



Monitoring Report

Asian Consulting Engineers Lahore

Our Ref.: ENV – LHR –51 / 2015

Monitoring Dates: January 23-27, 2015

By

**Environmental Services
SGS Pakistan (Pvt) Ltd.**



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1. Introduction

Asian Consulting Engineers hired the services of SGS Pakistan (Pvt.) Ltd. to conduct an environmental monitoring at four sites in Lahore. An environmental monitoring was conducted at mutually agreed sampling points. This report is prepared on the basis of monitoring conducted at Asian Consulting Engineers, Lahore. Field survey was carried out from January 23 to 27, 2015 for ambient air quality monitoring, dust estimation, meteorological conditions and for noise level monitoring.

1.1 Study Objectives

Followings were the main objectives of the study:

- To assess the impact of facility operations on the quality of environment.
- To develop the strategies for improvement of environmental performance in the areas where it is exceeding from (NEQS).

1.2 Scope of Services

Scope of services covered following main components:

- Ambient Air Quality Monitoring
- Weather Conditions
- Noise Level Monitoring
- PM₁₀

1.2.1. Ambient Air Quality Monitoring

In accordance to National Environmental Quality Standards (NEQS) the following priority pollutants were monitored in the ambient air.

- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO₂)
- Sulphur Dioxide (SO₂)
- Particulate Matter (PM₁₀)



In addition to above mentioned parameters, the weather conditions were also monitored in order to interpret ambient air quality. For the purpose following parameters would be monitored:

- Ambient Temperature
- Relative Humidity
- Barometric Pressure
- Wind Direction
- Wind Velocity

1.2.2. Noise Level Monitoring

Noise level using portable digital sound meter was monitored at same locations where the ambient air quality was monitored. The duration of monitoring was according to the standard at the sampling points.

1.3 Schedule

Detailed Environmental monitoring was conducted at the advised sites. The monitoring was conducted on January 23-27, 2015 for ambient air quality monitoring, meteorological data and for noise level monitoring.



2. Methodology

Following is the brief description of methodology adopted for this environmental monitoring:

2.1. Ambient Air Quality

Ambient air quality was monitored with the help of Mobile Air Quality Station equipped with the state of the art ambient air analyzers. Selection of sampling point was made considering the wind direction at the advised sampling site. Following pollutants were measured during monitoring:

- Carbon Monoxide (CO)
- Oxides of Nitrogen (NO_x)
- Sulphur Dioxide (SO₂)
- Particulate Matter (PM₁₀)

2.1.1. Carbon Monoxide

Carbon monoxide monitoring was carried out using gas filter Correlation CO analyzer. Measurement range of the analyzer is 0-100 ppm. Continuous data was recorded for duration of 24 hrs and hourly average is reported.

2.1.2. Nitrogen Dioxide

Nitrogen Dioxide at the project site was measured using chemiluminescent analyzer. Measurement range of the analyzer is 0-50 ppb and 0-1000 ppm. Reference method used for detection of NO₂ is USEPA Method RFNA-1289-074.

2.1.3. Sulphur Dioxide

Concentration of Sulphur dioxide in ambient air of the project site is measured by using Pulsed Fluorescent Analyzer. Measurement range of the analyzer is 0-50 ppb and 0-1000 ppm. USEPA Designated Method EQSA-0486-060 was used to measure SO₂ concentrations.



Table 01: Methodology of Ambient Air Quality Monitoring

Air Pollutant	Monitoring Technique	Method	Measurement Range	Lowest Detection Limit
Carbon Monoxide (CO)	Gas Filter Correlation CO Analyzer	USEPA Designated Method RFCA-0981-054	0 – 100 ppm	0.01 ppm
Sulfur Dioxide (SO ₂)	Pulsed Fluorescent Analyzer	USEPA Designated Method EQSA-0486-060	0 – 50 ppb 0 – 100 ppm	1 ppb
Nitrogen Dioxide (NO ₂)	Chemiluminescent Analyzer	USEPA Designated Method RFNA-1289-074	0 – 50 ppb 0 – 100 ppm	1 ppb
Particulate Matter (PM ₁₀)	Light Scattering Technique	ISO 21501-4;2007	1-1000 µg/m ³	1 µg/m ³

2.1.4. Sampling and Analysis of Particulate Matter (PM₁₀)

Particulate matter concentration in terms of PM₁₀ was monitored in the ambient air with the help of Aerocet 531 Sampler. Reference method used for PM₁₀ determination in ambient air is ISO 21501-4; 2007.

