

Environmental Impact Assessment

July 2017

PAK: Jalalpur Irrigation Project

Project No. 46528-002

Part 3 of 12 of the Appendices

Prepared by Irrigation Department, Government of Punjab for the Asian Development Bank (ADB).

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Irrigation Department
Government of Punjab

DETAILED DESIGN OF JALALPUR IRRIGATION PROJECT

Appendices

ENVIRONMENTAL IMPACT ASSESSMENT
(EIA)

MAY 2017



Detailed Design of Jalalpur Irrigation Project

APPENDICES

EIA

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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4928	Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46		
Sample dates	Date of sampling: August 31, 2015 Date of sample received: September 1, 2015		
Sampling carried out by	LES team (Abdul Ghaffar)		
Sampling location	Jalalpur Irrigation Project: Bugga Sharif		
Sample description	Type of sample	Groundwater Category-1 (Hand pump)	
	Coordinates	E 284412 N 3592091	

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	APHA 4500-H ⁺ -B	1/9/2015	pH	-	7.16 ± 0.08	6.5-8.5
2	HACH-8025	2/9/2015	Color	Pt-Co	25 ± 3	15 (TCU)
3	APHA 2160-B	2/9/2015	Taste	mg/L	Salty	Acceptable
4	APHA 2150-B	2/9/2015	Odor	mg/L	Odorless	Acceptable
5	Turbidity Meter	2/9/2015	Turbidity	NTU	90 ± 2	5
6	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	25 ± 3	NGV
7	APHA-2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	7750 ± 29	<1000
8	APHA 2340-C	7/9/2015	Total Hardness	mg/L	1450 ± 14	<500
9	Spectrophotometer	16/9/2015	Iodine*	mg/L	<0.10	NGV
10	Spectrophotometer	16/9/2015	Ammonia*	mg/L	<0.1	NGV
11	HACH-8029	9/9/2015	Fluoride	mg/L	0.65 ± 0.03	1.5
12	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	0.4 ± 0.1	50
13	HACH-8507	9/9/2015	Nitrite (NO ₂ ⁻ -N)	mg/L	0.002 ± 0.001	3
14	APHA 4500-Cl ⁻ -B	7/9/2015	Chloride (Cl ⁻)	mg/L	3649 ± 18	250
15	HACH-8051	10/9/2015	Sulfate	mg/L	560 ± 10	400
16	Flame photometer	16/9/2015	Sodium (Na) ¹ *	mg/L	1784	200
17	HACH-8008	9/9/2015	Total Iron	mg/L	3.4 ± 0.6	0.3
18	Atomic Absorption	16/9/2015	Zinc (Zn) *	mg/L	<1.0	5
19	Arsenic kit	7/9/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	5/9/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	5/9/2015	Fecal Coliform	MPN/100mL	>23	NIL

* Test conducted at Sub-Contracted lab report reference # Env-Lhr 679/2015-04

- No Unit
APHA American Public Health Association
BDL Below detection limit
BDL For Arsenic

NTU Nephelometric Turbidity Unit
NGV No Guideline Value
BDL For Fluoride

Note: Results relates only to the sample tested.

M. Zia-ul-Haq
Manager (Technical & Quality)

Shafqat Ullah
General Manager

(End of the Report)

