

Annexure-A

**NOC FROM IRRIGATION
DEPARTMENT**

IRRIGATION DEPARTMENT

Office of the

Superintending Engineer, Link Circle
Canal Bank Dharampura Lahore.
Phone # +92 42 99250310
Email: se:link_canal@yahoo.com

To

The Managing Director,
WASA, LDA, Lahore.

No. 5224/124-G Dated 05-12-2017

Subject: **NOC REGARDING SURFACE WATER INDUCTION AND
CONSTRUCTION OF WATER TREATMENT PLANT.**

(101) Reference

WASA LDA LAHORE	
Diary No.	4438
Date	6-12-17
MD	
DMD (FA & R)	
DMD (O & M)	
DMD (Engg)	
D (P & E)	
PS TO MD	

- (A) Chief Engineer, Irrigation Lahore Zone, Lahore letter Nos.
- 2383/WII/2017/18076-77/57/2016, dated 22-08-2017
(Annexed with minutes of the meeting dated 26-07-2017).
 - 2835/WII/LHR/2017/22022/3/2017, dated 13-10-2017
(Annexed with minutes of the meeting dated 19-09-2017).
 - 3429/WII/LHR/2017/26757-58 / 57/2016, dated 30-11-2017
(Annexed with minutes of the meeting dated 23-11-2017).
- (B) Director Planning and Design, WASA, LDA, Lahore letter No. P&D/1212-17, dated 04-10-2017.

All the above reference letters of worthy Chief Engineer, Irrigation Lahore Zone, Lahore on the above cited subject along with annexures were endorsed to concerned Executive Engineer, Chakbandi Division, Lahore, for immediate compliance. In this regards, Executive Engineer, Chakbandi Division, Lahore has reported vide letter No. # 380/43-WB, dated 04-12-2017 (copy attached) wherein he has described the prevailing situation regarding capacity and safety of BRBD Link Canal.

Anyhow, this committed 100 Cs from BRBD Link Canal for drinking water to Lahore city vide minutes of the meeting dated 27-07-2017 can be managed and can be provided by Punjab Irrigation Department.

In this context of foregoing, undersigned as Superintending Engineer, Link Circle, Lahore has no objection in providing 100 Cs to WASA from R.D. 279+500/R (Escape structure) as phase-01. You are requested to sign an agreement

For record pl



IRRIGATION DEPARTMENT

Office of the

Superintending Engineer, Link Circle
Canal Bank Dharampura Lahore.

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with the Executive Engineer, Chakbandi Division, Lahore for provision of this 100 Cs at the disposal of WASA.

D.A/As above


Superintending Engineer,
Link Circle, Lahore

C.C.

1. Secretary to Govt. of the Punjab, Irrigation Department, Lahore.
2. Chief Engineer, Irrigation Lahore Zone, Lahore, for information, guidance and with the request to direct the Consultants (G3) to give an immediate appropriate solution for enhancing capacity of BRBD Link so as to supply this 100 Cs and future supplies without stress over the BRBD Link Canal.
3. Executive Engineer, Chakbandi Division, Lahore, for necessary action as per rules and regulation.



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4-1-18
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Annexure-B

CONSTRUCTION ACTIVITIES AND MATERIALS

Construction Activities and Materials **Cost Estimates Breakup - Capital Cost**

Capital Cost - Summary

1 US\$ = 150 PKR

Sr. No.	Description	Amount (PKR in Million)	Amount (USD in Million)
1	New Ravi Syphon, Intake Structure and Raw Water Channel (as per feasibility level estimate provided by Punjab Irrigation Department - Breakup is attached at Annexure-11)		
	Total Cost A	4,661.94	31.08
2	Surface Water Treatment Plant (SWTP) - Civil and E&M Works		
2.1	Civil Works		
2.1.1	Raw Water Tank and Raw Water Pump House	22.17	0.15
2.1.2	Primary Sedimentation Tanks	127.41	0.85
2.1.3	Coagulation Chamber	2.34	0.02
2.1.4	Flocculation & Clarifiers	408.70	2.72
2.1.5	Sludge Thickener	16.07	0.11
2.1.6	Sludge Drying Beds with Shades	39.13	0.26
2.1.7	Rapid Gravity Filtration Unit	168.60	1.12
2.1.8	Clear Water Tank, Pump House and Disinfection Room	348.23	2.32
2.1.9	Chemical Storage Building and Alum Dosing Station	44.77	0.30
2.1.10	Admin Building	5.81	0.04
2.1.11	Staff Quarters	19.35	0.13
2.1.12	Internal Roads, H.T & Transformers Room	73.97	0.49
	Sub Total (2.1)	1,276.55	8.51
2.2	Electrical & Mechanical Works including SCADA System		
2.2.1	Supplying and Installation of Mechanical Equipment including Pumping Machinery etc.	2,942.09	19.61
2.2.2	Supplying and Installation of Electrical Equipment etc.	2,042.84	13.62
2.2.3	SCADA and Instrumentation	228.87	1.53
	Sub Total (2.2)	5,213.80	34.76
	Total (2.1 + 2.2)	6,490.35	43.27
3	Transmission Main (HDPE Pipe)		
3.1	Transmission Main including Valves, Fittings etc. (HDPE Pipe - Length 3.5 km)	642.25	4.28
	Total (3)	642.25	4.28
4	Feeding Main for 04 Serving Areas (HDPE Pipe)		
4.1	Feeding Main including Valves, Fittings etc. (HDPE Pipe)	2,732.59	18.22
	Total (4)	2,732.59	18.22
5	Construction and Rehabilitation of Distribution Network including Water Meters		
5.1	Distribution Network including Valves, Fittings etc. (HDPE Pipe)	470.46	3.14
5.2	Supply and Fixing Leakage Detection Equipment (NRW)	150.00	1.00
5.3	Domestic & Bulk Water Meters and Water Flow Meters	1,352.01	9.01
	Total (5)	1,972.47	13.15
6	Miscellaneous Works		

Capital Cost - Summary

1 US\$ = 150 PKR

Sr. No.	Description	Amount (PKR in Million)	Amount (USD in Million)
6.1	Substation for External Electrification by LESCO	450.00	3.00
6.2	Shifting of Services of Electricity, SuiGas, PTCL Cable and Electric Poles	150.00	1.00
6.3	Restoration of Roads	50.00	0.33
6.4	General Items with Allied Works	60.00	0.40
	Total (6)	710.00	4.73
	Total B (2+3+4+5+6)	12,547.66	83.65
	Additional cost for Mega Projects @ 4.16% on Civil Works	53.10	0.35
	PRA @ 5 %	627.38	4.18
	Cost for Owner's Engineer Consultancy Services	206.18	1.37
	PMU-LWASA Establishment	211.21	1.41
	Plantation Cost (L.S)	10.00	0.07
	Total Cost	13,655.54	91.04
	Contingencies @ 2 %	273.11	1.82
	Total Cost B	13,928.65	92.86
	Capital Cost (A+B)	18,590.59	123.94
	O&M Cost for 02 years	1,360.75	9.07
	Total Cost	19,951.34	133.01

2.1.1. Raw Water Tank and Raw Water Pump House**MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore**

Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
A	Raw Water Tank					
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	1854.169	Cu:m	1.00	233.65	433,227.00
2	Chapter 6 Item 5-h					

2.1.1. Raw Water Tank and Raw Water Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate).					
	Apron Ratio 1: 3: 6	192.953	Cu:m	1.00	6967.65	1,344,425.00
	Apron Ratio 1: 2: 4	16.37	Cu:m	1.00	7,964.85	130,345.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	176.588	Cu m	1.00	10401.75	1,836,819.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	182.448	Cu:m	1.00	13818.95	2,521,240.00
	Cantilever RCC top Slabs Ratio (1:2:4)	13.530	Cu:m	1.00	9324.50	126,160.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60)	73,160.10	Kg	100	13,646.00	9,983,427.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	503.00	Cu:m	1.0	2090.56	1,051,561.00
6	Chapter 21 Item 13					

2.1.1. Raw Water Tank and Raw Water Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	154	No	1.0	284.25	43,775.00
7	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	2644.800	m	1.0	230.55	609,759.00
8	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	93.750	m	1.0	3031.70	284,222.00
9	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	368.213	Cu:m	1.0	55.30	20,362.00
10	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km).(Lead up to 8 Km)	1337.361	Cu:m	1.0	250.75	335,343.00
Sub-Total(A)						18,720,665.00
B	Raw Water Pump House					
1	Chapter-7,Item 5-i					
	Pacca brick work in ground floor: i) cement, sand mortar:	145.259	Cu:m	1.00	7821.30	1,136,112.00
2	Chapter-6,Item6-a-iii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.): a). Reinforced cement concrete in roof slab, beams, columns, lintels, girders and other structural members laid in situ or pre-cast laid in position, or pre-stressed members cast in situ, complete in all respect, Type C (nominal mix 1:2:4)	53.172	Cu:m	1.00	6967.65	370,484.00
3	Ch-6,Item-9(b)					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges	5,317.20	Kg	100	13,646.00	725,585.00

2.1.1. Raw Water Tank and Raw Water Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	for binding of steel reinforcement (also includes removal of rust from bars):- (c) Deformed bars (Grade40)					
4	Chapter-1,Item-1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	126.54	Cu:m	1.0	2090.56	264,542.00
5	Ch-11,Item-10(b)					
	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, up to 20' height. b) 1:3	220.00	Sq.m	1.00	228.10	50,182.00
6	Ch-11,Item-9(b)					
	Cement plaster 1/2" thick in 1:4 up to 20 ft height	372.300	Sq.m	1.00	201.30	74,944.00
7	Ch-11,Item-25(a-iii)					
	White washing 3 coats on new surface.	412.300	Sq.m	1.00	30.75	12,678.00
8	Ch-11,Item-18(a)					
	Cement pointing 1:2 struck joints, on wall up to 20' height, i/c extra cost of labour and material for red oxide pigment in cement pointing to match with the colour of bricks (i) Ratio 1: 5	370.600	Sq.m	1.00	216.70	80,309.00
9	Ch-6,Item-3(b)					
	Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 mm) gauge, in foundation and plinth: (b) Ratio 1: 4: 8	33.00	Cu:m	1.00	4738.15	156,359.00
10	Ch-10,Item-15(i)					
	Providing and laying topping of cement concrete 1:2:4, including surface finishing and dividing in panels:-3"Thick	220.00	Sq.m	1.00	715.25	157,355.00
11	Ch-10,Item-42					
	Providing and fixing marble strip of any shade for dividing the mosaic flooring into panels a) Size 1½" x 3/8" (40 x 10 mm)	132.00	m	1.00	21.65	2,858.00
12	Ch-9,Item-5					
	Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs. per %Sft. or 1.72 Kg/Sq.m bitumen coating sandblinded.	231.44	Sq.m	1.00	732.85	169,609.00
13	Ch-9,Item-14					
	Khassi pernalas in cement sand mortar 1:2, 12" outside width finished smooth with a floating coat of neat cement	18.0	m	1.00	338.50	6,093.00
14	Ch-9,Item-15					
	Khurra on roof 2' x 2' x 6" (600 x 600 x 150 mm)	4.000	No	1.00	499.65	1,999.00
15	Ch-9,Item-16					

2.1.1. Raw Water Tank and Raw Water Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Bottom Khuras of brick masonry in cement mortar 1:6, 4'x2'x4½" (1200x600x113 mm) over 3" (75 mm) cement concrete 1:4:8.	4.000	No	1.00	887.25	3,549.00
16	Ch-25, Item-41(b-v)					
	Providing and fixing steel windows with openable glazed panels, using beam section for frame 1½"x1"x5/8"x1/8" (40x25x16x3 mm), Z-section for leaves ¾"x1"x¾"x1/8" (20x25x20x3 mm), T-section sashes 1"x1"x1/8" (25x25x3 mm), glass panes, wooden screed for glazing embedded over a thin layer of putty duly screwed with leaves, brass fittings, holdfast, duly painted, complete in all respects, including all cost of material and labour, etc. as per approved design and as directed by the Engineer-in-charge:- b) fixed with wire gauze, 22 SWG v) glass pane 5 mm thick	21.60	Sq.m	1.00	5070.80	109,529.00
17	Ch-25, Item-31					
	Making and fixing steel grated door with 1/16" thick (1.5mm) sheeting, including angle iron frame 2"x2"x3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre, with locking arrangement.	6.45	Sq.m	1.00	11121.40	71,733.00
18	Ch-12, Item-31					
	Providing and fixing M.S. flat ½"x1/8" (13mm x 3mm) grill including ¾" x 1/8" (20 mm x 3 mm) M.S. flat frame, in windows of approved design, including painting three coats, complete in all respects.	21.60	Sq.m	1.00	2360.75	50,992.00
19	Ch-13, Item-5(c-i & ii)					
	Painting new surface: c) Preparing surface and painting of doors and windows any type (including edges):					
	i) priming coat.	12.90	Sq.m	1.00	82.45	1,064.00
	ii) each subsequent coat of paint. (Two Coats)	25.800	Sq.m	1.00	44.30	1,142.00
Sub-Total(B)						3,447,118.00
Total(A+B)						22,167,783.00
Rupees in Million						22.168

2.1.2. Pre-Sedimentation Tanks						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and	114,37.34	Cu:m	1.00	233.65	2,672,333.00

2.1.2.Pre-SedimentationTanks						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	dressed within 50 ft. (15 m) lead: i) In ordinary Soil.					
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	2,068.30	Cu:m	1.00	6,947.65	14,369,859.00
	Apron Ratio 1: 2: 4	434.40	Cu:m	1.00	7,964.85	3,459,931.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	1,633.91	Cu:m	1.00	10,401.75	16,995,471.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	719.33	Cu:m	1.00	13,818.95	9,940,441.00
	Cantilever RCC top Slabs Ratio (1:2:4)	129.44	Cu:m	1.00	9,324.50	1,206,987.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60)	483,592.05	Kg	100	13,646.00	65,990,971.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by	2,472.90	Cu:m	1.0	2,090.56	5,169,750.00

2.1.2.Pre-SedimentationTanks						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	truck or by any other means owned by the contractor (Lead up to 400 KM)					
6	Chapter 21 Item 13					
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	208	No.	1.0	284.25	59,124.00
7	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	7,099.56	m	1.0	230.55	1,636,804.00
8	Chapter 13 Item 9-ii					
	Bitumen coating to plastered or cement concrete surface: ii) 14 lbs. per 100 Sft. (6.35 Kg per Sq.m)	1,209.60	Sm	1.0	76.75	92,837.00
9	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	1137.000	m	1.0	3031.70	3,447,043.00
10	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	1233.468	Cu:m	1.0	55.30	68,211.00
11	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km).(Lead up to 8 Km)	9183.480	Cu:m	1.0	250.75	2,302,758.00
Total						127,412,520.00
Rupees in Million						127.413

2.1.3.CoagulationChambers						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	80.725	Cu:m	1.00	233.65	18,861.00
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	13.91	Cu:m	1.00	6,947.65	96,635.00

2.1.3.CoagulationChambers						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Apron Ratio 1: 2: 4	2.59	Cu:m	1.00	7,964.85	20,647.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	13.30	Cu:m	1.00	10,401.75	138,320.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	26.28	Cu:m	1.00	13,818.95	363,181.00
	Cantilever RCC top Slabs Ratio (1:2:4)	10.00	Cu:m	1.00	9,324.50	93,266.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars): (c) Deformed bars (Grade-60)	8,787.32	Kg	100	13,646.00	1,199,118.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor. (Lead Up to 400 KM)	49.96	Cu:m	1.00	2,090.00	104,422.00
6	Chapter 21 Item 13					
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	64.00	No	1.00	284.25	18,192.00
7	Chapter 6 Item 28					

2.1.3. Coagulation Chambers						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects	103.06	m	1.00	230.55	23,760.00
8	Chapter 13 Item 9-ii					
	Bitumen coating to plastered or cement concrete surface: ii) 14 lbs. per 100 Sft. (6.35 Kg per Sq.m)	144.22	Sm	1.00	76.75	11,069.00
9	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	76.56	m	1.00	3,031.70	232,095.00
10	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	14.37	m	1.00	55.30	795.00
11	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km). (Lead up to 8 Km)	67.79	Cu m	1.00	250.75	16,998.00
Total						2,337,359.00
Rupees in Million						2.337

2.1.4. Baffled Flocculators and Horizontal Clarifiers						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	42,984.69	Cu:m	1.00	233.65	10,043,374.00
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	5,129.56	Cu:m	1.00	6,947.65	35,638,410.00
	Apron Ratio 1: 2: 4	110.32	Cu m	1.00	7,964.85	878,746.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface,					

2.1.4. Baffled Flocculators and Horizontal Clarifiers						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	5,019.23	Cu m	1.00	10,401.75	52,208,830.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	3,049.54	Cu:m	1.00	13,818.95	42,141,551.00
	Cantilever RCC top Slabs Ratio (1:2:4)	392.86	Cu:m	1.00	9,324.50	3,663,242.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60)	1,653,043	Kg	100	13,646.0	225,574,226.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor. (Lead Up to 400 KM)	11,960.30	Cu:m	1.0	2,090.56	25,003,728.00
6	Chapter 21 Item 13					
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	240	No	1.0	284.25	68,220.00
7	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	10,888.48	m	1.0	230.55	2,510,339.00
8	Chapter 13 Item 9-ii					
	Bitumen coating to plastered or cement concrete surface: ii) 14 lbs. per 100 Sft. (6.35 Kg per Sq.m)	23,15.52	Sm	1.0	76.75	177,716.00

2.1.4. Baffled Flocculators and Horizontal Clarifiers						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
9	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	3,409.44	m	1.0	3031.70	10,336,399.00
10	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	1,628.03	Cu:m	1.0	55.30	90,030.00
11	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km).(Lead up to 8 Km)	1,472.20	Cu:m	1.0	250.75	369,153.00
Total						408,703,964.00
Rupees in Million						408.704

2.1.5. Sludge Thickeners						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	2316.031	Cu:m	1.00	233.65	541,141.00
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	212.850	Cu:m	1.00	6947.65	1,478,809.00
	Apron Ratio 1: 2: 4	3.570	Cu:m	1.00	7964.85	28,437.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):					

2.1.5. Sludge Thickeners						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	209.280	Cu:m	1.00	10401.75	2,176,878.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	98.753	Cu:m	1.00	13818.95	1,364,664.00
	Cantilever RCC top Slabs Ratio (1:2:4)	0.897	Cu:m	1.00	9324.50	8,366.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60)	61,696.32	Kg	100	13,646.0	8,419,080.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	467.74	Cu:m	1.0	2090	977,582.00
6	Chapter 21 Item 13					
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	24	No	1.0	284.25	6,822.00
7	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	731.46	m	1.0	230.55	168,638.00
8	Chapter 13 Item 9-ii					
	Bitumen coating to plastered or cement concrete surface: ii) 14 lbs. per 100 Sft. (6.35 Kg per Sq.m)	50.90	Sm	1	76.75	3,907.00
9	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	105.0322	m	1.00	3,031.70	318,426.00
10	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	28.74	m	1.00	55.30	1,590.00

2.1.5. Sludge Thickeners						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
11	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km). (Lead up to 8 Km)	2290.161	Cu m	1.00	250.75	574,258.00
Total						16,068,598.00
Rupees in Million						16.069

2.1.6. Sludge Drying Beds with Shades						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	3763.601	Cu:m	1.00	233.65	879,365.00
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	341.596	Cu:m	1.00	6967.65	2,380,124.00
	Apron Ratio 1: 2: 4	27.96	Cu:m	1.00	7,964.85	222,721.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	468.152	Cu m	1.00	10401.75	4,869,600.00

2.1.6. Sludge Drying Beds with Shades						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity	Unit	Rate	Amount(PKR)	
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	138.994	Cu:m	1.00	13818.95	1,920,746.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-('c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):('c) Deformed bars (Grade-60)	121,429.12	Kg	100	13,646.00	16,570,217.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	840.44	Cu:m	1.0	2090.56	1,756,995.00
6	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	541.760	m	1.0	230.55	124,903.00
7	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	948.365	Cu:m	1.0	55.30	52,445.00
10	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km).(Lead up to 8 Km)	2533.713	Cu:m	1.0	250.75	635,328.00
11	Shades on Sludge Drying Beds	2008.00	Sq:m	1.0	4,842.00	9,722,736.00
Total					39,132,444.00	
Rupees in Million					39.132	

2.1.7. Rapid Sand Filters (10 No.) 02 Unit = 12 m x 6 m x 4.8 m						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	17286.217	Cu:m	1.00	233.65	4,038,925.00
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	1277.418	Cu:m	1.00	6947.65	8,875,053.00
	Apron Ratio 1: 2: 4	48.540	Cu m	1.00	7964.85	386,614.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	1774.017	Cu m	1.00	10401.75	18,452,881.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	1506.724	Cu:m	1.00	13818.95	20,821,344.00
	Cantilever RCC top Slabs Ratio (1:2:4)	142.740	Cu:m	1.00	9324.50	1,330,979.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60)	670,422.20	Kg	100	13,646.0	91,485,813.00

2.1.7. Rapid Sand Filters (10 No.) 02 Unit = 12 m x 6 m x 4. 8 m						
MRS, 1st BI-Annual-2019 (1st January -2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	4,104.48	Cu:m	1.0	2090.56	8,580,668.00
6	Chapter 21 Item 13					
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	1200	No	1.0	284.25	341,100.00
7	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	1574.400	m	1.0	230.55	362,978.00
8	Chapter 13 Item 9-ii					
	Bitumen coating to plastered or cement concrete surface: ii) 14 lbs. per 100 Sft. (6.35 Kg per Sq.m)	2262.432	Sq:m	1.0	76.75	173,642.00
9	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	1050.400	m	1.0	3031.70	3,184,498.00
10	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	3071.041	Cu:m	1.0	55.30	169,829.00
11	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km).(Lead up to 8 Km)	11477.651	Cu:m	1.0	250.75	2,878,021.00
12	Chapter 19 Item 39.iii					
	Supply and fitting of cast iron manhole cover with frame, etc. complete.	40.00	Cu:m	1.0	1476.45	59,058.00
Non-Schedule Items						
	Filter Media					
13	Providing and Laying in position gravel, size (1/2"-3/4" gauge) complete in all respect as per drawings and directed by the Engineer's in-charge.	288.00	Cu:m	1.0	5300.00	1,526,400.00
14	Providing and Laying in position gravel, size (1/4"-1/2" gauge) complete in all respect as per drawings and directed by the Engineer's in-charge.	288.00	Cu:m	1.0	5300.00	1,526,400.00
15	Providing and Laying in position gravel, size (1/4"-10 mesh) complete in all respect as per drawings and directed by the Engineer's in-charge.	288.00	Cu:m	1.0	5300.00	1,526,400.00

2.1.7. Rapid Sand Filters (10 No.) 02 Unit = 12 m x 6 m x 4.8 m						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
16	Providing and Laying in position coarse sand, size (16 mesh to 20 mesh) complete in all respect as per drawings and directed by the Engineer's in-charge.	864.00	Cu:m	1.0	2500.00	2,160,000.00
17	Providing and Laying in position coarse sand, size (10 mesh to 16 mesh) complete in all respect as per drawings and directed by the Engineer's in-charge.	288.00	Cu:m	1.0	2500.00	720,000.00
Total						168,600,603.00
Rupees in Million						168.601

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
A	Treated Water Tank					
1	Chapter 3 Item 21-b					
	Earthwork excavation in irrigation channels, drains, etc. to designed section, grades and profiles, excavated material disposed-off and dressed within 50 ft. (15 m) lead: i) In ordinary Soil.	20081.318	Cu:m	1.00	233.65	4,692,000.00
2	Chapter 6 Item 5-h					
	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	Apron Ratio 1: 3: 6	1265.382	Cu:m	1.00	6967.65	8,816,739.00
	Apron Ratio 1: 2: 4	36.63	Cu:m	1.00	7,964.85	291,752.00
3	Chapter 6 Item 6-i-ii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-					
	(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:					
	(2) Type B (nominal mix 1: 1½: 3)					
	RCC Base Slab	964.752	Cu m	1.00	10401.75	10,035,109.00
	(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other					

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	structural members laid in situ or precast laid in position, or pre-stressed members cast in situ, complete in all respects:					
	RCC Walls (1:1 1/2:3)	1047.660	Cu:m	1.00	13818.95	14,477,561.00
	Cantilever RCC top Slabs Ratio (1:2:4)	554.771	Cu:m	1.00	9324.50	5,172,958.00
4	Chapter 6 Item 9-c					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60) Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-(c) Deformed bars (Grade-60)	402,482.40	Kg	100	13,646.00	54,922,748.00
5	Chapter 1 Item 1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	3,369.54	Cu:m	1.0	2090.56	7,044,221.00
6	Chapter 21 Item 13					
	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	266	No	1.0	284.25	75,611.00
7	Chapter 6 Item 28					
	Providing embedding 10" (250 mm) wide ¼" (6 mm) thick rubber water stopper in expansion joints of R.C.C. roof slab complete in all respects.	1460.000	m	1.0	230.55	336,603.00
8	Chapter 18 Item 13					
	Providing and fixing G.I. pipe railing, as per standard drawing.	175.800	m	1.0	3031.70	532,973.00
9	Chapter 3 Item 13.i					
	Rehandling of earthwork: a) Lead up to a single throw of Kassi, phaorah or shovel	1266.923	Cu:m	1.0	55.30	70,061.00
10	Chapter 3 Item 17.a.b.c					
	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 miles (8 Km). d) for every ½ mile (800 m) additional lead or part thereof, beyond 5 miles (8 Km).(Lead up to 8 Km)	16932.956	Cu:m	1.0	250.75	4,245,939.00
Sub-Total(A)						110,714,275.00
B	Raw Water Pump House					

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
1	Chapter-7,Item 5-i					
	Pacca brick work in ground floor: i) cement, sand mortar:	114.329	Cu:m	1.00	7821.30	894,203.00
2	Chapter-6,Item6-a-iii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.): a). Reinforced cement concrete in roof slab, beams, columns, lintels, girders and other structural members laid in situ or pre-cast laid in position, or pre-stressed members cast in situ, complete in all respect, Type C (nominal mix 1:2:4)	64.455	Cu:m	1.00	6967.65	449,100.00
3	Ch-6,Item-9(b)					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- (c) Deformed bars (Grade40)	6,445.50	Kg	100	13,646.00	879,553.00
4	Chapter-1,Item-1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	56.72	Cu:m	1.0	2090.56	118,577.00
5	Ch-11,Item-10(b)					
	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, up to 20' height. b) 1:3	294.920	Sq.m	1.00	228.10	67,271.00
6	Ch-11,Item-9(b)					
	Cement plaster 1/2" thick in 1:4 up to 20 ft height	370.110	Sq.m	1.00	201.30	74,503.00
7	Ch-11,Item-25(a-iii)					
	White washing 3 coats on new surface.	665.030	Sq.m	1.00	30.75	20,450.00
8	Ch-11,Item-18(a)					
	Cement pointing 1:2 struck joints, on wall up to 20' height, i/c extra cost of labour and material for red oxide pigment in cement pointing to match with the colour of bricks (i) Ratio 1: 5	352.965	Sq.m	1.00	216.70	76,488.00
9	Ch-6,Item-3(b)					

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 mm) gauge, in foundation and plinth: (b) Ratio 1: 4: 8	31.75	Cu:m	1.00	4738.15	150,446.00
10	Ch-10,Item-15(i)					
	Providing and laying topping of cement concrete 1:2:4, including surface finishing and dividing in panels:-3"Thick	211.68	Sq.m	1.00	715.25	151,404.00
11	Ch-10,Item-42					
	Providing and fixing marble strip of any shade for dividing the mosaic flooring into panels a) Size 1½" x 3/8" (40 x 10 mm)	127.01	m	1.00	21.65	2,750.00
12	Ch-9,Item-5					
	Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs. per %Sft. or 1.72 Kg/Sq.m bitumen coating sandblinded.	231.78	Sq.m	1.00	732.85	169,859.00
13	Ch-9,Item-14					
	Khassi pernalas in cement sand mortar 1:2, 12" outside width finished smooth with a floating coat of neat cement	27.0	m	1.00	338.50	9,140.00
14	Ch-9,Item-15					
	Khurra on roof 2' x 2' x 6" (600 x 600 x 150 mm)	6.000	No	1.00	499.65	2,998.00
15	Ch-9,Item-16					
	Bottom Khuras of brick masonry in cement mortar 1:6, 4'x2'x4½" (1200x600x113 mm) over 3" (75 mm) cement concrete 1:4:8.	6.000	No	1.00	887.25	5,324.00
16	Ch-25,Item-41(b-v)					
	Providing and fixing steel windows with openable glazed panels, using beam section for frame 1½"x1"x5/8"x1/8" (40x25x16x3 mm), Z-section for leaves ¾"x1"x¾"x1/8" (20x25x20x3 mm), T-section sashes 1"x1"x1/8" (25x25x3 mm), glass panes, wooden screed for glazing embedded over a thin layer of putty duly screwed with leaves, brass fittings, holdfast, duly painted, complete in all respects, including all cost of material and labour, etc. as per approved design and as directed by the Engineer-in-charge:- b) fixed with wire gauze, 22 SWG v) glass pane 5 mm thick	28.800	Sq.m	1.00	5070.80	146,039.00
17	Ch-25,Item-31					
	Making and fixing steel grated door with 1/16" thick (1.5mm) sheeting, including angle iron frame 2"x2"x3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre, with locking arrangement.	28.80	Sq.m	1.00	2360.75	67,990.00

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
18	Ch-12,Item-31					
	Providing and fixing M.S. flat ½"x1/8" (13mm x 3mm) grill including ¾" x 1/8" (20 mmx3 mm) M.S. flat frame, in windows of approved design, including painting three coats, complete in all respects.	9.68	Sq.m	1.00	11121.40	107,600.00
19	Ch-13,Item-5(c-i & ii)					
	Painting new surface: c) Preparing surface and painting of doors and windows any type (includingedges):					
	i) priming coat.	19.35	Sq.m	1.00	82.45	1,595.00
	ii) each subsequent coat of paint. (Two Coats)	38.700	Sq.m	1.00	44.30	1714.000
Sub-Total(B)						3,397,004.00
C	ChlorineRoom					
1	Chapter-7,Item 5-i					
	Pacca brick work in ground floor: i) cement, sand mortar:	25.776	Cu:m	1.00	7821.30	201,600.00
2	Chapter-6,Item6-a-iii					
	Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.): a). Reinforced cement concrete in roof slab, beams, columns, lintels, girders and other structural members laid in situ or pre-cast laid in position, or pre-stressed members cast in situ, complete in all respect, Type C (nominal mix 1:2:4)	53.797	Cu:m	1.00	6967.65	374,839.00
3	Ch-6,Item-9(b)					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- (c) Deformed bars (Grade40)	5,379.70	Kg	100	13,646.00	734,114.00
4	Chapter-1,Item-1					
	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead Up to 400 KM)	93.91	Cu:m	1.0	2090.56	196,326.00
5	Ch-11,Item-10(b)					

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, up to 20' height. b) 1:3	30.25	Sq.m	1.00	228.10	6,900.00
6	Ch-11,Item-9(b)					
	Cement plaster 1/2" thick in 1:4 up to 20 ft height	120.450	Sq.m	1.00	201.30	24,247.00
7	Ch-11,Item-25(a-iii)					
	White washing 3 coats on new surface.	150.700	Sq.m	1.00	30.75	4,634.00
8	Ch-11,Item-18(a)					
	Cement pointing 1:2 struck joints, on wall up to 20' height, i/c extra cost of labour and material for red oxide pigment in cement pointing to match with the colour of bricks (i) Ratio 1: 5	140.855	Sq.m	1.00	216.70	30,523.00
9	Ch-6,Item-3(b)					
	Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 mm) gauge, in foundation and plinth: (b) Ratio 1: 4: 8	4.54	Cu:m	1.00	4738.15	21,499.00
10	Ch-10,Item-15(i)					
	Providing and laying topping of cement concrete 1:2:4, including surface finishing and dividing in panels:-3"Thick	30.25	Sq.m	1.00	715.25	21,636.00
11	Ch-10,Item-42					
	Providing and fixing marble strip of any shade for dividing the mosaic flooring into panels a) Size 1½" x 3/8" (40 x 10 mm)	18.15	m	1.00	21.65	393.00
12	Ch-9,Item-5					
	Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs. per %Sft. or 1.72 Kg/Sq.m bitumen coating sandblinded.	229.31	Sq.m	1.00	732.85	168,053.00
13	Ch-9,Item-14					
	Khassi pernalas in cement sand mortar 1:2, 12" outside width finished smooth with a floating coat of neat cement	4.5	m	1.00	338.50	1,523.00
14	Ch-9,Item-15					
	Khurra on roof 2' x 2' x 6" (600 x 600 x 150 mm)	1	No	1.00	499.65	500.00
15	Ch-9,Item-16					
	Bottom Khuras of brick masonry in cement mortar 1:6, 4'x2'x4½" (1200x600x113 mm) over 3" (75 mm) cement concrete 1:4:8.	1.000	No	1.00	887.25	887.00
16	Ch-25,Item-41(b-v)					
	Providing and fixing steel windows with openable glazed panels, using beam section for frame 1½"x1"x5/8"x1/8" (40x25x16x3 mm), Z-section for leaves ¾"x1"x¾"x1/8" (20x25x20x3 mm), T-section sashes 1"x1"x1/8" (25x25x3 mm), glass panes, wooden screed for glazing embedded over	3.60	Sq.m	1.00	5070.80	18,255.00

2.1.8. Treated Water Tank and Pump House						
MRS, 1st BI-Annual-2019 (1st January-2019 to 30th June-2019) District Lahore						
Sr. No.	Description	Quantity		Unit	Rate	Amount(PKR)
	a thin layer of putty duly screwed with leaves, brass fittings, holdfast, duly painted, complete in all respects, including all cost of material and labour, etc. as per approved design and as directed by the Engineer-in-charge:- b) fixed with wire gauze, 22 SWG v) glass pane 5 mm thick					
17	Ch-25, Item-31					
	Making and fixing steel grated door with 1/16" thick (1.5mm) sheeting, including angle iron frame 2"x2"x3/8" (50x50x10 mm) and 3/4" (20 mm) square bars 4" (100 mm) centre to centre, with locking arrangement.	14.03	Sq.m	1.00	11121.40	155,978.00
18	Ch-13, Item-5(c-i & ii)					
	Painting new surface: c) Preparing surface and painting of doors and windows any type (including edges):					
	i) priming coat.	19.35	Sq.m	1.00	82.45	1,595.00
	ii) each subsequent coat of paint. (Two Coats)	38.700	Sq.m	1.00	44.30	1714.000
Sub-Total(C)						6,224,772.00
Total(A+B+C)						116,076,495.00
No. of Units						03
Total Cost in PKR						348,229,485.00
Rupees in Million						348.229

2.2.1 Supplying and Installation of Mechanical Equipment

Sr. No.	Description	Quoted Price in Euro (€)	Cost in PKR
1	Intake Structure & Screen Chamber	L.S	30,000,000
2	Coagulation/Flocculation and Clarifier Tanks to include the following:- HDPE and Stainless Steel piping of various sizes from 25mm to 150mm, for chemical flocculants and polymers, Laminar Filters and support system, stainless steel vacuum pipework for sludge removal, mixing blades, HDPE perforated pipes in Laminar tanks, sludge control valves, compressed air system and compressor, penstocks, aluminum handrails, traps and grills, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	2,400,000	406,872,000
3	Rapid Gravity Filtration Units to include the following:- Quartz sand 1mm particle size with min 65% silicon content, and gravel filter material 5mm particle size, air diffuser units, Air Blower system and all Stainless Steel piping for filter backwash, Motive Water Pumps and System and pipework/fittings, back wash pumps and pipework/fittings for filter backwash, Stainless Steel syphon units and gauges, penstocks, aluminum handrails, traps and grills, overhead	4,600,000	779,838,000

	cranes, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees		
4	Wash Water and Sludge Treatment to include the following:- Water recovery pumps and pipework, level switches, Sludge pumps and pipework, Penstocks, agitators, pumps and pipework lower to upper tanks, guide rails, chains, HDPE pipework for polymer, perforated HDPE pipes, sludge valves operated by compressed air, compressed air piping, non-corrosive walkways, penstocks, perforated HDPE pipe for sludge beds, aluminum stop logs for sludge beds, aluminum handrails, traps and grills, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	2,400,000	406,872,000
5	Chemical Buildings to include the following:- Lime and Aluminum Sulphate mixers, polymer mixing tank system and special pumps, and interconnecting pipework in HDPE/Stainless Steel including fittings, Lime Special Pumps and controls, Aluminum Sulphate Pumps and controls, Chlorine handling and mixing system including special pumps and controls, Chlorine safety system including vacuum suction system and neutralization tower including sensors, valves, piping, fittings, aluminum handrails, traps and grills, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,500,000	254,295,000
6	Treated Water Tank to include the following:- inlet pipe Stainless Steel, overflow Pipe Stainless steel, outlet pipe stainless steel, aluminum handrails, traps and grills, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	310,000	52,554,300
7	Exploitation, administrative and electrical buildings to include the following:- Fully equipment public health laboratory all office furniture, with facility for real time monitoring of incoming and outgoing water quality, diesel tank for Generator, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	425,000	72,050,250
8	Pumping Machinery (as per Quotation attached)		
i	Providing, Installing, testing commissioning Centrifugal pump for Raw water having Discharge of 2,040 m ³ /h against 5 m dynamic head coupled with 60.00 BHP (45 KW) 1450 RPM. Rate includes providing, installing, MCU (Motor Control Unit), Base frame, Coupling, Coupling Guard (4 working & 3 standby).		33,591,805
ii	Providing, Installing, testing commissioning Vertical turbine pump for clear water having Discharge of 2,550 m ³ /h against 60 m dynamic head with required column pipe & bowl assembly, coupled with 560 KW 993 RPM vertical A.C electric motor. Rate further includes providing, installing VFD, MCU (Motor Control Unit), Base frame, Coupling, Coupling Guard, DN400 Butterfly Valve, pump manufacturer makes, erecting clamp		374,507,320

	motor stool with all accessories complete in all respect. (7 working & 2 standby)		
9	Spare Parts , set of critical spares for 1 year for all equipment including bearings, seals, filters, lubricants installation works, 5% pipe and fittings, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	500,000	84,765,000
10	Yard Piping to include the following:- All interconnecting pipes and fittings, penstocks, valves, manholes, service trenches, for raw water, clear water, sludge, waste water, lime milk, Aluminum sulphate solution, Chlorine solution, polymer to coagulation and recovering tanks, compressed air lines, pipes from 1400mm to 25mm in stainless steel, HDPE, DI, concrete as per design requirements, Collection Pit and pumps for overflow water return to canal, aluminum access ladders, grills, covers, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,600,000	271,248,000
11	Supply of Diesel Generator Set of 1600 EKW / 2000 KVA Prime Power, 1500 RPM, 400 Volts, 3 Phase, 50 Hertz at 0.8 power factor - 03 No. @ USD 390,000/-	-	175,500,000
	Total Mechanical Works		2,942,093,675
Note			
	1 Euro = 169.53 PKR		