Air sample for detection of PM₁₀ concentration counts individual particles utilizing scattered laser light and calculates the equivalent mass concentration.

2.2 Meteorological Conditions

In addition to the advised parameters for ambient air quality, weather conditions were also monitored continuously for 24 hours with the help of mobile weather station. Selection of sampling points was made considering the wind direction at the advised sampling site.

2.3 Noise Level Monitoring

Noise level monitoring was conducted at mutually agreed locations using portable Digital Sound Meter. Sound Pressure Level (SPL) measurements (in dB) were performed utilizing Sound Level Meter (European Class 1 Standard) complying with standards IEC60051 TYPE 1 IE60804 TYPE 1 JIS C 1505 in accordance to SGS Standard Operating Procedures (SOP).

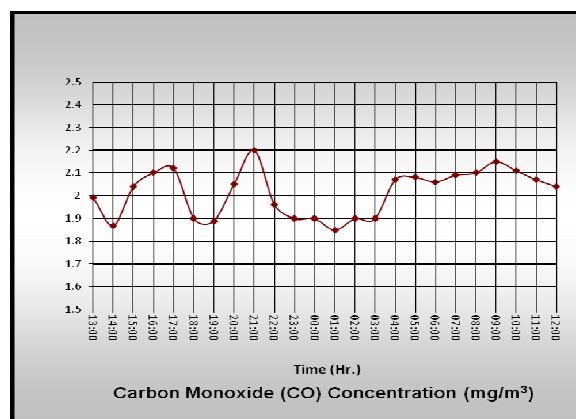
3. Results and Discussion

SGS Pakistan (Pvt.) Ltd. Conducted an environmental monitoring at client’s advised sampling points. Scope of this monitoring covered monitoring of ambient air quality, weather conditions, dust estimation and noise level monitoring. The monitoring results are given as **Annexure I to III**.

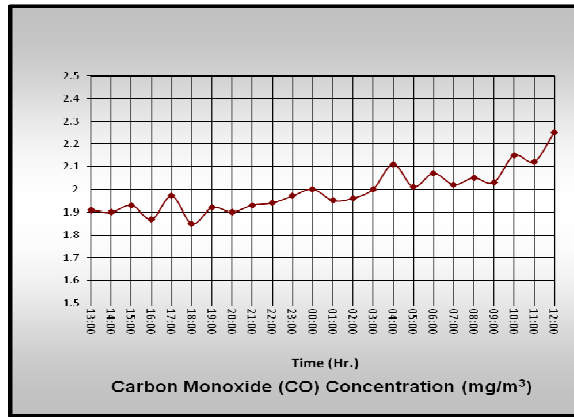
The results of ambient air quality monitored for 24 hrs are given in **Annexure-II** of the report. National Environmental Quality Standards (NEQS) for Ambient given in **Annexure-IV** used for comparison.

The average concentration of carbon monoxide (CO) for 08 hrs according to the National Environmental Quality Standards (NEQS) for Ambient Air should not exceed from 5.0 mg/m³. The values obtained were 2.01 mg/m³, 1.99 mg/m³, 2.05 mg/m³ and 2.18 mg/m³ at ‘Liberty Roundabout’, ‘Fawara Chowk near Sadiq Trade Centre’, ‘Shadman Chowk’ and at ‘Qartaba Chowk’ respectively.

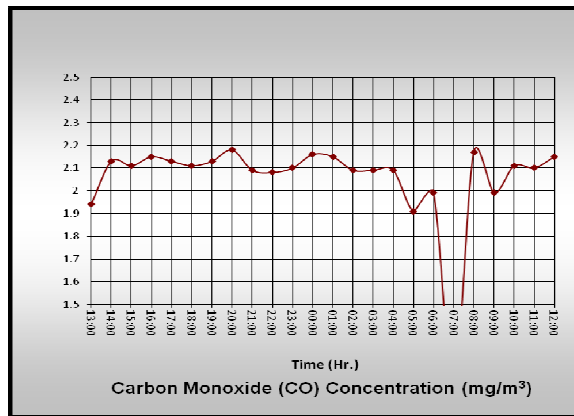
Graphs **01-04** show prevailing concentration of CO in mg/m³ at all four project sites during 24 hrs of monitoring.