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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4925		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling: Date of sample received:		August 31, 2015 September 1, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Near Bhelawal			
Sample description	Type of sample	Groundwater Category-2 (Agri-Tube well)		
	Coordinates	E 307091		
		N 3608336		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	Meter	7/9/2015	Conductivity	µs/cm	37750 ± 125	NGV
2	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	4 ± 1	NGV
3	APHA 2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	18670 ± 30	<1000
4	APHA 4500-Cl-B	7/9/2015	Chloride (Cl ⁻)	mg/L	9495 ± 32	250
5	HACH-8051	10/9/2015	Sulfate	mg/L	825 ± 7	400
6	APHA 2320-B	7/9/2015	Bicarbonate	mg/L	300 ± 6	NGV
7	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	0.3 ± 0.1	50
8	APHA 3500-Mg-E	7/9/2015	Magnesium (Mg)	mg/L	202 ± 5	100
9	APHA 3500-Ca-B	7/9/2015	Calcium as (Ca)	mg/L	289 ± 4	200
10	APHA 4500 P	16/9/2015	Phosphate	mg/L	<0.05	NGV
11	AAS/ICP	16/9/2015	Sodium*	mg/L	9072.5	200
12	AAS/ICP	16/9/2015	Potassium*	mg/L	175	NGV
13	AAS/ICP	16/9/2015	Ammonia*	mg/L	<0.1	NGV
14	AAS/ICP	16/9/2015	Boron*	mg/L	0.311	0.3
15	AAS/ICP	16/9/2015	SAR*	-	64.66	NGV
B. Bacteriological Testing						
1	APHA 9221-E	3/9/2015	E.Coli	MPN/100mL	>23	Nil

* Test conducted at Sub-Contract lab SGS Lahore, report reference Env-Lhr 679/2015-07

-	No Unit	NTU	Nephelometric Turbidity Unit
APHA	American Public Health Association	NGV	No Guideline Value
BDL	Below detection limit		

Note: Results relates only to the sample tested,

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Manager (Technical & Quality)

Shafqat Ullah
General Manager

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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4924		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling: Date of sample received:		August 31, 2015 September 1, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Sahotra			
Sample description	Type of sample	Ground water Category-I (Hand pump)		
	Coordinates	E 313471		
		N 3604535		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	APHA 4500-H ⁻ B	1/9/2015	pH	-	7.28 ± 0.07	6.5-8.5
2	HACH-8025	2/9/2015	Color	Pt-Co	39 ± 2	15 (TCU)
3	APHA 2160-B	2/9/2015	Taste	mg/L	salty	Acceptable
4	APHA 2150-B	2/9/2015	Odor	mg/L	Odorless	Acceptable
5	Turbidity Meter	2/9/2015	Turbidity	NTU	162 ± 4	5
6	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	35 ± 3	NGV
7	APHA-2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	15480 ± 42	<1000
8	APHA 2340-C	7/9/2015	Total Hardness	mg/L	4600 ± 15	<500
9	Spectrophotometer	16/9/2015	Iodine*	mg/L	<0.10	NGV
10	Spectrophotometer	16/9/2015	Ammonia*	mg/L	<0.1	NGV
11	HACH-8029	9/9/2015	Fluoride	mg/L	1.40 ± 0.03	1.5
12	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	0.2 ± 0.1	50
13	HACH-8507	9/9/2015	Nitrite (NO ₂ ⁻ -N)	mg/L	BDL	3
14	APHA 4500-Cl ⁻ B	7/9/2015	Chloride (Cl ⁻)	mg/L	7164 ± 22	250
15	HACH-8051	10/9/2015	Sulfate	mg/L	2000 ± 15	400
16	Flame photometer	16/9/2015	Sodium (Na) ⁺ *	mg/L	2340	200
17	HACH-8008	9/9/2015	Total Iron	mg/L	5.4 ± 0.3	0.3
18	Atomic Absorption	16/9/2015	Zinc (Zn)*	mg/L	1.361	5
19	Arsenic kit	7/9/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	5/9/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	5/9/2015	E. Coli	MPN/100mL	>23	NIL

* Test conducted at Sub-Contracted lab SGS Lahore, report reference Env-Lhr 679/2015-03

-	No Unit	NTU	Nephelometric Turbidity Unit
APHA	American Public Health Association	NGV	No Guideline Value
BDL	Below detection limit		
BDL	For Arsenic 0.01 mg/L		

Note: Results relates only to the sample tested.