2.2.2 Supplying and Installation Of Electrical Equipment

Sr. No.	Description	Quoted Price in Euro (€)	Cost in PKR
1	Coagulation/Flocculation and Clarifier Tanks to include the following:- Local Distribution Panels and sub panels, all switches, control units, cables, cabling to other buildings and Main Switch Panels, conduits, cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,000,000	169,530,000
2	Rapid Gravity Filtration Units to include the following:- Local Distribution Panels and sub panels, all switches, control units, cables, cabling to other buildings and Main Switch Panels, conduits, cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,700,000	288,201,000
3	Wash Water and Sludge Treatment to include the following:- Local Distribution Panels and sub panels, all switches, control units, cables, cabling to other buildings and Main Switch Panels, conduits, cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,550,000	262,771,500
4	Chemical Buildings to include the following:- Local Distribution Panels and sub panels, all switches, control units, cables, cabling to other buildings and Main Switch Panels, conduits, cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,350,000	228,865,500

5	Exploitation, administrative and electrical buildings to include the following: Local Distribution Panels and sub panels, all switches, control units, cables, cabling to other buildings and Main Switch Panels, Backup Generator with auto start/stop, conduits, cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	5,000,000	847,650,000
6	Clear Water Pumping Station to include the following:- Local Distribution Panels and sub panels, all switches, control units, cables, cabling to other buildings and Main Switch Panels, conduits, cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	800,000	135,624,000
7	Spare Parts to include the following:- Breakers all sizes, 03% lengths of cables, conduits and cable trays, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	390,000	66,116,700
9	Yard Piping to include the following:- Collection Pit and pumps for overflow water return to canal wiring, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	260,000	44,077,800
	Total Electrical Works		2,042,836,500

2.2.3 Supplying and Installation of SCADA

Sr. No.	Description	Quoted Price in Euro (€)	Cost in PKR
1	SCADA system Server, 60" display screen, SCADA software, design and build system, pressure sensors, electromagnetic flow meters on raw water, electromagnetic flow meters for backwash filter water, electromagnetic flow meters potable water outlet, electromagnetic flow meters for recovered water from sludge, electric or air controls on inlet and outlet valves to filter tank for backwash, air wash, sludge removal, aluminum sulphate, chlorine, lime milk and polymer, start controls for all pumps (Raw Water, Clear Potable Water, Motive Water, Backwash water, sludge, agitators, Recovery Tank pumps) through level control switches both immersed and beam type, all cat 6E interconnecting cabling, all relays, switches in main switch panel and sub-panels, uninterrupted power supplies on all panels, solenoids on all valves in WTP, installation works, testing and commissioning, safety, shipping of any imported goods to site and all import taxes and fees	1,350,000	228,865,500
	Total SCADA Works	1,350,000	228,865,500

3.1	Transmission Main including Valves, Fittings etc. (HDPE Pipe - Length 3.5 km)				
Sr. No.	Description	Unit	Qty	Unit Rate Rs	Amount. Rs.
	N.S. Rate				
1	Providing and laying of Transmission Mains including laying, jointing, fittings/specials such as bends, tees, crosses whatever required at site drain crossing, drain crossing, testing shipment charges, duties, taxes, transportation to stores, transportation stores to site complete in all respects. Including provision for Specials i.e. bends, sluice valves, gate valves etc. Rate also includes the cost of excavation back filling, dismantling, restoration of roads, streets. Complete in all respect.				
	Transmission Main Including Valves, Fittings etc. (HDPE Pipe PN-10/SDR-17 / equivalent pipe-Length 3.5 K.M) as per EPC mode design.				
	a) 1500 mm i/d (Quotation attached)	m	3,500.00	183,500.00	642,250,000
	Total				642,250,000
	Rs. in Million				642.25

4.1	Feeding Main including Valves, Fittings etc. (HDPE Pipe)				
Sr. No.	Description	Unit	Qty	Unit Rate Rs/Meter	Amount. Rs.
	N.S. Rate				
1	Providing and laying of Feeding Mains including laying, jointing, fittings/specials such as bends, tees, crosses whatever required at site drain crossing, testing shipment charges, duties, taxes, transportation to stores, transportation stores to site complete in all respects. Including provision for Specials i.e. bends, sluice valves, gate valves etc. Rate also includes the cost of excavation back filling, dismantling, restoration of roads, streets. Complete in all respect.				
	Feeding Main Including Valves, Fittings etc.:(HDPE Pipe PN-10/SDR-17 / equivalent pipe-Length 3.5 K.M)as per EPC mode design.				
	a)1500 mm i/d (Quotation attached)	m	191	183,500.00	35,048,500.00
	b)1400 mm i/d.(Quotation attached)	m	3,681	143,000.00	526,383,000.00
	c)900 mm i/d .(Analysis attached)	m	6,296	94,645.68	595,889,227.00
	d)800 mm i/d.(Analysis attached)	m	5,517	77,716.48	428,761,828.00
	e)630 mm i/d.(Analysis attached)	m	7,017	51,447.44	361,006,688.83
	f)450 mm i/d.(Analysis attached)	m	32,325	23,603.96	762,997,863.00
	Total Rs.	m	55,027	Total Rs.	2,710,087,106.83
	g) Booster Pumps	No	150	150,000.00	22,500,000.00
	G Total Rs.			Total Rs.	2,732,587,106.83
			Rs. in Million.		2,732.59

5.1		Distribution Network including Valves, Fittings etc.																
Sr. No	Description													Unit	Qty	Unit Rate Rs	Amount. Rs.	
	N.S. Rate																	
1	Providing and laying of Distribution Network including laying, jointing, fittings/specials such as bends, tees ,crosses whatever required at site drain crossing, testingshipment charges, duties, taxes, transportation to stores, transportation stores to site complete in all respects. Including provision for Specials i.e. bends, sluice valves, gate valves etc. Rate also includes the cost of excavation back filling, dismantling, restoration of roads, streets. Complete in all respect.																	
	Distribution System Including Valves, Fittings etc.:(HDPE Pipe PN-10/SDR-17 / equivalent pipe-as per EPC mode design)																	
	a)800 mm i/d.(Analysis attached)												m	826	77,716.48	64,193,813.65		
	b)630 mm i/d.(Analysis attached)												m	790	51,447.44	40,643,477.86		
		MRS. Ch:04 It:45																
2		Dismantling and removing road metaling.																
	a	18"i/d	450	mm	=	2,256.00	x	1.10	x	0.25	x	90%	=	Cu:m	558.36		-	
	b	12"i/d	315	mm	=	9,344.00	x	0.90	x	0.25	x	90%	=	Cu:m	1,892.16		-	
	c	10"i/d	250	mm	=	5,032.00	x	0.90	x	0.25	x	90%	=	Cu:m	1,018.98		-	
	d	8" i/d	200	mm	=	5,922.00	x	0.80	x	0.25	x	80%	=	Cu:m	947.52		-	
	e	6" i/d	160	mm	=	4,349.00	x	0.70	x	0.25	x	80%	=	Cu:m	608.86		-	
	f	4" i/d	110	mm	=	41,807.00	x	0.60	x	0.25	x	30%	=	Cu:m	1,881.32		-	
	g	3"i/d	90	mm	=	11,417.00	x	0.60	x	0.25	x	30%	=	Cu:m	513.77		-	
								Total					=	Cu:m	7,420.96	442.35	3,282,662.00	

3	MRS.Ch:04 It:19-d																
	Dismantling cement concrete with brick aggregate.																
	a	18"i/d	450	mm	=	2,256.00	x	1.10	x	0.15	x	10%	=	Cu:m	37.22		-
	b	12"i/d	315	mm	=	9,344.00	x	0.90	x	0.15	x	10%	=	Cu:m	126.14		-
	c	10"i/d	250	mm	=	5,032.00	x	0.90	x	0.15	x	10%	=	Cu:m	67.93		-
	d	8" i/d	200	mm	=	5,922.00	x	0.80	x	0.15	x	20%	=	Cu:m	142.13		-
	e	6" i/d	160	mm	=	4,349.00	x	0.70	x	0.15	x	20%	=	Cu:m	91.33		-
	f	4" i/d	110	mm	=	41,807.00	x	0.60	x	0.15	x	70%	=	Cu:m	2,633.84		-
	g	3"i/d	90	mm	=	11,417.00	x	0.60	x	0.15	x	70%	=	Cu:m	719.27		-
	Total																
													=	Cu:m	3,817.87	663.50	2,533,156.00
MRS Ch:04 It:19-c																	
4	Dismantling cement concrete 1:2:4 plain.																
	Quantity same as per item No .																
					=	3							=	Cu:m	3,817.87	2,432.95	9,288,684.00
MRS Ch:04 It:19-c																	
5	Excavation of trenches in all kinds of soil, except cutting rock, for water supply pipelines up to 5 ft. (1.5 m) depth from ground level, including trimming, dressing sides, leveling the beds of trenches to correct grade and cutting pits for joints, etc. complete in all respects.																
	a	18"i/d	450	mm	=	2,256.00	x	1.10	x	1.50			=	Cu:m	3,722.40		-
	b	12"i/d	315	mm	=	9,344.00	x	0.90	x	1.40			=	Cu:m	11,773.44		-
	c	10"i/d	250	mm	=	5,032.00	x	0.90	x	1.30			=	Cu:m	5,887.44		-
	d	8" i/d	200	mm	=	5,922.00	x	0.80		1.30			=	Cu:m	6,158.88		-

	e	6" i/d	160	mm	=	4,349.00	x	0.70		1.20			=	Cu:m	3,653.16		-
	f	4" i/d	110	mm	=	41,807.00	x	0.60		1.20			=	Cu:m	30,101.04		-
	g	3" i/d	90	mm	=	11,417.00	x	0.60		1.20			=	Cu:m	8,220.24		-
								Total					=	Cu:m	69,516.60	166.35	11,564,086.00
		N.S. Rate															
6		Providing and laying of Distribution Network (HDPE pipe - Class PN-10/SDR-17 - PE-100 (BLACK) FOR WATER ISO4427/DIN 8074/8075) including laying, jointing, fitting, drain crossing, testing, shipment charges, duties, taxes, transportation to stores, transportation stores to site complete in all respects. (Analysis attached)															
	a	18" i/d	450	mm	=									m	2,256.00	17,679	39,884,288.00
7		MRS Ch:23 It:42-b															
		Providing, laying, cutting, jointing, testing and disinfecting High Density Polyethylene Pipe (HDPE-100) working pressure pipe in trenches. complete in all respects:-															
		PN-10(SDR-17)															
	b	12" i/d	315	mm	=									m	9,344.00	6,146.60	57,433,830.00
	c	10" i/d	250	mm	=									m	5,032.00	3,846.30	19,354,582.00
	d	8" i/d	200	mm	=									m	5,922.00	2,443.50	14,470,407.00
	e	6" i/d	160	mm	=									m	4,349.00	1,568.10	6,819,667.00
	f	4" i/d	110	mm	=									m	41,807.00	761.30	31,827,669.00
	g	3" i/d	90	mm	=									m	11,417.00	508.75	5,808,399.00
		N.S. Rate															
8		Provision made for HDPE specials such as tees, bends, reducers, crosses, C.I valves and all others required at site .															

		Take 20% of Item No .				=	6	+	7			=	%	135,714,554	20%	27,142,910.80
	MRS Ch:21 It:12-a	MRS Ch:07 It:30														
9		Supplying and filling sand under floor; or plugging in wells.														
	a	18"i/d	450	mm	=	2,256.00	x	1.10	x	0.75			=	Cu:m	1,873.02	-
	b	12"i/d	315	mm	=	9,344.00	x	0.90	x	0.62			=	Cu:m	5,212.02	-
	c	10"i/d	250	mm	=	5,032.00	x	0.90	x	0.55			=	Cu:m	2,512.46	-
	d	8"i/d	200	mm	=	5,922.00	x	0.80	x	0.50			=	Cu:m	2,391.42	-
	e	6"i/d	160	mm	=	4,349.00	x	0.80	x	0.46			=	Cu:m	1,617.05	-
	f	4"i/d	110	mm	=	41,807.00	x	0.70	x	0.41			=	Cu:m	12,138.49	-
	g	3"i/d	90	mm	=	11,417.00	x	0.70	x	0.39			=	Cu:m	3,155.05	-
								Total					=	Cu:m	28,899.50	
		Deduct volume of pipe														
	a	18"i/d	450	mm	=	2,256.00	x	0.45	x	0.45	x	0.785	=	Cu:m	358.58	-
	b	12"i/d	315	mm	=	9,344.00	x	0.31	x	0.31	x	1.785	=	Cu:m	1,654.82	-
	c	10"i/d	250	mm	=	5,032.00	x	0.25	x	0.25	x	2.785	=	Cu:m	875.80	-
	d	8"i/d	200	mm	=	5,922.00	x	0.20	x	0.20	x	3.785	=	Cu:m	896.50	-
	e	6"i/d	160	mm	=	4,349.00	x	0.16	x	0.16	x	4.785	=	Cu:m	532.68	-
	f	4"i/d	110	mm	=	41,807.00	x	0.11	x	0.11	x	5.785	=	Cu:m	2,926.14	-

	g	3"i/d	90	mm	=	11,417.00	x	0.09	x	0.09	x	6.785	=	Cu:m	627.40		-
								Total					=	Cu:m	7,871.93		
		Net Qty of sand			=	28,899.50	-	7871.93					=	Cu:m	21,027.58	643.15	13,523,888.00
		MRS Ch:03 It:13-b															
10		Rehandling of earthwork: b) Up to a lead of 50 ft. (15 m).															
		Take 80% of Item No .					=	5	=	55,613.28			=	Cu:m	55,613.28	77.40	4,304,467.87
		MRS Ch:03 It:24-c															
11		Compaction of earthwork (soft, ordinary or hard soil) :-c) Ramming earthwork (all types of soil).															
		Quantity same as per item No .					=	10					=	Cu:m	55,613.28	33.20	1,846,361.00
	MRS Ch:21 It:12-a	MRS Ch:21 It:12-a															
12		Restoration of metaled road, on laid service line, including compaction:-a) Carpeted road, with 2" (50 mm) carpet and 10" (250 mm) depth of stone metal for sub-base and base.															
	a	18"i/d	450	mm	=	2,256.00	x	1.0	x	90%			=	Sq:m	2,030.40		-
	b	12"i/d	315	mm	=	9,344.00	x	0.90	x	90%			=	Sq:m	7,568.64		-
	c	10"i/d	250	mm	=	5,887.44	x	0.80	x	90%			=	Sq:m	4,238.96		-
	d	8" i/d	200	mm	=	6,158.88	x	0.8	x	80%			=	Sq:m	3,695.33		-
	e	6" i/d	160	mm	=	4,349.00	x	0.8	x	80%			=	Sq:m	2,609.40		-
	f	4" i/d	110	mm	=	41,807.00	x	0.60	x	30%			=	Sq:m	7,525.26		-
	g	3"i/d	90	mm	=	11,417.00	x	0.60	x	30%			=	Sq:m	2,055.06		-

								Total			=	Sq:m	29,723.04	976.50	29,024,553.00
13		MRS Ch:06 It:3-d													
		Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 m) gauge, in foundation and plinth:- (a) Ratio 1: 6: 12													
		Quantity same as per item No .				=	3				=	Cu:m	3,817.87	4,020.15	15,348,406.00
		MRS Ch:06 It:5-f													
14		Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):1:2:4													
		Quantity same as per item No .				=	4				=	Cu:m	3,817.87	7,964.85	30,408,754.00
		MRS Ch:06 It:6-a-ii													
15		Providing and laying reinforced cement concrete (including pre-stressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc. and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:- (3) Type C (nominal mix 1: 2: 4)													
		RCC thrust blocks.													
	a	18"i/d	450	mm	=	2,256.00	/	300	=	8.0	No				
		8.0	x	3.00	x	1.00	x	1	=	Cu:m		24.0			
	b	12"i/d	315	mm	=	5,032.00	/	200	=	25.0	No				
		25.0	x	3.00	x	1.00	x	1		Cu:m		75.0			
	c	10"i/d	250	mm	=	5,032.00	/	200	=	25.0	No				
		25.0	x	3.00	x	1.00	x	1		Cu:m		75.0			
	d	8"i/d	200	mm	=	5,922.00	/	200	=	30.0	No				
		30.0	x	3.00	x	1.00	x	1		Cu:m		90.0			
	e	6"i/d	160	mm	=	4,349.00	/	200	=	22.0	No				
		22.0	x	3.00	x	1.00	x	1		Cu:m		66.0			
	f	4"i/d	110	mm	=	41,807.00	/	200	=	209.0	No				
		209.0	x	3.00	x	1.00	x	1		Cu:m		627.0			
	g	3"i/d	90	mm	=	11,417.00	/	200	=	57.0	No				
		57.0	x	3.00	x	1.00	x	1		Cu:m		171.0			

						Total			=		Cu:m	1128.0	1128.0	9,324.50	10,518,036
16		Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- (b) Deformed bars (Grade-40).													
		Qty. RCC as per item No					=	15	=		Cu:m	1128.0			
		1128.0	x	175.0	/	2.204				Kg	=	89564	89564	131.26	11,756,496
	MRS Ch:01 It:01	MRS Ch:01 It:01													
17		Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor.(Lead up to 400 KM From Margalla Quarry At Taxila)													
		PCC 1:2:4 as per item No.					=	14	=		3,817.87	=	Cu:m		
		RCC 1:2:4 as per item No.					=	15	=		1,128.00	=	Cu:m		
						Total			=		4,945.87	=	Cu:m		
		Quantity of Bajri=				=	4,945.87	x	154	x	4		Cu:m	4,352.36	2,091.55
								7	x	100					9,103,188.00
		MRSCh:03It:17-a,b,c													
18		Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m) a) up to ¼ mile (400 m). b) for every 330 ft. (100 m) additional lead or part thereof, beyond ¼ mile (400 m) up to one mile. (1.6 Km.) c) for every ¼ mile (400 m) additional lead or part thereof, beyond one mile (1.6 Km.) up to 5 mile (8 Km).d) for every ½ mile (800 m) additional lead													
		Quantity same as per item No .					=	3				=	Cu:m	3,817.87	
		Quantity same as per item No .					=	4				=	Cu:m	3,817.87	
		Quantity as per item No .					=	5	=		69,516.60	=			
		Dead volume of pipe as per item No .					=	9	=		7,871.93				
		Dead volume of sand as per item No .					=	9	=		21,027.58				

						Net Total	=		=	40,617.10		Cu:m	40,617.10		
		Take 80% of above.					=	-	=	32,493.68	=	Cu:m	48,252.83	215.05	10,376,772.00
		Total Rs.													470,458,554.19
		Say Rs.													470.460

5.3 Domestic & Commercial Water Meters and Water Flow Meters

Sr. No.	Description	Unit	Qty	Unit Rate Rs	Amount. Rs.
1	Provide, install, test, disinfect & commission of Domestic Water Meters (Multi jet / Volumetric Rotary Piston type /Notating disc) size 15mm with all fittings. Accuracy Class-II and flow rate Q3/Q1 = 160 as per ISO 4064:2014 / OIML R49:2013 standard	No.	110,106	9,100.00	1,001,964,600
2	Provide, install, test, disinfect & commission of Commercial Water Meters (Multi jet / Volumetric Rotary Piston type /Notating disc) size 20 to 25 mm with all fittings. Accuracy Class-II and flow rate Q3/Q1 = 160 as per ISO 4064:2014 / OIML R49:2013 standard	No.	4,059	13,700.00	55,608,300
3	Provide, install, test, disinfect & commission Water Magnetic Flow Meters with all fittings.				
	a) 1400 mm	Set	2	8,895,000.00	17,790,000
	b) 1200 mm	Set	6	6,872,000.00	41,232,000
	c) 900 mm	Set	5	4,186,000.00	20,930,000
	d) 800 mm	Set	19	3,890,000.00	73,910,000
	e) 600 mm	Set	16	1,654,000.00	26,464,000
	f) 450 mm	Set	91	1,254,000.00	114,114,000.00
	Total				1,352,012,900
	Rs. in Million				1,352.010

6.5 General Items with Allied Works

Sr. No.	Description	Unit	Qty.	Rate	Amount
1	Providing and fixing G.I. pipe railing, as per standard drawing.	m	18,180.00	3031.70	44,497,368
2	Plain GI sheet iron spouts fixed in position, including painting.	Each	24,240.00	392.75	9,520,260
3	Sign Boards	L.S	200.00	30,000.00	6,000,000
	Total				60,017,628
	Rs. in Million				60.02

Annexure-C

SUMMARY OF POPULATION PROJECTIONS

Annexure - C

Summary of population projections is given below:

Phases	Sr. No	Year	2017	2020	2025	2030	2035	2040
		Growth Rate		2.83	2.75	2.68	2.61	2.54
		Sub Division	Population 2017	Projected Population 2020	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040
Phase I	1	Shadipura	223384	242891	278177	317350	360807	408818
	2	Baghbanpura	357875	389127	445656	508414	578036	654952
	3	Mustafabad	100196	108946	124773	142343	161835	183370
	4	Fateh Garh	388415	422333	483687	551801	627364	710844
								1957984
Phase II	5	Shadbagh	304935	331564	379731	433205	492528	558066
	15	Datanagar	228822	248804	284949	325076	369591	418770
	14	Gujjar pura	210765	229170	262462	299423	340425	385724
								1362560
Phase III	9	Anarkali	144834	157482	180360	205758	233934	265063
	17	City	226342	246107	281860	321552	365585	414232
	18	Ravi Road	97968	106523	121998	139178	158237	179293
	19	Krishan Nagar	318814	346655	397014	452922	514945	583466
	8	Shimla Hill	98759	107383	122983	140302	159514	180740
								1622793
Phase IV	6	Mirsi Shah	105497	114710	131374	149874	170398	193072
	10	Tajpura	247908	269557	308716	352190	400418	453700
	11	Mugalpura	134553	146303	167557	191152	217328	246247
								893019
Phase V	7	Gulberg	152099	165381	189407	216079	245669	278358
	12	Ichra	211410	229871	263266	300339	341467	386904
	13	Mozang	183899	199958	229007	261256	297032	336556
	20	Gulshan-e- Ravi	185091	201254	230491	262949	298957	338738
	16	Samanabad	153775	167203	191494	218460	248376	281426
								1621982
LWP	34	Dholanwal	48533	52771	60437	68948	78390	88821
	21	Allama iqbal town	83614	90916	104123	118786	135052	153023
	22	Farrukhabad	103031	112028	128303	146371	166415	188558
	23	Green town	288747	313962	359572	410208	466381	528440
	24	Industrial area	333305	362411	415060	473509	538350	609986
	25	Garden Town	100921	97421	109734	125675	143933	164842
	26	Johar town	266008	289237	331256	377904	429653	486825
	27	Mustafa town	399736	434643	497785	567884	645649	731562
	28	Sabzazar	250483	272357	311923	355848	404577	458412
	29	Shahdara	212942	231537	265173	302516	343942	389708
	30	Township	140069	152301	174426	198989	226238	256342
	31	Jublee town	263650	286673	328319	374554	425845	482509
	32	LDA Avenue-I	287980	313128	358617	409118	465142	527036
	33	Farrukhabad	35681	38797	44433	50690	57632	65300
								5131366

Phases	Sr. No	Year	2017	2020	2025	2030	2035	2040
		Growth Rate		2.83	2.75	2.68	2.61	2.54
		Sub Division	Population 2017	Projected Population 2020	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040
Rural and Non-WASA	35	Barki	188711	185711	205190	234999	268092	304804
	36	Bhaseen	140443	137443	152707	174892	199520	226842
	37	Chung	205538	202538	223487	255953	291997	331983
	38	Halloke	123265	120265	134029	153500	175116	199096
	39	Hundiara	220462	217462	239714	274538	313199	356088
	40	Jia Bagga	60962	57962	66286	75915	86606	98465
	41	Kamahan	1230126	1227126	1337547	1531857	1747576	1986886
	42	Manga	106535	103535	115838	132666	151349	172074
	43	Niaz Baig	11630	8630	12646	14483	16522	18785
	44	Riwind	164142	161142	178476	204404	233188	265120
	45	Industrial NW	25870	22870	28129	32216	36752	41785
	46	Johar Town NW	95411	92411	103743	118814	135545	154107
	47	Garden Town NW	13727	10727	14926	17094	19501	22172
	48	Ichra NW	7143	4143	7767	8895	10148	11537
	49	Mustafa Town NW	7825	4825	8508	9744	11117	12639
	50	Gulshan-e-ravi NW	95271	92271	103591	118640	135347	153881
	51	Krishna Nagar NW	29614	26614	32200	36878	42071	47832
	52	Ravi Road NW	18550	15550	20170	23100	26353	29962
	53	Kasur Pura NW	50587	47587	55005	62995	71866	81708
	54	City NW	4096	1096	4454	5101	5819	6616
	55	Gujar pura NW	27118	24118	29486	33770	38525	43801
	56	Baghbanpura NW	3906	906	4247	4864	5549	6309
	57	Darrogawala NW	20005	17005	21752	24912	28420	32312
	58	Muslimabad NW	17792	14792	19346	22156	25276	28737
	59	Salamat Pura NW	57431	54431	62446	71518	81589	92762
	60	Fateh Garh Nw	36072	33072	39222	44920	51246	58263
	61	Shadra-NW	36500	30000	39687	45453	52056	59618
	62	Kahna	114860	124890	143033	163176	185521	210207
	63	Cantt,DHA,RA Bazar	1087838	1084338	1182834	1354668	1551465	1776852
	64	Model Town	34980	31480	38035	43560	49888	57136
								6888376

ANNEXURE - D

Punjab Environmental Quality Standards (PEQS)

ANNEXURE - D (1)

Punjab Environmental Quality Standards for Municipal and Liquid Industrial Effluents

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532



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**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(120 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Municipal and Liquid Industrial Effluents is published for general information:

DR SYED ABUL HASSAN NAJME

Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Government of the Punjab
Environment Protection Department

NOTIFICATION: No. SO(G)/EPD/7-26/2013. - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Municipal and Liquid Industrial Effluents.

Punjab Environmental Quality Standards for Municipal and Liquid Industrial Effluents (mg/l, unless otherwise defined)

No	Parameter	Into Inland Waters	Into Sewage Treatment
1	2	3	4
1	Temperature or Temperature Increase *	$\leq 3^{\circ}\text{C}$	$\leq 3^{\circ}\text{C}$
2	pH value (H^{+})	6-9	6-9
3	Biochemical Oxygen Demand (BOD_5) at 20°C ⁽¹⁾	80	250
4	Chemical Oxygen Demand (COD) ⁽¹⁾	150	400
5	Total suspended solids (TSS)	200	400
6	Total dissolved solids (TDS)	3500	3500
7	Grease and Oil	10	10
8	Phenolic compounds (as phenol)	0.1	0.3
9	Chloride (as Cl^{-})	1000	1000
10	Fluoride (as F^{-})	10	10
11	Cyanide (as CN^{-}) total	1.0	1.0
12	An-ionic detergents (as MBAs) ⁽²⁾	20	20
13	Sulfate (SO_4^{2-})	600	1000

No	Parameter	Into Inland Waters	Into Sewage Treatment
1	2	3	4
14	Sulfide (S^{2-})	1.0	1.0
15	Ammonia (NH_3)	40	40
16	Pesticides ⁽³⁾	0.15	0.15
17	Cadmium (Cd) ⁽⁴⁾	0.1	0.1
18	Chromium (trivalent and hexavalent) ^{(4) (1)}	1.0	1.0
19	Copper (Cu) ⁽⁴⁾	1.0	1.0
20	Lead (Pb) ⁽⁴⁾	0.5	0.5
21	Mercury (Hg) ⁽⁴⁾	0.01	0.01
22	Selenium (Se) ⁽⁴⁾	0.5	0.5
23	Nickel (Ni) ⁽⁴⁾	1.0	1.0
24	Silver (Ag) ⁽⁴⁾	1.0	1.0
25	Total Toxic metals	2.0	2.0
26	Zinc (Zn)	5.0	5.0
27	Arsenic (As) ⁽⁴⁾	1.0	1.0
28	Barium (Ba) ⁽⁴⁾	1.5	1.5
29	Iron (Fe)	8.0	8.0
30	Manganese (Mn)	1.5	1.5
31	Boron (B) ⁽⁴⁾	6.0	6.0
32	Chlorine (Cl_2)	1.0	1.0

Explanations:

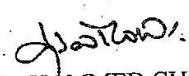
1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Provincial Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.
2. Methylene Blue Active Substances; assuming surfactant as biodegradable.

3. Pesticides include herbicides, fungicides and insecticides.
4. Subject to total toxic metals, discharge should not exceed level given at S.N. 25.
5. Applicable only when and where sewage treatment is operational and $BOD_5=80$ mg/l is achieved by the sewage treatment system.

* The effluent should not result in temperature increase of more than 30°C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.

** The value for industry is 200 mg/l.

- Note:
1. Dilution of liquid effluents to meet to the PEQS limiting value is not permissible through fresh water mixing with the effluent before discharging into the environment.
 2. The concentration of pollutants in water being used will be subtracted from the effluent for calculating the PEQS limits.


(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

ANNEXURE - D (2)

Punjab Environmental Quality Standards for Motor Vehicles Exhaust and Noise

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532



The Punjab Gazette

PUBLISHED BY AUTHORITY

LAHORE MONDAY AUGUST 15, 2016

**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(123 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for motor vehicle exhaust and noise is published for general information:

DR SYED ABUL HASSAN NAJMEE

Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013. - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for motor vehicle exhaust and noise:

**Punjab Environmental Quality Standards for Motor Vehicle
Exhaust and Noise**

(i) For In-use Vehicles

No	Parameter	Standards (maximum permissible limit)	Measuring methods	Applicability
1	2	3	4	5
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode	To be compared with Ringlemann Chart at a distance of 6 meters or more	Immediate effect
2	Carbon Monoxide	6%	Under idling conditions: Non dispersive infrared detection through gas analyzer	
3	Noise	85 dB(A)	Sound-meter at 7.5 meter from the source	

(ii) For New Vehicles

EMISSION STANDARDS FOR DIESEL VEHICLES

(a) For Passenger Cars and Light Commercial Vehicles (g/km)

Type of Vehicle	Category/Class	Tiers	CO	HC+ NOx	PM	Measuring method	Applicability
1	2	3	4	5	6	7	8

Passenger Cars	M1: with reference mass (RW) upto 2500 kg	Pak-II, IDI	1.0	0.7	0.08		All imported and locally manufactured diesel vehicles with effect from 01-07-2012
	Cars with RW over 2500 kg to meet NI category standards	Pak-II, DI	1.0	0.9	0.10	NEDC (ECE 15+EUDCL)	
Light Commercial Vehicles	NI-I(RW<1250kg)	Pak-II, IDI	1.0	0.70	0.08		
		Pak-II, DI	1.0	0.90	0.10		
	NI-II(1250kg<RW<1700kg)	Pak-II, IDI	1.25	1.0	0.12		
		Pak-II, DI	1.25	1.3	0.14		
	NI-III(RW>1700kg)	Pak-II, IDI	1.50	1.2	0.17		
		Pak-II, DI	1.50	1.6	0.20		

Parameters Standards (maximum permissible limit)	Measuring method
85 dB(A)	Sound-meter at 7.5 meters from the source

(b) For Heavy Duty Diesel Engine and Large Goods Vehicles (g/KWh)

Type of Vehicle	Category/ Class	Tiers	CO	HC	NOx	PM	Measuring method	Applicability
1	2	3	4	5	6	7	8	9
Heavy Duty Diesel Engine	Trucks & Buses	Pak-II	4.0	1.1	7.0	0.15	ECE-R-49	All imported and locally manufactured diesel vehicles with effect from 01-07-2012
Large Goods Vehicle	N2(2000 and up)	Pak-II	4.0	7.0	1.1	0.15	EDC	

es								
Parameters	Standards (maximum permissible limit)							Measuring methods
Noise	85 dB(A)							Sound-meter at 7.5 meters from the source

EMISSION STANDARDS FOR PETROL VEHICLES (g/km)

Type of Vehicle	Category/Class	Tiers	CO	HC+ NOx	Measuring method	Applicability
1	2	3	4	5	6	7
Passenger Cars	M1: with reference mass (RW) upto 2500kg. Cars with RW over 2500kg to meet NI category standards	Pak-II	2.20	0.5	NEDC(EC E15+EUDC L)	All imported and new models * locally manufactured petrol vehicles with effect from 01-07-2009**
Light Commercial Vehicles	N1-I(RW<1250kg)	Pak-II	2.20	0.5		
	N1-II(1250kg> RW<1700kg)	Pak-II	4.0	0.65		
	N1-III(RW>1700kg)	Pak-II	5.0	0.08		
Motor Rickshaws & Motor Cycles	2,4 strokes<150cc	Pak-II	5.5	1.5	ECER 40	
	2,4 strokes>150cc	Pak-II	5.5	1.3		

Parameters	Standards (maximum permissible limit)	Measuring method
Noise	85 dB(A)	Sound-meter at 7.5 meters from the source

Explanations:

DI: Direct Injection

IDI: Indirect Injection

EUDCI: Extra Urban Driving Cycle

NEDC: New European Driving Cycle

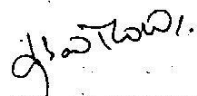
ECE: Urban Driving Cycle

M: Vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat.

N: Motor vehicles with at least four wheels designed and constructed for the carriage of goods

* Now Model means both model and design type change

** The existing Model of petrol driven vehicles locally manufactured with immediately switched over to Pak-II emission standards but not later than 30th June 2012


(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

ANNEXURE - D (3)

Punjab Environmental Quality Standards for Ambient Air

EXTRA ORDINARY ISSUE

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LAHORE MONDAY AUGUST 15, 2016

**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(122 of 2016)**

12th August 2016.

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Ambient Air is published for general information:

DR SYED ABUL HASSAN NAJMEE

Secretary

Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/7-26/2013. - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Ambient Air:

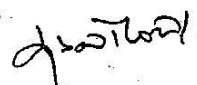
Punjab Environmental Quality Standards for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
Sulfur Dioxide (SO ₂)	Annual Average*	80 µg/m ³	Ultraviolet Fluorescence method
	24 hours**	120 µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	40 µg/m ³	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	80 µg/m ³	
Ozone (O ₃)	1 hour	130µg/m ³	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360µg/m ³	High Volume Sampling, (Average flow rate not less than 1.1 m ³ /min).
	24 hours**	500µg/m ³	
Respirable Particulate Matter PM ₁₀	Annual Average*	120µg/m ³	Preferably β-Ray absorption method
	24 hours**	150µg/m ³	
Respirable Particulate Matter PM _{2.5}	Annual Average*	15µg/m ³	Preferably β-Ray absorption method
	24 hours**	35µg/m ³	

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
	1 hour	15 $\mu\text{g}/\text{m}^3$	
Lead (Pb)	Annual Average*	1 $\mu\text{g}/\text{m}^3$	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 $\mu\text{g}/\text{m}^3$	
Carbon Monoxide (CO)	8 hours**	5 mg/m^3	Non Dispersive Infra Red (NDIR) method
	1 hour	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.


(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

ANNEXURE - D (4)

Punjab Environmental Quality Standards for Noise

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532



The Punjab Gazette

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LAHORE MONDAY AUGUST 15, 2016

**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(121 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Noise is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/ 7-26/2013. In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Noise:

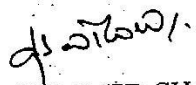
Punjab Environment Quality Standards for Noise

Punjab Environment Protection Act, 2002					
No.	Category of Area/Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2013	
		Limits in dB(A) Leq*			
		Day Time	Night Time	Day Time	Night Time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Day time hours; 6:00am to 10:00pm.
2. Night Time hours; 10:00 pm to 6:00 am.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospital, educational institutions and courts
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority

* dB(A) Leq: Time weighted average of the level of sound in decibel on scale A which is relatable to human hearing.


 (IQBAL MOHAMMED CHAUHAN)
 Secretary, Government of the Punjab
 Environment Protection Department

ANNEXURE - D (5)

Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-Medical Waste

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**GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION
(119 of 2016)**

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-medical Waste by Incineration, Autoclaving, Microwaving, and Deep Burial is published for general information:

DR SYED ABUL HASSAN NAJME

Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

**Government of the Punjab
Environment Protection Department**

NOTIFICATION: No. SO(G)/EPD/ 7-26/2013: In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-medical Waste by Incineration, Autoclaving, Microwaving, and Deep Burial.

All bio-medical waste incinerators shall meet the following operating and emission standards:

A. Operating Standards:

1. Combustion Efficiency, computed as given below, shall be at least 99.0%:

$$\text{Combustion Efficiency} = \frac{\% \text{CO}_2}{\% \text{CO}_2 + \% \text{CO}} \times 100$$

2. Minimum temperature of the primary chamber shall be 800°C.
3. The gas residence time in secondary chamber shall be at least 1 (one) second at the temperature of 1200 ± 50°C with at least 3% oxygen in the stack emissions.

B. Emission Standards:

No.	Parameter	Standard	
1.	2.	3.	4.
		Limiting concentration in mg/NM ³ unless stated	Sampling Duration in minutes, unless stated
1.	Particulate matter	50	30 or 1NM ³ of sample volume, whichever is more
2.	Nitrogen Oxides expressed as NO ₂	400	30 for online sampling or grab sample
3.	HCl	50	30 or 1 NM ³ of sample volume, whichever is more

No.	Parameter	Standard	
		3.	4.
4.	Total Dioxins and Furans	0.1 ng TEQ/N ³ (at 11% O ₂)	8 hours or 5NM ³ of sample volume, whichever is more
5.	Hg and its compounds	0.05	2 hours or 1NM ³ of sample volume, whichever is more

Note:

- (a) Air pollution control devices shall be installed or retrofitted with the incinerator to achieve the above given emission standards. All existing incinerators shall comply with these standards within a period of 2 years from the date of this notification.
- (b) Secondary combustion chambers and pollution control devices of existing incinerators shall be suitably retrofitted, if necessary, to achieve these standards.
- (c) Chlorinated plastics shall not be incinerated and the wastes incinerated shall also not be chemically treated with any chlorinated disinfectant.
- (d) Ash from incineration of biomedical waste shall be disposed of at a Hazardous Waste Treatment and Disposal Facility. However, it may be disposed of in municipal landfill, if the toxic metals in incineration ash are within the regulatory quantities as defined under the Hazardous Waste or as revised from time to time.
- (e) Only low Sulphur fuel such as Light Diesel Oil, CNG, or LPG shall be used as fuel in the incinerator.
- (f) Stack gaseous emissions shall be monitored under maximum capacity of the incinerator once in three months through a laboratory approved under the Punjab Environmental Protection Act, 1997 and record of such analysis results shall be maintained and submitted to EPA Punjab. For dioxins and furans, monitoring shall be done once in a year.
- (g) Continuous emission monitoring system for the CO, CO₂, and O₂ parameters shall be installed in stack and its data shall be transmitted in real time to the servers at EPA Punjab.
- (j) The monitored values shall be corrected to 11% Oxygen on dry basis.
- (k) In addition to complying with temperature and residence time standards, incinerators (combustion chambers) shall be operated with such temperature, retention time and turbulence, as to achieve Total Organic

Carbon (TOC) content in the slag and bottom ashes less than 3% or their loss on ignition shall be less than 5% of the dry weight.

- (l) Combustion gas analyzers shall be used to measure CO₂, CO and O₂.

DEEP BURIAL

1. A pit or trench shall be dug about 2 meters deep. It shall be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.
2. It shall be ensured that animals do not have any access to burial sites. Covers of galvanized iron/wire meshes may be used.
3. Burial shall be performed under close and dedicated supervision.
4. The deep burial site shall be relatively impermeable and no shallow well should be close to the site.
5. The pits shall be away from habitation, and sited so as to ensure that no contamination of any surface water or ground water occurs. The area should not be prone to flooding or erosion.
6. The location of the deep burial site shall be authorized by EPA Punjab.
7. A record of all pits for deep burial shall be maintained.

AUTOCLAVING

Dedicated autoclave shall be used for disinfecting and treating bio-medical waste.