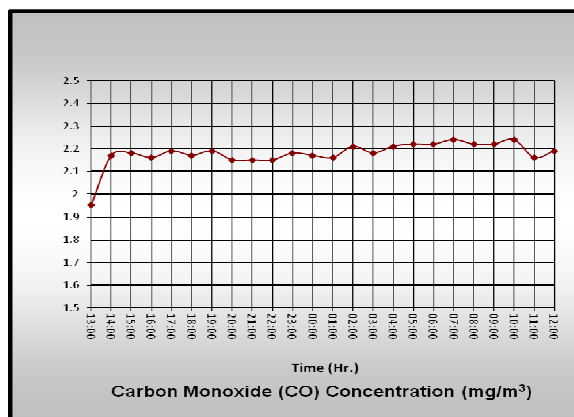
Graph 1: CO Concentration during 24 Hrs monitoring at Liberty Roundabout



Graph 2: CO Concentration during 24 Hrs monitoring at Fawara Chowk near Sadiq Trade Centre



Graph 3: CO Concentration during 24 Hrs monitoring at Shadman Chowk



Graph 4: CO Concentration during 24 Hrs monitoring at Qartaba Chowk



Average 24 hrs arithmetic mean mentioned in Environmental Quality Standards (NEQS) for Ambient Air for Nitrogen Dioxide (NO₂) is 80 µg/m³ and average concentrations of Nitrogen Dioxide (NO₂) measured during 24 hrs monitoring were found 17.14 µg/m³, 21.57 µg/m³, 26.40 µg/m³ and 17.43 µg/m³ at 'Liberty Roundabout', 'Fawara Chowk near Sadiq Trade Centre', 'Shadman Chowk' and at 'Qartaba Chowk' respectively.

According to standard the 24 hrs concentration of Sulphur Dioxide (SO₂) in ambient air should not exceed from 120 µg/m³ while concentration obtained during 24 hrs monitoring were found 36.93 µg/m³, 33.33 µg/m³, 53.62 µg/m³ and 71.47 µg/m³ at 'Liberty Roundabout', 'Fawara Chowk near Sadiq Trade Centre', 'Shadman Chowk' and at 'Qartaba Chowk' respectively.

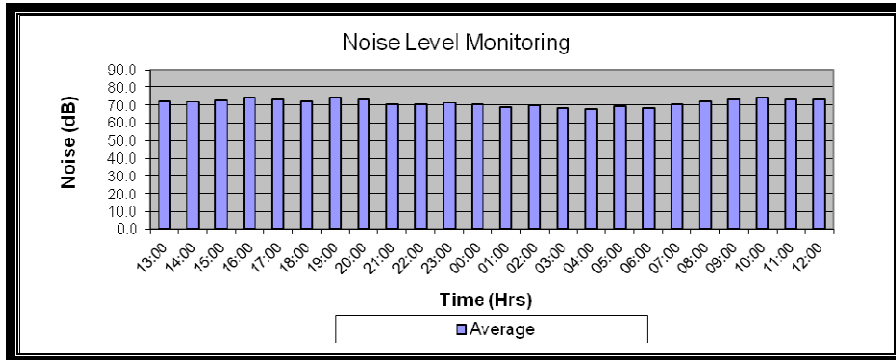
Concentration of Sulphur Dioxide (SO₂) in ambient air is within limit according to Environmental Quality Standards (NEQS) at all sites.

The ambient particulate matter PM₁₀ were found in the range of 136.0 µg/m³, 141.9 µg/m³, 135.0 µg/m³ and 190.9 µg/m³ at 'Liberty Roundabout', 'Fawara Chowk near Sadiq Trade Centre', 'Shadman Chowk' and at 'Qartaba Chowk' respectively, whereas the standards value is 150µg/m³.

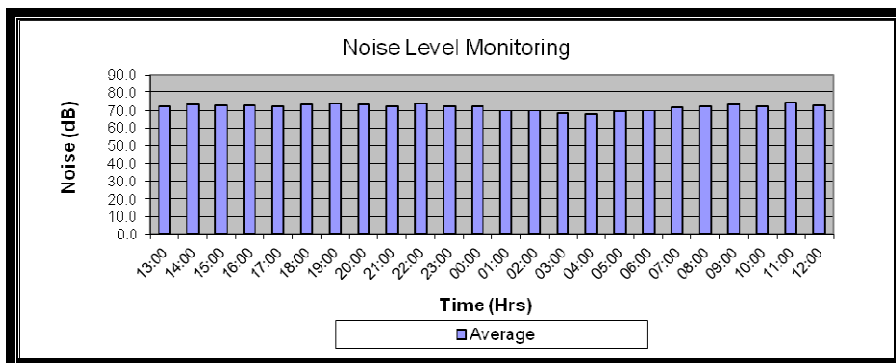
Table 02: Average Obtained Concentrations of Priority Pollutants