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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4923		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling: Date of sample received:		August 31, 2015 September 1, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Near Khawra			
Sample description	Type of sample	Ground water Category -3 (Hand pump)		
	Coordinates	E 314496		
		N 3610709		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	APHA 4500-H-B	2/9/2015	pH	-	7.59 ± 0.07	6.5-8.5
2	HACH-8025	10/9/2015	Color	Pt-Co	8 ± 1	15 (TCU)
3	APHA 2160-B	2/9/2015	Taste	mg/L	Salty	Acceptable
4	APHA 2150-B	2/9/2015	Odor	mg/L	Odorless	Acceptable
5	Turbidity Meter	9/9/2015	Turbidity	NTU	1.6 ± 0.3	5
6	APHA 2540-D	8/9/2015	Total Suspended Solids (TSS)	mg/L	10 ± 2	NGV
7	APHA-2540-D	9/9/2015	Total dissolved solid (TDS)	mg/L	6480 ± 18	<1000
8	APHA 2340-C	7/9/2015	Total Hardness	mg/L	1467 ± 7	<500
9	Spectrophotometer	16/9/2015	Iodine*	mg/L	<0.10	NGV
10	Spectrophotometer	16/9/2015	Ammonia*	mg/L	<0.1	NGV
11	HACH-8029	9/9/2015	Fluoride	mg/L	1.60 ± 0.08	1.5
12	HACH-8039	7/9/2015	Nitrate (NO ₃ -N)	mg/L	5.8 ± 0.5	50
13	HACH-8507	9/9/2015	Nitrite (NO ₂ -N)	mg/L	0.041 ± 0.003	3
14	APHA 4500-Cl-B	7/9/2015	Chloride (Cl ⁻)	mg/L	2674 ± 14	250
15	HACH-8051	10/9/2015	Sulfate	mg/L	875 ± 12	400
16	Flame photometer	16/9/2015	Sodium (Na)*	mg/L	3976.25	200
17	HACH-8008	11/9/2015	Total Iron	mg/L	0.33 ± 0.02	0.3
18	Atomic Absorption	16/9/2015	Aluminium*	mg/L	<0.02	0.2
19	Atomic Absorption	16/9/2015	Antimony*	mg/L	<0.005	0.005
20	Atomic Absorption	16/9/2015	Zinc (Zn)*	mg/L	<1.0	5
21	Atomic Absorption	16/9/2015	Cadmium*	mg/L	<0.002	0.01
22	Atomic Absorption	16/9/2015	Mercury *	mg/L	<0.001	0.001
23	Atomic Absorption	16/9/2015	Nickel *	mg/L	<0.02	0.02
24	Atomic Absorption	16/9/2015	Selenium*	mg/L	<0.005	0.01
25	Atomic Absorption	16/9/2015	Barium*	mg/L	<0.005	0.7
26	Atomic Absorption	16/9/2015	Boron*	mg/L	0.17	0.3
27	APHA 3500-Mg-E	7/9/2015	Magnesium	mg/L	186 ± 4	100
28	APHA 3500-Cr-B	14/9/2015	Total Chromium	mg/L	0.03 ± 0.01	0.05
29	HACH-8506	14/9/2015	Copper	mg/L	0.15 ± 0.02	2.0
30	APHA 3500-Pb-B	14/9/2015	Lead	mg/L	0.007 ± 0.001	0.01
31	Arsenic kit	7/9/2015	Arsenic	mg/L	BDL	0.05
B. Bacteriological Testing						
1	APHA 9221-B	5/9/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	5/9/2015	E. Coli	MPN/100mL	>23	NIL

* Test conducted at Sub-Contracted lab report reference Env-Lhr 679/2015-10

- No Unit

NTU

Nephelometric Turbidity Unit

APHA American Public Health Association

BDL

Below detection limit

Note: Results relates only to the sample tested

M. Zia-ul-Haq

M. Zia-ul-Haq
Manager (Technical & Quality)

Shafqat Ullah

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General Manager

(End of the Report)

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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4920	Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46		
Sample dates	Date of sampling: August 30, 2015 Date of sample received: August 31, 2015		
Sampling carried out by	LES team (Abdul Ghaffar)		
Sampling location	Jalalpur Irrigation Project: Sauwal		
Sample description	Type of sample	Ground water Category-3 (Hand pump)	
	Coordinates	E 326127 N 3615990	