1. In a gravity flow autoclave, medical waste shall be subjected to:
 - (i) a temperature of not less than 125°C at 15 pounds per square inch (psi) with a residence time of not less than 60 minutes; or
 - (ii) a temperature of not less than 135 °C and a pressure of 30 psi with an autoclave residence time of not less than 45 minutes; or
 - (iii) a temperature of not less than 150 °C and a pressure of 50 psi with an autoclave residence time of not less than 30 minutes.
2. In a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. Waste shall be treated at:
 - (i) a temperature of not less than 125 °C and pressure of 15 psi with a autoclave residence time of not less than 45 minutes. or
 - (ii) a temperature of not less than 135 °C and a pressure of 35 psi with an autoclave residence time of not less than 30 minutes.
3. Medical waste shall be deemed treated if all parameter (residence time, temperature and pressure) indicators indicate that their required values

were reached during the autoclaving process. If for any reasons, either of the parameter (residence time, temperature or pressure) was not reached, the entire batch of waste shall be autoclaved again until all the required parameters (temperature, pressure and residence time) are achieved.

4. For recording of operational parameters, each autoclave shall have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of day, load identification number and operating parameters throughout the entire length of the autoclave cycle.
5. The autoclave should completely and consistently kill the approved biological indicator at its maximum design capacity. Biological indicator for autoclave shall be *Bacillus stearothermophilus* spores using vials or spore strips with at least 1×10^4 spores per milliliter.
6. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 125°C or a pressure less than 15 psi.
7. A chemical indicator strip/tape that changes color when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

STANDARDS OF MICROWAVING

1. Microwave treatment shall not be used for cytotoxic or radioactive wastes, contaminated animal carcasses, body parts, and large metal items.
2. The microwave system shall comply with the efficacy test/routine tests and a performance guarantee provided by the manufacturer/supplier.
3. The microwave should completely and consistently kill the bacteria and other pathogenic organisms that is ensured by approved biological indicator at its maximum design capacity. Biological indicators for microwave shall be *Bacillus Subtilis* spores using vials or spore strips with at least 1×10^1 spores per milliliter.

LIQUID WASTE

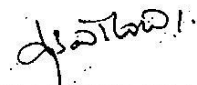
The effluent generated from a hospital should conform to the following limits:

PARAMETERS	PERMISSIBLE LIMITS
pH	6.3-9.0

Suspended solids	100 mg/l
Oil and grease	10 mg/l
BOD ₅	30 mg/l
COD	250 mg/l
Bio-assay test	90% survival of fish after 96 hours in 100% effluent.

These limits are applicable to the hospitals, which are either connected to sewers without terminal sewage treatment plant or not connected to public sewers.

For discharge into public sewers with terminal treatment facilities, the general standards as notified under the Punjab Environmental Protection Act, 1997 shall be applicable.


(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

Annexure-E

Gap Analysis and Requirements for Statutory Clearances

Gap Analysis and Requirements for Statutory Clearances

Topic	World Bank Policies	Pakistan Laws and Regulations	How the gap will be addressed in the EMF
Screening	The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of environmental assessment. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.	Early screening of projects is carried out according to Pakistan Environmental protection Agency Review of IEE and EIA Regulations, 2000. The EPA classifies the proposed project into two categories	Subprojects will be screened under both systems.
Safeguard document requirement (IEE, EIA, EMP)	For a Category A project: EIA and EMP For a Category B project: Less detailed EIA than Category A, and / or an EMP For a Category C project: Only Screening, no documentation required	For Schedule 1: IEE For Schedule 2: EIA	Safeguard Instruments/Documents will be prepared in consideration with or as per requirements of both the systems
Physical cultural resources	OP4.11 requires the development of PCR management plan or its incorporation in EMP developed for EA	In Antiquities Act 1975, there is no requirement for such procedures	The World Bank system will be followed.
Consultation	According to OP 4.01 Category A and B requires consultations with project affected groups and local nongovernmental organizations (NGOs). Category A projects require at least two consultations: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) after preparation of Draft EIA report	According to PEPA 1997, there is no provision for consultation at screening stage. However, a public consultation/hearing is conducted after preparation of Draft EIA for EPA approval.	Consultation will also be held at earlier stage as required.

Annexure-E(1)

**COMPARISON BETWEEN IFC/AIIB AND PEQS
FOR NOISE**

COMPARISON BETWEEN IFC / AIIB AND PEQS GUIDELINES FOR NOISE

IFC / AIIB			PEQS		
Receptor	Day Time	Night Time		Day Time	Night Time
	07:00 - 22:00	22:00 - 07:00			
Residential, Institutional and Educational	55	45	Residential Area (A)	55	45
Industrial and Commercial	70	70	Commercial Area (B)	65	55
			Industrial Area (C)	75	65
			Silence Zone (D)	50	45

According to the guidelines of IFC and PEQS for noise it can be observed that;

1. there are no hours mention for day and night time in PEQS
2. the Industrial and Commercial values have a quiet difference
3. the values of PEQS for Industrial and Commercial are more stringent then IFC

Annexure-F

TRAFFIC COUNT

Traffic Count

The traffic count was observed in 4 different time segments including the peak hours of the day. The total number of vehicles passing through were count manually including Tractor Trolleys, Chingchi Autos, Autos, Donkey Carts, Trucks, Wagons, Loaders, Pickups, Bikes and cars. Per day vehicles including all were estimated as 501 vehicles in a day of 16 hours.

Calculation

501 Vehicles per day

$501 \times 7 = 3507$ per week

For confidence ratio/limit total number of vehicles were divided by 0.95 to get the total number of vehicles per week after confidence limit.

$3507 \times 0.95 = 3691.57 \sim 3692$

For the conversion factor for low urban area traffic count the total number of vehicles were multiplied to 0.98 for the annual average daily traffic rate.

$3692 \times 0.989 = 3618$

Annual Average Daily Traffic Rate = 3618 Vehicles

Annexure - F



Pictorial Profile for Traffic Count at Bhaini Road

Annexure - G

PACKAGE 03 - LAB REPORTS

Package - 03
Surface Water Treatment Plant
LAB Reports

Package - 03

Surface Water Treatment Plant

Ambient Air Monitoring Reports



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc # GEL-TP-06-F-003

Issue # 01

Issue Date: 15-12-17

PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No:

GEL/Internal/06-19/A-2

Name of Customer:

Lahore Water & Sanitation Authority

Address:

31 - B, Zahoor Elahi Road, Block B Gulberg II,

Lahore-Pakistan.

Project:

Lahore Water & Wastewater Project

Location:

Mentioned Below

Date of Monitoring:

30.06.2019

Date of Completion of Analysis:

05.07.2019

Date: 05.07.2019

S. NO.	Source	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	1 Km Away From Ranger Area, 400 m Right Down Dera Haji Akram	BDL	13	2.6	35.5	48.2	27	
2	Western Side of Project	BDL	17	2.6	31.7	42.3	36	
3	Mid Side, Dera Mian Yousaf	BDL	14	2.6	41.1	43.8	30	
4	Northern Side of Project	BDL	19	2.6	29.9	42.1	28	
5	Project Area Towards, Gang-e-Sandhuwan	1.1	16	5.2	43	43.2	34	

Deviation from standard method if any:

Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

This report is not valid for any negotiation.

1. Report Prepared by:

[Signature]
Analyst

2. Checked/Verified by:

[Signature]
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

[Signature]
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 05.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

2nd and 3rd Floor, 4-5 Commercial Area, Cavalry Ground, Lahore- Cantt, Pakistan.

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GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL-TP-08-F-003
Issue # 01
Issue Date: 15-12-17
PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-1
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 01.07.2019
Date of Completion of Analysis: 05.07.2019

Date: 05.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Near Graveyard	BDL	14	2.6	29.9	50.3	30	
2	Boundary Line Behind Cold Storage, Dera Imran Hafeez	1.1	18	5.2	37.4	51.4	36	
3	Gang-e-Sandhuwan Population	1.1	22	20.8	74.8	61.5	60	
4	Gang-e-Sandhuwan Road	1.1	19	23.5	71.0	59.4	78	
5	Taj Garh Grave Yard	1.1	24	15.6	59.8	58.2	68	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

2. Checked/Verified by:

3. Signature of the incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 05.07.2019

END OF THE REPORT



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Doc. # GEL-TP-08-F-003

Issue # 01

Issue Date: 15-12-17

PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-2
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 02.07.2019
Date of Completion of Analysis: 05.07.2019

Date: 05.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Taij Garh	3.4	28	18.3	74.8	62.2	86	
2	Shalimar Ring Road Industrial Scheme	5.7	26	28.7	67.3	64.3	102	
3	Al Rahim Gardens End Point	1.1	23	20.8	63.5	53.4	60	
4	Mominpura Grid Station (Back Side) Al Rahim Gardens	2.2	29	15.6	67.3	58.4	60	
5	Hando Chowk (Industries) Mominpura Road	4.6	21	31.3	61.7	69.8	96	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

Ahsan Saeed
Analyst

2. Checked/Verified by:

M. Anis Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Ghyasuddin
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 05.07.2019

END OF THE REPORT



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Doc # GEL-TP-08-F-003

Issue # 01

Issued Date: 15-12-17

PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/06-19/A-1
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 29.06.2019
Date of Completion of Analysis: 05.07.2019

Date: 05.07.2019

S. NO.	Source	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	From Where Link Canal to be Extracted From BRB Canal	1.1	14	5.2	56.1	56.1	54	
2	Transmission Main 2 nd Point	BDL	12	2.6	44.8	44.8	38	
3	Transmission Main 3 rd Point	BDL	15	2.6	46.7	46.7	40	
4	Transmission Main End Point at Start of Ranger Area 300 m Right Down	BDL	11	2.6	41.1	41.1	31	
5	Just Before End of Ranger Area, 300 m Right Down	BDL	16	2.6	48.6	48.6	29	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

This report is not valid for any negotiation.

1. Report Prepared by:

2. Checked/Verified by:

3. Signature of the incharge of the environmental laboratory:

Name: Ghayasuddin

Designation: Manager (Admin)

Date: 05.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Package - 03

Surface Water Treatment Plant

Ground Water Quality Reports

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-2
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well Mid Point (Dera Mian Yousaf)
Date of sample Received: 02.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.028	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	55.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.052	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.50	pH meter	
8	Nitrite	mg/l	≤0.3	0.031	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	60.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	384.0	Evaporation	
17	Turbidity	NTU	<5	0.04	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
*Selected parameters for ISO-17025 scope.
AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Sarder
Analyst

2. Checked/Verified by:

M. Asif
Chief Analyst

3. Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc # GEL-TP-08-F-001
Issue # 01
Issue date: 15-12-17
PAGE 1 OF 1

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-1
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Dera Haji Akram, 1 Km Away
From Ranger Area)
Date of sample Received: 01.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	≤0.05	0.035	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	64.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.049	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.42	pH meter	
8	Nitrite	mg/l	≤0.3	0.022	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	74.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	481.0	Evaporation	
17	Turbidity	NTU	<5	0.08	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Amna Gardor
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Ghyanendra
Name: Ghyanendra
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



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GLOBAL ECO LAB

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Doc. # GEL-TP-06-F-001
Issue # 01
Issue date: 15-12-17
PAGE 1 OF 1

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/W-4
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Dera mian Imran Hafeez Boundary Lind Backside of Cold Store)
Date of sample Received: 30.06.2019
Sample Condition: Satisfactory
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.027	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	32.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.041	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	---	6.5 to 8.5	7.51	pH meter	
8	Nitrite	mg/l	≤0.3	0.020	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	52.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	---	Not Objectionable	Not Objectionable	Taste Panel	
16	Total Dissolved Solids	mg/l	<1000	348.0	Evaporation	
17	Turbidity	NTU	<5	0.03	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Gardar
Analyst

2. Checked/Verified by:

M. Ahsan
Chief Analyst

3. Signature of incharge of the environmental laboratory:

Name: Ghayasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/W-2
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Main Road Near Graveyard/ Cold Store Mosque)
Date of sample Received: 29.06.2019
Sample Condition: Satisfactory
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.024	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	38.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.058	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.50	pH meter	
8	Nitrite	mg/l	≤0.3	0.024	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	54.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	349.0	Evaporation	
17	Turbidity	NTU	<5	0.05	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
*Selected parameters for ISO-17025 scope.
AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

[Signature]
Analyst

2. Checked/Verified by:

[Signature]
M. Asif Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

[Signature]
Name: Ghayasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL-TP-08-F-001
Issue # 01
Issue date: 15-12-17
PAGE 1 OF 1

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/W-1
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Bajwa Farm)
Date of sample Received: 29.06.2019
Sample Condition: Satisfactory
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.028	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	42.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.051	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.54	pH meter	
8	Nitrite	mg/l	≤0.3	0.018	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	52.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	342.0	Evaporation	
17	Turbidity	NTU	<5	0.04	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Gardar
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



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Package - 03

Surface Water Treatment Plant

Surface Water Quality Reports



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL-TP-08-F-001
Issue # 01
Issue date: 15-12-17
PAGE 1 OF 1

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/W-3
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Surface Water (From Where Link Canal to be Extracted
From BRB Canal)
Sample Condition: Satisfactory
Date of sample received: 29.06.2019
Date of completion of analysis: 07.07.2019

Date: 07.07.2019

S.No.	Parameters.	Unit	PEQS	Concentrations	Method	Remarks
1	pH Value*	....	6-9	7.66	pH Meter	
2	Total Dissolved Solids	mg/l	3500	102.0	Evaporation	
3	Total Suspended Solids	mg/l	200	80.0	Filtration	
4	BOD ₅	mg/l	80	5.0	BOD Trak	
5	Zinc	mg/l	5.0	0.058	Atomic Absorption	
6	Lead	mg/l	0.5	BDL	Atomic Absorption	
7	Nitrite	mg/l	.....	0.032	Spectrophotometer	

Deviation from standard method if any: Nil

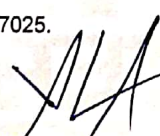
PEQS: Punjab Environmental Quality Standards

*These parameters are included in the scope of ISO 17025.

BDL: Below detectable limit.

This report is not valid for any negotiation

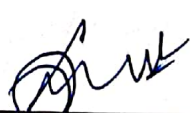
1. Report Prepared by:


Ahsan Sarder
Analyst

2. Checked/Verified by:


M. Asif
Chief Analyst

3. Signature of the incharge of environmental laboratory:


Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Package - 03
Surface Water Treatment Plant
Soil Analysis Report



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL / LAB / 4 / 16
Issue # 01
Issue Date : 01-04-12
PAGE 1 OF 1

SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/Soil-2
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil Sample Mid Point Dera Mian Yousaf
Date of sampling: 02.07.2019
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	7.71	
2	Sulphate	mg/kg	NS	72	
3	Sulphide	mg/kg	NS	1.1	
4	Chloride	mg/kg	NS	82	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	141	
7	Potassium	mg/kg	NS	6.9	
8	Calcium	mg/kg	NS	238.0	
9	Magnesium	mg/kg	NS	42	
10	Iron	mg/kg	NS	0.031	
11	Barium	mg/kg	NS	2.2	
12	Zinc	mg/kg	NS	9.6	

This report is not valid for any negotiation.
NS: Not Specified.
BDL: Below detectable limit.

1 Sample analyzed by:

Ahsan Sarder
Analyst

2 Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3 Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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GLOBAL ECO LAB

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Doc. # GEL / LAB / 4 / 18
Issue # 01
Issue Date : 01-04-12
PAGE 1 OF 1

SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/Soil-1
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil Sample 1 Km Away From Ranger Area 400 M
Down Eight, Dera Haji Akram
Date of sampling: 01.07.2019
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	7.86	
2	Sulphate	mg/kg	NS	80	
3	Sulphide	mg/kg	NS	1.5	
4	Chloride	mg/kg	NS	93	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	148	
7	Potassium	mg/kg	NS	7.5	
8	Calcium	mg/kg	NS	304.0	
9	Magnesium	mg/kg	NS	65	
10	Iron	mg/kg	NS	0.032	
11	Barium	mg/kg	NS	2.8	
12	Zinc	mg/kg	NS	11.2	

This report is not valid for any negotiation.

NS: Not Specified.

BDL: Below detectable limit.

1 Sample analyzed by:

Aftab Sarder
Analyst

2 Checked/Verified by:

M. Asim Iqbal
Chief Analyst

3 Signature of Incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



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GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL / LAB / 4 / 18
Issue # 01
Issue Date : 01-04-12
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SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/Soil-3
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil Sample Boundary Line Behind Cold Storage,
Dera Imran Hafeez
Date of sampling: 30.06.2019
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	7.91	
2	Sulphate	mg/kg	NS	86	
3	Sulphide	mg/kg	NS	1.9	
4	Chloride	mg/kg	NS	102	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	156	
7	Potassium	mg/kg	NS	8.2	
8	Calcium	mg/kg	NS	310.0	
9	Magnesium	mg/kg	NS	72	
10	Iron	mg/kg	NS	0.41	
11	Barium	mg/kg	NS	3.2	
12	Zinc	mg/kg	NS	14.7	

This report is not valid for any negotiation.

NS: Not Specified.

BDL: Below detectable limit.

1 Sample analyzed by:

Ahsan Sarder
Analyst

2 Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3 Signature of Incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Doc. # GEL / LAB / 4 / 18
Issue # 01
Issue Date : 01-04-12
PAGE 1 OF 1

SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/Soil-2
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil Sample Near Graveyard
Date of sampling: 29.06.2019
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

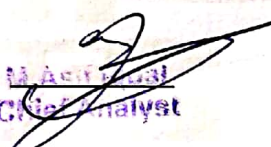
S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	7.67	
2	Sulphate	mg/kg	NS	78	
3	Sulphide	mg/kg	NS	1.2	
4	Chloride	mg/kg	NS	68	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	143	
7	Potassium	mg/kg	NS	5.5	
8	Calcium	mg/kg	NS	238.0	
9	Magnesium	mg/kg	NS	62	
10	Iron	mg/kg	NS	0.29	
11	Barium	mg/kg	NS	1.8	
12	Zinc	mg/kg	NS	9.5	

This report is not valid for any negotiation.
NS: Not Specified.
BDL: Below detectable limit.

1 Sample analyzed by:


Analyst

2 Checked/Verified by:


Manager (Admin)

3 Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



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Doc. # GEL/LAB/4/18
Issue # 03
Issue Date : 01-04-12
PAGE 1 OF 1

SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/06-19/Soil-1
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil sample From Where Link Canal to Extracted
From BRB Canal
Date of sampling: 29.06.2019
Date of completion of analysis: 07.07.2019

Dated: 07.07.2019

S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	7.84	
2	Sulphate	mg/kg	NS	82	
3	Sulphide	mg/kg	NS	1.5	
4	Chloride	mg/kg	NS	72	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	138	
7	Potassium	mg/kg	NS	7.2	
8	Calcium	mg/kg	NS	246.0	
9	Magnesium	mg/kg	NS	58	
10	Iron	mg/kg	NS	0.32	
11	Barium	mg/kg	NS	2.5	
12	Zinc	mg/kg	NS	11.8	

This report is not valid for any negotiation.

NS: Not Specified.

BDL: Below detectable limit.

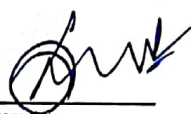
1 Sample analyzed by:


Ahsan Gorder
Analyst

2 Checked/Verified by:


Ahsan Gorder
Analyst

3 Signature of incharge of the environmental laboratory:


Name: Ghyasuddin
Designation: Manager (Admin)
Date: 07.07.2019

END OF THE REPORT



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Annexure - H

PACKAGE 04 - LAB REPORTS

Package - 04

Water Distribution Area

LAB Reports

Package - 04
Water Distribution Network
Ambient Air Monitoring
Reports



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc # GEL-TP-08-F-003
Issue # 01
Issue Date: 15-12-17
PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-3
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 03.07.2019
Date of Completion of Analysis: 10.07.2019

Date: 10.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Main Canal Road, Below Ring Road Bridge	5.7	28	20.9	59.2	72.1	102	
2	Dera Gujran Orange Train Station	2.3	26	7.8	46.8	73.5	74	
3	Drogevala Chowk	6.9	24	26.1	76.7	82.3	128	
4	Fateh Garh	4.6	31	13.1	58.0	68.4	91	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

M. Asif Iqbal
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



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Issue # 01
Issue Date: 15-12-17
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AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-4
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 04.07.2019
Date of Completion of Analysis: 10.07.2019

Date: 10.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Near Dry Port, Railway Phatak, Shoib Autos Mughalpura	3.4	19	18.3	54.5	78.2	88	
2	Nawan Pull	2.3	22	13.1	52.2	60.3	105	
3	Sukh Nehr	2.3	17	10.4	50.4	68.6	92	
4	Baghbanpura Orange Station	2.3	24	15.6	66.5	78.3	123	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

Amber Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Ghyasuddin
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



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AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-5
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 05.07.2019
Date of Completion of Analysis: 10.07.2019

Date: 10.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Cantt Drain Ittehad Park	1.1	30	18.3	60.4	61.1	67	
2	Mustafaabad Allama Iqbal Road, Dharampura	3.4	21	23.5	53.8	72.3	83	
3	National Museum of Science & Technology, UET	2.3	26	13.1	54.5	74.2	119	
4	Wagha Town, Near Ring Road,	1.1	18	7.8	58.3	62.5	82	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

Analyst

2. Checked/Verified by:

Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



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Issue # 01
Issue Date: 15-12-17
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AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-7
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 07.07.2019
Date of Completion of Analysis: 15.07.2019

Date: 15.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Lakhodair, Near Ring Road	2.3	21	7.8	54.5	65.6	82	
2	Bassi Morr Gol Chakkar, Yasin Hospital Ring Road Toll Plaza	2.3	24	20.9	60.8	70.2	102	
3	Mominpura Road Near Hardware Store	3.4	19	15.7	54.5	73.8	79	
4	Karol Ghati, Ring Road	6.9	26	31.3	42.6	66.1	101	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

Ahsan Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Ghyasuddin
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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Issue # 01

Issue Date: 15-12-17

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AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-8
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 08.07.2019
Date of Completion of Analysis: 15.07.2019

Date: 15.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Atif Park Boghewal Chowk	3.4	26	10.4	62.4	66.1	93	
2	Shahalu Chowk	9.1	27	15.7	70.5	76.4	107	
3	Ghoray Shah Road, Govt Boys Company School, Kot Khawaja Road	2.3	19	20.9	68.2	73.6	76	
4	Siraj Road, Near Sultan Pura Road	2.3	17	7.8	54.0	71.2	130	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

Ali
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Ghaya
Name: Ghaya
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-9
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 09.07.2019
Date of Completion of Analysis: 15.07.2019

Date: 15.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Orange Train Station # 6, Before UET	4.6	21	10.4	57.4	74.3	105	
2	Shalimar Link Road Near Mosque	9.1	26	23.5	47.5	75.7	136	
3	Railway Workshop Colony Nabipura	1.1	22	5.2	50.1	55.4	64	
4	Takiya Yateem Shah, WASA Tubewell	2.3	24	7.8	62.4	63.2	79	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

Abbas Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:

Ghyasuddin
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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Issue # 01
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PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-10
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 10.07.2019
Date of Completion of Analysis: 15.07.2019

Date: 15.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Abdullah Chowk Salamat Pura	4.6	18	18.3	60.8	72.6	102	
2	Gulshan-e-Haider Colony, Opposite to Young Scholar School, Backroad of Orange Train	1.1	21	13.1	52.4	58.4	81	
3	Rangwala Karkhana, Backside of Zahra Shafi Hospital	5.7	20	18.3	62.6	72.2	105	
4	Masjid Khoo Jattan	4.6	16	15.7	50.3	69.8	97	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

[Signature]
Analyst

2. Checked/Verified by:

[Signature]
Analyst

3. Signature of the incharge of the environmental laboratory:

[Signature]
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Issue Date: 15-12-17

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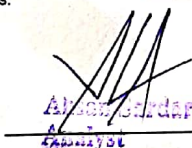
Report reference No: GEL/Internal/07-19/A-11
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 11.07.2019
Date of Completion of Analysis: 18.07.2019

Date: 18.07.2019

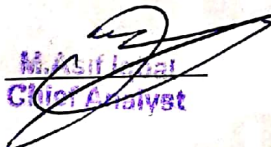
S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Bhaini Road Droghewala, Near English Grammer School/Afzal Marriage Hall	6.9	18	10.4	68.5	70.6	92	
2	Ring Road Zahra Peer/Bhaini Road, Factory Road	5.7	23	31.3	46.2	70.2	89	
3	MA Cold Storage Ring Road	2.3	20	18.3	48.1	72.5	81	
4	Boghiwal Road Near Latif Marriage Hall	4.4	18	15.7	60.8	71.4	84	

Deviation from standard method if any:
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:


Ahsan Uddin
Analyst

2. Checked/Verified by:


M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of the environmental laboratory:


Name: Ghyasuddin
Designation: Manager (Admin)
Date: 18.07.2019

END OF THE REPORT



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AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: GEL/Internal/07-19/A-12
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project: Lahore Water & Wastewater Project
Location: Mentioned Below
Date of Monitoring: 12.07.2019
Date of Completion of Analysis: 18.07.2019

Date: 18.07.2019

S. NO.	Location	CO (mg/m ³)	O ₃ (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	Noise (dBA)	PM ₁₀ (ug/m ³)	Remarks
	PEQS	10	130	120	80	75	150	
1	Mian Mir Road, Sikander Road	2.3	24	18.3	56.4	68.2	82	
2	Harbanspura Road Jalal Colony	3.4	20	23.5	70.9	71.8	121	
3	Ring Road, Service Road	2.3	20	10.4	58	64.9	87	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
This report is not valid for any negotiation.

1. Report Prepared by:

2. Checked/Verified by:

3. Signature of the incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 18.07.2019

END OF THE REPORT



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Package - 04

Water Distribution Network

Ground Water Quality Reports



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Doc # GEL-TP-08-F-001
Issue # 01
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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-14
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Wagah Town, Near Ring Road)
Date of sample Received: 10.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 15.07.2019

Dated: 15.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.042	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	38.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.064	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	---	6.5 to 8.5	7.10	pH meter	
8	Nitrite	mg/l	≤0.3	0.024	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	38.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	---	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	362.0	Evaporation	
17	Turbidity	NTU	<5	0.02	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

2. Checked/Verified by:

3. Signature of Incharge of the environmental laboratory:

[Signature]
M. Asif Iqbal
Chief Analyst

Name: Ghayasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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Doc.# GEL-TP-08-F-001
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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-13
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Shah Gohar, Eid Gah Mehmood Boti)
Date of sample Received: 09.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 15.07.2019

Dated: 15.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	≤0.05	0.029	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	38.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.034	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.54	pH meter	
8	Nitrite	mg/l	≤0.3	0.022	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	45.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	386.0	Evaporation	
17	Turbidity	NTU	<5	0.03	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
*Selected parameters for ISO-17025 scope.
AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Anson Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-12
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Mehar Bashir Colony Karol Ghati)
Date of sample Received: 09.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 15.07.2019

Dated: 15.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.038	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	25.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.025	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.60	pH meter	
8	Nitrite	mg/l	≤0.3	0.019	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	31.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	275.0	Evaporation	
17	Turbidity	NTU	<5	0.02	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
*Selected parameters for ISO-17025 scope.
AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Zohra Sarder
Analyst

2. Checked/Verified by:

M. Asim Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Name: Ghayasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-11
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Dilawar Road, Misri Shah)
Date of sample Received: 08.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 15.07.2019

Dated: 15.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.038	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	82.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.042	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.78	pH meter	
8	Nitrite	mg/l	≤0.3	0.023	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	100.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	504.0	Evaporation	
17	Turbidity	NTU	<5	0.07	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
*Selected parameters for ISO-17025 scope.
AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Ghyasuddin
Name: Ghyasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-10
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Nadia Ghee Mill Tohid Park)
Date of sample Received: 08.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 15.07.2019

Dated: 15.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.031	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	78.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.038	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.64	pH meter	
8	Nitrite	mg/l	≤0.3	0.018	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	90.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Pannel	
16	Total Dissolved Solids	mg/l	<1000	468.0	Evaporation	
17	Turbidity	NTU	<5	0.04	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Gardar
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 15.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-9
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Faisal Children Park Mughalpur)
Date of sample Received: 06.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 10.07.2019

Dated: 10.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.046	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	78.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.052	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.40	pH meter	
8	Nitrite	mg/l	≤0.3	0.022	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	95.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Panel	
16	Total Dissolved Solids	mg/l	<1000	492.0	Evaporation	
17	Turbidity	NTU	<5	0.04	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Asim Saeed
Analyst

2. Checked/Verified by:

M. Asim Saeed
Chief Analyst

3. Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-8
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Salamatpura Bari Janazgah)
Date of sample Received: 06.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 10.07.2019

Dated: 10.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.037	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	84.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.061	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.49	pH meter	
8	Nitrite	mg/l	≤0.3	0.025	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	110.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Panel	
16	Total Dissolved Solids	mg/l	<1000	534.0	Evaporation	
17	Turbidity	NTU	<5	0.08	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Zardar
Analyst

2. Checked/Verified by:

M. Asif Khan
Chief Analyst

3. Signature of Incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-7
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water WASA Tube Well (Takiya Yateem Shah)
Date of sample Received: 05.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 10.07.2019

Dated: 10.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	≤0.05	0.042	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	92.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.041	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.55	pH meter	
8	Nitrite	mg/l	≤0.3	0.021	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	105.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Panel	
16	Total Dissolved Solids	mg/l	<1000	518.0	Evaporation	
17	Turbidity	NTU	<5	0.05	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards.

BDL: Below detectable limit.

*Selected parameters for ISO-17025 scope.

AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-6
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II, Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of Sample: Ground Water Tube Well (Infantry Road)
Date of sample Received: 05.07.2019
Sample Condition: Satisfactory
Date of completion of analysis: 10.07.2019

Dated: 10.07.2019

Sr. No.	Parameters	Unit	PEQS	Concentration	Method	Remarks
1	Arsenic	mg/l	<0.05	0.042	AAS	
2	Cadmium	mg/l	0.00	BDL	AAS	
3	Chloride*	mg/l	<250	72.0	Digital Titrator	
4	Iron	mg/l	0.3	BDL	AAS	
5	Manganese	mg/l	≤1.5	0.057	AAS	
6	Mercury	mg/l	≤0.001	BDL	AAS	
7	pH Value*	....	6.5 to 8.5	7.75	pH meter	
8	Nitrite	mg/l	≤0.3	0.026	HACH Method 8507	
9	Oil & Grease	mg/l	NS	BDL	Extraction	
10	Phenolic Compounds	mg/l	0.002	BDL	HACH Method 8047	
11	Selenium	mg/l	0.01	BDL	AAS	
12	Sulphate	mg/l	NS	80.0	HACH Method 8035	
13	Chromium	mg/l	≤0.05	BDL	AAS	
14	Colour	cu	≤15	0.0	HACH Method 8025	
15	Taste	....	Not Objectionable	Not Objectionable	Taste Panel	
16	Total Dissolved Solids	mg/l	<1000	445.0	Evaporation	
17	Turbidity	NTU	<5	0.06	Turbidity meter	
18	Total Coliforms	MPN/ 100ml	0	0	Culture	

Deviation from standard method if any: Nil
PEQS: Punjab Environmental Quality Standards.
BDL: Below detectable limit.
*Selected parameters for ISO-17025 scope.
AAS: Atomic Absorption Spectrophotometer

1. Report Prepared by:

Ahsan Gardar
Analyst

2. Checked/Verified by:

M. Asir Iqbal
Chief Analyst

3. Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT

Package - 04
Water Distribution Network
Surface Water Quality
Reports



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CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-4
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Surface Water (Mustafaabad Allama Iqbal Road Dharampura,
Lahore Canal)
Sample Condition: Satisfactory
Date of sample received: 03.07.2019
Date of completion of analysis: 10.07.2019

Date: 10.07.2019

S.No.	Parameters.	Unit	PEQS	Concentrations	Method	Remarks
1	pH Value*	....	6-9	7.88	pH Meter	
2	Total Dissolved Solids	mg/l	3500	114.0	Evaporation	
3	Total Suspended Solids	mg/l	200	374.0	Filtration	
4	BOD ₅	mg/l	80	6.0	BOD Trak	
5	Zinc	mg/l	5.0	0.064	Atomic Absorption	
6	Lead	mg/l	0.5	BDL	Atomic Absorption	
7	Nitrite	mg/l	.....	0.036	Spectrophotometer	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards

*These parameters are included in the scope of ISO 17025.

BDL: Below detectable limit.

This report is not valid for any negotiation

1. Report Prepared by:

Ahsan Sarder
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

2nd and 3rd Floor, 4-5 Commercial Area, Cavalry Ground , Lahore- Cantt, Pakistan.

PABX: 0092 42 36670097 till 98. Compliance: 0092 42 36681281. Email: info@gel-intl.org. Website: www.gel-intl.org



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc.# GEL-TP-08-F-001
Issue # 01
Issue date: 15-12-17
PAGE 1 OF 1

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-3
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Surface Water (Near Ring Road, Main Canal Road)
Sample Condition: Satisfactory
Date of sample received: 03.07.2019
Date of completion of analysis: 10.07.2019

Date: 10.07.2019

S.No.	Parameters.	Unit	PEQS	Concentrations	Method	Remarks
1	pH Value*	....	6-9	7.81	pH Meter	
2	Total Dissolved Solids	mg/l	3500	103.0	Evaporation	
3	Total Suspended Solids	mg/l	200	142.0	Filtration	
4	BOD ₅	mg/l	80	4.0	BOD Trak	
5	Zinc	mg/l	5.0	0.092	Atomic Absorption	
6	Lead	mg/l	0.5	BDL	Atomic Absorption	
7	Nitrite	mg/l	.....	0.028	Spectrophotometer	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards

*These parameters are included in the scope of ISO 17025.

BDL: Below detectable limit.

This report is not valid for any negotiation

1. Report Prepared by:

Ahsan Gerdar
Analyst

2. Checked/Verified by:

M. Asif Iqbal
Chief Analyst

3. Signature of the incharge of environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 10.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Package - 04

Water Distribution Network

Waste Water/ Drain Water Quality Reports



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc.# GEL-TP-08-F-001
Issue # 01
Issue date: 15-12-17
PAGE 1 OF 1

CHEMICAL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/W-5
Name of Customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Drain Water (Cantt. Drain)
Sample Condition: Satisfactory
Date of sample received: 04.07.2019
Date of completion of analysis: 10.07.2019

Date: 10.07.2019

S.No.	Parameters.	Unit	PEQS	Concentrations	Method	Remarks
1	pH Value*	....	6-9	7.26	pH Meter	
2	Total Dissolved Solids	mg/l	3500	886.0	Evaporation	
3	Total Suspended Solids	mg/l	200	374.0	Filtration	
4	BOD ₅	mg/l	80	228.0	BOD Trak	
5	Zinc	mg/l	5.0	0.160	Atomic Absorption	
6	Lead	mg/l	0.5	0.05	Atomic Absorption	
7	Nitrite	mg/l	.....	0.510	Spectrophotometer	

Deviation from standard method if any: Nil

PEQS: Punjab Environmental Quality Standards

*These parameters are included in the scope of ISO 17025.

BDL: Below detectable limit.

This report is not valid for any negotiation

1. Report Prepared by:

ANWAR KADAR
Analyst

2. Checked/Verified by:

M. Asif Raza
Chief Analyst

3. Signature of the incharge of environmental laboratory:

Name: Ghyasuddin

Designation: Manager (Admin)

Date: 10.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Package - 04

Water Distribution Network

Soil Quality Reports



GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL / LAB / 4 / 18

Issue # 01

Issue Date : 01-04-12

PAGE 1 OF 1

SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/Soil-4
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil Sample Wagh Town, Near Ring Road
Date of sampling: 12.07.2019
Date of completion of analysis: 18.07.2019

Dated: 18.07.2019

S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	7.91	
2	Sulphate	mg/kg	NS	76	
3	Sulphide	mg/kg	NS	2.3	
4	Chloride	mg/kg	NS	74	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	154	
7	Potassium	mg/kg	NS	9.3	
8	Calcium	mg/kg	NS	257.0	
9	Magnesium	mg/kg	NS	61	
10	Iron	mg/kg	NS	0.034	
11	Barium	mg/kg	NS	2.2	
12	Zinc	mg/kg	NS	13.7	

This report is not valid for any negotiation.

NS: Not Specified.

BDL: Below detectable limit.

1 Sample analyzed by:

Analyst

2 Checked/Verified by:

Chief Analyst

3 Signature of incharge of the environmental laboratory:

Name: Ghyasuddin
Designation: Manager (Admin)
Date: 18.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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GLOBAL ECO LAB

Formerly : Global Environmental Lab (GEL)

Doc. # GEL / LAB / 4 / 18
Issue # 01
Issue Date : 01 -04-12
PAGE 1 OF 1

SOIL ANALYSIS TEST REPORT

Report reference No: GEL/Internal/07-19/Soil-3
Name of customer: Lahore Water & Sanitation Authority
Address: 31 - B, Zahoor Elahi Road, Block B Gulberg II,
Lahore-Pakistan.
Project Name: Lahore Water & Wastewater Project
Nature of sample: Soil Sample Near Cant Drain
Date of sampling: 12.07.2019
Date of completion of analysis: 18.07.2019

Dated: 18.07.2019

S.No.	Parameters	Units	NEQS	Concentration	Remarks
1	pH	.....	NS	8.32	
2	Sulphate	mg/kg	NS	110	
3	Sulphide	mg/kg	NS	9.8	
4	Chloride	mg/kg	NS	138	
5	Fluoride	mg/kg	NS	BDL	
6	Sodium	mg/kg	NS	256	
7	Potassium	mg/kg	NS	15.4	
8	Calcium	mg/kg	NS	310.0	
9	Magnesium	mg/kg	NS	98	
10	Iron	mg/kg	NS	0.045	
11	Barium	mg/kg	NS	5.3	
12	Zinc	mg/kg	NS	21.8	

This report is not valid for any negotiation.

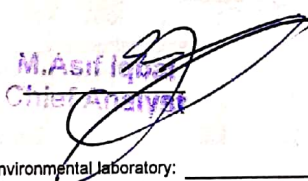
NS: Not Specified.

BDL: Below detectable limit.

