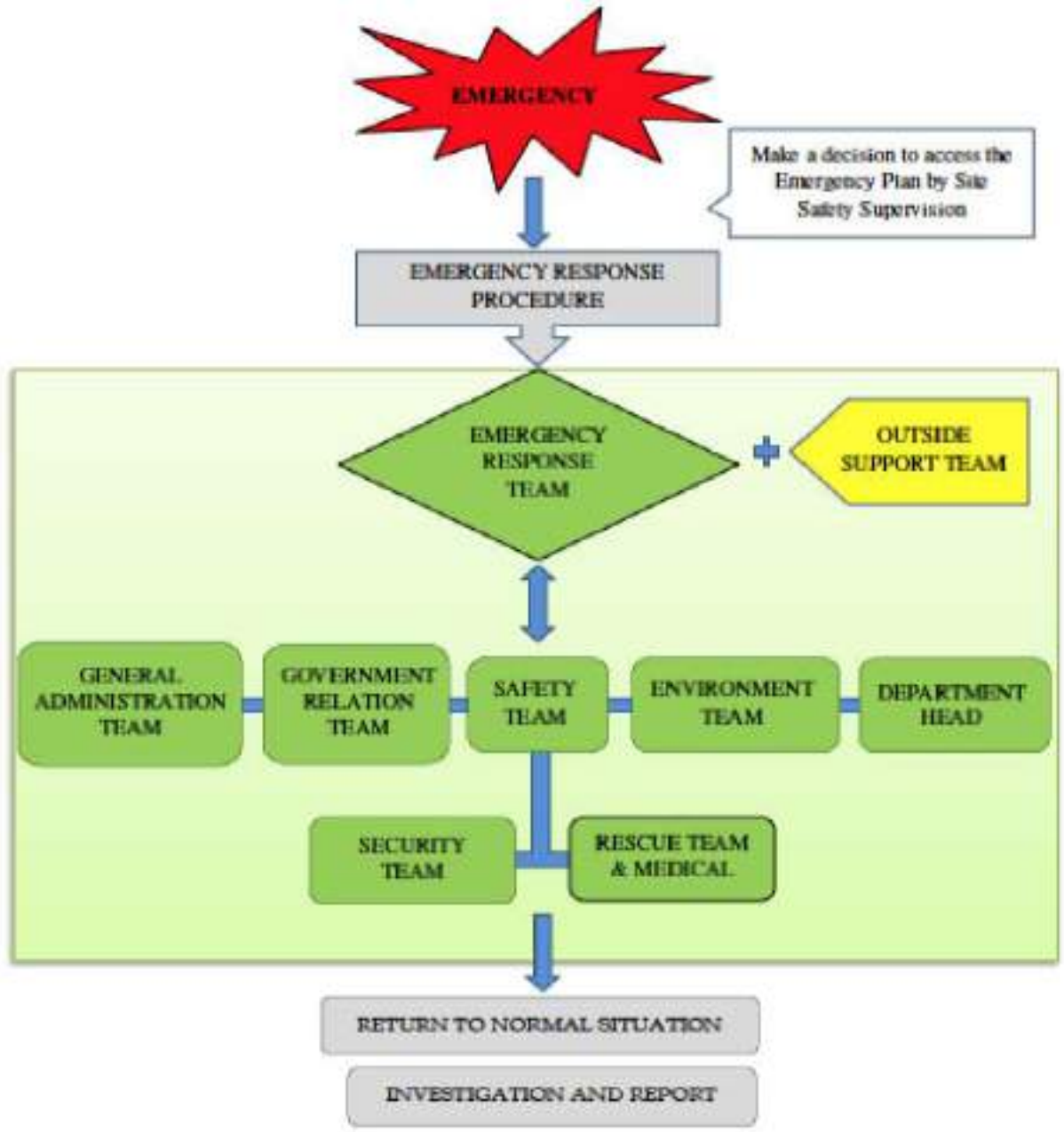
Upon advice of medical emergency, maintain contact with first aid personnel and summon ambulance if required.