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration				NEQS
				Liberty Roundabout	Fawara Chowk	Shadman Chowk	Qartaba Chowk	
Nitrogen Dioxide (NO ₂)	µg/m ³	24Hours	1.00	17.14	21.57	26.40	17.43	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	36.93	33.33	53.62	71.47	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.01	1.99	2.05	2.18	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	1.00	136.0	141.9	135.0	190.9	150 (µg/ m ³) For 24 Hours

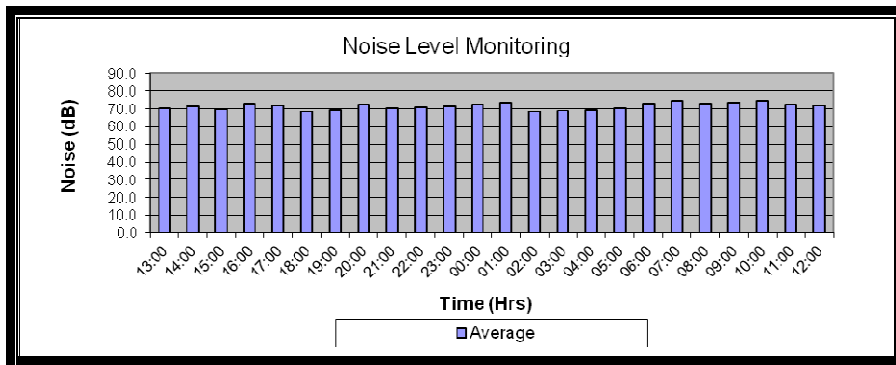
Noise level monitoring was conducted at the same locations where ambient air quality was monitored. Results are attached as Annexure-III of the report. The noise level were found in range of 67.7 to 74.6 (dB.A), 68.0 to 74.4 (dB.A), 68.4 to 74.6 (dB.A) and 73.4 to 81.3 (dB.A) at ‘Liberty Roundabout’, ‘Fawara Chowk near Sadiq Trade Centre’, ‘Shadman Chowk’ and at ‘Qartaba Chowk’ respectively. Graphs 05-08 show the values obtained during noise level monitoring at project sites.



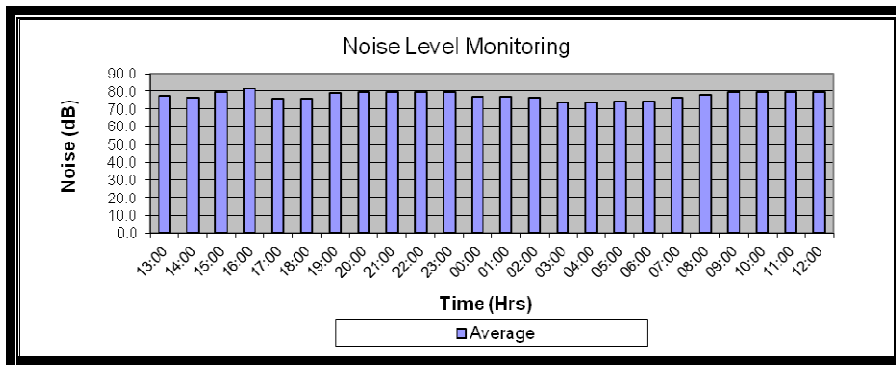
Graph 05: Variation of Noise with Time at Liberty Roundabout



Graph 06: Noise Level Monitoring at Fawara Chowk (near Sadiq Trade Centre)



Graph 07: Noise Level Monitoring at Shadman Chowk



Graph 08: Noise Level Monitoring at Qartaba Chowk



Annexure – I

Meteorological Data



Meteorological Data

Client : Asian Consulting Engineers
Sampling Point : Liberty Roundabout
Date of Intervention : January 23-24, 2015
Place of Intervention : Lahore