1 Sample analyzed by:


Anwar Sarda
Analyst

2 Checked/Verified by:


M. Asif Iqbal
Chief Analyst

3 Signature of incharge of the environmental laboratory:


Name: Ghyasuddin
Designation: Manager (Admin)
Date: 18.07.2019

END OF THE REPORT



Certificate No: 112/DD(Lab)/EPA/05/2017 Certified By "Environmental Protection Department" - Government of the Punjab

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Annexure - I

ENVIRONMENTAL MONITORING OF PACKAGE 03

Annexure - I



Ambient Air Quality Monitoring

Annexure - I



Ambient Air Quality Monitoring

Annexure - I



Noise Monitoring

Annexure - I



Water Sampling

Annexure - I



Soil Sampling

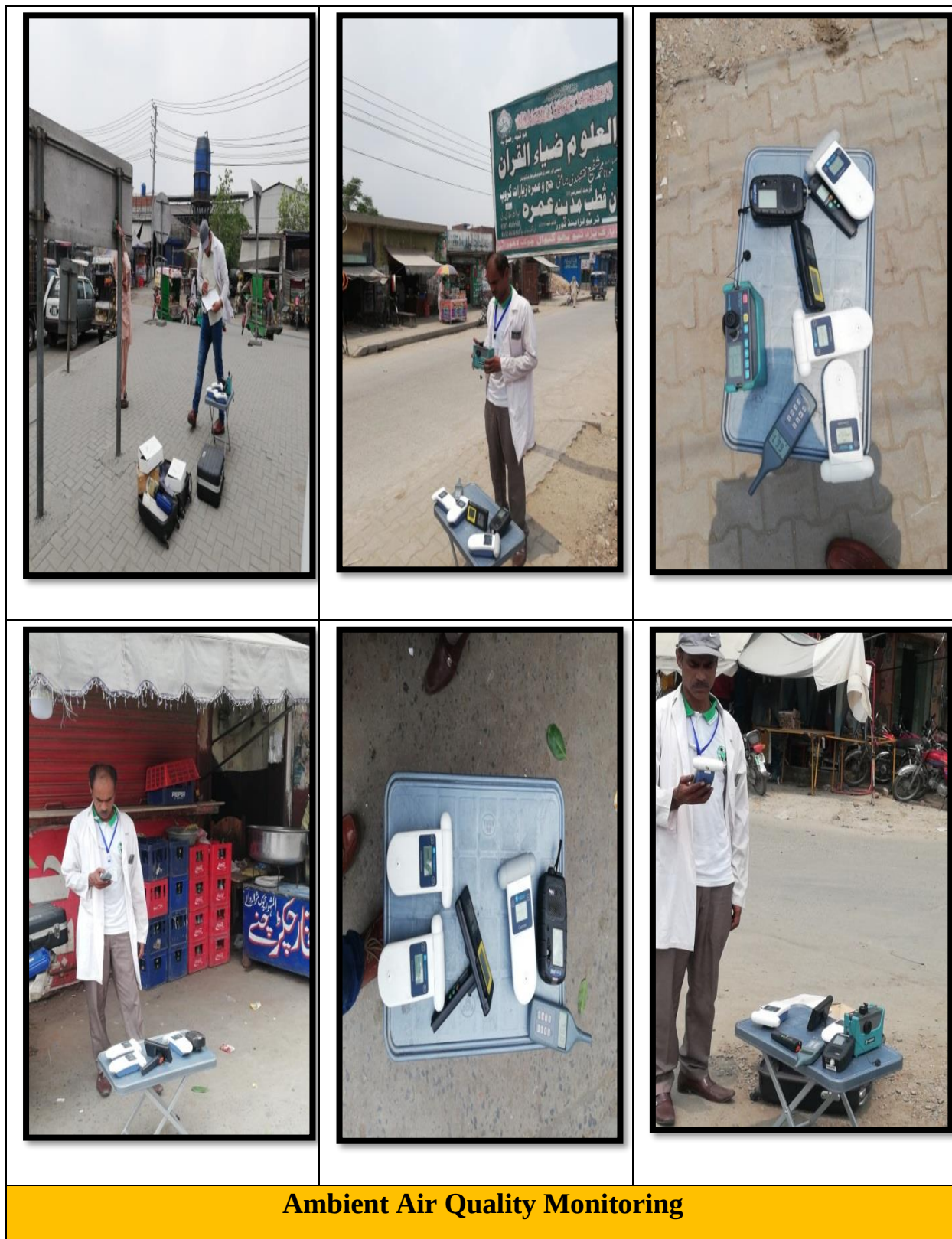
Annexure - J

ENVIRONMENTAL MONITORING OF PACKAGE 04









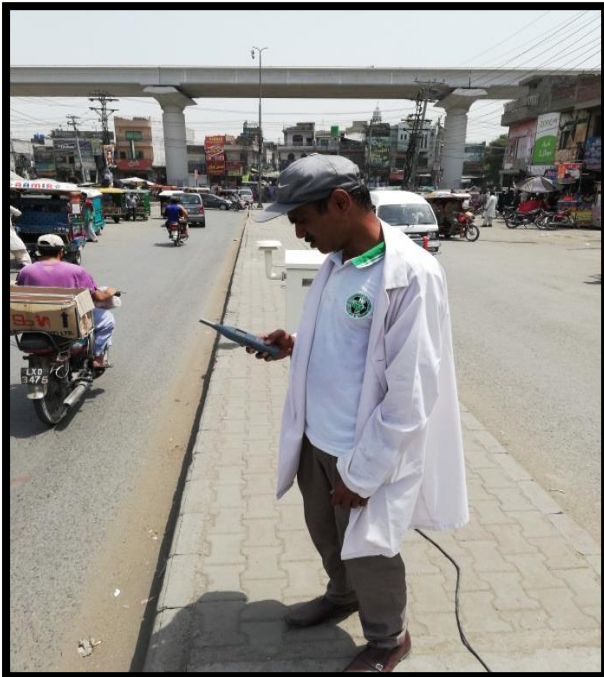
Ambient Air Quality Monitoring



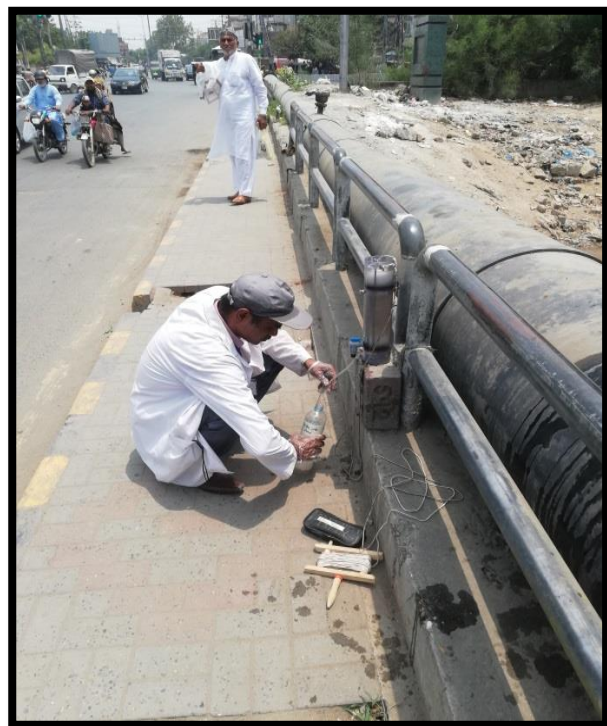
Ambient Air Quality Monitoring







Noise Monitoring



Surface Water Sampling



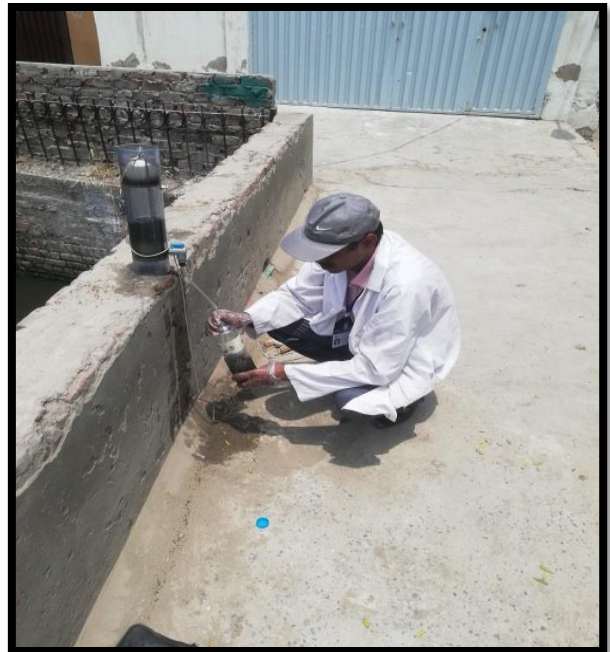
Surface Water Sampling



Surface Water Sampling



Surface Water Sampling



Drain Water Sampling



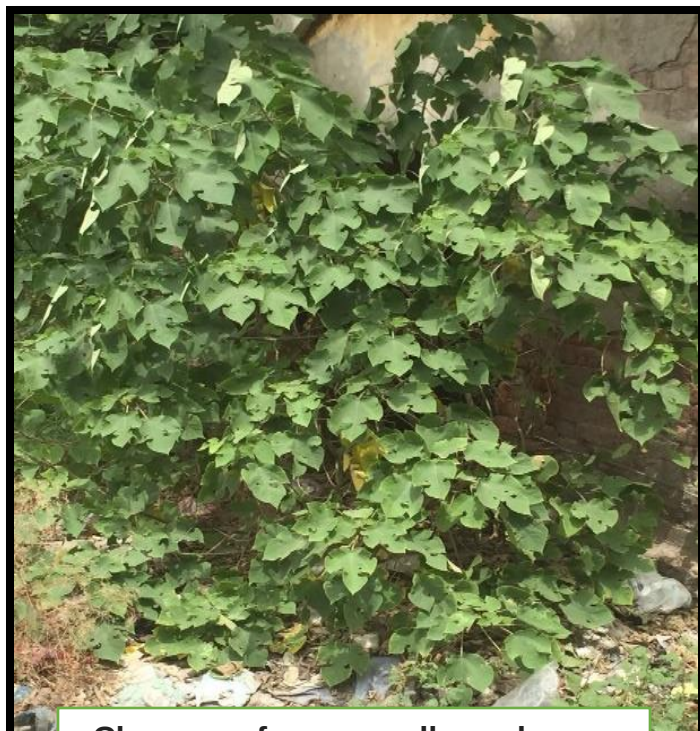
Soil Sampling

Annexure - K

PICTORIAL PROFILE OF FLORA AND FAUNA PACKAGE 03 AND 04



Landscape



Close up of paper mulberry leaves



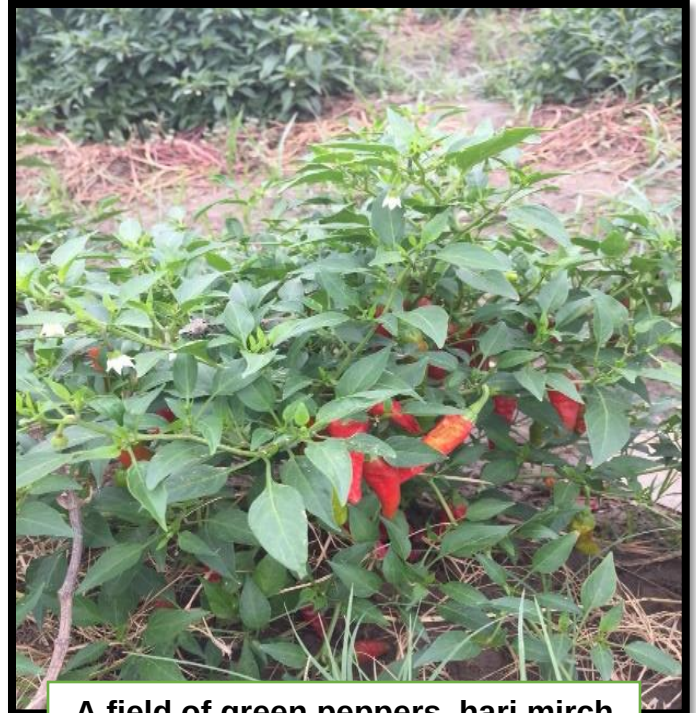
Women picking hari mirch Green



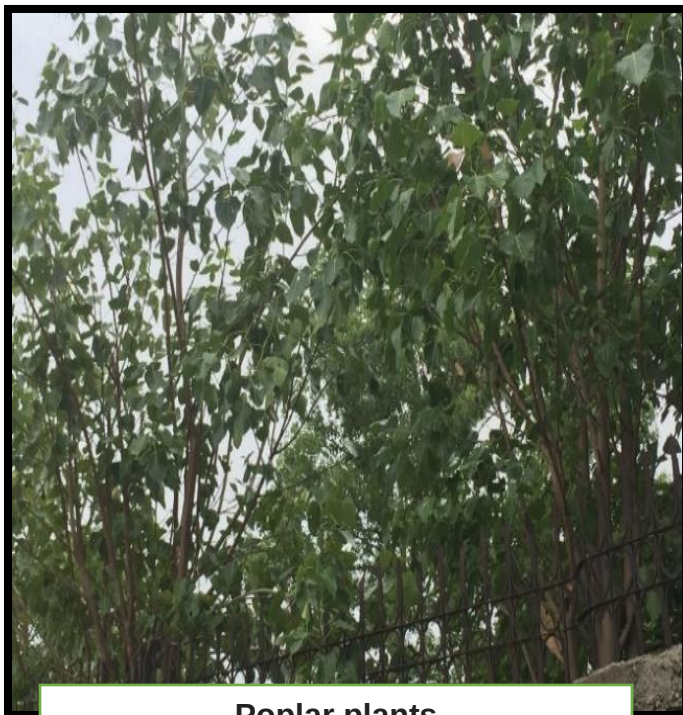
Alstonia scholaris



Close up of green pepper plants



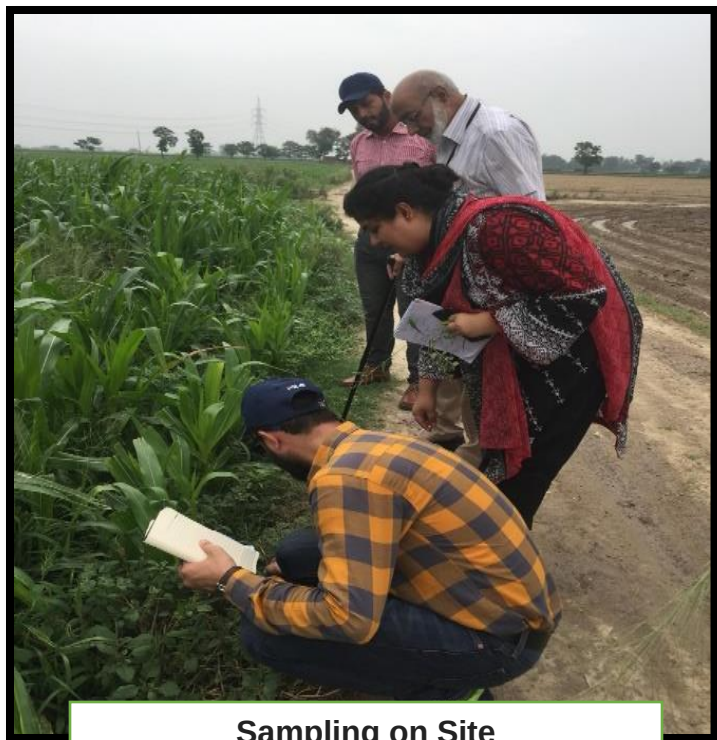
A field of green peppers, hari mirch



Poplar plants



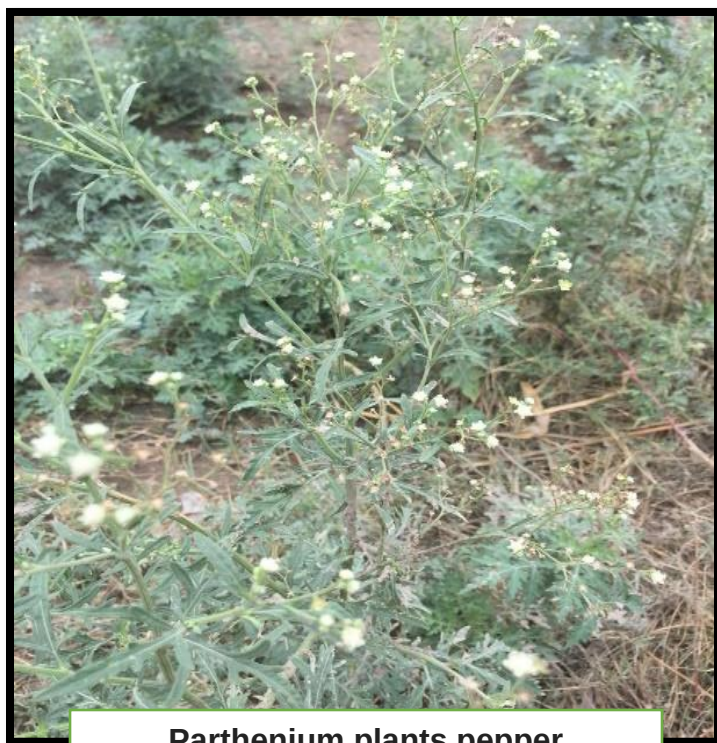
Alstonia scholaris pepper



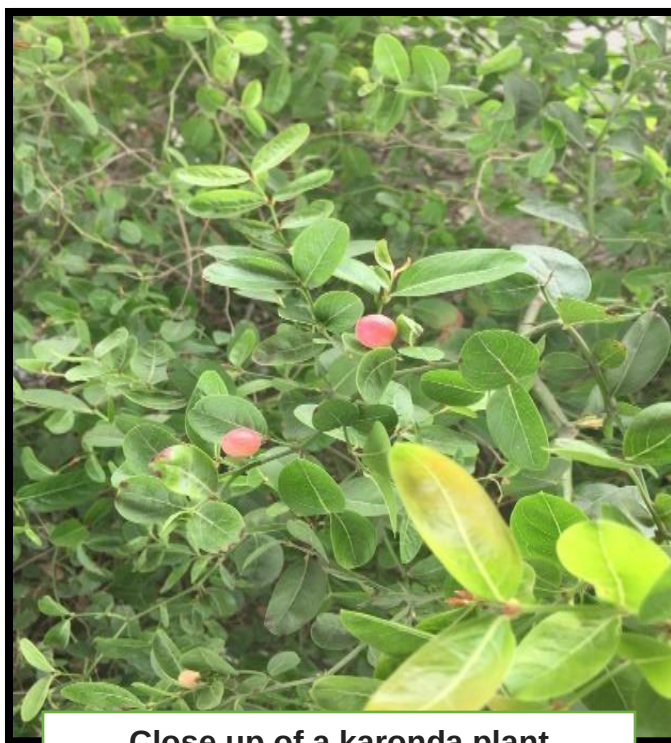
Sampling on Site



Discussion regarding Sampling



Parthenium plants pepper



Close up of a karonda plant



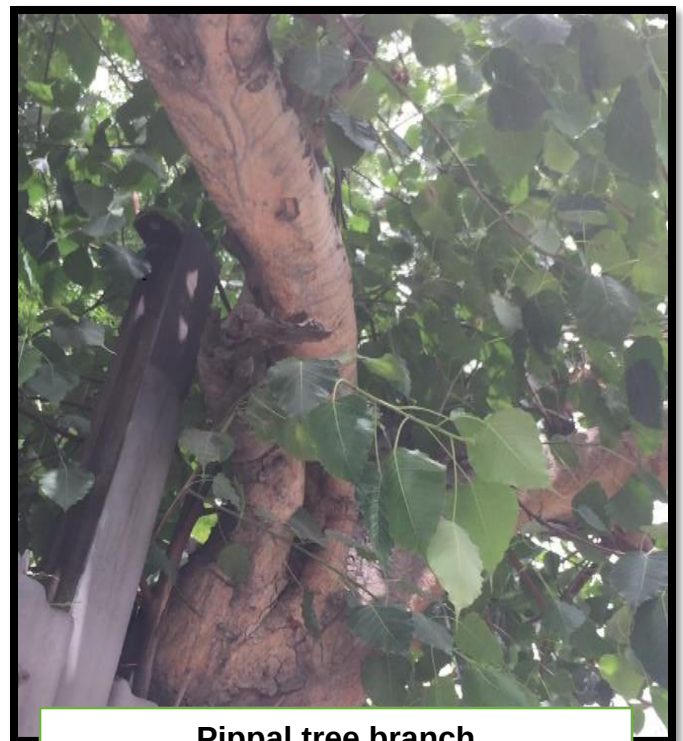
A small leaf Terminalia tree



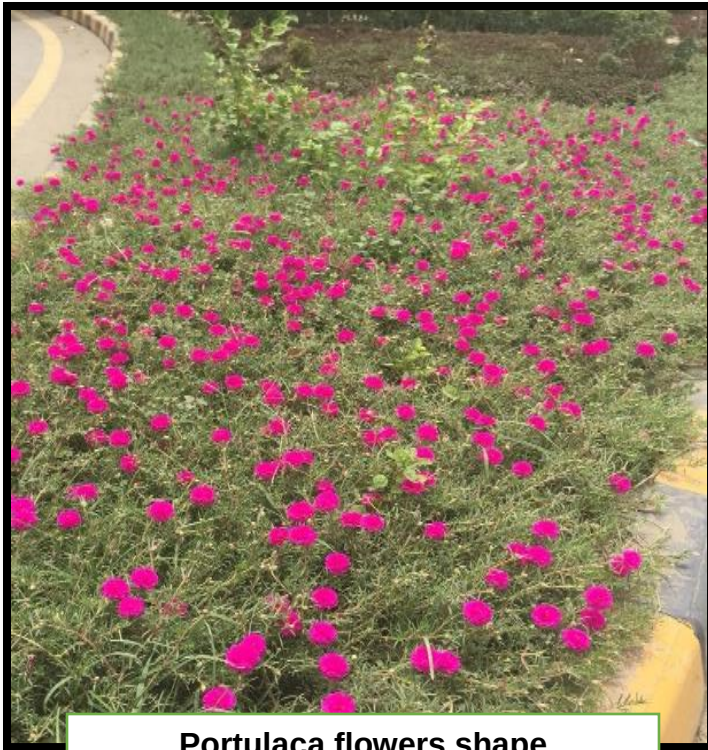
A yucca plant in a bad shape



A pygmy date palm in a very bad



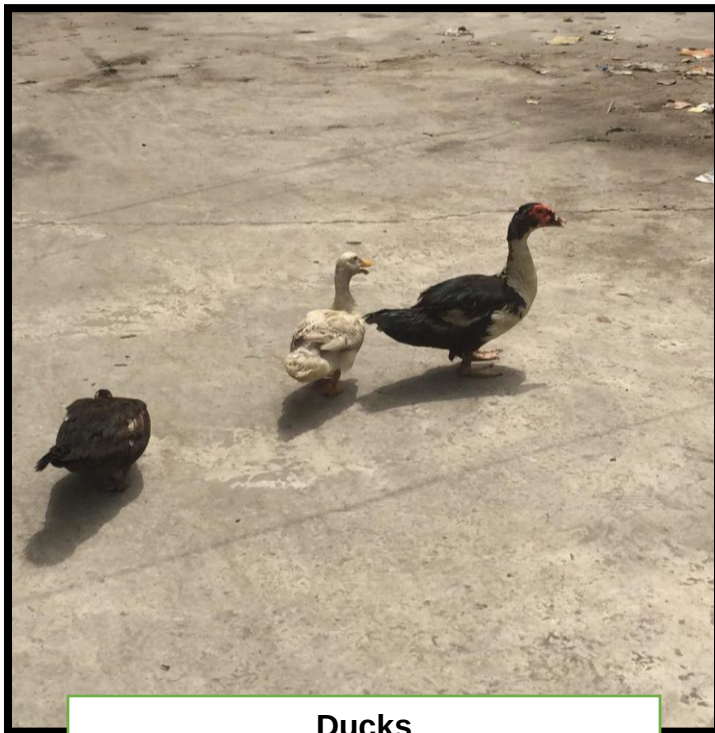
Pippal tree branch



Portulaca flowers shape



Young corn, maize, plants shape



Ducks



Sampling on Site

Annexure - L

PICTORIAL PROFILE OF INDUSTRIAL SURVEY OF PACKAGE 03 AND 04

Picture Gallery



Annexure - L



Annexure-M

PICTORIAL PROFILE OF PUBLIC CONSULTATION



PICTORIAL PROFILE OF PUBLIC CONSULTATION



PICTORIAL PROFILE OF PUBLIC CONSULTATION



PICTORIAL PROFILE OF PUBLIC CONSULTATION



PICTORIAL PROFILE OF PUBLIC CONSULTATION



PICTORIAL PROFILE OF PUBLIC CONSULTATION

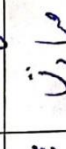
Annexure-N

PUBLIC CONSULTATION FEEDBACK FORMS

Atlan Iqbal road, Durhumpura - Social Survey Feedback Form:

Name	Age	Occupation	Address	Educational	Income	Caste	Family System	Feedback	Signature	Contact #
Nazina Khan	23	Teacher	Harbans Pura	B.S. Comp. Sci.	15,000/-	Rehmani	Separate	اگر ملکہ کے لئے ترقی ہو تو لگنا چاہیے		0305-9836188
Tehmina	23	Teacher	Harbans Pura	B.S. Comp. Sci.	15,000/-	Rehmani	Separate	منصوبہ کیلئے لگنا چاہیے		
Yonas	52	Manager	Greenpark Ravi Road	under-matric	30,000	Shikh	Joint	اسی منصوبہ پر جلدی علی گڑھ چاہیے		0324 4456972
Saima Imran	30	housewife	upper mall	matric	15,000	malik	Joint	فرد لگنا چاہیے		0321 7159516
Kalb-e-Abbas	53	Banker	MBA, almost 100m	B.S.C. Math. Phys.	25,000/-	Rajput	Joint	یہ ایک اچھا منصوبہ ہے		0322 4274880
Sadeel	32	Printer Shop (Sakina)	Burhampur middle	daily wages		khan	Joint	ایم آر کے ساتھ اور بھی انٹر فیکشن		
Imran	36	Salesman	Mughalpura near UBS	Matric	15,000/-	Rajput	Joint	پانی کی کمی تو جو دار ہے پانی کی کمی بہت پانی		0360 8865657
Atif	28	Salesman	Mughalpura	Matric	23,000/-	khan	Joint	اچھا برو بیکٹری ہے		0324 4685082
Sakina Bibi	70	housewife	Shalabagh	Nil	30,000/-	Rajput	Joint	پانی کی کمی تو جو دار ہے پانی کی کمی بہت پانی		
M. Kaiser	33	optician	Shalabagh	Matric	30,000/-	Rajput	Joint	فرد لگنا چاہیے		
Ali Haider	23	Shopkeeper	G.T. Road Bagh Bah	MBA	30,000/-	Rajput	Joint	ملکہ کے لئے ترقی کے لئے ایک اور فکری فرد کے لئے		0316-41182342
Naveen	40	housewife	Defence Road	F.A	50,000/-	Butt	Separate	اسی منصوبہ پر جلدی علی گڑھ چاہیے		0320-4455977
Murtaza Shah	28	Salesman	Darogah wala	B.A	35,000/-	Syed	Separate	فرد لگنا چاہیے		0321 4281128

Social Survey Feedback Form:

Name	Age	Occupation	Address	Education	Income	Caste	Family System	Feedback	Signature	Contact #
Imam	25	Shop	Mughalpura	Matric	30K	Rajput	Joint	منصورہ گنگا چائیہ		0307464078
Tariq	55	Shop	Mughalpura	Matric	35K	Sheikh Separate		بسترین منصورہ		530-553882
Haseen Mustafa	52	Cont. Servant	Mughalpura	F.A.	27K	Syed	Joint	مفتی کا خیال	S-15522K	0308-9221345
Khuram	35	Shop	Shalimar	Matric	50K	Sheikh	Separate	مدیریت جی بی		021-426830
N. Shabir	35	Rickshaw	Shalimar	Six	25K	Arain	Joint	چائے خانہ	منتر 11	0311-405390
Anwar	40	Shop	Singhpura	B.Sc.	30K	Pathan	Joint	پرو جینک بسترین		03216477113
N. Shaker	40	Shop	Baghwanpura	Matric	40K	Rajput	Joint	علاؤ ترستی		03386172407
Tamreen	22	Shop	Singhpura	Matric	32K	Kanika	Separate	علاقہ بسترین		0303537625
Ahsan	24	Shop	Singhpura	Matric	15K	Nalik	Joint	علاقہ بے		032454676
Nasir Ali	40	Shop	Singhpura	F.A.	20K	Telt	Joint	منورہ ماحول		03080380141
Aamir	27	Shop	Quaid-e-Azam Middle		40K	Rajput	Separate	پاکستان ٹورسٹ		03004049192
Nasir	28	Laborer	Handu Chok	-		Nalik	Separate	رہز دست منورہ		03065009668
M. Sadiq	31	Hotel	Handu Chok	-		Anarsi	Separate	علی صبر آنا بے منورہ		03449371204

Social Survey Feedback Form:

Name	Age	Occupation	Address	Education	Income	Caste	Family System	Feedback	Signature	Contact #
Bashir Khan	47	Driver	Allama Iqbal Road Dharanpura	Matric	25,000	Ashain	Joint	میں نے سب سے زیادہ	شیر	—
Shahab	44	Employee	Dharanpura	Matric	20,000	Sheikh	Joint	کلیا بہت زیادہ ہے	شیر	0300-4811480
Naseer Ahmad	54	Employee	Dharanpura	F.A	20,000	Rajput	Joint	بہت زیادہ ہے	شیر	03247736
Shahzad	38	Employee	Dharanpura	F.A	17,000	Ashain	Joint	بہت زیادہ ہے	Shahzad	0320-1683101
Naseem Javeid	39	Branch Man	Dharanpura	Matric	40,000	Rajput	Separate	بہت زیادہ ہے	M. Khan	0301-555550
Anjum Shahzad	53	Emp. large	Dharanpura	Matric	15,000	Ashain	Separate	بہت زیادہ ہے	Shahzad	0323-0497
M. Fatih Chaudhary	32	Banker	Dharanpura	NBA	25,000	Mughal	Joint	بہت زیادہ ہے	Shahzad	0305-1103531
Zehrat Khan	34	Employee	Dharanpura	Middle Pharmacy	10,000	Ratham	Joint	بہت زیادہ ہے	Shahzad	0300-915446
Umar	28	Business	Dharanpura	Pharmacy	20,000	Rajput	Separate	بہت زیادہ ہے	Shahzad	0304-4806229
M. Zahoor	32	Employee	Mughalpur	Primary	800-1000	Ashain	Separate	بہت زیادہ ہے	Shahzad	0304-7165202
Qaiser	25	Salesman	Mughalpur	Matric	16,000	Ashain	Separate	بہت زیادہ ہے	Shahzad	0304-999453
Ahson	28	Designer	Mughalpur	I.Com	15,000	Qureshi	Joint	بہت زیادہ ہے	Shahzad	0304-605784
Komal	21	Teacher	Mughalpur	B.S (Hons)	12,000	Mughal	separate	بہت زیادہ ہے	Shahzad	0324-12457

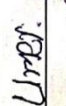
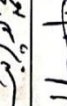
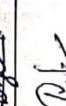
Social Survey Feedback Form:

Name	Age	Occupation	Address	Education	Income	Caste	Family System	Feedback	Signature	Contact #
Sarfaraz	30	Laborer	Hando-Lyikan	N/A	30X	Gujjar	Joint	اچھ کا خیال رکھو	سفر	818 0322-47994
Abdul-Gani	33	Zamidar	Ganj-Sindhwan	N/A		Rajput New	Joint	کام چلا رہا ہوں	عبدالغنی	446 0322-4232
Gannudan	55	Zamidar	Ganj-Sindhwan	N/A		Rajput	Joint	کاروبار سنا کر رہا ہوں	فکر دین	—
Akshad	45	Shop	Ganj-Choud	Matric	25X	Asthan	Joint	محنت میں مصروف ہوں	ارشد	0303-951362
Asfay	48	Shop	"	Matric		Kambo	Separate	نیارو دے گا کر رہا ہوں	اشفاق	300 426.507
Sarfat Ali	38	Shop/Hotel	"	N/A		Joint	Joint	صوفیہ ہو چکا ہوں	سفر	0342 3927490
Razan Ali	42	Shop	"	N/A		Rajput Separate		عام اچھا ہے۔	سفر	0341-860 2414
N. Selay	22	Shop	"	N/A		Rajput Joint		غل میں آنا چاہیے۔	سفر	0344-400 2095
Ch. Hira-Kambo	30	Shop	"	Matric		Anan Joint		علاقہ نئی کھی	لیاقت علی	0341-43 22266
M. Faraz	27	Shop	"	N/A		Anan Separate		محنت میں مصروف ہوں	سفر	1316-4639 671
Liyaqat Ali	50	Shop	"	Middle		Anan Joint		یون چاہیے۔	سفر	0323-4929 4964929
Nehsin Ali	27	Shop	"	N/A		Anan Separate		محنت میں مصروف ہوں	لیاقت علی	0324-449 57379
Rizwan	40	Shop	"	N/A		Anan Joint		محنت میں مصروف ہوں	عمر علی	0321- 677990
						Anan Joint		لڑھکا	لڑھکا	0346-45 4444

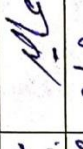
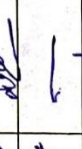
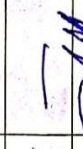
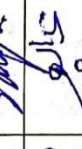
Social Survey Feedback Form:

Name	Age	Occupation	Address	Educational	Income	Caste	Family System	Feedback	Signature	Contact #
Ashu	30	House wife	Shalamar Chowk	Matriculate	—	Araia	Separate	شوالمار چوک	AISA	03004488469
Ahsan	22	Shopkeeper	Shalamar Chowk	B.A		Sheikh	Separate	شوالمار چوک	Sheikh	0323-72703
Rahel	33	Shopkeeper	Shalamar Chowk	Matric	15,000	Mughal	Joint	شوالمار چوک	Rahel	0323-72703
Rehmat Ali	60	Employee	Shalamar Chowk	—	400-500	Araia	Joint	شوالمار چوک	Rehmat	—
Afzal	32	Shopkeeper	Shalamar Chowk	Matric	15,000	Gujjar	Separate	شوالمار چوک	Afzal	0322-338790
Nasir	24	Driver	Shalamar Chowk	Middle	15,000	Eyed	joint	شوالمار چوک	Nasir	0302937234
Owais	22	Employee	Begum Pura Chowk	Middle	17,000	Mehar	Joint	شوالمار چوک	Owais	—
M. Anjad	44	Workshop	Begum Pura Chowk	Matric	15,000	Balah	Joint	شوالمار چوک	M. Anjad	0334 9793783
Bashir Ahmad	40	Vendor	Begum Pura Chowk	Matric	10,000	Araia	Separate	شوالمار چوک	Bashir	0332760
M. Nazeem	25	Vendor	Begum Pura Chowk	Primary	10,000	Rehman	Separate	شوالمار چوک	M. Nazeem	0306553420
M. Yousaf	55	Scrapshop	Begum Pura Chowk	Primary	7000	Mughal	Separate	شوالمار چوک	M. Yousaf	0300-4432
Sarfraz Ali	41	Workshop	Begum Pura Chowk	Middle	30,000	Mughal	Separate	شوالمار چوک	Sarfraz	0324-8473
Shahzad	50	Scrapshop	Begum Pura Chowk	Middle	30,000	Rathor	Joint	شوالمار چوک	Shahzad	0306553420

Social Survey Feedback Form:

Name	Age	Occupation	Address	Education	Income	Caste	Family System	Feedback	Signature	Contact #
Amir	42	General Store	Alina Sghal Road	F.A	50k	Ahhadi	J	افغانستان		0302 4240540
Yaron	39	Salesman	Shahman	F.A	50k	Pajani	J	ساحر پانی طاکا		0321 4190124
Fahudin	50	Toddler	Alina Sghal Road	Nil	10k	Shukh	S	علاقہ ترقی کرنا		8835132 0323
M. Umer	22	Worker	Alina Sghal Road	Middle	12k	Bud	J	رضی کے ریت کم کمان		0300 94129893
M. Aliem	68	Auto mechanic	"	100m	18k	Bud	J	نیکس ماہ صاف کرنے		0349 4355183
Shahid	40	Zimindara	Dharm Pura	FA	80k	Gujjar	J	سین کا خاصہ کچھ		0300 4652286
K. M. Son	20	Mobile Shop	Muskel Pura	Middle	5k	Khan	J	انجیا صاف کرنے		0321 1018052
Latif	30	Pikharu	Daroshwala	Nil	20k	Khali	S	انجیا صاف کرنے		0324 4133455
M. Azam	32	Shopkeeper	Sandhama	Nil	15k	Lahar	J	صاف کرنے، پھارنا		
Javed	68	General Shop	Sandhama	Nil	35k	Nau	J	سلاخ ترقی کرنا		6827935
M. Akbar	25	Behar	Mandi Sandhama	Nil	10-15k	Khali	J	انجیا صاف کرنے		0324 4491500
Shahid	42	General Shopkeeper	Singh Pura	Middle	24k	Pajani	J	پنر بن صاف کرنے		6324 4800662
Amir	60	Retired	Singh Pura	Middle	10k	Alia	J	انجیا صاف کرنے		0334 4491500

Social Survey Feedback Form:

Name	Age	Occupation	Address	Education	Income	Caste	Family System	Feedback	Signature	Contact #
Munir Ahmad	60	Shopkeeper	Baghban Pura.	Matric	15,000	Sheikh	Separate	میں نے بہت اچھا فیڈ بک دیا ہے۔		0315 420976
Abid	38	Shopkeeper	Baghban Pura	Matric	15,000	Rathan	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0313-400161
Saydar	24	Employee	Baghban Pura	Matric	10,000	Rajput	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0300885523
Jafan	23	Vendor	Baghban Pura	—	32,000	Rajput	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		—
M-Riaz	23	Hardware	Chungi Srip	Matric	10,000	Ansari	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0323-7526505
Abu Bakas	21	Student	Mehsode Chungi	B.S	—	Jutt	Separate	میں نے بہت اچھا فیڈ بک دیا ہے۔		0305 5000129
Fayyaz	23	Vendor	Chungi Vasa	Matric	15,000	Rajput	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0380 423719
Sadiaz	45	Employee	Chungi Asad Garden	—	13,000	Gujjar	Separate	میں نے بہت اچھا فیڈ بک دیا ہے۔		0320-4779818
Ayqaz	40	Security guard	Asad Garden	—	—	Khok	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		—
Shorant	45	Employee	Pir Abdul Kaman	Matric	15,000	Mughal	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0300 9437773
Abad	40	Employee	Tandeyla	—	18,000	Araich	Separate	میں نے بہت اچھا فیڈ بک دیا ہے۔		0322 7848023
Jawid	45	Manager	Chanjay Sindhu	—	—	Meyon	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0322-4532865
Atif	25	McFamit	Chanjay Sindhu	—	1000	Jutt	Joint	میں نے بہت اچھا فیڈ بک دیا ہے۔		0322-4326367

Social Survey Feedback Form:

Name	Age	Occupation	Address	Education	Income	Caste	Family System	Feedback	Signature	Contact #
Shaqid	40	Owner Businessman	Shabziman di G.T. Lahore	Middle	15,000	Rajpoot	Separate	بہ اچھا برہمنیکٹ ہے		0332-442539
Minsarut	38	house wife	Sh G.T. road	Matric	20,000	Rajpoot	Separate	پانی کی کمی کو دور کرنے کے لیے اچھا طریقہ ہے		03067068
Sumera	44	house wife	nabipura anarayan	F.A	18,000	Malik	Joint	اسی منصوبے پر جلسی عمل کرنا چاہیے		0322-
Mrs. Hadi	40	Teacher	Darogewala	Master Urdu	7,000-1	Syed	Joint	ملکی بھرتی کے لیے اداروں کی فہرست لود کر کے اچھا ہے		9898220
Alam	23	Sales man	Chaman Park, Baghpora	F.A	20,000	Rajpoot	Separate	تم اس حق میں ہیں۔		03224038
Syed Shabzib Abbas	47	Optician	Gari-Shalvi	Matric	18,000-29,000	Syed	Separate	مرد رنگ چاہیے		0354424644
M. Sarfaraz	38	guard	Shadi pura Band road	Matric	13,000	Rajpoot	Joint	پانی کی کمی کو بستر طریقہ سے دور کرنا		03039677817
Mehmona	25	Teacher	Baghpora	grad - Commerce	16,000	Mughal	Sep	لوگوں کو صاف پانی فراہم کرنا بہت اچھا کام ہے		0324-1044978
Harwan	35	Sales man	Chugi stop G.T. road	F.A	27,000	Ansari	Separate	عوام کو پانی جڑ سے آگے لانا چاہیے		0307-8863380
Nazir	24	Shipkeeper Business	Chugi stop wara shahar	F.A	4 Lac	Mian	Joint	مرد رنگ چاہیے		0324-8863380
Daniel	26	Owner Businessman	Chugi stop, Islam Park	I Com	50,000	Sheikh	Joint	بہ ایک بہت اچھا تجویز ہے		0323-4044871
Rarees	23	owner Businessman	Handu Chowk	Nil	20-22,000	Rajast	Joint	اسی منصوبے پر جلسی کرنا چاہیے		0909820481

کل درآمد بریلیٹ

Chowk

Social Survey Feedback Form: LWASA-AIIB

Name	Age	Occup	Address	Edu	Income	Caste	Family System	Feedback	Sign	Contact #
Rahim Dad	27	Carpenter	Wagha Town	Mulla	10-15	Rathan	5	میرا بیٹا ہے		0321 7030424
Nisamat Ullah	38	Carpenter	Wagha Town	Mulla	10	Rathan	5	میرا بیٹا ہے		0305 1689635
Akmal Shikhan	27	Engineer	Taj Bagh	BSE	50	Arain	5	میرا بیٹا ہے		2500 2770811
M. Abd. Ullah	20	Nothing	Lakhodars	Mulla	0	Jutt	5	میرا بیٹا ہے		0322 483108
Rafiqat	30	Electrician	Lakhodars	Mulla	50	Jutt	5	میرا بیٹا ہے		0334 4370991
Nadeem	29	Farmer	Lakhodars	Nip	25-30	Jutt	5	میرا بیٹا ہے		0313 4681818
Khalid mehmood	49	Kabbaz	Bhaini	Mastri	10-12	Dogras	5	میرا بیٹا ہے		0303 2085028

Annexure-O

PICTORIAL PROFILE OF CONSULTATION WITH GOVERNMENT OFFICIALS AND RESPONSIBLE AUTHORITIES



Consultation with Deputy Secretary (Planning), Punjab Forest Department, Lahore.