1.7 SECURITY TEAM

- If ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct vehicle closest to the scene.
- Prevent access to the site of unauthorized personnel (press, etc.).

1.8 EMERGENCY COORDINATOR

- The Emergency Coordinator shall assist emergency personnel at the scene as required through allocation of company resources.
- The Emergency Coordinator shall ensure next-of-kin are properly notified as soon as possible and give whatever company support and assistance is necessary to assist them bundle the situation
- The Emergency Coordinator shall ensure that senior management personnel are advised of the emergency as soon as practical after the event.



Note: Name of contact person and call number from Owner/Contractor to be determined.

1.9 INCIDENT AND ACCIDENT REPORT

Section A: Identification Data

Report No:	Date of Reported:	Reporter:	Sign:
Job Title:		Company Name:	

Section B: Violence Rate

Accident Violence: ☐ 01-Death ☐ 02-Serious Injury ☐ 03-Lost Time Injury ☐ 04-First Aid ☐ 05- Not Injury ☐ 06-Near Miss

Property Damage Cost: ☐ 1-2,000 USD ☐ 2,001-10,000 USD ☐ 10,001-50,000 ☐ > 50,001

Section C: Environmental Impact

Affected area	☐ Construction area	☐ Public area	
Receptor	☐ None	☐ Workers	☐ Community
Type of pollution	☐ Physical	☐ Chemical	☐ Biological
Toxicity	☐ Non-toxic	☐ Low - toxic	☐ High - toxic
Return to Normal	☐ 1 day	☐ 1 day to 1 week	☐ ≥ 1 week
Cumulative impact	☐ Non-cumulative	☐ Cumulative	

Section D: Injured/Illness Employee

1.Name:	Sex:	Date of Birth: Month	Day	Year	Age:	Regular Job Title:	Experience: In this job title Years Weeks	In this Project Years Weeks
	☐ Male ☐ Female							

Site:	Company:	Reference:	Phone No:	Social Security Number

Part of Body Injured or Affected:

☐ Head	☐ Hands	☐ Face	☐ Nose
☐ Eyes	☐ Legs	☐ Teeth	☐ Neck
☐ Trunk	☐ Toes	☐ Elbow	☐ Shoulder
☐ Back	☐ Ankle	☐ Wrist	☐ Foot
☐ Arms	☐ Thump	☐ Fingers	☐ Internal

Remark: .....

Nature of Injury or Illness:

☐ Laceration	☐ Amputation	☐ Puncture	☐ Fracture
☐ Strain & Sprain	☐ Burns	☐ Contusion	☐ Dry Heat Friction
☐ Hernia	☐ Foreign Body	☐ Chemical	☐ Contamination
☐ Skin (Occupationnel)	☐ Rash	☐ Irritation	

Remark: .....

2.Name:	Sex:	Date of Birth: Month	Day	Year	Age:	Regular Job Title:	Experience: In this job title Years Weeks	In this Project Years Weeks
	☐ Male ☐ Female							

Site:	Company:	Reference:	Phone No:	Social Security Number

Part of Body Injured or Affected:

☐ Head	☐ Hands	☐ Face	☐ Nose
☐ Eyes	☐ Legs	☐ Teeth	☐ Neck
☐ Trunk	☐ Toes	☐ Elbow	☐ Shoulder
☐ Back	☐ Ankle	☐ Wrist	☐ Foot
☐ Arms	☐ Thump	☐ Fingers	☐ Internal

Remark: .....

Nature of Injury or Illness:

☐ Laceration	☐ Amputation	☐ Puncture	☐ Fracture
☐ Strain & Sprain	☐ Burns	☐ Contusion	☐ Dry Heat Friction
☐ Hernia	☐ Foreign Body	☐ Contamination	☐ Chemical
☐ Skin (Occupationnel)	☐ Rash	☐ Irritation	

Remark: .....

Section E: Accidents/Incident Details

Date Accident/Incident Occurred:	Time Accident/Incident Occurred:	Exact Location of the Accident / Incident:

Details of the actual Job Being done at the time:

Details of Accident / Incident / What actually happened?