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	°C		m/s	%	
13:00	11	W	2.7	72	763.4
14:00	12	W	3.1	71	763.6
15:00	17	W	3.6	73	767.0
16:00	16	W	3.6	74	766.7
17:00	16	W	1.8	74	766.6
18:00	14	NW	0.9	82	766.6
19:00	13	NW	0.9	86	767.2
20:00	13	NW	0.9	88	767.5
21:00	13	NW	0.8	89	767.6
22:00	12	NW	0.4	91	767.5
23:00	12	NW	0.9	92	767.3
00:00	12	NW	0.4	92	766.8
01:00	11	W	1.3	91	766.6
02:00	11	W	0.4	93	766.5
03:00	10	W	0.4	93	766.3
04:00	10	W	0.9	94	766.3
05:00	09	NW	1.8	94	766.9
06:00	09	NE	1.8	95	767.1
07:00	09	NE	1.8	95	767.4
08:00	10	NE	1.8	94	767.9
09:00	13	NE	2.2	81	768.7
10:00	14	W	2.2	74	768.8
11:00	18	W	2.7	60	768.1
12:00	19	E	2.2	56	767.8



Meteorological Data

Client : Asian Consulting Engineers
Sampling Point : Fawara Chowk (near Sadiq Trade Centre)
Date of Intervention : January 24-25, 2015
Place of Intervention : Lahore

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	°C		m/s	%	
13:00	19	SW	1.9	55	766.0
14:00	18	SW	1.5	57	766.2
15:00	18	SW	1.7	61	766.4
16:00	16	SW	2.4	66	766.5
17:00	16	E	2.0	72	766.5
18:00	15	E	1.3	78	766.6
19:00	14	E	1.8	81	767.0
20:00	13	E	2.2	86	767.2
21:00	13	E	1.8	89	767.6
22:00	12	E	1.8	91	767.9
23:00	11	E	1.3	92	767.9
00:00	11	E	1.3	93	768.0
01:00	10	E	1.8	94	767.8
02:00	10	E	1.3	94	767.4
03:00	10	E	1.3	95	767.0
04:00	10	E	1.8	95	766.8
05:00	09	E	1.3	95	766.9
06:00	09	E	1.8	95	767.0
07:00	09	E	1.8	95	767.6
08:00	09	E	1.3	95	767.9
09:00	09	E	1.3	95	768.4
10:00	10	E	2.2	95	768.9
11:00	11	E	2.2	92	769.2
12:00	12	E	1.8	88	768.5



Meteorological Data

Client : Asian Consulting Engineers
Sampling Point : Shadman Chowk
Date of Intervention : January 25-26, 2015
Place of Intervention : Lahore

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	°C		m/s	%	
13:00	11	E	2.2	92	769.2
14:00	13	E	2.7	83	767.2
15:00	13	N	2.7	83	766.7
16:00	13	NE	1.8	83	766.3
17:00	12	NE	1.8	84	766.4
18:00	12	NE	1.3	87	766.5
19:00	11	NE	1.8	88	766.5
20:00	12	NE	2.2	88	767.1
21:00	12	NE	1.8	87	767.7
22:00	12	NE	2.2	86	768.1
23:00	12	NE	1.8	85	768.1
00:00	11	NE	2.7	86	768.0
01:00	11	NE	2.2	86	767.7
02:00	11	NE	1.8	84	768.0
03:00	11	NE	2.7	81	767.7
04:00	11	NE	2.2	81	767.7
05:00	11	NE	1.8	80	767.5
06:00	11	N	2.2	79	767.1
07:00	11	N	1.8	79	768.1
08:00	12	N	0.9	77	768.7
09:00	12	N	0.9	76	769.4
10:00	13	SE	1.3	77	769.8
11:00	13	SW	2.2	75	769.6
12:00	14	S	2.7	74	769.2



Meteorological Data

Client : Asian Consulting Engineers
Sampling Point : Qartaba Chowk
Date of Intervention : January 26-27, 2015
Place of Intervention : Lahore

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	°C		m/s	%	
13:00	14	SW	3.1	69	764.6
14:00	15	SW	3.1	67	764.8
15:00	16	SW	3.6	67	765.4
16:00	15	SW	3.1	67	764.7
17:00	14	SW	3.1	70	764.9
18:00	14	SW	2.2	73	764.8
19:00	13	SW	1.8	76	765.0
20:00	13	SW	2.2	79	765.6
21:00	12	S	1.8	83	765.8
22:00	12	SW	2.2	86	765.9
23:00	11	SW	1.8	88	766.2
00:00	11	SW	1.8	89	766.0
01:00	10	SW	1.8	89	765.7
02:00	09	SW	1.8	89	765.4
03:00	08	SW	0.9	90	765.4
04:00	08	SW	0.4	91	765.0
05:00	08	SW	0.9	93	765.2
06:00	08	SW	0.9	93	765.8
07:00	08	S	09	93	766.4
08:00	08	SW	1.8	92	766.9
09:00	09	SW	2.2	91	767.3
10:00	11	SW	2.2	83	767.5
11:00	14	SW	2.2	75	767.7
12:00	13	S	3.6	77	767.7