Consultation with Director General at Fisheries Department, Lahore



Consultation with Deputy Secretary (Operations) at Punjab Irrigation Department, Lahore
Consultation with XEN (operation) at Punjab Irrigation Department, Lahore



Consultation with Director HQ at Punjab Wildlife & Parks Department, Lahore



Consultation with Deputy Director (Planning) at Punjab Industries



Consultation with Director Pakistan Metrological Department



Consultation with Deputy Director Pakistan Geological Survey, Lahore



Consultation with Regional Director Pakistan Council of Research in Water Resources (PCRWR) Lahore



Consultation with Deputy Director Archaeology Department, Lahore

Annexure-P

FEEDBACK FORMS OF CONSULTATION WITH GOVERNMENT OFFICIALS AND RESPONSIBLE AUTHORITIES

Government/Stakeholder Consultation/Feedback Form

Name	Designation	Address	Feedback	Contact No. & Email	Signature
MA'ADEEN ANJUM	Deputy Director	Geologized Survey of Pakistan Chare	The proposed site doesn't fall in high seismic activity area. Sufficient measures should be adopted in any seismic conditions.	0333-4350613 nadeemah1000@yahoo.com	
Zameer Ahmed SODRO	Regional Director	Regional Office 6.4 km. of Rawand Road Lahore	The water quality of proposed area is not upto the mark. Clean drinking water should be provided to avoid many infectious diseases.	0301 8686 765- singrasaz Q gmarl.com	
Muhammad Atzal Khan	Deputy Director (South)	Shahi Qila	Pipe leakage - Proper design and layout map should be provided. All the establishment should be at proper distance from all cultural & heritage sites. If all the management measures adopted by keeping protection of cultural sites in mind then Archaeology Dept. have no issue.	042-4933 2672	
Maqsood Ahmad	Deputy Director (North)	Shahi Qila		0321-478 4084	

GOVERNMENT STAKEHOLDER CONSULTATION FOR AIB- LWASA PROJECTS

Name	Department	Designation	Feedback	Signature	Contact No.
1) Dr. Sikandar Hayat	Fisheries Dept.	D.G.	Through request letter.		042-99212379
2) Muhammad Naeem Parithi	Punjab Wildlife & Parks Dept.	Director H.S.	Require formal letter of introduction of the project addressed to DG Wildlife to proceed further	 24/7/2019	042-99212384
3) Dr. Naeem Mushtaq	DS, OP-II Irrigation Dept		referred to xenops. before for discussion on matter	 24/7/19	042-99212708
4) Naeem Baig	SEN(OP), Irrigation & M zone.		formal request from Environment Dept. is required. 24/7/19		042-99212089

Government Official / Stake Holder Consultation Form

Sr. No	Department	Contact Person	Designation	Feedback	Signature
1	PAKISTAN METEOROLOGICAL DEPARTMENT Regional Centre Lahore	MOHAMMAD AJMAL SHAH	DIRECTOR	CLIMATE VARIES DAY TO DAY AND LOCATION TO LOCATION. WEATHER FORECASTING IS A TECHNICAL ASPECT PROPER ENVIRONMENTAL MANAGEMENT MEASURES SHOULD BE ADOPTED IN ALL PROJECTS	
2					
3					
4					

GOVERNMENT STAKEHOLDERS CONSULTATION FOR AHB-LWASA PROJECTS

Name	Department	Designation	Feedback	Email ID / Contact No.	Signature
Muhammad Tariq Naseem	Forest, Wildlife & Fisheries	Deputy Secretary (Planning)	Dr. Samia Saif, Environmental & Social Impact Assessment Expert along with her team visited my office. She informed about project titled "Labore Water & Waste Water Treatment Project". The location of the project is Mouza Ganj Sindhuwan & Naaf. It consist of surface water treatment plant, transmission mains, feeding mains & distribution system. The Surface Water Treatment Plant shall cover more than 300 acres of Agriculture land with trees at random. The construction of surface treatment plant will disturb bio-diversity of the area. The flora & fauna associated with this ecosystem will be disturbed at the time of construction of surface water treatment plant, transmission mains, feeding mains & distribution system. It is the duty of the consultant firm to propose steps which will be helpful to save or rehabilitate original flora & fauna. It is proposed that construction of infrastructure may be carried out in such a way that original flora i.e. trees & shrubs can be saved. Moreover after completion of the project about 25-30% area may be declared as Green Area where ever green indigenous tree species with maximum foliage like Pipal, Arjun, Ficus spp & Pelkin may be planted which will be helpful to save bio-diversity of the area. In addition,	ahb.ta.ahb@diglobal.com 0355 6660024	

GOVERNMENT STAKEHOLDERS CONSULTATION FOR AIB-LWASA PROJECTS

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Annexure-Q

PICTORIAL PROFILE OF CONSULTATION WITH EXPERTS



Consultation with Environmental Expert: Dr. Kausar Jamal Cheema



Consultation with Waste Water Expert: Dr. Asim Mahmood



Consultation with Biological Expert: Dr. Aleem Chaudhary



Consultation with Environmental Expert: Dr. Saamia Saif



Consultation with Solid Waste Expert: Dr. Ali Kamran



Consultation with Hydrological Expert: Mr. Waqar Ahmad

Annexure-R

FEEDBACK FORM OF CONSULTATION WITH EXPERTS

Environmental Experts Feedback Form-LWASA Project

Sr. No	Name	Designation	Feedback	Contact Details	Signature
01	Muhammad Wasim	Lecturer	The project site is not located in flood prone area but suitable measures should be adopted for urban flooding. Detailed water quality assessment of area should be carried out.	03008470712 hydrologist86@gmail.com	M. Wasim
02	Dr. Ali Kamran	Waste Management Expert	Solid waste generated from the site should be managed effectively. Waste generated from site should be disposed off according to TMA guidelines.	0300-445506 alikamran@yahoo.com	Dr. Ali Kamran
03	DR. SAFIA SAF	Environment Expert	The project will result in positive impacts if the implementation of EMP is ensured.	0324-4664355	Dr. Safia

Name	Occupation	Address	Feedback	Signature	Number
Dr. Farida Arooj	Teaching Water Expert.	Department of Environmental Sciences, UMS, Lahore	Chlorination is not appropriate due to by products formation, so you should use ozonation for disinfection otherwise project is very important for the residents of Lahore. At least membrane technology should be used for the purification of water. and detailed investigation of BOD canal water quality must be conducted to check the adequacy of WWTP design. Continuous monitoring must be conducted through the process to check the possibility of water. Mitigation measures to avoid environmental impacts are appropriate.	<i>[Signature]</i> 8/9/19.	

GOVERNMENT STAKEHOLDER CONSULTATION FOR AIB- LWASA PROJECTS

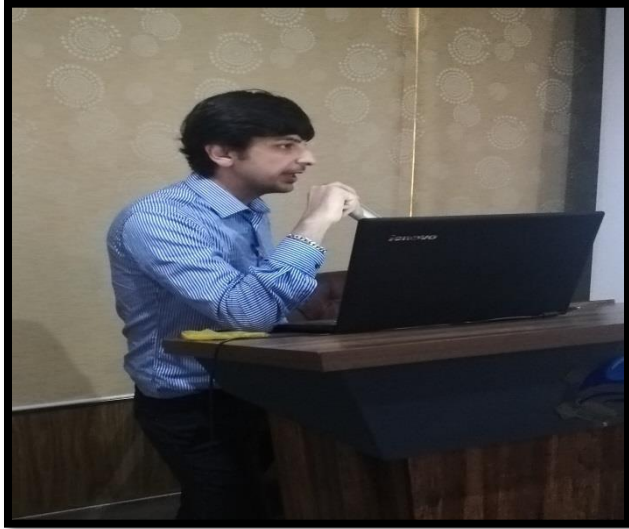
Name	Department	Designation	Feedback	Signature	Contact No.
Tammi Hand Tanger	Dist Wishup Dept	Dist. mid-level officer Wishup	Really is good workshop for consultation & submissions about future and plans of no submissions by Sept		0333- 4208418

Annexure-S

PICTORIAL PROFILE OF STAKEHOLDER ENGAGEMENT WORKSHOP



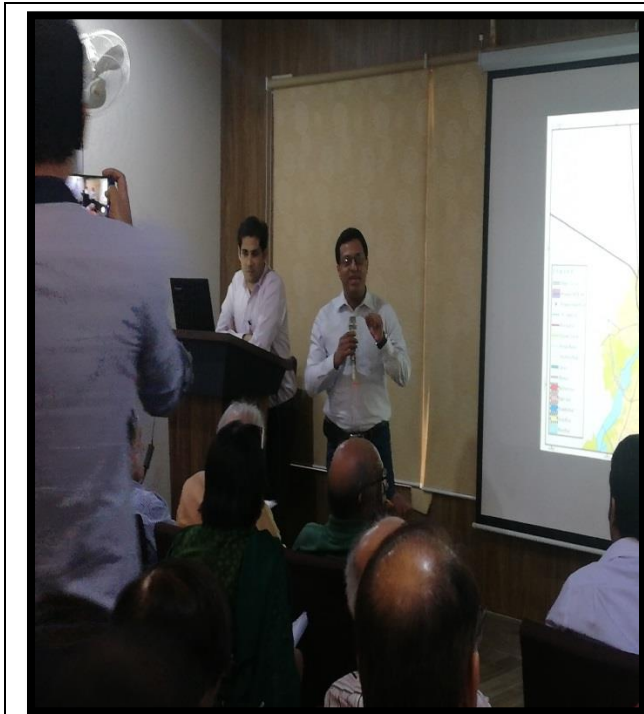
Pictorial Profile of Stakeholder Consultation Workshop



Pictorial Profile of Stakeholder Consultation Workshop



Pictorial Profile of Stakeholder Consultation Workshop



Pictorial Profile of Stakeholder Consultation Workshop

Annexure-T

ATTENDANCE SHEET OF STAKEHOLDER ENGAGEMENT WORKSHOP

Attendance Sheet of Stakeholder Consultation Workshop

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	Azmat Beg	MMP	Environmental Specialist	27- Empress Road, Lahore	03334535623	azmat.beg@gmail.com
	DR. KHANUM BEGUM	Dept of Fisheries B.	Division Fisheries Ph.	2. Santa Road Lahore	0321-484104	khaidipeniaz07@gmail.com
	IHSAN UL HAQ FAROOQI	MM Pakistan	Social Development Specialist	27- Empress road Lahore	0344-407347	ihshanul.haque@mm-pakistan.com
	Amanat Ali	Urgent Dept.	SDO Ravi Syphon	Canal bank Mustafabad Lahore	03006099564	feziamanata@gmail.com

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	Sara Raza	Forman Christian College University (FCCU)		B.	0331-425-2984	sara.raza313@gmail.com
	Shah Zaib Alvi	ECO	Project Manager	Cavalry Ground Lahore Cantt.	0301-6641633	Szaidalvi@ecv-india.org
	Iftikhar Ahmed	ECO	Environmental Engineer	Cavalry Ground Lahore Cantt.	0310-4462438	iftikharahmed0738@gmail.com

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	M. Shuaib Kabeer	C-3 Engineering	Environmental Manager	—	0333- 0133153	Shuaibkabeer@ eco-intl.org
	Munazza Khan Khan	C-3 Engineering	Jr. Environmental	—	0313- 7006410	MunazzaKhan@ eco-intl.org
	Waqas Naseer	WASA LDA LHR	XEN (WWT)	—	0340-9316516	
	M. Umair Imtiaz	WASA LDA LHR	SDO (WWT)	—	0321-7979 008	

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
1	Muhammad Wasim	Punjab University Lahore	Lecturer	College of Earth and Environmental Sciences University of Punjab (Lahore)	03008470112	hydrologist186@gmail.com
2	Syed Aslam Sabzwari	MMP	Team-Leader	27-Express Road, Lahore	0345-1006301	aslam.sabzwari@mmpakistan.com
3	Syed Imran Haider	MMP	ENGINEER	"	0317-5103037	imran.haider@mmpakistan.com
4	Muhammad Rehman	WASA	AD GIS		0334-1334400	muhammad.rehman@hotmail.com

5) Rao Zakarya Farooq
Irrigation Div (Enod Social)
337- Canal 0333-4978676 adre.pppm.p
view.society@gmail.com
Lahore

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
1	Shahid Habib	Irrigation Dept	Deputy Director		0321-4600718	Shahid.Habib@gmail.com
2	Zahid Iqbal	ECO	Director Sociology	Cavalry Ground Lahore Cantt	0300-8044476	Zahid@eco-intl.org USA600@gmail.com
3	Dr. Kamran Jamal Chaudhary	ECO	Environment Specialist	ECO Cavalry Ground Lahore Cantt	0333 4768090	drkamran@eco-intl.org
4	Sumaira Ashfaq	ECO	Junior Environmentalist	ECO Cavalry Ground Lahore	0307-7077593	Sumaira@eco-intl.org

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	BURIRA ANAM.	WASA-LDA	AD (GIS)		03368880805	Burira.anam@gmail.com.
	Asia Amin	WASA-LUR	AD (PED)	WASA Planning & Design Director General LUR	0337- 7802023	asiyaminin@yahoo.com
	Imdad Hussain	FCC	Assistant Professor	F-C College	0345 4711162	Imdadhussain@fcollege.edu.pk.
	Amna Rashid	PRC	Student	LSE Lahore	0334- 4005602	amnaresid1989@gmail.com

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	Sana Fatima	WASA, Lahore	Dy. Director (Procurement)	—	0337780037	s.imaide@pakistan.gov.pk
	MUJEEB WARS	WASA LAHORE	Director (H.O) to H.O	53-C-2 M.A.G. Rd. Fa	0321-4687037	mujeeb.wars@pakistan.gov.pk
	Saima Ashraf	ENWMP	Assistant	113/3 Gorkhi Shahin, Allama Iqbal, rd	03344337196	saimaashraf30@gmail.com
	Muhammad Khalid	DC-I WASA	A.D	S.P. F GULSHAN-E-NABI	0321-4877554	musa7884@gmail.com

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	MR HAMMAD AJMAL SHAD	PAKISTAN METEOROLOGICAL DEPARTMENT	DIRECTOR	Regional Meteorological Centre 46-Jail Road LAHORE	0333/4271258	mhamadshad 113@fmail.com
	Dr. Muhammad Ashraf Boddla	M H Pakistan	Chief Environmentalist	277 E-1 WAPDA Town, Lahore	03004739866	Bd. boddla99 @hotmail.com
	Sadagat Latif	Irrigation	Executive Engineer	Canal Bank Mustafabad Lahore	03224486727	sadagat-latif @yahoo.com
	Uzma Ali Khan	Irrigation	Sub Divisional Officer	Whore Durgah Division	0336-7483088	enguzamali144 @hotmail.com

ATTENDANCE SHEET OF PARTICIPANTS

Sr. No.	Name of Participant	Organization	Position	Address	Contact Number	Email Address
	Aziz ul Haq	Landholder	-	19A, ST. John Park, Lahore Cantt	0300 4388320	Azhaq1@a hotmail.com
	Mansoorul Haq	Landholder	-	village Gajee Sada - 29572 Sargodha Rd; Lahore cantt.	0300-8438238	MANZURHAQ1 @GMAIL.COM
	KAMIL KHAN MUMTAZ		Architect	18-A, ST. C, UPPER MALL SCHME	0300 424 1500	khanarchitects @gmail.com
	Rana Savran	Consultant		297-A Nishtar Alama Iqbal TOWN Lahore	0300 5263243	Savranrana @GMAIL.COM

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Annexure-U

CALCULATIONS FOR POWER REQUIRMENT

Calculations

TOTAL POWER REQUIREMENT OF EXISTING TUBE WELLS AND PROPOSED SWTP

Power Requirement of SWTP

The total energy requirement of proposed SWTP would be 04 MW.

Power Requirement of Existing Tube wells

Currently 60 tube-wells are working in these four serving areas providing water with direct pumping. The summary of existing operational tube-wells in these four areas is as below:

Tube wells		
Capacity	Number	Total Capacity (Cusecs)
2 cfs	19	38
4 cfs	41	164
Total	60	202

Following formula was utilized to calculate the total power (in KW) of each pump respective to their discharge capacity.

$$P = \frac{Qpgh}{3.6 \times 10^6}$$

P – kW (Power of pump)

Q - m³/h (Flow of Water)

ρ - kg/m³ (Density of Water)

g - m/s² (Gravitation Constant)

h – m (Head of pump)

Calculation of 2 cusec pumps:

$$P = \frac{(200 \text{ m}^3/\text{hr}) (1000 \text{ kg/m}^3) (9.81 \text{ m/s}^2) (250 \text{ m})}{3.6 \times 10^6}$$

$$3.6 \times 10^6$$

$$P = 136.25 \text{ kW}$$

By this formula the kW power of the tube wells of 2 cusecs was measured. It was found that approximately around 0.13625MW per hour. As there are 19 tube wells having the discharge capacity of 2 cusecs, the total energy consumed by them would be 2.58MW in one hour.

Calculation of 4 cusec pumps:

$$P = \frac{(400 \text{ m}^3/\text{hr}) (1000 \text{ kg/m}^3) (9.81 \text{ m/s}^2) (250 \text{ m})}{3.6 \times 10^6}$$

$$3.6 \times 10^6$$

$$P = 272.5 \text{ kW}$$

Similar calculations were done in case of tube wells of 4 cusecs discharge capacity, and it was found that 41 tube wells of 4 cusecs each would consume 11.17 MW of electricity in one hour.

The total energy consumed by all of the tube wells already installed are equal to 13.75Mw.

Annexure-V

LABOUR CAMP MANAGEMENT PLAN

LABOUR CAMP MANAGEMENT PLAN

The scope of this plan covers the sitting, development, management and restoration of construction camps to minimize and mitigate impacts on the environment. Local and migrants both shall be employed in this project.

This plan is developed as per guidance provided in ESMP on labour camp sitting, management and labour accommodation.

The contractor once on the site would require to establish a construction and labour camp. The land for the establishment of camps will be decided after obtaining consent from local residents and land owners.

Most of the impacts arising from operation of the camp would be managed mainly by Construction Contractor. Responsibilities for managing these impacts have been clearly initiated as contractual commitment, with suitable mechanisms for addressing non-compliance.

The contractor would also be required to formulate specific labor management procedure and mitigation prior to start construction and monitor and update the labour management plan as and when needed during the project.

LWASA would also develop a separate training manual with the help of technical experts to build the capacity of LWASA Staff, supervision Consultants and contractors and sub-contractors in developing and execution of this labour management plan. This plan would address detailed activities that will be undertaken to minimize the impact on all sensitive receptors present at site such as

- Communication and awareness plan on all national and provincial labour and women harassment laws and policies and its penal implications and allowances for workers benefit
- Labour codes of conduct with respect to child labour, manual scavenging, meeting with residents, nondiscrimination, harassment of colleagues including women and those belonging to other minority social groups
- Training sessions on HIV/AIDS and all other communicable diseases, etc.
- Compliant handling mechanism

Pre-Construction Stage

1. Siting

The contractor will work out arrangements for setting up his facilities during the duration of construction with the local residents and LWASA-PMU. These preparations shall be in the form of written agreement between the contractor and the local residents that would stipulate:

- Pictures of the proposed camp site in original condition;
- List the activities to be carried out at the site
- Environmental mitigation measures to be undertaken to avoid land, noise, air & water.
- Detailed layout plan for the establishment of the construction and labour camp that shall specify the various structures and facilities to be constructed in the camp including material storage and toilets.
- Detailed Site Restoration plan

All these arrangements will be verified by the LWASA-PMU to enable redressal of grievances at a later stage of the project.

1. Establishment of Labour and Construction Camps

During construction stage of the project, the contractor would establish and maintain necessary living accommodation, additional facilities for labour such that the supplies of food, healthcare and transport. The labour camp will be set up near or at the proposed site of STPs. The camp site should be selected keeping in mind that the site would not be located within or close to any sensitive receptor. The contractor should make sure that the camp site does not negatively affect local fauna and flora of the site. All activities should be carried out within the preidentified area.

The site supervisor should take attendance of each workers twice a day (morning and evening) and should maintain proper record. Furthermore, working hours of workers should be in accordance to the labour law.

All workers should be provided with proper ID cards. Site security guards should make sure that all workers entering to the site have their ID cards with them. No

unknown person should be allowed to enter at the site. Entry of outsiders should be maintained by the site security guard.

Living accommodation with all necessary facilities should be given to all the migrant workers employed for the complete duration of construction period. The rooms of workers shall be well ventilated and lighted. Transportation to the labour from the camp to the working site should also be provided (if possible).

- 1) Site barricading and safety
- 2) Clean Water Facility
- 3) Clean kitchen area
- 4) Clean Living Facilities
- 5) Sanitation Facilities
- 6) Waste Management Facilities
- 7) Provision of Rest Area Room and Emergency Assembly Point
- 8) Safe access road
- 9) Health Care Facilities
- 10) Crèche Facility
- 11) Storage of Construction
- 12) Firefighting Facility

1) Site Barricading and Safety

Site should be entirely barricaded from all the sides to avoid entry of outsiders into the site with adequate flags, marking & reflectors etc. for safety of pedestrians and general traffic movement. A proper board should be displayed at the site, name and capacity of the project, brief overview of financing & executing agency and contractor, estimated project time period, necessary safety and warning signs, sign related to restriction of entry without authorization & no smoking area. All machinery and equipment operation should be restricted to 6:00 AM to 6:00 PM.

2) Clean Water Facility

In order to provide clean water facility at the construction camp, the contractor shall ensure the provisions of the following

- Potable water shall be provided to constructor labour for drinking & cooking purpose. Clean water shall be provided for cleaning, washing and bathing purpose. Drinking water quality analysis should be carried out on monthly basis.
- Every water supply or storage source should be at a distance of not less than 15-20m from any sewage drain or other source of pollution. Water sources within 15-20m proximity of drain, toilet or any source of pollution should not be used as a source of drinking water in the project.
- If bore well used as drinking water source, it shall be properly covered, the door shall be kept locked and opened only for cleaning or inspection, which shall be done at least once a month. There shall be a motor installed for extraction of water from groundwater.
- In each site, suitable facilities for utensils and washing clothes shall be provided and maintained for the used contract labour living therein. Separate and adequate toilets should be provided for the use of male and female workers. Such facilities should be easily accessible and shall be kept in clean and hygienic conditions.

3) Clean Kitchen Area

An area should be designated at site for cooking and storage of eatables. Clean fuel such as shall be provided to workers for cooking purpose. Burning of garbage, paper firewood and any other material for cooking purposed shall be strictly prohibited at the site. all kitchen waste should be properly disposed off. Water storage container at kitchen should be covered and cleaned on monthly basis. Kitchen area should be away from toilets and bathing area.

4) Clean Living Facilities

Workers should be provided with bedding facility such as Charpai and long-lasting impregnated nets for mosquito and vector control.

Facilities for storage of personal belongings for workers should be provided in form of cupboard or locker.

A separate storage area should also be provided for the PPES & tools. Proper ventilation and lighting system should be ensured in construction camp.

5) Sanitation and Toilet Facilities

Appropriate sanitary arrangements shall be provided in every work place separately for male and female workers. The arrangements shall include:

- Every latrine shall be under covered area and partitioned enough to secure privacy with proper door and fastening
- All latrines shall be adequately lighted and shall be maintained in clean sanitary conditions
- All latrines should have a proper drainage system
- Appropriate water storage container shall be provided in all latrines.
- Good hygiene practices should be maintained in all camps.
- All the wastewater generated from these facilities should be disposed off properly through septic tanks

6) Waste and Wastewater Management in Labour Camp

A containerized sewage treatment plant (STP) can be installed for the duration of construction period which may treat water and make it reusable for green areas. After, the construction the same can be utilized for any other project

Provide appropriate dustbins for recyclable and non-recyclable waste in labour camp area. All recyclable waste shall be sold to authorized waste vendors and non-recyclable waste shall be disposed through EPA Certified waste vendor.

Dumping of waste and wastewater on surface/ground shall be strictly avoided or prohibited. Hazardous Waste shall not be stored in unlined ponds.

Wastewater generated from car washing/cleaning and maintenance area shall be passed through oil and grease trap and water shall be reused for sprinkling and wheel washing.

Wastewater generated at construction site should not be allowed to accumulate as standing water as the standing water may create breeding places for mosquitos.

All wastewater from labour camps shall not be directed into Ravi River but should be treated and disposed through septic tanks.

A temporary storm water drainage system should be provided at site and accumulation of storm water at site should be avoided.

Proper area shall be designated for storage of oils, lubricants and machine oils. All these substances shall be stored with suitable secondary containment

7) Provision of Rest Area Room and Emergency Assembly Point

A suitable shed should be provided at site for rest of male and female workers. Sheds should be made separately for women and men. The height of the shed shall not be less than 3.0 m from the floor level to the lowest of the roof. Sheds should be kept clean all the time. Emergency assembly point/area shall be demarcated properly at the site where all workers can assemble in event of fire, earthquake and natural calamity at the site.

8) Safe Access Road

Temporary paved surface shall be constructed to approach camp site. Transportation vehicles carrying construction material should be adequately covered to prevent dust generation and to avoid material spillage.

9) Medical and First Aid Facilities

Medical facilities shall be provided at site for labour. Visits of the doctor shall be managed twice a month wherein routine checkups would be carried out for workers. A separate camp should be built for medical checkups. Some awareness posters should be displayed at the site on safety facilitation, hygiene and HIV/AIDS. Training should be given to site personal to administer first aid on time. Adequately stocked first aid kit should be provided at the site. The first aid kit/box shall contain the following

- Small, medium, large sterilized dressings
- Piodine
- Plasters in different sizes and shapes
- A pack of Sterilized Gloves
- Bottle of potassium permanganate crystals
- Ointment for burns
- A bottle of suitable surgical antiseptic solution
- 1 pair scissors
- Thermometer (preferably digital)
- A pack skin rash cream
- Pain Killer

- Cough Medicine

Ambulance availability should be ensured at the site for carrying injured to the nearby hospital. Links should be made with nearby hospital/clinic to handle emergency if any. Number of doctors, nearby hospitals and ambulance shall be displayed in the first aid room & labour camp. All emergency contact numbers such as fire brigade, bomb disposal & police should be displayed at camp site, first aid and security guard room.

10) Crèches Facility

In case more women workers are employed, there shall be a suitable room of reasonable size for use of children under the age of 6 years. The room should have proper light and ventilation. A caretaker is to be appointed to look after the workers children. The use of the room shall be limited to children, their mothers and the caretaker.

11) Storage of Construction Material in Construction Camps

- A proper area should be designated for storage of all construction material.
- All hazardous substances such as oil, lubricants, paints should be stored in proper area. All these material/substances shall be stored with secondary containment to avoid spills.
- Impervious surfaces should be used for refueling sites and other fluid transfer areas to avoid water and soil contamination due to spillage.
- Training should be provided to workers on correct transfer and handling of fuels and chemicals
- Spill kit should be available and accessible to site workers
- All hazardous materials shall be stored in a barricaded area. In case of electrical equipment, danger signs shall be posted.
- The batch and asphalt mixing plant are to be located away from the residential area and not in the direction of wind. Separate vehicles parking areas and also workshop areas need to be provided.

12) Firefighting facilities

- Adequate firefighting arrangement shall be made at the site. The following precautions need to be taken:
 - Demarcation of area prone to fires with cautionary signage

- Portable fire extinguishers and/or sand baskets shall be provided at easily accessible locations
- Contractor shall educate the workers on usage of this equipment.

During Construction Activities

Keep and maintain construction camp free from litter/garbage and in good hygienic conditions. It should keep free from spillage of fuel, oil and lubricants. In case of accidental spillage, immediately clean the spill to avoid pollution of soil, water stored or adjacent water bodies. The following precautions need to be taken in construction camps.

- Adopt measures to ensure that no leaching of oil and grease into water bodies or underground water takes place
- Wastewater should not be discharged into water bodies.
- Regular collection of solid wastes should be ensured and should be disposed safely.
- All consumables as the first aid equipment for maintaining hygiene and sanitation should be recouped immediately.
- The scrap/debris generated during construction should be kept in a designated and barricaded area.
- The LWASA will monitor the cleanliness of construction campsites and ensure that the sites are properly maintained throughout the period of the contract.

A. Grievance Redressal System

A complaint box and complaint register should be provided at the site so any person from local resident can register their complaint, if any due of the camp, workers and other facilities. The grievance mechanism shall be communicated to local communities through consultations. Open house sessions/meetings should be conducted with workers on monthly basis to identify their concerns/problems and issues if any related to safety, comfort, health, hygiene and other issues.

Activities prohibited at site

- Those activities which should be strictly prohibited at site shall include
- Disturbance to local community

- Open burning of waste
- Adoption of unfair means or getting indulgence in any criminal activity
- Non-compliance of the safety rules as communicated by safety officers and during the trainings
- No fauna shall be harmed by any construction worker, except in self defense
- Cutting of tree without permission of project head
- No indigenous population shall be offended or teased

C. Post Construction/Decommissioning Stage

After the completion of construction work, all camp facilities shall be dismantled and removed from the site. The site shall be restored to original condition in no way inferior to the condition before to commencement of the work.

- All temporary structures should be removed and cleared from the site
- Waste generated during construction should be disposed suitably as per the construction waste management plan.
- All trenches should be filled in, disinfected and effectively sealed off
- All the areas within the camp site should be levelled and spread with stored top soil so as to aid faster rejuvenation.
- Residual topsoil, if any will be spread evenly in plantation sites or affected agricultural land adjacent to the proposed project site that has been impacted because of any accidental spillage.
- All fuel and oil contaminated soil shall be removed and transported and buried in waste disposal areas.
- Whole camp area should be left clean and tidy, in a manner keeping the adjacent lands neat and clear, to the entire satisfaction of LWASA
- Proper documentation of rehabilitation site shall be maintained. This shall include the following:
 - Pictures of rehabilitated site
 - Undertaking from contractor
 - Certification from project director of LWASA

Annexure-W

GHG EMISSIONS INVENTORY

Green House Gas Emission Inventory Package 03

		Activity Data			Total Fuel Consumption	*CO2 Emission Factor of Diesel Fuel	*CH4 Emission Factors of Diesel Fuel	*N2O Emission Factors of Diesel Fuel	GHG Emission kgCo2eq							Tonnage of CO2w
Machinery Type	Quantity	Fuel Consumption	Working Hours	Working Day						GWP of CO2		GWP of N2O		GWP of CH4	total kg/litres	TonsCo2e
		Diesel Liters	hr	days	litres	Liquid Basis Kg/litre	Liquid Basis Kg/litre	Liquid Basis Kg/litre	CO2 Kg/litre	100 yr GWP (AR4)1	N2O kg/litres	100 yr GWP (AR4)1	CH4 kg/litre	100 yr GWP (AR4)1		
Bulldozer (Rough Grading)	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Bulldozer (Stock Piling)	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Concrete Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.758334	265	2413.914048	28	642609.7829	642.6097829
Concrete Pump	2	26	12	260	159120	2.676492	0.0003612	0.000021672	425883.407	1	913.8388896	265	1609.276032	28	428406.522	428.406522
Crawler Crane	2	26	12	260	159120	2.676492	0.0003612	0.000021672	425883.407	1	913.8388896	265	1609.276032	28	428406.522	428.406522
Diesel Generator	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Excavator	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Grader	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.758334	265	2413.914048	28	642609.7829	642.6097829
Hydraulic Shovel	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Loader	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Off-Road Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.758334	265	2413.914048	28	642609.7829	642.6097829
Dump Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.758334	265	2413.914048	28	642609.7829	642.6097829
Water Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.758334	265	2413.914048	28	642609.7829	642.6097829
Wheel Loader	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Vibrating Compactor	2	26	12	260	159120	2.676492	0.0003612	0.000021672	425883.407	1	913.8388896	265	1609.276032	28	428406.522	428.406522
Compressor	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Batching Plant	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Asphalt Plant	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.9194448	265	804.638016	28	214203.261	214.203261
Grand Total					2466360				6601192.809		53.45095392		890.849232		6640301.09	6640.30109

Green House Gas Emission Inventory Package 04

		Activity Data			Total Fuel Consumption	*CO2 Emission Factor of Diesel Fuel	*CH4 Emission Factors of Diesel Fuel	*N2O Emission Factors of Diesel Fuel	GHG Emission kgCo2eq						Tonnage of CO2w	
Machinery Type	Quantity	Fuel Consumption	Working Hours	Working Day						GWP of CO2		GWP of N2O		GWP of CH4	total kg/litres	TonsCo2e
		Diesel Liters/hr	hr	days	litres	Liquid Basis Kg/litre	Liquid Basis Kg/litre	Liquid Basis Kg/litre	CO2 Kg/litre	100 yr GWP (AR4)1	N2O kg/litres	100 yr GWP (AR4)1	CH4 kg/litre	100 yr GWP (AR4)1		
Bulldozer (Rough Grading)	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Bulldozer (Stock Piling)	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Concrete Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.75833	265	2413.914	28	642609.7829	642.6097829
Concrete Pump	2	26	12	260	159120	2.676492	0.0003612	0.000021672	425883.407	1	913.83889	265	1609.276	28	428406.522	428.406522
Crawler Crane	2	26	12	260	159120	2.676492	0.0003612	0.000021672	425883.407	1	913.83889	265	1609.276	28	428406.522	428.406522
Diesel Generator	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Excavator	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Grader	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.75833	265	2413.914	28	642609.7829	642.6097829
Hydraulic Shovel	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Loader	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Off-Road Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.75833	265	2413.914	28	642609.7829	642.6097829
Dump Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.75833	265	2413.914	28	642609.7829	642.6097829
Water Truck	3	26	12	260	238680	2.676492	0.0003612	0.000021672	638825.1106	1	1370.75833	265	2413.914	28	642609.7829	642.6097829
Wheel Loader	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Vibrating Compactor	2	26	12	260	159120	2.676492	0.0003612	0.000021672	425883.407	1	913.83889	265	1609.276	28	428406.522	428.406522
Compressor	1	26	12	260	79560	2.676492	0.0003612	0.000021672	212941.7035	1	456.919445	265	804.638	28	214203.261	214.203261
Grand Total					2307240				6175309.402		13250.6639		23334.5		6211894.568	6211.894568

Per anum

Annexure-X

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT PLAN

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT PLAN

The contractor should conduct a Health Risk Assessment of all construction activities for all chemical, biological, physical, ergonomic, physiological health hazards and emergency situations associated with work at construction site. The risks should be evaluated as low, medium or high on the Risk Assessment Matrix based on which control measures should be selected and implemented. Onsite and Off-site emergency preparedness and response plan shall also be developed to effectively handle emergency situations on time.

The environmental, health and safety aspects and related emergency preparedness response can include incidence such as collapse of plant structure, trench, fire explosion and other occupational accidents.

The selection of controls should take into account hierarchy of control i.e. Elimination, Substitution, Engineering, Administrative and Personal Protective Equipment.

The Contractor shall develop the onsite emergency plan considering the significant environmental, occupational health and safety emergency at site and activities involved, and submit a copy of this plan to LWASA-PMU and Project Environmental Consultant before the start of work.

Construction staff shall be trained enough in the nature of handling occupational risk, hazards and relevant control and responses

All records of emergency preparedness plan along with emergency contact numbers, mock drills and corrective preventive action measure shall be maintained. All these records shall form part of quarterly report to the LWASA-PMU.

Contractor shall be responsible to handle emergency conditions and also be responsible to compensate damage against accident (if occurs at site)

1) Chemical Hazards

The Contractor shall identify, assess and control all hazardous material/substances involved in the construction including building materials, fumes, dust, proprietary chemical products and gases emitted because of cutting and welding activity at site.

2) Physical Hazards

The Contractor shall identify and evaluate the risks associated with physical hazards and eliminate them or control them as low as practicably possible by applying the principles stated below

Noise

The Contractor shall minimize noise from construction equipment by measures such as:

- Selecting less noise producing machinery
- Conducting regular maintenance of equipment
- Conducting periodic monitoring of sound pressure at least once each quarter

Vibration

Where exposure to vibration may affect any body part or full body e.g. during working with pneumatic drills, the Contractor shall ensure that exposures are assessed, eliminated or otherwise controlled.

Climate Stress

For operations under extreme weather/climatic conditions, The Contractor shall develop procedure in compliance with relevant standards.

3) Biological Hazards

Where bacteria, viruses, insects, mites and animals are present in the working environment, exposure to pathogenic biological agents shall be controlled.

Malaria

If the construction is taking place in such area where malaria is common disease, so contractor should prepare a comprehensive risk control program. Use of malaria prophylaxis is a must, similar is the case with wearing hard hats and wearing safety shoes. The four main components of malaria prophylaxis are:

Awareness

- Be alert and aware of the risk of malaria in the work sites
- Be informed of the signs and symptoms and know how long it will take to develop illness after being bitten by mosquitos.

Bite Prevention

Avoid being bitten by mosquitos by adopting following measures

- Use insect repellent
- Provide mosquito nets to workers at bedtime
- Wear long sleeves shirt and trousers when working outdoors

Chemoprophylaxis

- Preferably use when advised by competent health professional
- Take anti-malarial drugs (chemoprophylaxis) when needed to prevent infection from developing into clinical disease. Please note anti-malarial drugs don not guarantee 100% protection.
- Medications are safe to use when they are taken as per medical advice

Diagnosis and Treatment

- Early diagnosis and treatment can prevent death rate. Seek immediate diagnosis and treatment if fever like symptoms develop more than one week after entering and up to 3 months after leaving from the risk area.
- Notify your doctor of recent visit to malaria risk area
- Contractor should closely monitor performance of these Malaria Control Programs

Legionella Bacteria

Human made building water systems may support the growth of legionella bacteria thus causing Legionnaires disease. These bacteria can enter the human body when small droplets of water containing the bacteria are present in the air. The sources of legionella-contaminated water at construction sites which may lead to infection include:

- Domestic water storage tank
- Fire water tank
- Water storage tank used to suppress dust at site
- Pipe work and head
- Safety Showers

The Contractor shall appoint a competent person to evaluate the risk of legionella and to implement the control measures.