Section F: Accident Cause (Basic cause mark X / Contributing cause, if any mark O)

UNSAFE CONDITIONS		UNSAFE ACTS	
1	☐ Inadequately Guarded	1	☐ Operating Without Authority / Training
2	☐ Unguarded	2	☐ Operating at Unsafe Speed
3	☐ Defective Tools, Equipment, or Substance	3	☐ Marking SHE Device Inoperative
4	☐ Unsafe Design or Construction	4	☐ Using Unsafe Equipment or Equipment Unsafely
5	☐ Hazardous Arrangement	5	☐ Unsafe Loading, Placing, Mixing
6	☐ Unsafe Illumination	6	☐ Taking Unsafe Position
7	☐ Unsafe Ventilation	7	☐ Working on Moving or Dangerous Equipment
8	☐ Unsafe Clothing	8	☐ Distraction, Teasing, Horse Play
9	☐ Insufficient Instruction	9	☐ Failure to use Personal Protective Devices
10	☐ Lack of system of work	10	☐ Lack of effective instruction or supervision

Why was the unsafe act committed?_____ Why did the unsafe condition exist?_____

Section G: Guide to Corrective Action (Base on the cause checked above, I am taking the following corrective action)

UNSAFE ACT	UNSAFE CONDITION	If Supervisor can't handle, then recommend to
☐ Stop the Behaviour	☐ Remove	☐ Site Engineer, or
☐ Study the job	☐ Guard	☐ Site Manager, or
☐ Instruct (tell-show-try-check)	☐ Warn	☐ Project Manager, or
☐ Follow Up	☐ Supervisory Training	☐ Safety Committee
☐ Enforce		

Detail below any immediate remedial actions that have been taken:

Detail below any corrective and preventative actions that could be taken to prevent future re-occurrence:	Responsible	Completion Date

Section H: Witness Statement	
Witness Name	Interviewer Name

Section I: Reviewed & Recommend by			
Recommendation:			
Reviewed By:	Position:	Signature:	Date:

Remarks : If Accident or Incident happened with lost time injury and affected to the publicity must further report to Safety Department;
: First Aid Cases will not applicable to this form;
: The accident report shall submit to Safety Department within 3 days
: Attached the photograph or sketch the location of accident / incident;

1.10 SUGGESTED CONTENTS OF EPRP

The Contractor should prepare the EPRP based on the guidelines provided in the above sections. The suggested structure of the EPRP is listed below:

1. Purpose
2. Applicable Scope
3. Preparation Basis
4. Emergency Response System
   - 4.1 Generals
   - 4.2 Emergency Response System
   - 4.3 Responsibilities
5. Major Safety Risks
6. Precautionary Measures
   - 6.1 Training and Exercise
   - 6.2 Hazard Source Monitor
   - 6.3 Alert Action
   - 6.4 Management Measures
7. Control Measures
   - 7.1 Response
   - 7.2 Response Procedures
   - 7.3 Emergency Response
   - 7.4 Emergency Completion and Restoration
8. Emergency Response Report and Settlement
9. Supporting Measures
   - 9.1 Communication
   - 9.2 Emergency Team
   - 9.3 Funding for Emergency
   - 9.4 Provisions and Resources
10. Records

ANNEX-X
TREE PLANTATION PLAN

TREE PLANTATION/ AFFORESTATION PLAN

The basic purpose of afforestation/plantation of suitable species in the project area is to reduce the risk been made due to different construction activities for the proposed project. The expected risk made will be compensated by planting of saplings to enhance green cover and improve the overall environment of the area. Afforestation will not only reduce the risk been made but will also increase the Green cover, carrying capacity and aesthetics of the area along with many positive aspects and impacts. Total one Thousand (1000) plants should be planted for environmental enhancement of the area.

Plantation will be done after the construction work immediately. Plantation of indigenous trees species is highly important to maintain the biodiversity and ecological balance. It is also important to prevent global warming, soil erosion and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level. Along with the importance of construction, the afforestation activity will further help in enhancing the socio-economic condition of the area and project sustainability.