Annexure – II

Ambient Air Quality Monitoring Data



Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Liberty Roundabout
Date of Intervention : January 23-24, 2015
Place of Intervention : Lahore

Sr. #	Time	CO (mg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
1	13:00	1.99	12.36	21.62
2	14:00	1.87	12.61	39.74
3	15:00	2.04	16.95	36.62
4	16:00	2.1	14.50	45.25
5	17:00	2.12	12.61	47.31
6	18:00	1.9	28.96	43.67
7	19:00	1.89	26.85	48.30
8	20:00	2.05	26.81	50.83
9	21:00	2.2	23.01	55.66
10	22:00	1.96	12.61	76.18
11	23:00	1.9	16.95	66.83
12	00:00	1.9	14.50	52.57
13	01:00	1.85	14.97	48.31
14	02:00	1.9	14.48	42.76
15	03:00	1.9	11.91	38.01
16	04:00	2.07	14.43	15.08
17	05:00	2.08	18.27	24.54
18	06:00	2.06	21.36	19.81
19	07:00	2.09	32.04	26.79
20	08:00	2.1	34.66	35.60
21	09:00	2.15	9.88	13.03
22	10:00	2.11	7.63	14.48
23	11:00	2.07	6.81	12.86
24	12:00	2.04	6.16	10.43
Average Concentration		2.01	17.14	36.93



Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Liberty Roundabout
Date of Intervention : January 23-24, 2015
Place of Intervention : Lahore

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24Hours	1.00	17.14	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	36.93	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.01	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	2.00	136.0	150 (µg/ m ³) For 24 Hours

µg/m³: micrograms per cubic meter

mg/m³: miligram per cubic meter

LDL: Lowest Detection Limit

NEQS: National Environmental Quality Standards

Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Fawara Chowk (near Sadiq Trade Centre)
Date of Intervention : January 24-25, 2015
Place of Intervention : Lahore

Sr. #	Time	CO (mg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
1	13:00	1.91	28.37	30.67
2	14:00	1.90	13.04	35.80
3	15:00	1.93	24.64	27.00
4	16:00	1.87	26.75	24.58
5	17:00	1.97	29.76	36.04
6	18:00	1.85	32.52	36.92
7	19:00	1.92	29.37	47.81
8	20:00	1.90	10.92	55.76
9	21:00	1.93	9.54	52.76
10	22:00	1.94	9.04	57.55
11	23:00	1.97	10.46	37.41
12	00:00	2.00	11.88	32.49
13	01:00	1.95	12.14	34.16
14	02:00	1.96	16.06	35.49
15	03:00	2.00	17.92	19.82
16	04:00	2.11	25.24	24.06
17	05:00	2.01	31.46	20.70
18	06:00	2.07	15.75	33.20
19	07:00	2.02	35.38	24.34
20	08:00	2.05	40.36	31.02
21	09:00	2.03	30.31	30.51
22	10:00	2.15	36.90	32.98
23	11:00	2.12	10.22	22.10
24	12:00	2.25	9.53	16.66
Average Concentration		1.99	21.57	33.33



Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Fawara Chowk (near Sadiq Trade Centre)
Date of Intervention : January 24-25, 2015
Place of Intervention : Lahore

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24Hours	1.00	21.57	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	33.33	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	1.99	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	2.00	141.9	150 (µg/ m ³) For 24 Hours

µg/m³: micrograms per cubic meter

mg/m³: miligram per cubic meter

LDL: Lowest Detection Limit

NEQS: National Environmental Quality Standards

Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Shadman Chowk
Date of Intervention : January 25-26, 2015
Place of Intervention : Lahore

Sr. #	Time	CO (mg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
1	13:00	1.94	15.52	41.07
2	14:00	2.13	23.95	56.45
3	15:00	2.11	28.50	57.39
4	16:00	2.15	24.69	56.79
5	17:00	2.13	33.27	56.76
6	18:00	2.11	32.49	56.73
7	19:00	2.13	31.23	66.87
8	20:00	2.18	26.18	63.00
9	21:00	2.09	16.05	60.31
10	22:00	2.08	15.75	55.59
11	23:00	2.10	19.50	54.99
12	00:00	2.16	12.89	54.26
13	01:00	2.15	18.97	53.57
14	02:00	2.09	28.65	53.50
15	03:00	2.09	43.75	53.10
16	04:00	2.09	30.08	52.60
17	05:00	1.91	12.94	44.99
18	06:00	1.99	19.62	51.31
19	07:00	1.15	15.93	46.39
20	08:00	2.17	14.57	54.68
21	09:00	1.99	16.64	45.57
22	10:00	2.11	55.01	48.29
23	11:00	2.10	54.22	52.86
24	12:00	2.15	43.22	49.74
Average Concentration		2.05	26.40	53.62



Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Shadman Chowk
Date of Intervention : January 25-26, 2015
Place of Intervention : Lahore

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24Hours	1.00	26.40	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	53.62	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.05	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	2.00	135.0	150 (µg/ m ³) For 24 Hours

µg/m³: micrograms per cubic meter

mg/m³: miligram per cubic meter

LDL: Lowest Detection Limit

NEQS: National Environmental Quality Standards

Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Qartaba Chowk
Date of Intervention : January 26-27, 2015
Place of Intervention : Lahore

Sr. #	Time	CO (mg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
1	13:00	1.95	15.05	62.54
2	14:00	2.17	11.88	77.32
3	15:00	2.18	6.78	64.92
4	16:00	2.16	9.79	69.68
5	17:00	2.19	10.71	64.15
6	18:00	2.17	28.01	71.59
7	19:00	2.19	7.47	74.75
8	20:00	2.15	22.90	89.46
9	21:00	2.15	28.25	88.26
10	22:00	2.15	22.00	93.18
11	23:00	2.18	21.67	88.87
12	00:00	2.17	18.26	50.10
13	01:00	2.16	20.60	59.46
14	02:00	2.21	17.85	56.28
15	03:00	2.18	15.46	58.84
16	04:00	2.21	13.25	68.26
17	05:00	2.22	10.13	67.92
18	06:00	2.22	30.73	77.56
19	07:00	2.24	12.21	66.98
20	08:00	2.22	11.50	66.68
21	09:00	2.22	20.52	76.68
22	10:00	2.24	16.10	74.63
23	11:00	2.16	23.60	73.07
24	12:00	2.19	23.60	74.09
Average Concentration		2.18	17.43	71.47



Ambient Air Quality

Client : Asian Consulting Engineers
Sampling Point : Qartaba Chowk
Date of Intervention : January 26-27, 2015
Place of Intervention : Lahore

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24Hours	1.00	17.43	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	71.47	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.18	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	2.00	190.9	150 (µg/ m ³) For 24 Hours

µg/m³: micrograms per cubic meter

mg/m³: miligram per cubic meter

LDL: Lowest Detection Limit

NEQS: National Environmental Quality Standards



Annexure – III

Noise Level Monitoring Data

Noise Level Monitoring

Client : Asian Consulting Engineers
Sampling Point : Liberty Roundabout
Date of Intervention : January 23-24, 2015
Place of Intervention : Lahore

Sr. #	Time (Hrs)	Noise Level (Average)
1	13:00	72.2
2	14:00	72.0
3	15:00	72.7
4	16:00	74.4
5	17:00	73.5
6	18:00	72.4
7	19:00	74.6
8	20:00	73.6
9	21:00	70.3
10	22:00	70.3
11	23:00	71.4
12	00:00	70.6
13	01:00	68.6
14	02:00	69.7
15	03:00	68.2
16	04:00	67.7
17	05:00	69.2
18	06:00	68.5
19	07:00	70.5
20	08:00	72.4
21	09:00	73.5
22	10:00	74.5
23	11:00	73.3
24	12:00	73.6

Noise Level Monitoring

Client : Asian Consulting Engineers
Sampling Point : Fawara Chowk (near Sadiq Trade Centre)
Date of Intervention : January 24-25, 2015
Place of Intervention : Lahore

Sr. #	Time (Hrs)	Noise Level (Average)
1	13:00	72.6
2	14:00	73.4
3	15:00	72.9
4	16:00	72.7
5	17:00	72.5
6	18:00	73.6
7	19:00	73.7
8	20:00	73.6
9	21:00	72.5
10	22:00	73.7
11	23:00	72.3
12	00:00	72.4
13	01:00	69.8
14	02:00	69.8
15	03:00	68.3
16	04:00	68.0
17	05:00	69.3
18	06:00	69.7
19	07:00	72.1
20	08:00	72.5
21	09:00	73.5
22	10:00	72.6
23	11:00	74.4
24	12:00	73.1