Aedes Aegypti

Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue. The mosquitoes prefer to breed in areas of stagnant water, such as uncovered barrels, buckets, and discarded tires, but the most dangerous areas are wet shower floors and toilet tanks, as they allow the mosquitos to breed in the residence.

Symptom

Mild symptoms of dengue can be confused with other illnesses that cause fever, aches and pains, or a rash. The most common symptom of dengue is fever with any of the following:

- Nausea, vomiting
- Rash
- Aches and pains (eye pain, typically behind the eyes, muscle, joint, or bone pain)
- Any warning sign

Symptoms of dengue typically last 2–7 days. Most people will recover after about a week.

Diagnosis and Treatment

- Early diagnosis and treatment can prevent death rate. Seek healthcare provider if you develop a fever or have symptoms of dengue.
 - Rest as much as possible.
 - Take acetaminophen (also known as paracetamol outside of the United States) to control fever and relieve pain.
 - Do not take aspirin or ibuprofen!
 - Drink plenty of fluids such as water or drinks with added electrolytes to stay hydrated
 - Contractor should closely monitor performance of these dengue Control Programs

Bite Prevention

Avoid being bitten by mosquitos by adopting following measures

- Use insect repellent
- Provide mosquito nets to workers at bedtime
- Wear long sleeves shirt and trousers when working outdoors
- Avoid areas with standing water. Especially at times of high mosquito activity like dawn and dusk.
- Once a week, scrub off eggs sticking to wet containers, seal and/or discard them.

Awareness

- Be alert and aware of the risk of dengue in the work sites
- Conduct workshop on awareness of dengue and related precautionary measures
- Site workers be informed of the signs and symptoms and know how long it will take to develop illness after being bitten by mosquitos

Pest and Insect Control

Typical pests are mosquitos, snakes, rats and flies. Good cleaning and housekeeping of work sites is the basis of any pest control programme.

Furthermore, provide long lasting impregnated nets at the bedding time of workers. The Contractor shall take care of pest control services for the worksites and workers camp.

4. Ergonomic Hazard

The use of good manual handling and lifting techniques for construction work reduces back issues and other related injuries. The Contractor shall give training regarding correct posture and lifting techniques.

5. Psychological Hazards

The Contractor is required to be assured of all relevant and appropriate working practices that are being followed by the site workers.

Continuous and long working hours and shift can promote fatigue. Fatigue can lead to reduced mental function and attentiveness thus resulting in increased likelihood of accidents and ill health. As most construction activities hold safety risks so this shall not be provoked by fatigue because of unnecessary overtime. Contractor shall ensure local legislation and recommendations on maximum

working hours. The Contractor shall ensure that sub-contractors follow the agreed working hours.

6. Health Performance Monitoring and Incident Reporting & Investigation

The Contractor shall have a proper health monitoring system. A medical file shall be kept for each worker.

This file should include their details regarding pre employment fitness to work assessment, details of having any first aid treatment and details of medical checkup. The Contractor shall monitor:

- Numbers of health-related trainings & Audits
- First Aid treatment cases
- Number of workers undergoing medical check ups
- Number of occupational illness cases and frequency

Contractors shall consider health incidents and non-accidental deaths, involving their staff in the same way as they are expected to examine and report safety incidents.

7) Fitness to Work

The Contractor shall classify all worker groups whose specific work or working conditions require a minimum fitness for duty standard.

8) Local Health Facilities and Medical Emergency Response

The Contractor shall provide access to appropriately equipped and staffed hospitals. The Contractor shall provide first aid arrangements at site.

Make sure that proper attention shall be paid to ensure that the required first aid response times are achieved and should be verified by drills.

The Contractor shall develop a site-specific plan based on health risk assessment, which outlines the response to various medical emergency scenarios and evacuation procedures. The Contractor shall arrange for regular drills to exercise and learn from the numerous emergency scenarios.

9) General Health & Safety

Drinking Water

The Contractor shall provide sufficient potable water calculated at 25 litres per person per day, plus at least five days' emergency supply.

Garbage Collection

The Contractor shall provide an appropriate system for garbage collection and disposal. Spillage of refuse should be strictly avoided. Arrangement shall be made for a daily collection of wastes from construction sites

- Suitable skips or bins should be provided at strategic locations within the project area
- All bins shall be covered or cleaned immediately after being emptied.
- All waste shall be disposed off through approved waste vendor

10) Emergency Preparedness and Response Planning

The 'On-site emergency plan' to be developed by contractor and shall include minimum the following information:

- Site Locations
- Emergency Contact Numbers such as police, fire brigade, bomb disposal, rescue 1122, nearby hospitals and ambulance
- List of emergency equipment including fire extinguishers, fire suits etc.
- Layout maps mentioning the locations of emergency exit points/signs, emergency assembly area, emergency evacuation routes, locations of firefighting equipments and fire alarms
- Identification of Potential Emergency Situations, preventive, control & response measures
- Medical services / first aid

Annexure-Y

CHANCE FIND PROCEDURE

CHANCE FIND PROCEDURE

Purpose

The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, mainly archaeological resources, are encountered unexpectedly during project construction or operation.

The purpose of this document is to address the likelihood of archaeological deposits becoming visible during altering activities within the project area and to provide procedure to follow in the case of chance cultural and archaeological find to ensure that cultural and archaeological site are documented and protected as required.

Scope

This procedure is applicable to all activities done by the personnel, including contractors, that have the potential to expose a heritage object/site. The procedure outlines the actions to be taken when a previously unknown and potential heritage object/site is found during construction activities.

This Procedure outlines the roles and responsibilities and the response times obligatory from both project staff, and any relevant heritage authority/department.

Training

All personnel, particularly those working on earthwork and excavations, are to be trained on the identification of possible heritage object/sites and the appropriate actions for them with respect to this procedure during the Project briefings and regular toolbox talks.

Procedure

If any person notices a physical cultural resource, such as archaeological, cultural or historical sites, remains and objects, or a graveyard and/or individual graves during excavation or construction work, the following steps shall be taken:

1. Immediately stop all construction works in the area of chance find and quickly take photos of the find
- 1) Inform the Contractor or site supervisor who in turn will inform the responsible local authorities or Directorate General of Archaeology, Government of The Punjab (within 24 hours or less)

- 2) Delineate the discovered site or area; secure the site to avert any damage or loss of removable objects. In cases of removable antiquities or sensitive remains are found, a night security guard shall be arranged until the responsible department/authority take over
- 3) Initial assessment of the findings should be done by archaeologists. The archaeologist must make a rapid assessment of the find to determine its importance. Based on this assessment the appropriate plan can be developed. The significance of the findings should be assessed according to the various criteria applicable to cultural heritage such as historic, aesthetic, scientific values of the find
- 4) Sites of minor significance should be recorded immediately by the archaeologist, thus causing a least disruption to the work plan of the Contractor. The results of all archaeological work must be informed to the relevant department, once completed.
- 5) In case of significant find the relevant department (department for protection of heritage hereby referred as heritage team) should be informed immediately and in writing within 7 days from the find
- 6) The onsite archaeologist provides the Heritage team with documents such as photos and information as relevant for identification and assessment of the importance of heritage items.
- 7) The relevant department must investigate the fact within two weeks from the date of notification and deliver response in writing.
- 8) Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of archaeological or cultural importance) conservation, preservation and restoration
- 9) Construction activities/work could recommence only after permission is granted from the responsible authorities.
- 10) In case no response received from the relevant department/authority within the 2 weeks period mentioned above, this is considered as authorization to continue with suspended construction works.

Annexure-Y

One of the main requirements of the chance find procedure is record keeping. All finds must be registered and maintained by the contactor and LWASA-PMU. Photographs, copies of communication with decision making authorities, conclusions and recommendations must also be kept maintained.

Emergency Contacts

Directorate General of Archaeology, Government of The Punjab

archpunjab@gmail.com

Anjum Saleem Qureshi

Deputy Director (Survey)

Office: 04237661964

Annexure-Z

SOCIAL FRAMEWORK AGREEMENT (SFA)

SOCIAL FRAMEWORK AGREEMENT (SFA)

It is the commitment by the project proponent and the local community to work together for the successful completion of the project. It establishes bindings for both parties to minimize possible conflicts. SFA shall be considered as a “follow up” of the public consultation and public hearing and indicates that LWASA and the communities are mutually facilitating the construction surface water treatment plant.

Parties to Agreement

SFA will be signed through mutual open consent between the local village leaders and the project proponent. At least two leaders/elders will be chosen from each of the villages situated adjacent to the area where construction activity will be based. These leaders/elders will constitute a villagers committee, which will choose a Chairman among themselves.

SFA shall be signed by LWASA Resident Engineer (RE) representing the project proponent and by the Chairman of villagers' committee representing the local community before two month start of the construction work.

Agreement Contents

SFA shall be prepared in the form of a legal agreement in Urdu language on a stamp paper to be provided by LWASA Resident Engineer (RE) at the project cost. Three copies of the agreement shall be signed by both parties. All the mitigation measures described in EMP which are relevant to SFA shall be included in the agreement. The obligations of the LWASA and those of the community shall be listed clearly. Signed copies of SFA shall be kept by both parties.

Representative and LWASA agreed on that:

- Both parties i.e. LWASA/Contractor and Local representative will follow the terms of this document
- HSE executive will be hired for effective implementation of EM&MP
- Contractor/LWASA will be responsible for local hiring during project
- All work plan activity will be shared with local representative

Annexure-Z

- Notices will be issued in case of noisy activities
- Contractor/LWASA will be responsible for giving priority to locals for hiring and purchasing raw material
- Contractor/LWASA will be responsible for on time payments
- Contractor/LWASA will be responsible for establishing alternate routes for public in case of higher traffic flow during loading and unloading of raw material
- Contractor/LWASA will be responsible for completing proposed activity within given time
- A complaint cell will be established and a focal person will be appointed by LWASA/Contractor for effective grievance redress
- Contractor/LWASA will be responsible for organizing regular meeting with local representative to share proposed activities
- Contractor/LWASA will be responsible for giving notice to any worker/shopkeeper etc. before terminating its services
- LWASA will be responsible for appointing a person for assessment of overall performance of the contractor, workers and suppliers
- LWASA will be responsible for effective financial auditing

Annexure-AA

EMERGENCY RESPONSE PLAN

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1 SECTION I

1.1 Location and General Description

The SWTP is proposed at a distance of 4.5 km from BRBD canal towards Ring Road along Bhaini Road. Land in excess to 300 Acres required for SWTP is available at this location. Whole of the area is currently being used for cultivation purpose and no residential or commercial buildings are currently present. Another benefit of this location is that due to less traveling time of treated water the proposed UGT will not be required and single stage pumping will be used. This option may be most feasible as it does not require additional land for UGT and laying of Transmission Main meaning it will have least issues related to ESIA.

96 persons will be employed on contract for the operation of SWTP. The details are given in **Table 1** with their number of posts and designation.

Plant will be operated for specified time, but pumping will be done 24/7 to provide clean water supply to selected areas.

Table 1 Description of Manpower During Execution and Operations of the Project

Sr. No.	No. of Posts	Designation
1.	1	Assistant Director Process
2.	1	Assistance Director Operation
3.	1	Assistant Director Maintenance
4.	4	Sub Engineer Civil/ Mechanical/ Electrical
5.	20	Operators
6.	6	Lab Technician
7.	6	Accountant and Account Assistant
8.	4	Electrician
9.	6	Electrician Assistance
10.	4	Mechanic
11.	6	Mechanic Assistance
12.	4	Instrument Technician
13.	6	Naib Qasid
14.	6	Security Guard
15.	2	Store Keeper
16.	6	Drivers
17.	12	Labour (Skilled, Unskilled)
18.	1	Plant Manager, Deputy Director
Total	96	

This plan is required by the government of Pakistan Rule 18 of Civil Defence 1951.

The Employee Emergency Plan and Fire Prevention Plans standards. The objectives of the plan are to:

1. Prevent or reduce the occurrence of emergency at the Surface Water Treatment Plant (SWTP)
2. Provide SWTP associates with procedures to follow to prevent or reduce injuries or deaths.
3. Provide SWTP associates with procedures to follow to prevent or reduce damage to property and environment.

The following procedures and explanations cover a wide range of potential emergency situations that could occur at the SWTP. This plan will be extended to include other programs and procedures as they are developed. The Safety, Environmental and Security Team headed by the Plant Manager shall review the entire Emergency Response Plan on an annual basis. Any changes will be recommended to the Team with an explanation as to why the change is needed. Following the approval by the Team revision to the plan will be made; revised copies will be disseminated to the members.

It is recommended to test the plan periodically. A total facility evacuation is recommended at least annually, Smaller drills such as fire in different manufacturing areas or chemical spill emergency drills are recommended on quarterly basis. These drills will prove valuable when conducting the annual plan review.

It must be understood that many emergencies create other emergencies. For example, a fire causes a hazardous materials problem, or hazardous materials may cause a fire. In cases, such as these sections of the plan must be used simultaneously. Finally, no plan can detail all unforeseen events and no plan can replace common sense.

SWTP associates must not panic, they must think clearly and rationally of how they must react. They will be able to do so only through studying, discussing, and rehearsing these emergency response plans.

1.2 Plan Availability

Members of the Team at the SWTP shall be provided a personal copy of the Emergency Response Plan.

1.3 Emergency Response Organization

1.3.1 Emergency Response Team Coordinators

The Emergency Response Team Coordinators will be made before commissioning of SWTP that will include Emergency Coordinator and Assistant Emergency Coordinator.

Table 2 Emergency Response Team Coordinators

Emergency Coordinator	
Name	
Title	
Telephone No.	
Mobile No.	
Residence No.	
Assistant Emergency Coordinator	
Name	
Title	
Telephone No.	
Mobile No.	
Residence No.	

The **Emergency Coordinator** is responsible for ensuring support and providing necessary funding, equipment, facilities and personnel to properly and safely cope with all emergency situations. He shall possess thorough knowledge of the physical layout of the facility and emergency response equipment location and use. The Emergency Coordinator shall direct, guide and supervise personnel involved in emergency response operations. The Emergency Coordinator is the primary contact person for anyone or any agency seeking information regarding Emergency Response Plan.

The **Assistant Emergency Coordinator** is responsible for ensuring that team members are trained in the areas of emergency response as required by this plan. He is also responsible for maintaining the resources needed for emergency response as required by this plan. The Assistant Emergency Coordinator shall possess thorough knowledge of the physical layout of the facility and emergency response equipment location and use. The Assistant Emergency Coordinator will assist the Emergency Coordinator during the emergency operation. In the absence of the Emergency Coordinator the Assistant Emergency Coordinator will have the same authority as the Emergency Coordinator and will direct the operations of emergency response team and shall be primary contact person for anyone or any agency seeking information regarding the Emergency Response Plan.

1.3.2 Emergency Response Team Members

Table 3 Emergency Response Team Members

Sr. No.	Name	Designation	Phone Number
1.			

Sr. No.	Name	Designation	Phone Number
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Emergency Response Team Members at the SWTP will be trained to respond to specific emergencies. These emergencies include:

- Fires
- Hazardous materials emergencies
- Medical emergencies and injuries
- Confined space emergencies.

Team members will be thoroughly trained and will operate under the direction of the Emergency Coordinator or the Assistant Emergency Coordinator.

1.3.3 Authority Level

All emergency response operations at the SWTP shall be conducted through the use of Incident Command System. The Emergency Coordinator shall fill the role of Incident Commander, in the Emergency Coordinator's absence the role shall be filled by Assistant Emergency Coordinator. The Incident Commander has the authority to commit the resources necessary to safely mitigate the emergency situation. No other personnel may assume control of an incident. The primary command post is recommended to be the security guard's room near the main gate. The Emergency Coordinator shall be located there. A forward command post shall be established in a safe area near the location of the emergency and the Operational Sector shall be located there. During an emergency, the Incident Commander is to work with any public safety agency responding to the call of SWTP to bring the emergency to a safe, successful conclusion.

The Incident Commander shall be responsible for the dissemination of information to the media; public, and provincial, state, or federal authorities The Incident Commander shall follow

the IMCR program and / or utilize someone fulfilling the role of Public Information Officer (PIO) for this task.

1.3.4 Preplanning and Inspection

The Safety, Environmental and Security Coordinator will coordinate preplanning efforts with outside agencies, which may respond to emergencies at the SWTP. This preplanning and coordination may include but not be limited to:

1. Facility tours;
2. Review of potential emergencies which may occur;
3. Review of the SWTP Emergency Response Plan; and,
4. Joint training exercise.

To augment associate monitoring the Safety, Environmental and Security Coordinator shall conduct monthly inspections of the entire facility. The goal of these inspections will be to find initial evidence of an impending equipment or process failure that could create an emergency. The safety, Environmental and Security Coordinator shall make recommendations for any emergency response equipment needed to the Higher Management, repairs of equipment or processes shall be submitted through the usual plant procedures.

1.3.5 Emergency Alerting Procedures

SWTP personnel will be warned of an emergency situation by one or combination of the following:

1. Microphone
2. Smoke detector alarms (located at different points of the production facility);
3. Activation of the facility alarm system;
4. Verbal warning.

To report emergencies associates should:

1. Notify their supervisor or a member of management, whichever is easier or faster; or,
2. Notify the security office; or,
3. Call 16 (Fire Brigade), 04235850339& 04235850334.
4. Call Civil Defence 04239212109 or anti bomb squad 04239212111(if required).
5. Activate any one or a combination of the methods listed above; and,
6. If medical assistance is required call Services Hospital 37561351 or Edhi Welfare Trust 37848324, or Rescue 1122, and give the address of SWTP.

2 SECTION II

2.1 Facility Evacuation

2.1.1 Introduction

Evacuation of the SWTP facility is a serious operation in that if handled improperly personnel may become injured or left behind and injured or killed as a result of the emergency. Personnel shall be notified to evacuate the facility by any one or a combination of the methods or devices listed in Section I, under Emergency Alerting Procedures.

The personnel listed shall call for evacuation of the facility in the following situations:

Sr. No.	Situation	Action
1.	Fire	Associate discovering a fire, operator and Management at their discretion
2.	Hazardous materials spill	Any associate in cases of a severe or large spill operators and management at their discretion
3.	Severe weather	Management;
4.	Floods	Management;
5.	Earthquake	Management;
6.	Power outage	Plant technician Operator and management;
7.	Bomb threat	Operator and management;

2.2 Personnel Accountability System

At the beginning of shift operators shall make a count of employees in their department or under their supervision. The result of this count will be forwarded to the security office. Security shall post the totals on the personnel accountability roster. This roster shall be updated, as necessary. Also, security personnel shall keep a current count of contractors, visitors, etc. that are on site. This total shall be listed in the appropriate location on the personnel accountability roster.

When an evacuation is called for this personnel accountability roster shall be used to validate the head count, insuring that all persons have evacuated the facility and are accounted for.

The primary assembly area for all persons evacuating the facility will be properly marked.

2.3 Evacuation Procedures

- 1.** When personnel are notified to evacuate, they shall immediately proceed to the nearest Emergency exit and leave the building. If the Emergency exit is inaccessible, they should then proceed to the Main and leave the building.
- 2.** Movement to exist shall be in an orderly fashion, no one is to run but personnel shall exit without delay. If at all possible, and it will not unduly delay evacuation, personnel operating machinery shall turn the machinery off and /or stop processes in their work area before evacuating.
- 3.** While leaving the facility personnel are to assure that no fellow workers, visitors, contractors, etc. are left behind. All offices, work areas, restrooms, break rooms, etc. shall be searched to assure that persons do not remain there. Operators are ultimately responsible for ensuring this is accomplished.
- 4.** After leaving the facility all personnel are to report to the Primary Assembly Area. Personnel are to group according to their department assignment at the location marked by sign. Personnel shall remain in this area and shall leave areas of traffic movement clear. If the Primary Assembly Area is not safe for evacuees (due to smoke, vapours, etc.) then personnel should be directed to the Secondary Assembly Area, which shall be the outside facility at the road.
- 5.** Operators shall get a head count of personnel in their department and shall report the findings of this head count to the security guard.
- 6.** The security guard shall compare the evacuation head count with the personnel accountability roster totals. Any discrepancy will be made known to the Emergency Coordinator, and/or the Assistant Emergency Coordinator, and the person in-charge of responding public safety agencies.
- 7.** Operators shall dismiss their personnel from the assembly area only after being informed to do so by the Emergency Coordinator or Assistant Emergency Coordinator. Personnel shall re-enter the facility only when the Emergency Coordinator or Assistant Emergency Coordinator has given an all clear signal.
- 8.** The Emergency Coordinator or the Assistant Emergency Coordinator shall assure that public safety assistance has been summoned by calling 16 or 35850339, 35850334 or 36361450, Rescue 1122.
- 9.** First aid, if needed, shall be provided by first aid trained personnel.
- 10.** In the event that an evacuation takes place after normal business hours:
 - A.** Security shall notify the Emergency Coordinator or Assistant Emergency coordinator;
 - B.** Security shall notify the country office.

11. Under no circumstances shall any evacuated personnel that are not part of the emergency response operations re-enter the facility until after the all clear is given.

2.4 Evacuation: Important Points

Always remain alert. Emergencies can occur at any time. Wherever you are located in the facility always keep in mind where the nearest exit is located.

Dock doors should never be thought of as exits during emergencies as these doors may be of personnel door type.

All aisles and exit doors are to remain clear at all times. If at any time aisles, exit doors, etc. are found to be obstructed the Safety, Environmental and Security Coordinator is to be notified if the obstruction is not immediately removed.

No plan can take the place of common sense. If you encounter a situation that could cause you harm immediately move to an area of safety and sound an emergency alarm device.

Remain alert for:

- Fire
- Smoke
- Chemical vapours or liquids
- Explosions
- Unstable areas or buildings.

If you encounter smoke or chemical vapours always try to move uphill and/or upwind of the material.

Once you have reached the assembly area report to your designed point and remain there for a head count. Never leave this area until told to do so.

Management / Operator: If an evacuation has taken place during inclement weather you must get all evacuated personnel to shelter as soon as possible.

NEVER PANIC DURING AN EMERGENCY!

2.5 First Aid & Emergency Medical

2.5.1 Provisions

Injuries and medical emergencies can occur at any moment and their effects can have profound consequences, even death. Especially if emergency care is applied inappropriately or if it is delayed. Therefore, only trained personnel shall perform first aid measures and they shall be notified immediately when a SWTP associate suffers an injury or medical emergency.

First aid and emergency medical care must be available during hazardous materials; incidents confined space emergencies and are highly recommended to be immediately available during fires.

The SWTP should have trained personnel to provide first aid and CPR in emergency situations. If additional services (i.e. transport to a hospital) or more advanced medical care is needed the Management will request assistance from nearest hospital.

Personnel from local public safety agencies (Civil Defence, Fire Brigade) are not to enter hazardous areas (confined spaces, hazardous materials, spills, etc.) unless they are properly trained and equipped in accordance with applicable regulations.

SWTP personnel that are trained in first aid/CPR shall perform rescue of victims and will remove the victim from the hazardous area. Life saving techniques will not be performed while the victim and rescuer are located in immediately dangerous to life and health (IDLH) environments. Once the victim has been removed from the IDLH area the victim will be moved to the Decontamination Sector (if needed) that the victim will be placed under the care of Hospital.

Should any SWTP associate suffer injuries during normal plant operations? The first aid trained personnel shall be summoned to this person's location to render assistance. If the first aid provider or Management believes it necessary, the EMS will be summoned for further assistance.

If first aid supplies located in strategic areas throughout the facility. Their locations will be marked with stickers. For additional information contact Plant Manager.

2.6 FIRE

The purpose of this plan is to give associates procedures to follow, to prevent fires and to follow in case a fire occurs.

2.6.1 Pre-Emergency Actions

1. All personnel are to follow fire safety and prevention rules and procedures, and report fire hazards to the operator of the relevant section.
2. All personnel are to know the location of the fire extinguisher(s) and fire alarms stations in their work area. Fire extinguisher location is indicated by sticker.
3. All personnel are to know the location of the primary fire exit(s) and secondary fire exit(s) nearest their workstation, break room, or other areas they frequent.
4. All personnel are to know the location of the Primary Assembly Area and their responsibilities when reporting there.
5. All personnel are to know what signals an evacuation and how to call for evacuation of the facility.

2.6.2 Associate Actions during a Fire

2.6.2.1 Small Fire

1. If you are trained, promptly direct the discharge of a fire extinguisher at the base of the fire. If you are not trained immediately notify Plant Manager or operator about the fire.
2. Notify Plant Manager or operator of the section, follow his instructions.

2.6.2.2 Large or Uncontrolled Small Fires

1. Notify Plant Manager or operators immediately.
2. Initiate the facility evacuation plan if directed or if no operator is available.
3. If directed to do so, or if no operator is available, from a safe location call 16 or 35850339 or 36361450, Rescue 1122 to report the fire. Notify security that the call to fire brigade has been made or that security should make the call if you were unable to do so. Be prepared to tell 16 or 35850339, 35850334 or 36361450

The name of the plant and its location;

- The type of the emergency;
- Your name and the number you are calling from; and
- hang up only when told to do so.

Remember: Always summon help from safe area.

4. As you are evacuating the facility make sure to check restrooms, offices, break rooms, or other areas where persons may be found that did not hear the call to evacuate or the

effects of the fire may have already incapacitated that. Report to the Primary Assembly Area for a head count. Remain in the assembly area, out of the traffic flow areas, until you are given permission to leave.

5. Always follow these safety rules for evacuation:

- Never use an elevator, always use stairs;
- If smoke is encountered stay close to the ground or floor and crawl to the nearest exit,
- Test doors with the back of your hand before opening, if stuck, go to another exit;
- Close doors behind you to contain the fire.

2.6.3 Manager /operators Actions during a Fire

2.6.3.1 Small Fire

1. If you are trained, promptly direct the discharge of a fire extinguisher at the base of the fire. If you are not trained initiate facility evacuation.
2. Initiate the facility evacuation plan if necessary. Ensure that all occupants of the facility are evacuating to the Primary Assembly Area. Make sure that no one has been left behind in restrooms, offices, break rooms, etc.
3. Call 16 or 35850339, 35850334 or 36361450, Rescue 1122 from a safe Location to report the fire. If you are unable to place this call notify security to do so.
4. Report to the assembly area and take a head count of your personnel. Report the result of your head count to security. Keep all associates in the assembly area until instructed otherwise.

2.6.3.2 Large or Uncontrolled Small Fire.

1. Initiate facility evacuation immediately. Ensure that all personnel are evacuating the facility and that no one has been left behind in restrooms, office break rooms, etc.
2. Report to the Primary Assembly Area instruct security to call 16 or 35850339, 35850334 or 36361450 to report the fire Take a head count of your personnel and report the result of the head count to security.
3. Keep all personnel in the assembly area, out of traffic flow areas, until instructed otherwise.

2.7 HAZARDOUS MATERIALS

Exposure to hazardous materials can cause serious injuries, property and environmental damage. For these reasons it is important to follow established response procedures.

If a spill occurs or is discovered report it to Manager/ Operator and warn others immediately.

Some personnel at the SWTP will be trained in hazardous materials spill response while others have not. Therefore, only personnel that will be trained in hazardous material spill emergency response shall respond to emergency incidents. Personnel that work with chemicals in their normal course of duties may clean up small, non-emergency spills, but then only when wearing appropriate personal protective equipment. A non-emergency spill is one in which assistance from personnel outside of the work area or specialized clean-up equipment is not required to render the situation safe.

To fully protect all SWTP personnel, the facility and the environment, our emphasis will be on spill prevention.

2.7.1 Pre-Emergency Actions

1. All personnel shall follow safety procedures and plans when conducting operations involving hazardous materials.
2. All personnel shall complete hazard communication and personnel protective equipment training prior to working with hazardous materials.
3. Should question arise involving safety guidance while working with hazardous materials personnel shall seek the assistance of Manager/ Operator? Information can be obtained from the material safety data sheets (MSDS) located in your work area. Any additional information needed can be obtained from the Safety, Environmental and Security head / incharge.

2.7.2 Associate Actions during a Hazardous Materials Emergency

1. Do not attempt spill response, containment, or clean up. Notify Manager/ Operator immediately and if necessary, activate the facility evacuation plan. Unless you are authorized to do so, do not go near a chemical spill. But if you can safely control the spill (cut off a valve or switch) from an uninvolved location do so. If the evacuation plan is activated security shall be directed to call 16 or 35850339, 35850334 or 36361450 immediately for public safety assistance.
2. If evacuation of the facility is ordered, and you are not trained in hazardous materials spill response, proceed to the nearest exit and go to the Primary Assembly Area. When leaving your work area insure that no one is left behind in rest room, break rooms, etc. Make sure that all personnel, including visitors and contractors are evacuating. Remain at the Primary

Assembly Area for a head count and until you receive further orders. Stay out of traffic flow areas.

3. If you are a member of the Hazardous Materials Response Team respond to the Incident Command Post and await instructions from the Incident Commander.
4. If you or a fellow associate has been contaminated by a hazardous material immediately go to the nearest safety shower and activate it. While flushing the contaminated area remove any and all clothing, jewellery, etc. In-plant first aid providers shall be immediately notified, and security shall be directed to call 16 or 35850339, 35850334 or 36361450 for emergency medical assistance. Continue flushing the contaminated area with water for 15-30 minutes or until emergency medical assistance arrives.

2.7.3 Supervisor Action during a Hazardous Materials Emergency

1. If the spill is an incidental release (small spills, less than the reportable quantity, that can be cleaned up immediately by area personnel that do not need special equipment or assistance) direct clean-up operations as needed following all recommendations for safe operations and personal protection.
2. If the spill is beyond the control of immediately available personnel and resources, activate the facility evacuation plan and direct security personnel to call 16 or 35850339 or 36361450 for public safety assistance. Notify the facility Emergency Coordinator and/or the Assistant Emergency Coordinator. If at all possible, and it is safe to do so, positively identify the spilled material before leaving the area.
3. During evacuation ensure that all personnel, including visitors and contractors, are moving to the primary assembly area. If safe and if it will not delay the evacuation ensures that all machinery is shut down.
4. If you are not a member of Hazardous Materials Response Team proceed to the primary assembly area, get a head count of your personnel and report the total to security. Keep all personnel in the primary assembly area, out of traffic flow areas, until instructed otherwise. Remain ready to assist responding public safety agencies.
5. If you are a member of Hazardous Materials Response Team appoint an alternate to perform your duties at the primary assembly area. Report to the incident commander and at the incident command post and await further instruction.

2.8 DUST STORM – SEVERE WEATHER

During severe thunderstorm, the following weather advisories may be issued:

Dust Storm Watch: condition is right for a Dust Storm to occur.

Dust Storm Warning: a Dust Storm has been forecasted by Meteorology Department

In case of thunder/ dust storm sign, the Emergency Coordinator, Assistant Emergency Coordinator, managers, and operators on duty shall be notified by the security office via, telephone, or in person.

The Emergency Coordinator and/or Assistant Emergency Coordinator are responsible for ensuring that this plan is enacted. Managers and operators are to advise all associates under their direction, and contractors or visitors in their area, about the weather advisory. At the time of notification everyone must be prepared to take immediate action.

For many weather emergencies there will be ample warning time, for example hail storms, extreme heat or cold, etc. Exceptions are severe thunderstorms and dust storm; current weather forecasting systems offer very little if any warning (no warning will be observed if there is no radio/television monitoring). Therefore, primary emphasis will be placed on these emergencies.

2.8.1 Pre-Emergency Actions

1. All personnel shall pre-plan their most frequent work areas so that locations of substantial shelter are noted.
2. All emergency supplies are to be regularly inventoried to maintain adequate amounts. Examples are first aid kits, fire extinguishers, flashlights, etc.
3. Security guard should monitor the weather emergency alert radio (the regular radio) at his post. In the event the Meteorology Department announces that severe weather is in the Lahore area the security guards are to notify the Emergency Coordinator, Assistant Emergency Coordinator, managers, and operator via telephone, or in person.
4. Upon receiving this information these persons are to initiate appropriate actions.

2.8.2 Actions during A Storm Warning

1. If possible, shut down any equipment that may be operating, especially operations that involve hazardous materials.
2. If you are indoors stay there, but away from windows and glass doors.
3. Immediately proceed to a shelter. If one is not available move to the central or inner-most portion of the building on the lowest floor.

4. Protect yourself by getting under heavy objects like tables, desks, machinery that is bolted to the floor, etc. If no protection is available lay flat and put your hands over your head. If possible, cover your head with a blanket, towel, coat, etc.
5. If you are outdoors or in a building of light construction take shelter in a nearby, heavily constructed building if at all possible. If no such buildings are nearby seek shelter in a ditch or ravine. Protect your head and body with anything available. **DO NOT TAKE REFUGE NEAR TREES OR UNDER A VEHICLE!**

2.8.3 Actions after a Storm

1. Do not re-enter damaged buildings.
2. Assist any slight injured personnel to the Primary Assembly Area (parking lot on the East Side of the facility). Personnel with first aid training shall assist the injured. If someone is found to have severe injuries, do not move them unless they are in an area of danger (fire, hazardous materials, structural instability, etc.) and treat their injuries where the injured person is found. Assure that security has called 16 or 850339 or 6361450 and EMS for emergency assistance. Be prepared for this assistance to be delayed as these types incidents can cause wide-spread damage and injuries, thereby over-extending local emergency services.
3. Move to the Primary assembly area. Remain there for a head count and to receive instructions. Stay out of the traffic flow areas. Do not leave the assembly area until you are instructed to do so.
4. Do not use the telephone unless absolutely necessary to report emergencies.
5. Monitor radio and television broadcasts for emergency information.
6. Cooperate with company and local emergency services officials in returning the facility to working order.

2.8.4 Manager/ Operator Actions During & After a Storm

1. If severe weather warnings have been posted ensure the following:
 - A. That all personnel have been notified of this warning;
 - B. That all emergency equipment is in place and operable;
 - C. That all operators have flashlights;
 - D. That starting of any operations that would be adversely affected by severe weather have been delayed;
 - E. If Storm **WARNINGS** are in effect for the immediate area have all personnel move immediately to areas of protection.
2. If Storm occurs ensure that all personnel evacuate to the Primary Assembly Area after the Storm if the facility suffers any damage. Make sure that this evacuation is done in an

orderly and timely fashion to prevent further injury. If severe weather is continuing and shelter is needed, assemble personnel in a structurally sound building. As you leave your area ensure that machinery has been placed in the off position, and that all personnel (including visitors and contractors) have moved to the Primary Assembly Area.

3. Report to the Primary Assembly Area and get a head count of all personnel under your supervision. Report the result of the head count to security personnel.
4. Ensure that the security officer has called 16 or 35850339, 35850334, 36361450 or Rescue 1122 to report the emergency. If the telephones do not work make attempts to call 16 or 35850339, 35850334 or 36361450, Rescue 1122 via a mobile phone or assign someone to report to other neighbouring factory or nearest pay telephone (located at Gulberg main market). Should these systems be inoperable dispatch someone to notify local public safety agencies by reporting to Lahore Fire brigade or Civil Defence Department. If no one is in the fire station this person shall go to the nearest pay telephone and call 16 or 35850339, 35850334, 36361450 or Rescue 1122.
5. Treat injured personnel as listed above in Actions after a Storm, Bullet No. 2.

2.8.5 Actions for Other Severe Weather Situations

2.8.5.1 Hale storm

1. Stay tuned to local radio and television reports to assess how the problem may be. If reports indicate severe hale storm contact facility management for directions.
2. If instructed to dismiss personnel, attempt to assess area road conditions by calling local public safety agencies. See the Emergency Notification List in the appendix of the plan description for the appropriate numbers. Before personnel are dismissed follow proper facility shut down procedures.

2.8.5.2 Rain

1. Refer to the emergency response plan for flooding if necessary.

2.8.5.3 High Winds

1. Refer to items listed above for dust storm if damage occurs to facility property.

2.9 POWER OUTAGE

Many emergencies may cause power outage without warning, but most power outage accompanies severe weather. During periods of severe weather (thunderstorms, hale storms, high winds, etc.) you should anticipate power outages.

2.9.1 Pre-Emergency Actions

1. All emergency equipment (Emergency lights, generators, exit signs, emergency lighting systems, first aid kits, etc.) shall be regularly inspected and inventories kept complete.
2. All personnel shall pre-plan their main work areas so that they are familiar with evacuation routes.
3. If severe weather warnings have been issued, starting any operation that would be adversely affected by a power outage should be delayed.

2.9.2 Actions during a Power Outage

1. If the severe weather is in the area, Manager/operators shall retrieve emergency lights from their offices so that they will be capable of assisting with evacuation.
2. If a power outage occurs remain calm as emergency lighting should activate almost immediately. If emergency lighting does not activate or if your area is not adequately illuminated, remain at your present location. Do not move, wait for evacuation assistance.
3. Once emergency lighting activates or assistance arrives, place machinery operating switches in the off position before leaving your work station or area.
4. Evacuate, assisting other persons as you go, and report to the Primary Assembly Area (associate parking lot on the south side of the facility)/ Remain in the assembly area, out of traffic flow areas, for a head count and further instructions.

2.9.3 Manager/ operators Actions during a Power Outage

1. When severe weather warnings have been issued ensure the following:
 - A. That all personnel have been notified of this warning.
 - B. That all emergency equipment is in place and operable.
 - C. That all operators have emergency lights and spare batteries.
 - D. That the starting of any operations that would be adversely affected by a power outage has been delayed.
2. If a power outage occurs, ensure that all personnel are evacuated to the Primary Assembly Area in a timely and orderly fashion. If severe weather is continuing and shelter is needed assemble personnel in a structurally sound building. As you leave your work area ensure that all machinery switches are in the off position.

3. Report to the assembly area and get a head count of your personnel. Report the results of your head count to security personnel.
4. Ensure that the security officer has reported the power outage to the local authorities and be prepared to assist them once they arrive.
5. Dismiss your personnel or allow them back into the facility only when it is safe, and you have been instructed to do so.

2.10 BOMB THREATS

Bombing and the threat of being bombed are harsh realities in today's world. The public is becoming more aware of those incidents of violence that are perpetrated through the illegal use of explosive and other agents. Law enforcement agencies are charged with providing protection for life and properties, but law enforcement alone cannot be held responsible. Every citizen must do his or her part to ensure a safe environment.

This information is designed to help personnel at the SWTP prepare for the potential threat of bomb threats and bombings. While this information is applicable in most cases it cannot be emphasized enough the two most important points when dealing with bomb threats:

1. Be prepared; and,
2. Maintain strict access control to all areas of the facility.

2.10.1 General Information

1. Develop and maintain strict building access to prevent unauthorized persons from entering the facility. Examples of access control are:
 - A. Security gate access for vehicles.
 - B. Identification badges for all employees, visitors, contractors, etc.
 - C. Security enforce visitor check-in and check-out procedures
 - D. Keep all points of entry and exit secured.
2. If the assistance of local public safety agencies is requested, they may ask for help from the facility once they arrive, an example would be for search operations. If it is determined safe to do so, and management gives permission, assign personnel that volunteer to assist in the search. Assign associates to specific areas that they will be familiar with, such as areas in which they normally work. Persons that may be of particular assistance are maintenance, engineering, and supervisory personnel.
3. If you volunteer to participate in the search operation and are selected, you must absolutely follow the instructions of management or public safety officials. If a suspicious object is found do not touch or remove it. Immediately report the location of the object to the person in charge of your search area.
4. Do not utilize radio/cell phone communication within 1000 feet of the bomb threat location.