Note: *The PHA Lahore may be engaged for carrying out the proposed activates.*

IMPORTANCE OF TREE PLANTATION

- Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife.
- Trees control climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer.
- Trees also preserve warmth by providing a screen from harsh wind.
- Trees also lower the air temperature and reduce the heat intensity of the greenhouse effect by maintaining low levels of carbon dioxide.
- Both above and below ground, trees are essential to the eco-systems in which they reside.
- Trees absorb and store rainwater which reduce runoff and sediment deposit after storms. This helps the ground water supply recharge, prevents the transport of chemicals into streams and prevents flooding.
- Trees, shrubs and turf also filter air by removing dust and absorbing other pollutants like carbon monoxide, sulfur dioxide and nitrogen dioxide.

OBJECTIVES

- To Restore native species
- To improve the quality of air and reduce its pollution
- To add color to the landscape and enhances the beauty of the environment
- To uplift the quality of our living environment through active planting, proper maintenance and preservation of trees together with other vegetation.
- To Protect and conserve flora and fauna of the project area.
- To attract rain which is a positive impact on the project area at all.
- To reduce sedimentation by plantation in the project area which will act as protection wall against wind born dust particles.

AREA ENHANCEMENT PLAN

Plants will be raised along the nearby available project area or along roads, two on either side of the road. Distance from the outer boundary of the ROW and between two plants will be kept as 4 meters. Thus in one kilometer, 250 number of plants are to be raised in single row. Total number of plants will be **1000** in Number.

**The PHA or concerned Authority may update the standards of planting and choice of species as per the actual requirements and site suitability.*

Trees Recommended

Following Trees Are Recommended for Plantation.

Sr. No.	Local/English Name	Scientific Name
1	Neem	*Azadirachta indica*
2	Sukh Chain	*Pongamia pinnata*
3	Sirris	*Acacia lebbek*
4	Jacarnda	*Jacaranda moniosifolia*
5	Silver Oak	*Grevillea robusta*
6	Pilkan	*Ficus virens Spp*
7	Jaman	*Eugenia jambolina*
8	Kachnar	*Bauhinia variegate*

PLANTATION TECHNIQUE

Plantation of suitable broad leaved species is to be carried out in the project area or immediate vicinity (as per suitability) of the project area. The project area can be afforested and vegetation cover can be improved by adopting standard afforestation technique of digging pits. The project area is suitable for plantation activities and can be managed thoroughly with care.

WHEN TO PLANT

Planting should be completed early in the rains in as short a time as possible. The trees must be given time to become well established prior to the dry season. A good rule of thumb is to start planting when the soil is moist to a depth of 15-25 cm or to the bottom of the planting hole. Failures because planting is too late are more common than failures because of planting too early. To obtain good results and avoid labor shortage in these areas considerable preparatory planning is needed. The size of the

plantation might have to be adapted to the availability of labour. If dry sites cannot be planted in time, planting should be postponed until the next season.

Cost

Break-up of Expenditure per Avenue kilometer @ Rs. 1500/- per diem: Break-up of Expenditure per Avenue kilometer or 250 plants @ Rs. 1500/- per diem:

FIRST YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	Layout	1 Av.km	2 MD/Av.km	3000.00
2.	Digging of Pits 2.5 ft. each 2.5x250 = 625 cft.	625 cft.	5 MD/Av.km	7500.00
3.	Cost of Plants including	250 No.	Rs100/- plant	25,000.00
4.	Cost of planting of plants	250 No.	Rs. 25/- plant	6250.00
5.	Carriage of plants from private nursery to site including loading/unloading	250 No.	Rs. 10/- plant	2500.00
6.	Cost of Manure and Bhall (silt) including carriage	1 Av. Km		20,000.00
7.	H/watering 50 times 250x50 with water bowser, one driver and one coolie	12500 no.	5MD/per %0	100,000.00
8.	Weeding twice 250x2	500 no.	2 MD/per %	15,000.00
9.	Reopening of Pits twice (250x2)/cft/pit	500 cft.	2 MD/per %	15,000.00
10.	Unforeseen			5750.00
Total				200,000.00