Noise Level Monitoring

Client : Asian Consulting Engineers
Sampling Point : Shadman Chowk
Date of Intervention : January 25-26, 2015
Place of Intervention : Lahore

Sr. #	Time (Hrs)	Noise Level (Average)
1	13:00	70.1
2	14:00	71.6
3	15:00	69.9
4	16:00	72.9
5	17:00	71.7
6	18:00	68.4
7	19:00	69.3
8	20:00	72.2
9	21:00	70.3
10	22:00	70.8
11	23:00	71.2
12	00:00	72.4
13	01:00	73.5
14	02:00	68.5
15	03:00	69.1
16	04:00	69.5
17	05:00	70.2
18	06:00	72.8
19	07:00	74.3
20	08:00	72.7
21	09:00	73.3
22	10:00	74.6
23	11:00	72.4
24	12:00	71.9

Noise Level Monitoring

Client : Asian Consulting Engineers
Sampling Point : Qartaba Chowk
Date of Intervention : January 26-27, 2015
Place of Intervention : Lahore

Sr. #	Time (Hrs)	Noise Level (Average)
1	13:00	77.3
2	14:00	76.6
3	15:00	79.6
4	16:00	81.3
5	17:00	75.8
6	18:00	76.1
7	19:00	79.2
8	20:00	79.6
9	21:00	79.5
10	22:00	79.7
11	23:00	79.6
12	00:00	77.0
13	01:00	76.9
14	02:00	76.6
15	03:00	73.4
16	04:00	73.5
17	05:00	74.5
18	06:00	74.6
19	07:00	76.4
20	08:00	77.9
21	09:00	79.3
22	10:00	79.4
23	11:00	79.4
24	12:00	79.5



Annexure – IV

Standards

National Environmental Quality Standards (NEQS) for Ambient Air

Concentration in Ambient Air				
Pollutants	Time- Weighted Average	Effective from 1 st July 2010	Effective from 1 st January 2013	Method of measurement
SO ₂	Annual Average*	80 µg/m ³	80 µg/m ³	-Ultraviolet Fluorescence Method
	24 hrs**	120 µg/m ³	120 µg/m ³	
NO	Annual Average*	40 µg/m ³	40 µg/m ³	Gas Phase Chemiluminescence
	24 hrs**	40 µg/m ³	40 µg/m ³	
NO ₂	Annual Average*	40 µg/m ³	40 µg/m ³	Gas Phase Chemiluminescence
	24 hrs**	80 µg/m ³	80 µg/m ³	
O ₃	1 hr	180 µg/m ³	130 µg/m ³	Non Dispersive UV Absorption Method
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m ³	360 µg/m ³	High Volume Sampling (average flow rate not less than 1.1 m ³ /minute)
	24 hrs**	550 µg/m ³	500 µg/m ³	
Respirable Particulate Matter (PM ₁₀)	Annual Average*	200 µg/m ³	120 µg/m ³	-β Ray Absorption Method
	24 hrs**	250 µg/m ³	150 µg/m ³	
Respirable Particulate Matter (PM _{2.5})	Annual Average*	25 µg/m ³	15 µg/m ³	-β Ray Absorption Method
	24 hrs**	40 µg/m ³	35 µg/m ³	
	1 hr	25 µg/m ³	15 µg/m ³	
Lead (Pb)	Annual Average*	1.5 µg/m ³	1 µg/m ³	ASS Method after sampling using EPM 2060 or equivalent Filter paper
	24 hrs**	2 µg/m ³	1.5 µg/m ³	
Carbon Monoxide (CO)	8hrs**	5 mg/m ³	5 mg/m ³	Non Dispersive Infra Red (NDIR) Method
	1 hr	10 mg/m ³	10 mg/m ³	

*Annual arithmetic mean of minimum 104 measurements in a year, taken twice a week 24 hourly at uniform interval.

**24 hourly/ 8 hourly values should be met 98% of the in a year. 2% of the time. It may exceed but not on two consecutive days.



Annexure – V

Photographs

Photographs

Liberty Roundabout

	
<p>Ambient Air Quality Monitoring</p>	
	
<p>Particulate Matter & Noise Level Monitoring</p>	

Photographs

Fawara Chowk



Photographs Shadman Chowk



Ambient Air Quality Monitoring



Particulate Matter & Noise Level Monitoring

Photographs

Qartaba Chowk



Ambient Air Quality Monitoring



Particulate Matter & Noise Level Monitoring