2.10.2 Actions for Personnel Receiving a Bomb Threat

If you receive a bomb threat by telephone keeps the caller on the line for as long as possible. Attempt to get as much information as you can use the "Bomb threat Call guidelines." Try to contact someone to monitor the call with you.

After the bomb threat caller terminates the call contact one of the following persons:

- Emergency Coordinator;
- Assistant Emergency Coordinator; or,
- Your supervisor.

2.10.3 Associate Actions during a Bomb Threat:

1. If ordered to evacuate do so in an orderly manner, report to the Primary Assembly Area (the associate parking lot on the south side of the facility) for a head count. Remain in this area, out of traffic flow areas, until you receive further instructions.
2. If you notice anyone in your work area that should not be there notify your supervisor.
3. Keep your area clear of unnecessary packaging, boxes, or trash. This will make it more difficult for someone to leave a bomb device and it go unnoticed.
4. Keep all areas of the facility secured as much as possible to prevent unauthorized access.
5. If you find a suspicious object or package in any area of the facility **DO NOT TOUCH IT!** Notify your operator immediately.

2.10.4 Manager / operator Actions during a Bomb Threat

1. If evacuation of the facility is initiated make sure your personnel leave the building in an orderly, but swift, manner. Check all locations of your work area to ensure that no one was left behind. Report to the Primary Assembly Area (the parking lot on the East Side of the facility) and get a head count of your personnel. Report the results of the head count to security. Keep all personnel in the assembly area, out of traffic flow areas, until you receive further instructions.
2. Insist that your personnel keep their work areas clear of trash, debris, and unnecessary packaging and boxes.
3. Remain alert for suspicious persons in the facility. If any are noticed, or if a former employee that has been terminated is seen, call security
4. Enforce the policy of personnel doors remaining closed and secured when not in use. Periodically check personnel doors in your work area. If dock doors are left open watch for any unauthorized persons entering through them. If an unauthorized person is seen entering the facility notifies security.
5. If your personnel find a suspicious object or package evacuate the area and notify the Emergency Coordinator or Assistant Emergency Coordinator. If they are not available, and you decide it is necessary, have security call 16 or 35850339, 35850334, 36361450, anti-bomb squad 9212111 or Civil Defense 9212109 for assistance and initiate this action plan.
6. Assist public safety officials as needed in search operations or investigations. Only personnel who volunteer may be used for search operations.

2.11 EARTHQUAKE

Earthquakes occur without warning. That is why being prepared is so important.

The following plan will help personnel protect themselves and the facility should an earthquake occur.

2.11.1 Pre-Emergency Actions

1. Have emergency supplies on hand at all times. Check emergency supplies (i.e. flashlights, batteries, first aid kits, fire extinguishers, etc.). Also, a good inventory of hand tools will prove valuable.
2. Know how and where to cut off electricity, gas and water at the facility.
3. Look for heavy equipment or furniture that could topple over on top of you or glass container that could fall and cause injury. In areas where they are used check for flammable liquids that should be kept in flammable liquid storage cabinets. Make sure your fellow associates know where hazardous areas are and how to avoid them.
4. Plan and practice what to do if an earthquake should strike.

2.11.2 Actions During an Earthquake

1. If time and conditions permit shut down any equipment in your immediate work area.
2. If indoors stay there and take cover under sturdy, stationary furniture and equipment such as work tables or desks, or heavy machinery that is immovable. Standing in doorways or in a corner of a room may also provide some protection.
3. Stay away from glass windows and doors that may shatter. Also stay clear of tall bookcases, cabinets and appliances that may shift and fall over. Most casualties in earthquakes that occur due to falling materials.
4. If outdoors stay in open, away from buildings, trees and power-lines, do not near anything, there is danger of falling debris.
5. If driving stop and stay with your vehicle, but make sure that you are not positioned under or on a bridge. Move as far as possible out of the normal traffic pattern. Make sure not to park under trees, power lines, utility poles, signs, etc.

2.11.3 Actions after an Earthquake

1. Evacuate the facility as soon as it is safe to do so and report to the Primary Assembly Area for a head count. Assist other personnel as you leave the building. Check personnel for injuries follow first aid procedures and assist disabled persons. Do not leave the assembly area until you are told to do so.

2. Be prepared for aftershocks. Earthquakes sometimes occur in a series over a period of several days. Aftershocks may last from a few seconds to as long as five minutes and can occur for months after the original earthquake.
3. Do not re-enter damage buildings. Aftershocks can cause the building to collapse.
4. Do not use the telephone unless absolutely necessary to report fires, injuries, etc.
5. Monitor the radio and television for emergency broadcasts. Cooperate with company and public safety officials. Be prepared for increased response times for local public safety agencies. Damage and injuries can be created in an extensive area during an earthquake and this will overwhelm emergency service agencies.
6. Remain alert for gas and water leaks, electrical hazards, and broken sewer lines. Whenever possible turn the utilities off at the source. If you do enter a building do not use open flames for lighting. If you smell gas, ventilate the area, leave quickly and notify your Manager/ operator. Attempt to turn the gas off at a location remote from the leak. Do not re-enter that building until it is safe.

2.11.4 Manager / operators Actions After an Earthquake

1. Initiate evacuation of the facility as soon as it is safe to do so. Insure that your work area/department is clear of all persons. Make sure to check offices, break rooms, and restrooms for injured or trapped persons that cannot evacuate unassisted. Insure that all visitors and contractors are evacuating. Instruct all persons to move to the Primary Assembly Area (associate parking lot on the south side of the facility). Report to the results of the head count to the security officer. If someone is missing interview others to try and determine the missing person's last known location. Forward this information to rescue teams.
2. Direct or provide first aid services to the injured.
3. Ensure that security has called 16 or 850339 or 6361450 for emergency assistance and that management personnel have been notified. If the telephone system is inoperable attempt to notify local public safety by using a mobile phone. Attempts should be made utilizing both mobile systems If the mobile system is inoperable, assign someone to go to the pay telephones at the Gulberg main market to report the emergency. If these phones are not working this person should have been instructed to go to Fire brigade or civil defence department to report the emergency. If no one is in the fire station instruct this person to use the first available telephone to call 16 or 850339 or 6361450.
4. If it is confirmed that emergency service crews cannot respond, and management gives permission to do so, you may initiate search and rescue operation with volunteer personnel to locate missing associates.

5. During the search and call verbally for the missing person. If someone is located relay this information to local emergency service agencies and request immediate assistance.

2.12 FLOODS

Although the possibility of flooding at this facility is remote, the following plan will help associates protect themselves and the facility should a flood occur.

Some flooding is seasonal, and this can allow for advanced preparation. At other times flooding can occur rapidly (sometimes referred to as flash flooding) and can wash out roads and strand persons with little or no warning. Do not underestimate the power of floodwaters, no matter how shallow or calm the water looks. They can easily kill, injure, and cause great property damage. It is important to use extreme caution during all stages of flooding.

2.12.1 Pre-Emergency Actions

1. Secure your work area.
2. Secure files and lock up confidential documents. Move these materials to higher ground or floors when possible. Also, important business records in files or on computer disk must also be included.
3. Turn off machinery and equipment.
4. Secure hazardous materials and operations according to instructions. Delay starting any operation that could be adversely affected by flooding.
5. Protect your equipment to minimize damage.
6. Close windows and tape them if possible.
7. Secure any equipment that must be left outside. Of critical importance in containers of hazardous materials. Drums, tanks, etc. can be moved great distances by flood waters.
8. Move to higher ground, moving high and try to get away from flood waters. Remember; do not move to areas where you are without an avenue of escape. Do not get near tall trees as lightning could strike. Listen to the radio or television for updates on the flood and for evacuation instructions.
9. Regularly check emergency supplies and equipment (i.e., flashlights, first aid kits, etc.). For emergency waterproofing gather materials such as plastic sheeting, lumber, and sandbags.
10. Keep company vehicles fuelled. If electrical service is interrupted fuel may not be available.

2.12.2 Actions during Flooding

1. Avoid contact with electrical devices, sources, and carriers. While standing in water you are electrically grounded and can be killed with less current than a light bulb uses. Leave utility repairs to the experts.
2. If you are directed to evacuate do not hesitate. Go immediately to the Primary Assembly Area (parking lot on the East side of the facility). Remain there for a head count and further

instructions. Stay out of traffic flow areas. Be extremely cautious if evacuating at night as it will be more difficult to see areas that are flooded. Manager/ operators are to ensure that the facility is swiftly but safely, and completely evacuated.

3. If you are dismissed from the assembly area, return to your vehicle and drive from the area. Remain alert for emergency vehicles in the area. Avoid areas with rivers, streams or other low-lying areas. Do not attempt to drive where water is already over bridges or roads. If walking, do not attempt to cross-areas where the water is above your knees. Do not venture into water without an approved floatation device.
4. Continuously monitor news and weather reports.

2.12.3 Actions after the Flood

1. Report to the Primary Assembly Area and await directions from management or your operator in charge
2. Do not touch electrical equipment in wet areas.
3. Report broken utilities to your Manager/ operator.
4. Use only flash lights to examine damaged areas. Remain alert for flammable gas or liquid leaks.

2.12.4 Responsibilities of Manager/ operators

1. Stay informed concerning weather systems that may be bringing heavy rains into the Lahore area. If heavy rains are forecasted review emergency actions with associates under your supervision.
2. Follow Pre-Emergency Actions as listed in this plan. As associates report to you that precautionary steps are complete inspect those areas to ensure that all direction has been followed.
3. Ensure that emergency equipment in you work area has been inspected and is in adequate supply. Keep emergency light and spare batteries with you.
4. Ensure that all personnel adhere to safety rules regarding actions to take during flood emergencies.
5. If evacuation is called for report to the Primary Assembly Area and get a head count of your personnel. Report the results of the head count to security. If necessary, move all personnel to a sheltered area of safety. Keep all personnel out of traffic flow areas.
6. If associated as dismissed and are to leave the facility inform them of any areas known to be flooded and advise them to avoid these areas.
7. Cooperate with local public safety agencies.
8. After flood water subside and personnel are allowed back into the facility brief them on actions to take as listed in this plan. Report any utility systems disruption to management.

3 SECTION III

3.1 FLOW CHARTS

3.1.1 FIRE

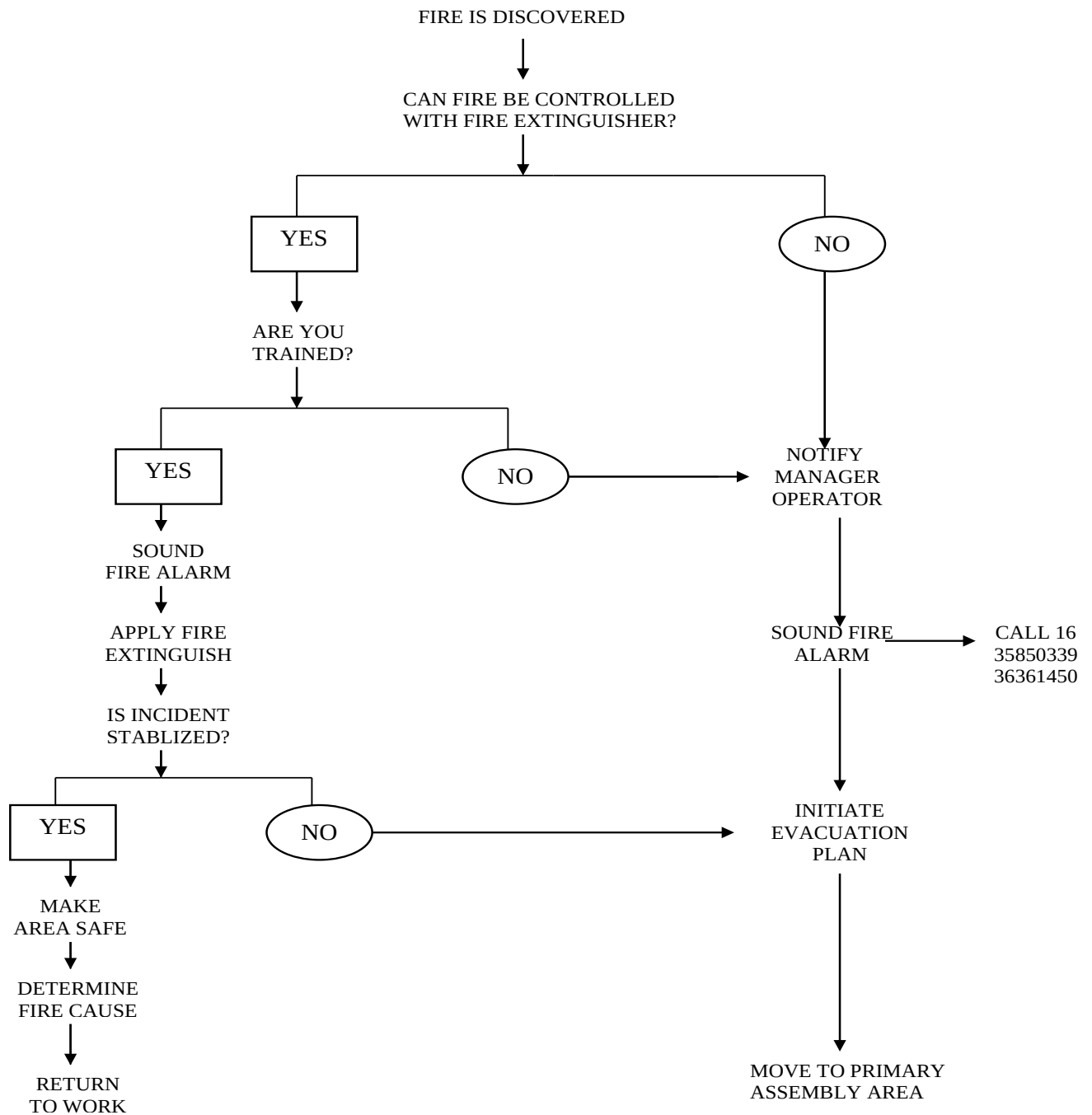


Figure 1 Fire Response Flow Chart

3.1.2 HAZARDOUS MATERIALS SPILL

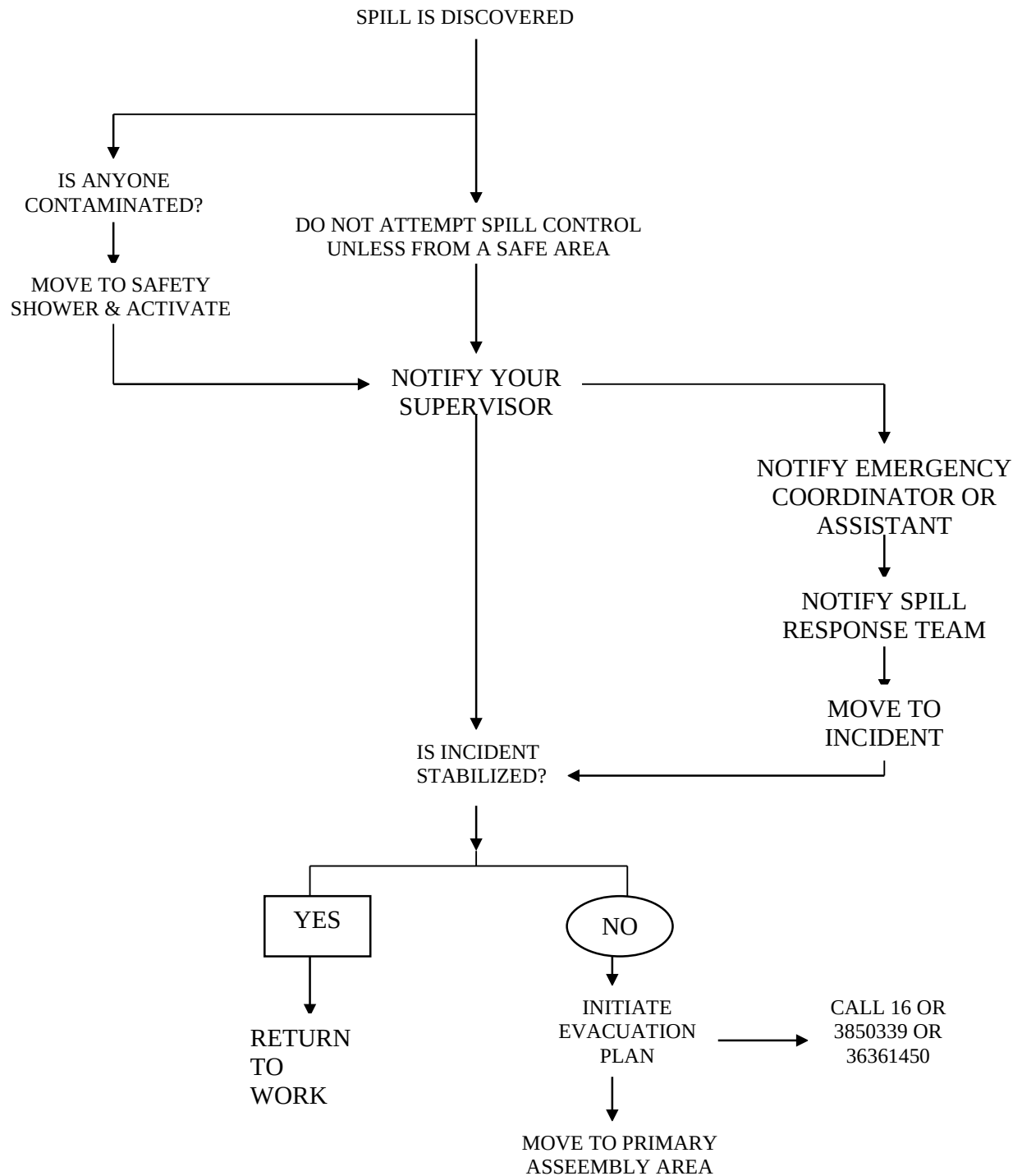


Figure 2 Hazardous Materials Spill Response Flow Chart

3.1.3 DUST STORM - SEVERE WEATHER

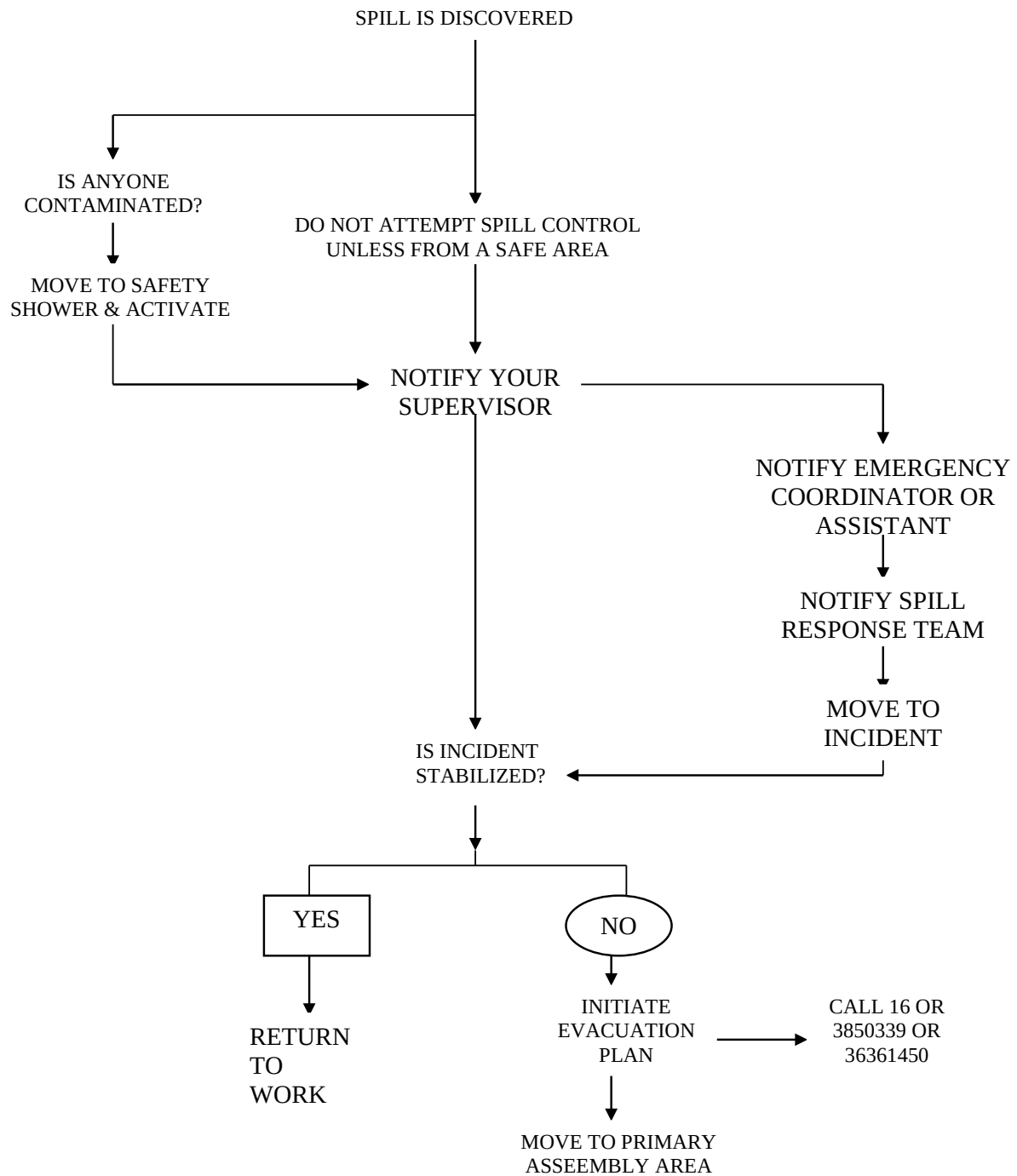


Figure 3 Dust Storm - Severe Weather Response Flow Chart

3.1.4 POWER OUTAGE

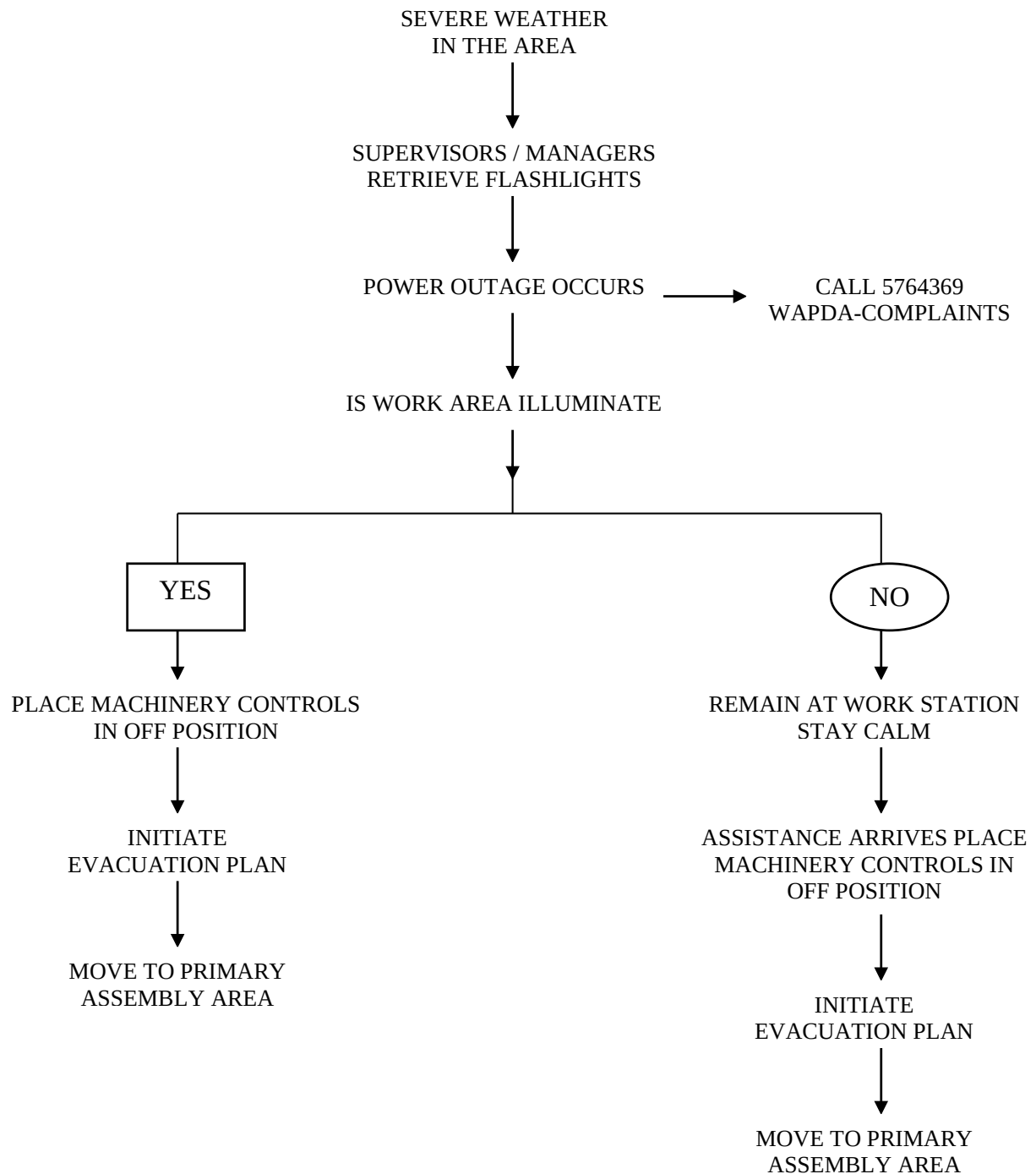


Figure 4 Power Outage Response Flow Chart

3.1.5 BOMB THREAT

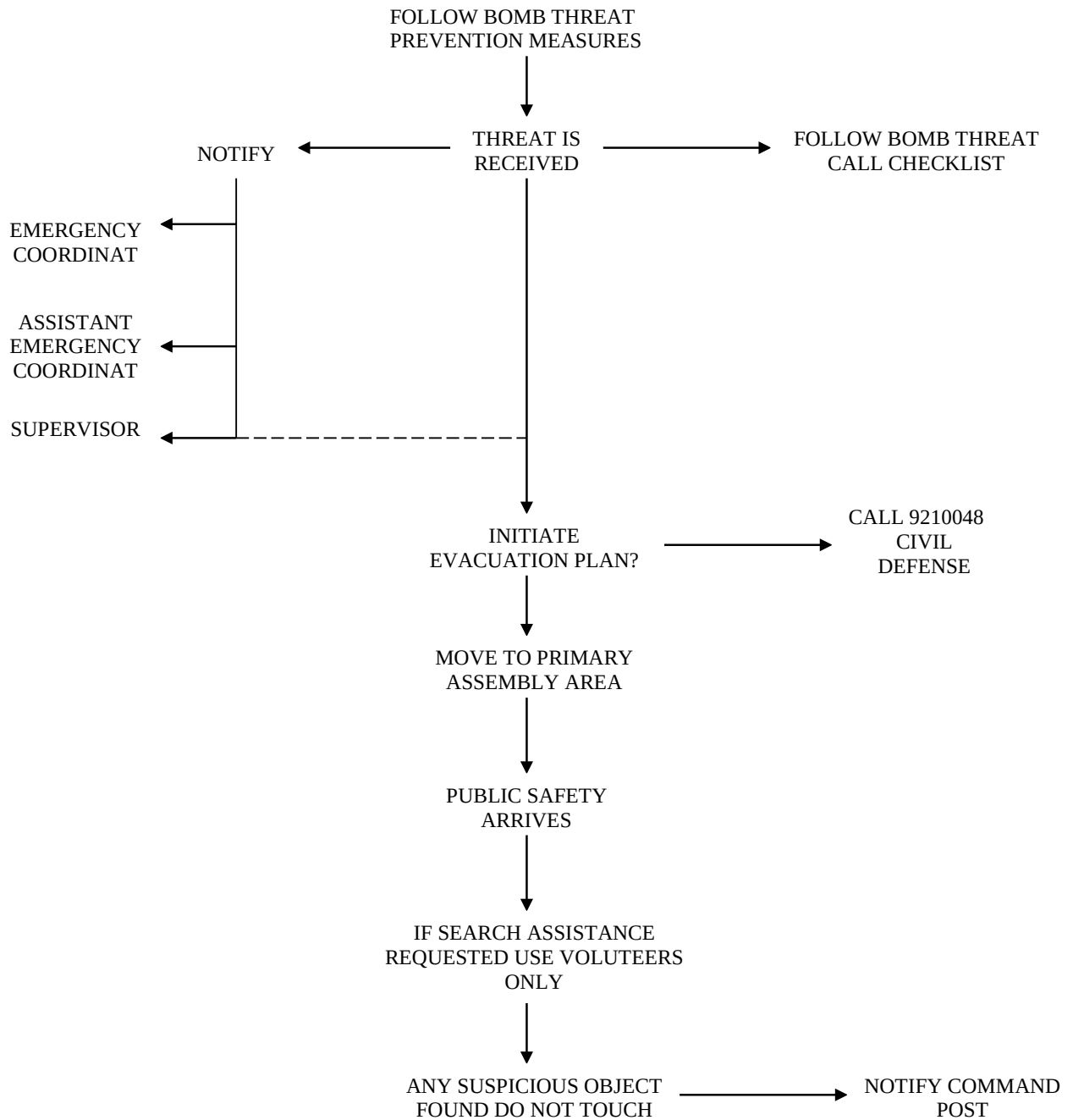


Figure 5 Bomb Threat Response Flow Chart

3.1.6 EARTHQUAKE

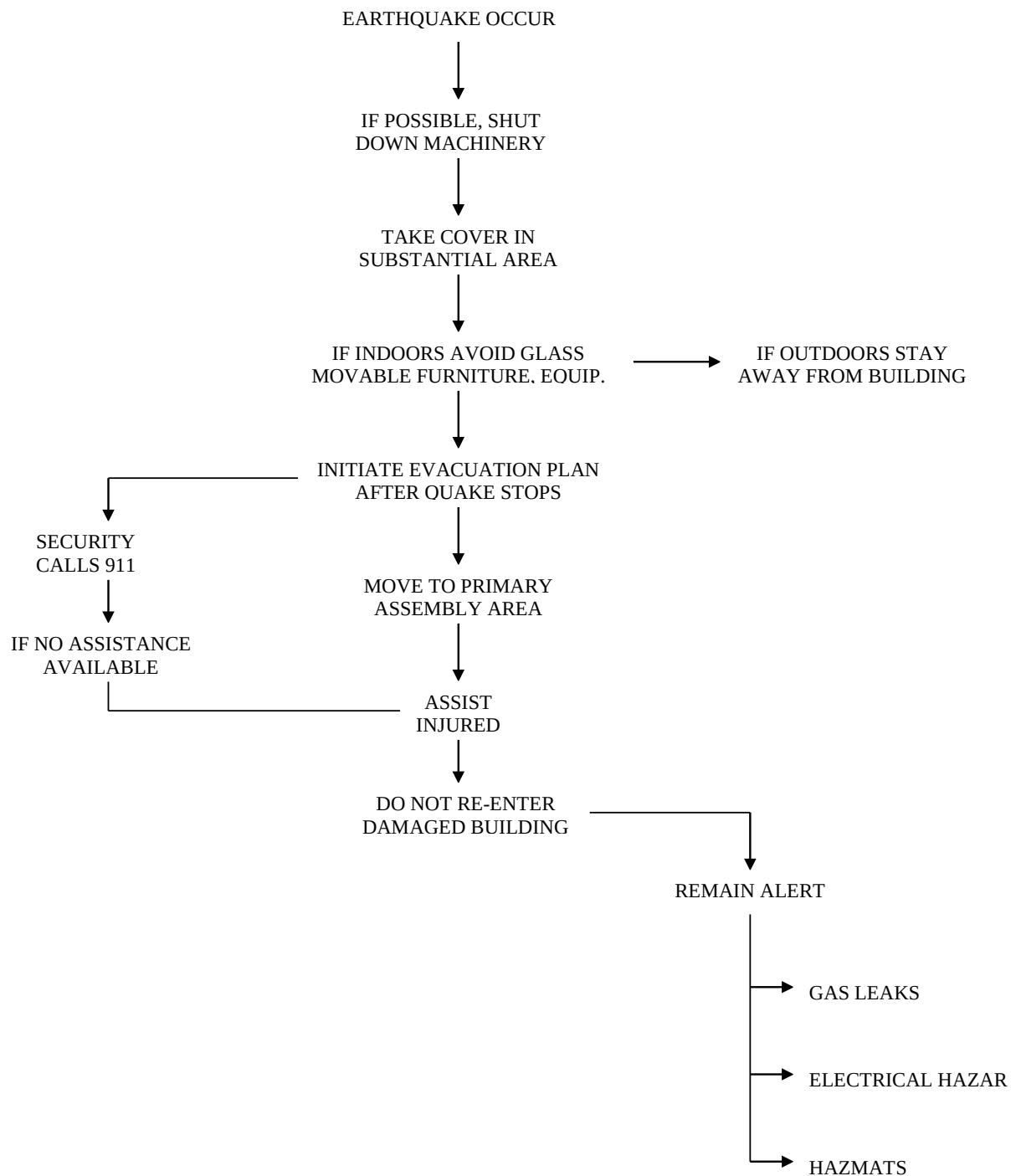


Figure 6 Earthquake Response Flow Chart

3.1.7 FLOODS

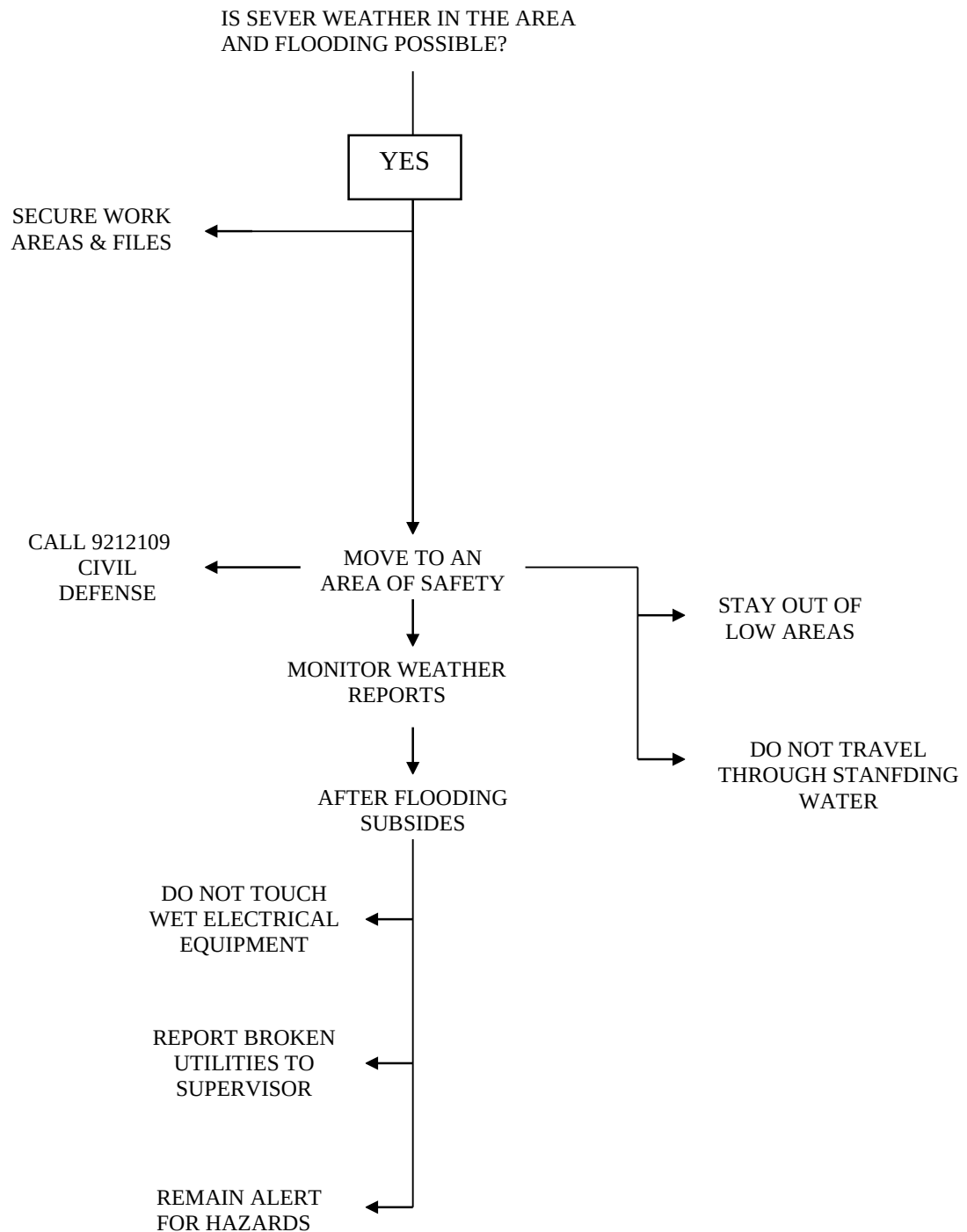


Figure 7 Floods Response Flow Chart

Annexure-BB

ENVIRONMENTAL ISSUES TRACKING REPORT

Environmental Issues Tracking Report

[illegible]

Annexure-CC

SAMPLE: GRIEVANCE LOGGING AND INITIAL RESPONSE FORM

Sample: Grievance Logging and Initial Response Form

Date of Receiving Concern/Grievance		
Mode of Receiving:		
Name of Aggrieved Person/Party		
Name of Organization/Status:		
Position:		
Address:		
Telephone/Fax and Email Address:		
Most effective means to send a response Mail Email Phone		
location of Comment/Grievance		
Nature		
Received by		
Date of initial response		
Initial Response details and sent by		
Resolved/Addressed by		
Nature of Resolution		
Date of Resolution		
Signed by PMU ESS		

Annexure-DD

TOOLS FOR CONDUCTING ESIA (PACKAGES-03 AND 04)

Screening Checklist for Surface Water Supply Network

Sr#	Screening questions	Yes	No	Remarks/Risk severity (major, minor, moderate, variable, short or long term)
PRE-CONSTRUCTION PHASE				
1.	Project Siting Is the project area...			
	▪ Densely populated?	☐	☐	
	▪ Heavy with development activities?	☐	☐	
	▪ Adjacent to or within any environmentally sensitive areas?	☐	☐	
	▪ Cultural heritage site	☐	☐	
	▪ Protected Area	☐	☐	
	▪ Wetland	☐	☐	
	▪ Buffer zone of protected area	☐	☐	
	▪ Special area for protecting biodiversity	☐	☐	
2.	Potential Environmental Impacts of SWTP Will the Project cause...			
	▪ Impairment of historical/cultural monuments/areas and loss/damage to these sites?	☐	☐	
	▪ Interference with other utilities and blocking of access to buildings; nuisance to neighbouring	☐	☐	

	areas due to noise, smell, and influx of insects, rodents, etc.?			
	Dislocation or involuntary resettlement of people	☐	☐	
	Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	☐	☐	
	Overflows and flooding of neighbouring properties with raw sewage?	☐	☐	
	Environmental pollution due to inadequate sludge disposal in sewers?	☐	☐	
	Noise and vibration due to blasting and other civil works?	☐	☐	
	Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?	☐	☐	
	Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?	☐	☐	
	Social conflicts between construction workers from other areas and community workers?	☐	☐	
	Road blocking and temporary flooding due to land excavation during the rainy season?	☐	☐	
	Noise and dust from construction activities?	☐	☐	
	Traffic disturbances due to construction material transport	☐	☐	
	Temporary silt runoff due to construction?	☐	☐	
	Hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?	☐	☐	

	Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	☐	☐	
	Contamination of surface and ground waters due to sludge disposal on land?	☐	☐	
	Health and safety hazards to workers from toxic gases	☐	☐	
CONSTRUCTION PHASE				
3.	Potential Impacts of Construction of SWTP			
	a. Existing Communication	☐	☐	
	Disruption to communication routes	☐	☐	
	Disruption of public access	☐	☐	
	b. Public Utilities	☐	☐	
	Interruption of supply, danger and cost	☐	☐	
	c. Tourism	☐	☐	
	Imposition of unattractive activities	☐	☐	
	d. Soil and Water Pollution	☐	☐	
	Pollution due to temporary activities	☐	☐	
	Pollution at the construction camp	☐	☐	
	e. Drainage, Erosion and Sediment Load	☐	☐	
	Disruption of existing drainage networks	☐	☐	
	Erosion from spoil heaps, stock piles and other loose materials	☐	☐	

	▪ Increased sediment loading in watercourses	☐	☐	
	f. Noise and Air	☐	☐	
	▪ Noise pollution from construction machinery	☐	☐	
	▪ Air pollution from construction machinery	☐	☐	
	▪ Mud on public roads	☐	☐	
	g. Demolition	☐	☐	
	▪ Public and Worker's safety	☐	☐	
	h. Use of Explosives	☐	☐	
	▪ Public and Worker's safety	☐	☐	
	i. Surplus Spoil	☐	☐	
	▪ Excess fill from pipeline trenches	☐	☐	
	j. Employment	☐	☐	
	▪ Temporary local job opportunities for construction workers	☐	☐	
	k. Public Safety	☐	☐	
	▪ General construction activity	☐	☐	
	▪ Traffic at construction camps	☐	☐	
	▪ Heavy equipment movement and operation in public areas	☐	☐	
	▪ Changes in existing traffic circulation	☐	☐	
	l. Worker's Safety	☐	☐	

	▪ Accidents common on construction sites	☐	☐	
	m. Other Sites	☐	☐	
	▪ Increased Heavy Goods Vehicles (HGV) turning movements at sites	☐	☐	
	▪ Mud and chippings on roads	☐	☐	
	n. Resource Consumption	☐	☐	
	▪ Water use at construction camps	☐	☐	
	▪ Use of aggregate resources	☐	☐	
	▪ Water use for construction activities	☐	☐	
	▪ Haulage (transport)	☐	☐	
OPERATIONAL PHASE				
4.	Potential impacts of Operation of SWTP (Temporary)			
	a. Water and Sewage Overflows	☐	☐	
	▪ Raw sewage leakage and due to pipe breakage	☐	☐	
	▪ Overflow from blocked pumping stations	☐	☐	
	▪ Overflow from treatment ponds during heavy rain	☐	☐	
	b. Noise and Vibration	☐	☐	
	▪ Noise created during the excavation of pipes for repair	☐	☐	
	c. Air Quality	☐	☐	
	▪ Dust from excavations for pipeline repair	☐	☐	
	d. Odor	☐	☐	
	▪ Odor from sewers	☐	☐	
	e. Soil and Water Pollution	☐	☐	

	▪ Overflow from broken pipelines and blocked manholes	☐	☐	
	f. Traffic	☐	☐	
	▪ Vehicular movements of operational staff	☐	☐	
	▪ Septage tankers	☐	☐	
	▪ Disruptions during network repairs	☐	☐	
	g. Solid Waste	☐	☐	
	▪ Broken road surfacing and soil from pipeline repairs	☐	☐	
	▪ Sludge	☐	☐	
	h. Public and Workers Health and Safety	☐	☐	
	▪ Accidents due to unimpeded public access	☐	☐	
5.	Potential Impacts of Operation of SWTP (Permanent)			
	a. Public Health	☐	☐	
	▪ Provision of safe and sustainable water	☐	☐	
	b. Induced Development	☐	☐	
	▪ Unplanned development in the vicinity of water and sewerage services	☐	☐	

Provisional Scoping Matrix

No.	Item	Scoping Result			Rational of Assessment
		P	C	O	
1. Natural Environment					
1.1	Climate/ Meteorological Phenomena				
1.2	Topography				
1.3	Geology				
1.4	Soil Erosion				
1.5	Hydrology				
1.6	Groundwater				
1.7	Ecosystem, Flora, Fauna and Biodiversity				
1.8	Protected area/Forest				

1.9	Coastal Zone				
1.10	Landscape				
1.11	Natural Disaster				
2.					
2.1	Air Pollution				
2.2	Offensive Odor				
2.3	Water Pollution				
2.4	Bottom Sediment Contamination				
2.5	Soil Contamination				
2.6	Land Subsidence				
2.7	Noise/Vibration				
2.8	Sunshine Obstruction				

2.9	Waste/Hazardous Materials				

3. Social Environment					
3.1	Involuntary Resettlement				
3.2	Land Acquisition				
3.3	Utilization of Local Resources				
3.4	General, Regional/City Plans				
3.5	Social Institutions				
3.6	Social Infrastructure and Services				
3.7	Local Economy and Livelihood				

3.8	Unequal Distribution of Benefit and Damage				
3.9	Local Conflict and Inequity				

3.10	Water Usage, Water Rights				
3.11	Cultural and Historical Heritage				
3.12	Religious Facilities				
3.13	Sensitive Facilities (ex. Hospital, school, precision machine factory)				
3.14	Poor People				
3.15	Ethnic Minorities /Indigenous People				
3.16	Children's Rights				

3.17	Public Health				
3.19	Occupational Health and Safety (OHS)				

4. Others					
4.1	Accidents				
4.2	Greenhouse Effect Gas (GHG) Emissions				

Note: P: Pre-Construction, **C:** Construction, **O:** Operation

Significant impact is expected (+: Positive impact, Negative impact)

Some impact is expected (+: Positive impact, -: Negative impact)

Extent of impact is unknown, further examination will be required (+: Positive impact, -: Negative impact)

No impact is expected

Rapid Environmental Assessment of Proposed Grid Station			
Screening Questions	Yes	No	Remarks
a. Project Siting			
• Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site	☐	☐	
• Protected Area	☐	☐	
• Wetland	☐	☐	
• Mangrove	☐	☐	
• Estuarine	☐	☐	
• Buffer zone of protected area	☐	☐	
• Special area for protecting biodiversity	☐	☐	
b. Potential Environmental Impacts			
• Will the Project cause...	☐	☐	
✓ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?	☐	☐	
✓ encroachment on precious ecosystem (e.g. sensitive or protected areas)?	☐	☐	
✓ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?	☐	☐	
✓ damage to sensitive coastal/marine habitats by construction of submarine cables?	☐	☐	
✓ deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?	☐	☐	
✓ increased local air pollution due to rock crushing, cutting and filling?	☐	☐	
✓ chemical pollution resulting from chemical clearing of vegetation for construction site?	☐	☐	
✓ noise and vibration due to blasting and other civil works?	☐	☐	
✓ dislocation or involuntary resettlement of people	☐	☐	
✓ social conflicts relating to inconveniences in living conditions where construction interferes with pre existing roads?	☐	☐	
✓ hazardous driving conditions where construction interferes with pre-existing roads?	☐	☐	
✓ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	☐	☐	

✓ creation of temporary breeding habitats for mosquito vectors of disease?	☐	☐	
✓ dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?	☐	☐	
✓ environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	☐	☐	
✓ facilitation of access to protected areas in case corridors traverse protected areas?	☐	☐	
✓ accident risks associated with maintenance of lines and related facilities?			
✓ health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?	☐	☐	
✓ disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?	☐	☐	
c. Design Phase Considerations			
• Site selection for grid stations	☐	☐	
✓ Poor site selection;	☐	☐	
✓ unstable soils.	☐	☐	
• Route selection for transmission lines	☐	☐	
• Type of equipment.	☐	☐	
• Soil and water contamination	☐	☐	
✓ Absence of appropriate waste (solid and liquid) disposal arrangements/systems	☐	☐	
✓ Using transformers with PCB-containing oil.	☐	☐	
• Loss of natural Vegetation and threat to wildlife	☐	☐	
✓ Routing the transmission lines through forested and wildlife-sensitive areas	☐	☐	
d. Construction Phase Impacts			
• Physical Environment	☐	☐	
o Land and soil	☐	☐	
✓ Erosion due to excavation	☐	☐	
✓ Formation of pits due to improper backfilling			
o Air and Dust	☐	☐	
✓ Chronic health affects	☐	☐	
✓ Reduced visibility on roads	☐	☐	
o Water contamination	☐	☐	
✓ Wastage and misuse of water	☐	☐	
o Noise	☐	☐	
✓ Stress	☐	☐	
✓ Hypertension	☐	☐	
✓ Hearing loss	☐	☐	

✓ Headache	☐	☐	
o Construction debris	☐	☐	
✓ Formation of heaps	☐	☐	
✓ Remaining concrete material results in hardening of ground surface	☐	☐	
• Biological Environment	☐	☐	
o Loss of/damage to the floral 'resources (natural vegetation) of the area	☐	☐	
✓ Cutting of trees	☐	☐	
o Loss of/damage to faunal resources (wildlife) of the area.	☐	☐	
• Social Environment	☐	☐	
✓ Disturbance to routine market and local business activities	☐	☐	
✓ Conflicts between laborers and local communities			
• Roads and networks	☐	☐	
✓ Traffic congestion	☐	☐	
✓ Night time visibility of drivers is reduced			
• Health and safety	☐	☐	
✓ Lack of awareness to general public about safety may lead to accidents	☐	☐	
✓ Incompetent and untrained workers might cause harm to themselves and others	☐	☐	
✓ Construction works may include many risks and hazards that may lead to injuries or even death	☐	☐	
e. Operation phase impacts			
• Soil Contamination	☐	☐	
• Water Contamination	☐	☐	
• Metrological conditions	☐	☐	
✓ Heavy rainfall may break damaged overhead transmission lines which may lead to electrical shock hazards	☐	☐	
• Electric and magnetic field	☐	☐	
✓ Human health impacts such as, neuropsychological disorders or cardiovascular diseases	☐	☐	
• Transformer oil spillage	☐	☐	
✓ Contamination of soil and water bodies	☐	☐	

Potential Impacts of Water Treatment works

Key	
Impact Type	Direct, Indirect
Rating	Minor, Moderate, Major
Extent	Limited, wide
Duration	Temporary, Short to Long term, Long term, Permanent

Project component:		Water Treatment works		
Phase: Construction				
Issue	Potential Impact	Impact Type and Rating	Extent	Duration
Air pollution	- Emissions from construction equipment - Emissions from project vehicles.			
Noise pollution	Intermittent noise from construction equipment and heavy project vehicles.			
Water pollution	- Water pollution from dredging activities - Aaccidental spillage of fuel and lubricants.			
Water levels	Water levels may be affected by construction of the impoundment weir and reservoir.			
Soil erosion and contamination	- Inappropriate construction practices - Inappropriate soil protection measures which may induce or accelerate soil erosion with possible pollution and siltation of downstream water sources; - Removal of top soil may lead to loss of soil fertility			
Solid waste generation	- Domestic waste from camps may be an eye sore - It may contaminate soil and water resources.			
Impacts on flora and fauna	- Loss of wetland plants and associated fauna; - Cleared vegetation may compromise aesthetic value of the sites.			

Public Safety including accidents as a result of increased vehicular traffic	• Excavations and transportation of equipment, site workers and debris and movement of heavy equipment may pose a safety risk to the general public; • Increase in the likelihood of accidents within and around the vicinity of water works area from possible careless driving of project vehicles. • Creation of quarries and borrow pits may be a potential for accidents as people and animals can fall in them.			
Public health problems	• Pools of stagnant water may form in pits, holes and excavated ditches during the wet season and create suitable habitats for disease vectors such as mosquitoes. • Poor hygiene in workers camps.			
Occupational health and safety	• Exposure of workers to occupational health and safety hazards from activities such as: excavations; • working with heavy equipment; • working under noisy conditions, working in confined spaces; • lifting of heavy objects; storage, handling and use of hazardous substances and wastes; • Poor hygiene and sanitation in workers camps.			
Disturbance and interruption of commercial and social activities	• Interference with economic livelihoods such as commercial and social activities.			
Disruption of social order	• Influx of people in the area which may affect the local economy, • cause alteration of culture and introduce undesirable behavioural changes.			
Raw material use	• Large quantities of construction material will be involved, for example, cement, steel, oil fuel, pipe materials (e.g. PVC, uPVC, concrete and/or steel). • Also, large quantities of local materials, e.g. sand, gravel will be involved. • Additional impacts include wet season excavation, creation of quarry sites and borrow pits. If excavated areas are not re-instated and if materials are not well stored and utilized, as well as instituting management measures for waste materials,			

	contamination of the environment may occur.			
Visual amenities	Construction sites e.g. creation of pits during excavations, if not well managed, may have impacts on aesthetics of the surroundings with the possibility to affect the neighbouring residents to the SWTP with moderate view point.			
Phase: Operation and maintenance				
Issue	Potential Impact	Impact Type and Rating	Extent	Duration
Air pollution	Emissions from generators.			
Noise pollution	Intermittent noise from generators.			
Water pollution	- Water pollution from discharge of sludge from sedimentation tanks, containing alum; - backwash water which may contain silt and dirt.			
Water levels	Water levels may be affected by operating the impoundment weir and reservoir.			
Solid waste generation	Wastes, for example, used containers and packaging materials of alum and chlorine.			
Impacts on flora and fauna	Discharge of sludge and back wash water.			
Storage and handling of chemicals	Storage of alum and especially chlorine may induce rusting of holding metallic containers, and even rooftops, if they are made of iron.			
Occupational health and safety	Exposure of workers to occupational health and safety hazards while working with chemicals, cleaning and disposal, closing and opening of valves.			
Local incapacity/ inexperience to manage the facilities.	This will lead to poor operation and maintenance as well as deterioration of infrastructure and inadequate monitoring of environmental impacts of project activities.			
Water access	The poor people within the project area may not afford to pay for the water.			
Conflicts	- Potential for conflicts arising from protection and management of BRBD and its banks; - land acquisition.			

Potential Impacts of Laying of Transmission Main

Key	
Impact Type	Direct, Indirect
Rating	Minor, Moderate, Major
Extent	Limited, local, wide
Duration	Temporary, Short to Long term, Long term, Permanent

Project component:		Laying of Transmission Main		
Impact type	Potential Impact	Impact Type and Rating	Extent	Duration
Air pollution	Emissions from construction vehicles and equipment.			
Noise pollution	Noise pollution from heavy vehicles and construction equipment may cause nuisances to neighbouring communities and their livestock.			
Water pollution	Water pollution may result from: - wastewater from construction camps. - accidental spillage of fuels, lubricants and other chemicals. - siltation of water courses from runoff laden with sediment and dust. - high suspended solids from soil eroded from trenches, poorly constructed tracks.			
Soil erosion and contamination	- Site clearance of vegetation and excavation works using heavy equipment may induce/accelerate soil erosion and siltation of water courses and gardens. - Contamination may occur as a result of accidental or structural spillage of fuels, lubricant chemicals, sanitary wastewater, etc., as well as from leakage from inadequately protected solid waste storage facilities and sites. - Soil may lose its fertility because of removal of topsoil.			

Solid waste generation	Vegetation and soil from excavation, as well as waste from contractor's camps, construction waste material, pipe off-cuts and packaging material may produce large quantities of waste.			
Impacts on flora and fauna	Removal of natural vegetation may lead to potential habitat loss of its associated fauna.			
Public health problems	- Public health problems may occur in the case of badly managed construction camps and work sites. - These include: - Pools of stagnant water may be a source of water borne diseases. - Poor hygiene in camps.			
Public Safety	- Safety problems at the construction sites may arise from excavations, transportation and movement of heavy equipment. - Manually executed works expected to dominate the pipeline laying will take a longer construction time leading to prolonged safety risks such as falling into trenches.			
Visual amenities	Laying of pipelines may have a negative impact on aesthetics of the surroundings such as the soils from the trenches that will be dumped along the trenches			
Disturbance and interruption of commercial and social activities	- Improper laying of pipelines may cause traffic disruptions and congestion, resulting in temporary disturbance and interruption of commercial and social activities. - It may also cause damage to infrastructure (roads, utility lines) and disruption of public services.			
Socio- economic disruption	- Trenches for the pipelines may be dug through peoples' farms destroying crops, in front of shops, displacing stalls along road reserves and other properties which will affect their livelihood and incomes. - Furthermore, influx of people in the area may cause alteration of			

	culture and introduce behavioral changes.			
Socio- economic disruption	Trenches for the pipelines will involve some land acquisition.			
Occupational health and safety	- Workers may be exposed to occupational health and safety hazards from project activities such as: - accidents in excavations; - working with heavy equipment; - working under noisy conditions. - working in confined spaces; lifting of heavy objects; - storage, handling and use of dangerous substances and wastes.			
Phase: Operation and Maintenance				
Issue	Potential Impact	Impact Type and Rating	Extent	Duration
Alteration of natural drainage patterns	Drainage patterns where pipes cross may be altered by laying of the pipelines, for drainage channels and is blocked at the pipe crossing, it may block or alter the water flow.			
Water pollution	- Water pollution may result from spillage of fuel and lubricants during maintenance; waste disposal along damaged lines may also cause pollution - For sewer lines that will be crossing, pollution may arise from leakage of sewage in case the pipes get damaged.			
Noise pollution	Noise generated from vehicles used during maintenance or from generators in case they are used to pump the water can be a nuisance to sensitive receptors.			
Air pollution	This could be in form of emissions from maintenance vehicles.			

Solid waste generation	• Solid wastes may be produced by maintenance works, especially where sections of pipelines are replaced.			
Soil erosion and contamination	• Inspection and maintenance works for the pipelines may require clearance of sites of vegetation, as well as the execution of excavation works, possibly using heavy equipment. This may induce or accelerate erosion.			
Impacts on flora and fauna	• Inspection and maintenance works may require the removal of the natural vegetation, leading to potential habitat loss of its associated fauna.			
Nuisances and public health risks as a result of operational failures of the distribution network	• Accidental ruptures and structural degradation of pipelines that may accrue from ageing and poor maintenance, accompanied by low pressure in the pipes may allow the intrusion of potentially polluted groundwater into the drinking water distribution system. • Ruptured pipes may also cause flooding and if the water stagnates, this may pose a risk of water-borne diseases.			
Energy consumption	• Operation of the water distribution system may involve the use of energy for pumping which will cause a relative increase in energy demand.			
Occupational health and safety	• Occupational health and safety problems may arise during maintenance of the pipelines. These may include: • lifting of heavy and sharp objects and transportation of materials for maintenance, • storage as well as handling and use of dangerous substances.			
Local incapacity/ Inexperience to manage the facilities	• This will lead to poor operation and maintenance as well as deterioration of infrastructure as well as accidents due to lack of			

	enough technical knowledge in safety requirements for equipment/machinery operation. • Inadequate monitoring of environmental impacts of project activities.			
Disturbance and interruption of commercial and social activities	• Interference with commercial and social activities will be very low.			
Disturbance and interruption of commercial and social activities	• Maintenance activities for the water distribution network may cause traffic disruptions and congestion, resulting in disturbance and interruption of commercial and social activities. • Other infrastructure e.g. roads, sewer lines, drains may also be disrupted.			

Potential Impacts of Disruption to Public Utilities

Utility	Nature of Impact	Severity
1. High Voltage Electricity Cables	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	
2. Medium Voltage Electricity Cables	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	
3. Low Voltage Electricity Cables	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	
4. Trunk Distribution Pipelines	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	
5. Local Water Networks	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	
6. Telephone Cables	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	
7. Telecom Cables	Interruption of Supply	
	Personal Injury	
	Cost of Repair/Delay to Works	

Sensitive Receptors Survey Form

A. Identify any sensitive populations/uses that are currently on-site or surrounding property usage within 200 - 500 feet of the site property boundary	On-site	Off-site
1. Residences or residential property	☐	☐
2. Public or Private Schools	☐	☐
3. Childcare centres.	☐	☐
4. Public parks, playgrounds or other recreation areas	☐	☐
5. Religious centres (madrassa, mazaar, mosque etc.)	☐	☐
6. Other sensitive population use(s)	☐	☐
7. None of the above	☐	☐
Note: If any of the above applies, attach a list of addresses, facility names, type of use, and a map depicting each location relative to the site		

B. Ecological Receptors	Yes	No
1. Has an Ecological Evaluation (EE) been conducted	☐	☐
2. Are any site-related contaminants above any Ecological Screening Criteria?	☐	☐
3. Are there any Environmentally Sensitive Natural Resources (ESNRs) on or adjacent to the site, or potentially impacted by site related contamination?	☐	☐
4. Do available data indicate an impact to Ecological Receptor(s)	☐	☐
5. Has an Ecological Risk Assessment been conducted?	☐	☐

C. Current site uses (check all that apply)

☐ Industrial	☐ Residential	☐ Commercial
☐ School or child-care	☐ Government	☐ Park or recreational use
☐ Vacant	☐ Agricultural	☐ Other:

D. Planned future on-site uses and off-site uses	On-site	Off-site

1. Industrial	☐	☐
2. Residential	☐	☐
3. Commercial	☐	☐
4. School and Child-care	☐	☐
5. Government	☐	☐
6. Park or recreational Use	☐	☐
7. Vacant	☐	☐
8. Agriculture	☐	☐
9. Other	☐	☐

E. Water Well Inventory		
Summary of Water Wells Within 0.5 Mile Radius of The Site. (DG = Down gradient)		
Nature	Total No.:	Active No.:
1. Industrial		
2. Domestic		
3. Agricultural		
F. Potential Receptor Points		
1. Well No./Designation		
2. Distance from Site (ft.)		
3. Total Well Depth (ft.)		
4. Current use of Water		
5. Screened Interval Below Ground:		
6. Year Constructed:		
G. Underground Utility Survey (within 500-foot radius)		
1. Nearest Underground Utility (Include Name, Type, Depth of Utility, Distance and Direction from Affected Zone)		
2. Nearest Down gradient Underground Utility (Include Name, Type, Depth of Utility, Distance and Direction from Affected Zone)		
H. Building/Confined Space Survey (within 500-foot radius)		

1. Nearest Building/Confined Space (Include Name, Type, Distance and Direction from Affected Zone)	
2. Nearest Down gradient Building/Confined Space (Include Name, Type, Distance and Direction from Affected Zone)	
I. Surface Water Survey (within 500-foot radius)	
1. Nearest Surface Water (Include Name, Type, Distance and Direction from Affected Zone)	
2. Nearest Down gradient Surface Water	
3. Impacted Surface Water (Include Name, Type, Distance and Direction from source area)	
J. Sensitive or Protected Habitat Survey (within 500-foot radius)	
4. Nearest Sensitive or Protected Habitat (Include Name, Type, Distance and Direction from Affected Zone)	
5. Nearest Down gradient Sensitive or Protected Habitat	
K. Current Area Land Use and Zoning	
1. Source property current land use and zoning information	
2. Surrounding property current land use and zoning within 500' of site (indicate direction)	
3. Source of land use and zoning information	

Assessment of Cumulative and Induced Impacts

Questions	Yes	No	Remarks
1. Is the proposed project within a relatively undisturbed landscape or an already disturbed landscape?			
2. Do topographic or other constraints spatially limit the impact that the project may have on Valued Environmental Components (VECs)?			
3. Are there any unmitigated direct impacts (i.e., impacts only of the proposed project)?			
4. Is there any ongoing significant impact of past actions?			
5. Do the nearest existing projects to the proposed action have an impact on the same VECs?			
6. Have any actions been officially announced by other project proponents in the same region with the intent to start the EIA process?			
7. Have any issues or VECs already been identified in the EIA or by local stakeholders that maybe of concern beyond the footprint of the proposed project?			
8. Are any ecological species locally or regionally rare?			
9. Are there any environmentally sensitive areas that may be disturbed?			
10. Would the proposed project contribute to a loss of habitat (terrestrial or aquatic) that may affect the VECs in the study area?			
11. Is there reliable information that describes the VECs and their habitats?			
12. Is there adequate information available about other actions to determine if they are contributing to other than negligible impacts on the same VECs?			
13. Are indicators available to assess impacts on VECs?			
14. Are there indicators of significance, other than thresholds, that should be considered?			
15. Could the action induce other actions to occur (such as road access)?			

16. Can a historical baseline be described against which consecutive changes can be compared?			
17. Are certain analytical approaches mandatory for assessing impacts on some VECs?			
18. Are quantitative thresholds available for any of the VECs?			
19. Are qualitative thresholds available that describe intended land use (e.g., land use plans)?			
20. Is the standard application of mitigation adequate to mitigate significant impacts?			
21. Can reclamation reduce the duration of land disturbance and hasten the recovery of environmental components to pre-disturbance conditions?			
22. Is habitat of equivalent capability available elsewhere to compensate for lost habitat?			
23. Is there an opportunity to initiate a regional-level mitigation (or compensation) of impacts?			
24. What is required for monitoring and impact management as follow-up?			

Note: Valued environmental components (VECs) are defined as fundamental elements of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use that may be affected by a proposed project.

Socio-economic and Health Survey | Assessment

Interviewer's Name: _____ Date: _____

Q. 1 Respondent's Name: _____

Q. 2 Cell # _____ Q. 3 Age (years): _____

Q. 4 Education Level

☐ Illiterate

☐ Primary

☐ Middle

☐ Secondary

☐ Higher Secondary

☐ Graduate

☐ Post Graduate

☐ Deeni Uloom

Q. 5 Languages Spoken:

i. Urdu _____ ii. Punjabi _____ iii. English _____ iv. Other _____

Q. 6 Present Residential Address: _____

Q. 7 District: _____

Q. 8 Marital Status:

i. Married

ii. Un-Married

iii. Divorced/ Separated/Widowed

Q. 9 Occupancy Status & Sources of Income:

i. Govt. Servant _____

ii. Private Service _____

iii. Business _____

a) Office/company _____

b) Shop _____

iv. Agriculture _____

v. Livestock _____

vi. Labor _____

vii. Retired _____

viii. Any other (Specify) _____

Q. 10 Business Ownership (if office/company holder or shop)

i. Owner

ii. Rent

Q. 11 Distance from Main Road: _____ (ft/m)

Q. 12 Personal Income (Monthly average)

☐ Rs. 5,000---15,000

☐ Rs. 16,000---25,000

☐ Rs. 26,001-35,000

☐ Rs. 36,000-50,000

☐ Rs above 50,000

Q. 13 Monthly Expenditure:

i. Less than 2000

ii. 2001-5000

iii. 5001-8000

iv. 8001-11000

v. 11001-14000

vi. 14001 and above

Q. 14 Housing Condition:

i. Pucca

ii. Katcha

iii. Hut

iv Any other (Specify)

Q. 15 What is the type of the ownership of your house? Self-Owned ☐ Rented ☐

Q. 16 Source of Drinking Water:

i. Public

ii. Private

iii. Any other (Specify)

Q. 17 Common Diseases:

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

Q. 18 Total No. of Dependents: _____

Q. 19 Age Group and Education Level of Dependents:

Age Group	Male	Education	Female	Education
0-4				
5-9				
10-19				
20-39				
40-59				
60+				

Q. 20 Educational Facilities Available:

				If yes then reply	
Sr.	Facilities	Yes	No	Govt.	Private
1	Primary School				
2	Middle School				
3	High School				
4	College				
5	Vocational Training Centers				
6	Deeni Madrassa				
7	Others				

Q. 21 Institutional Facilities Available:

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

Q. 22 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. 23 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. 24 During construction:

- ☐ Information about alternative traffic route
- ☐ Arrangements of utilities backup
- ☐ Do nothing and wait for service to be restored

Q. 25 Does any NGO exists: 1. Yes ☐ 2.No ☐

Q. 26 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. 27 Do you have any livestock?

Yes _____ No _____

If yes, how much? _____

Q.28 Land use:

i. Agriculture _____

ii. Commercial _____

iii. Residential _____

iv. Any other _____

Q.29 Do you know about the subject Project?

i. Yes ii. No

Q.30 In your opinion, should this Project be implemented at the proposed location?

i. Yes ii. No

If yes, then reasons

If no, then reasons

Q.31 In your opinion, what will be the possible impacts of this Project on the locals?

Q.32 What are the major problems of your area?

Sr.	Types of Problems	Proposed Solutions
1		

2		
3		
4		
5		

Q.33 Are there any historical places/monuments exist?

1. Yes ☐ 2. No ☐

Q.34 If yes:

Sr.	Name	Number	Location (use codes)
			Inside = 1 Near = 2
1	Rock Carvings		
2	Historical Ruins		
3	Old Graveyard		
4	Others		

Q. 35 Capability of the respondent:

- i. High _____
- ii. Medium _____
- iii. Low _____

Q.36 Sources of water

- ☐ tap water
- ☐ purchased water from a refilling station (where tap water is sold by a private company after it is reportedly re-treated)
- ☐ purchased bottled water
- ☐ water from filtration plants
- ☐ regularly collected rain water (in addition to other sources of water)

Q.37 Consistency of service throughout the day and year

- ☐ less than 24-hour per day service
- ☐ two to three days at a time
- ☐ periods of several days without water service
- ☐ low water pressure on most days.

Q.38 During interruptions of service or periods of low pressure,

- ☐ possession of a household storage tank
- ☐ drums or buckets
- ☐ Do nothing and wait for water service to return

Q. 39 Storage and treatment practices within the home

- ☐ closed containers, such as bottles or covered pitchers,
- ☐ open containers (exclusively or in addition to covered containers) uncovered buckets or bowls.

Q.40 Treat water before drinking

- ☐ Yes
- ☐ No

Q. 41 Treatment method

- ☐ by adding chlorine or bleach
- ☐ boiling
- ☐ using a filter, such as coal, sand or cloth (2%).
- ☐ by settling (referring to the time the water remained in a tank, drum, or other container).

Q.42 Do you pay for water service?

- ☐ Yes
- ☐ No

Q.43 Water costs (Rs/month) for water service

- | | | |
|---|--------------------------------|--------------------------------|
| ☐ LESS THAN 5000 | ☐ 5000 | ☐ 10000 |
| ☐ 15000 | ☐ 20000 | ☐ |

Q.44 Cost per month on bottled water or water from a refilling station or truck

- ☐
- ☐
- ☐
- ☐

Q.45 Water shortage in your area

- ☐ Yes ☐ No

Q.46 Does water shortage a

- ☐ A big problem
- ☐ Somewhat a problem
- ☐ No problem at all

Q.47 Do you believe that tap water is safe to drink?

- ☐ Yes ☐ No

Q.48 If no, what does make you believe that the water is unsafe for drinking

- ☐ appearance of the water (dirty, cloudy, has particles in it, or has a strange color)
- ☐ it makes them feel ill
- ☐ contains bugs or bacteria
- ☐ has a bad smell or taste
- ☐ contaminated with chemicals or pesticides
- ☐ has too much chlorine

Survey Form for Industries Data

Sr#	Information required	Remarks / Evidence (documents, pictures)
1.	Digital mapping & coordinates of the project area and surrounding within 10m ²	
2.	Total number of industries	
3.	Type of Industry/Business	
4.	List the primary products produced at this facility	
5.	List raw materials and process additives used	
6.	Does production vary significantly by season	
7.	List raw materials and process additives used	
8.	Complete the Wastewater Pollutants Checklist ▪ Identify sampling points ▪ Sampling of effluents discharge from selected industries ▪ Laboratory testing & analysis of specific parameters	
9.	Treatment facility in the factory (if any) for pre-treatment of its WW before discharge	
10.	Pictorial evidence of WW discharge by factories within project area	

11.	Characteristics and volume (parameters of WW generated) from each selected industry	
12.	Status of discharged WW treatment	
13.	Information on compliance of WW generated by industry with PEQS List down industry specific PEQs to check the compliance	
14.	Disposal of WW - Nearby Drain - Canal - River	
15.	Do you have, or have you ever applied for or been issued an Industrial User Pre-treatment Permit to discharge wastewater to the sewer collection system?	
16.	Do you have, or have you ever applied for or been issued any other Environmental Permits?	
17.	Do you have any underground storage tanks at your facility? If yes, list contents and volume of each tank?	
18.	Do you have any above ground storage tanks at your facility? If yes, for each tank, list the contents, volume, whether the tank has any spill prevention or containment devices, such as dikes, and procedures for draining any containment devices.	
19.	Number of WW discharge outlets along River Ravi	
20.	Current water usage downstream of River Ravi	
21.	Hydrological and hydraulic data of River Ravi	

Annexure-EE

Composition of the ESIA Team

Composition of the ESIA Team

Name	Position on team	Organization
Ms. Samina Islam	Team Leader	Perseverance Social and Environmental Safeguards (PSES)
Dr. Asim Mahmood	Senior Environment Specialist	G3 Consulting Engineering (Pvt.) Ltd.
Dr. Saamia Saif	Environment Specialist	Perseverance Social and Environmental Safeguards (PSES)
Mr. Kamran Nawaz	Social Specialist	Perseverance Social and Environmental Safeguards (PSES)
Mr. Maqsood Ahmad	Resettlement Specialist	Perseverance Social and Environmental Safeguards (PSES)
Ms. Rizwana Waraich	Poverty and Social Expert	Perseverance Social and Environmental Safeguards (PSES)
Mr. Zahid Iqbal	ESIA Social Expert	Perseverance Social and Environmental Safeguards (PSES)
Ms. Hajira Saif	Liaison/Coordination Manager	Perseverance Social and Environmental Safeguards (PSES)
Ms. Abeeha Islam	Social Expert	Perseverance Social and Environmental Safeguards (PSES)
Dr. Wasim Ahmad Khan	Aqua Biologist	Perseverance Social and Environmental Safeguards (PSES)

Dr. Nawaz Chaudhary	Geologist	Perseverance Social and Environmental Safeguards (PSES)
Dr. Aleem Chaudhary	Ecologist	Perseverance Social and Environmental Safeguards (PSES)
Dr. Iftikhar Ahmad	Hydrologist	Perseverance Social and Environmental Safeguards (PSES)
Dr. Kausar J Cheema	Senior Environmentalist	Perseverance Social and Environmental Safeguards (PSES)
Ms. Sunaina Ashfaq	Jr. Environmentalist	Perseverance Social and Environmental Safeguards (PSES)
Ms. Munazza Khan	Jr. Environmentalist	Perseverance Social and Environmental Safeguards (PSES)
Mr. M. Shuaib Kabeer	Environmental Surveyor / Data Collector	Perseverance Social and Environmental Safeguards (PSES)
Mr. S. Mustafain Haider	Environmental Surveyor / Data Collector	Perseverance Social and Environmental Safeguards (PSES)
Mr. Shah Zaib	Environmental Surveyor / Data Collector	Perseverance Social and Environmental Safeguards (PSES)
Mr. Saifullah	Environmental Surveyor / Data Collector	Perseverance Social and Environmental Safeguards (PSES)
Mr. Usman Sheikh	Environmental Surveyor / Data Collector	Perseverance Social and Environmental Safeguards (PSES)
Mr. Zain ul Abideen	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)
Mr. Rana Jamiullah	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)
Ms. Muqaddas Haidri	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)
Ms. Sara Noor	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)
Mr. Mohammad Shahzad	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)

Mr. Nadeem Bhutta	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)
Mr. Haleem Ahmad	Jr. Sociologist	Perseverance Social and Environmental Safeguards (PSES)
Ms. Shazia Rehman	Social Surveyor	Perseverance Social and Environmental Safeguards (PSES)
Mr. Nasir Qureshi	Assistant Social Surveyor	Perseverance Social and Environmental Safeguards (PSES)
Mr. Attiq-ur-Rehman	Assistant Social Surveyor	Perseverance Social and Environmental Safeguards (PSES)
Mr. Mohammad Umer Shah	Assistant Social Surveyor	Perseverance Social and Environmental Safeguards (PSES)
Mr. Adnan Ahmad	Assistant Social Surveyor	Perseverance Social and Environmental Safeguards (PSES)
Mr. Rana Sajawal	Assistant Social Surveyor	Perseverance Social and Environmental Safeguards (PSES)
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Annexure-FF

REFERENCES

REFERENCES

- Environmental and Social Impact Assessment for Lahore Water and Wastewater Management Project (LWWMP), Inception Report (Final) Jxan-2019
- PC-1 of Lahore Water and Wastewater Management Project (LWWMP)-Construction of SWTP at BRBD Canal-June, 2019
- Final Feasibility Study Report of Lahore Water and Wastewater Management Project (LWWMP)-Feb. 2019
- (Japan International Cooperation Agency (JICA) Study in 2010 titled “Preparatory Study on Lahore Water Supply, Sewerage and Drainage Improvement Project”)
- Malik, A. (2015). Geotechnical statistical evaluation of Lahore site data and deep excavation design
- Sheikh, M. I. (2010). Role of Environmental Geology for Urbanization of Lahore City Pakistan (Doctoral Dissertation, University of the Punjab, Lahore, Pakistan).
- <http://www.gsp.gov.pk/>
- Building Code of Pakistan (BCP 2007)
- Ahmad, T. I. (2013). The role of rural women in livestock management: socio-economic evidences from diverse geographical locations of Punjab (Pakistan) (Doctoral dissertation, Université Toulouse le Mirail-Toulouse II)
- <https://www.worldweatheronline.com>
- <https://wasa.punjab.gov.pk/>
- Hassan, G. Z., Hassan, F. R., & Akhtar, S. (2016). Environmental Issues and concerns of Groundwater in Lahore. Proceedings of the Pakistan Academy of Sciences., Life and Environmental Science, 53(3), 163-178.
- Kanwal, S., Gabriel, H. F., Mahmood, K., Ali, R., Haidar, A., & Tehseen, T. (2015). Lahore's groundwater depletion-A review of the aquifer susceptibility to degradation and its consequences. University of Engineering and Technology Taxila. Technical Journal, 20(1), 26.
- Performance of ductile-iron pipe in soils". Journal (American Water Works Association). 60 (6): 645–655.

- Public Works April 15, 1995 Ductile iron mains; Water Supply and Treatment SECTION: Pg. pC34(4) Vol. V126
- Wildman, P. (1990). Methodological and social policy issues in social impact assessment. *Environmental Impact Assessment Review*, 10(1-2), 69-79.
- Social Indicators of Pakistan-2016, Pakistan Bureau of Statistics
- <https://data.worldbank.org/country/pakistan>
- Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, 2006
- World Bank Group, August (2017). ESIA and ESMP – Baghdad Water Supply and Sewerage Improvement Project
- National Institute of Environmental Health Sciences (2002)
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) (2001); International Agency for Research on Cancer (2002); U.S. National Institute of Health (2002); Advisory Group to the Radiation Protection Board of the UK (2001), and U.S. National Institute of Environmental Health Sciences (1999))
- U.S. National Institute of Environmental Health Sciences (2002)
- ICNIRP (1998): Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)
- McGhee, T. J., & Steel, E. W. (1991). Water supply and sewerage (Vol. 6): McGraw-Hill New York.
- Ashraf, U., Hameed, I., & Chaudhary, M. N. (2016). Solid waste management practices under public and private sector in Lahore, Pakistan. *Bulletin of Environmental Studies*, 1(4), 98-105
- Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, 2006
- IPCC Fifth Assessment Report (2013)