SECOND YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	Cost of Plants 20% Restocking	50 No.	Rs.100/- plant	5,000.00
2.	Cost of planting	50 No.	Rs. 25/- plant	1250.00
3.	Carriage of plants	50 No.	Rs. 10/- plant	500.00
4.	H/watering 50 times with water bowser, one driver and one coolie	12500 no.	5MD/per %0	100,000.00
5.	Reopening of Pits twice (250x2)	500 cft.	2 MD/per %	1,5000.00
6.	Weeding twice 250x2	500 no.	2 MD/per %	1,5000.00

7.	Unforeseen			1250.00
Total				1,38,000.00

THIRD YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	Cost of Plants 10% Restocking 25 No.	25 No.	Rs.100/- plant	2500.00
2.	Cost of planting	25 No.	Rs. 25/- plant	625.00
3.	Carriage of plants	25 No.	Rs. 10/- plant	250.00
4.	H/watering 40 times x250 no.	10,000 no.	5MD/per %0	75000.00
5.	Reopening of Pits twice (250x2)	500	5MD/per %0	3750.00
6.	Unforeseen			2875.00
Total				85,000.00

FOURTH YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	H/watering 30 times	7500 no.	5MD/per %0	56250.00
5.	Pruning and cleaning of plants	250 no.	5MD/per %0	1875.00
6.	Unforeseen			1875.00
Total				60,000.00

*Cost for raising 1 Av. Km and 04 years Maintenance of 250 plants in single row: = **Rs. 483,000/-**

Cost for above activities = 1,932,000 **(Cost-A)**

Cost for Purchasing One Plant = 2,000 PKR

Total Plants Need to be Purchased = 1000 Numbers

Total Cost of Purchasing 1000 Plants = 2,000 x 1000

Cost-B = **2,000,000/- PKR**

Grand Total Cost (A+B) = **A** 1,932,000+ **B** 2,000,000 = **3,932,000/- or**

Say 4 Million PKR/-

***The above calculations and standards are approximate and tentative provided on the basis of available data which may be updated by the implementing agency as per actual, during implementation.*

ANNEX-XI
BREAKUP OF HEALTH AND SAFETY COST

Annex-XI

BREAKUP OF HEALTH AND SAFETY COST

Items	Quantity	Cost / Item (Rs.)	Total Cost (Rs.)	Rationale
(A) Personal Protective Equipments PPEs				
Dust masks	21,600	20	432,000	One dust mask to be used in a week by each labourer for 36 months and for 144 weeks the quantity will be 432,000 dust masks.
Safety Shoes	300	2,000	600,000	Two safety shoes are supposed to be used for 36 months by each labourer and for 150 labourers for 36 months construction period it is estimated to be 300
Gloves	1,500	200	300,000	ten pairs of gloves is to be used by each labourer for 36 months and 2,000 gloves are estimated to be used by 150 labourers.
First Aid Box	6	3,000	18,000	One First Aid Box is proposed for 25 labourers and for 150 labourers 6 aid boxes are estimated.
Ear Plugs	21,600	30	648,000	One set of ear plug to be used for a week by each labourer and for 144 weeks (36 months) it is estimated to be 21,600 for 150 labourers.
Safety Helmets	600	1,000	600,000	Four safety helmets are to be used by each labourer for 24 months and for 150 labourers 600 safety helmets are estimated.
Safety Jackets (Hi Vis)	450	800	360,000	Three safety Jacket (Hi Vis) to be used by each labourer for 36 months to be used by 150 labourers.
Sub-Total (A)			***2,958,000***	
(B) Others				
Provision of Dust Bins	10	500	5,000	Ten dust bins are proposed to be placed at construction site for the whole construction period.
Warning Tape	20	500	10,000	---
Safety Cones	20	1,000	20,000	20 safety cones are estimated to be placed at active construction sites.
Safety Sign Boards	15	1,500	22,500	20 safety sign boards are proposed to be placed at active construction sites.
Sub-Total (B)			***57,500***	
Grand Total (A + B)			***3,015,500***	

Time required for Construction = 36 Months
No. of labour required during construction = 150