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	APHA 4500-H ⁻ B	1/9/2015	pH	-	7.55 ± 0.07	6.5-8.5
2	HACH-8025	10/9/2015	Color	Pt-Co	34 ± 3	15 (TCU)
3	APHA 2160-B	2/9/2015	Taste	mg/L	Salty	Acceptable
4	APHA 2150-B	2/9/2015	Odor	mg/L	Odorless	Acceptable
5	Turbidity Meter	9/9/2015	Turbidity	NTU	16.5 ± 0.8	5
6	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	4 ± 1	NGV
7	APHA 2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	3950 ± 19	<1000
8	APHA 2340-C	7/9/2015	Total Hardness	mg/L	1500 ± 11	<500
9	AAS/ICP	16/9/2015	Iodine*	mg/L	<0.10	NGV
10	AAS/ICP	16/9/2015	Ammonia*	mg/L	<0.1	NGV
11	HACH-8029	9/9/2015	Fluoride	mg/L	0.48 ± 0.04	1.5
12	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	1.0 ± 0.2	50
13	HACH-8507	9/9/2015	Nitrite (NO ₂ ⁻ -N)	mg/L	0.008 ± 0.002	3
14	APHA 4500-Cl ⁻ -B	7/9/2015	Chloride (Cl ⁻)	mg/L	1849 ± 10	250
15	HACH-8051	10/9/2015	Sulfate	mg/L	18 ± 1	400
16	AAS/ICP	16/9/2015	Sodium (Na)*	mg/L	1690	200
17	HACH-8008	11/9/2015	Total Iron	mg/L	0.47 ± 0.05	0.3
18	AAS/ICP	16/9/2015	Aluminium*	mg/L	<0.02	0.2
19	AAS/ICP	16/9/2015	Antimony*	mg/L	<0.005	0.005
20	AAS/ICP	16/9/2015	Zinc (Zn)*	mg/L	<1.0	5
21	AAS/ICP	16/9/2015	Cadmium*	mg/L	<0.002	0.01
22	AAS/ICP	16/9/2015	Mercury *	mg/L	<0.001	0.001
23	AAS/ICP	16/9/2015	Nickel *	mg/L	<0.02	0.02
24	AAS/ICP	16/9/2015	Selenium*	mg/L	<0.005	0.01
25	AAS/ICP	16/9/2015	Barium*	mg/L	<0.005	0.7
26	AAS/ICP	16/9/2015	Boron*	mg/L	0.085	0.3
27	APHA 3500-Mg-E	7/9/2015	Magnesium	mg/L	180 ± 5	100
28	APHA 3500-Cr-B	14/9/2015	Total Chromium	mg/L	0.02 ± 0.01	0.05
29	HACH-8506	14/9/2015	Copper	mg/L	0.18 ± 0.01	2.0
30	APHA 3500-Pb-B	14/9/2015	Lead	mg/L	0.005 ± 0.001	0.01
31	Arsenic kit	7/9/2015	Arsenic	mg/L	BDL	0.05
B. Bacteriological Testing						
1	APHA 9221-B	5/9/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	5/9/2015	E. Coli	MPN/100mL	2.2	NIL

* Test conducted at Sub-Contract lab SGS Lahore, report reference Env-Lhr 679/2015-09

No Unit
APHA American Public Health Association
BDL Below detection limit
Note: Results relates only to the sample tested

M. Zia-ul-Haq
M. Zia-ul-Haq
Manager (Technical & Quality)

Nephelometric Turbidity Unit

Shafqat Ullah
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General Manager

(End of the Report)



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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4919		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling:		August 30, 2015	
	Date of sample received:		August 31, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Near Dhariala Jalib			
Sample description	Type of sample	Ground water Category -2 (Agri Tube well)		
	Coordinates	E 334862		
		N 3614608		

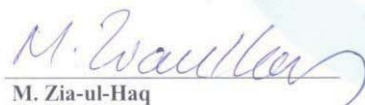
B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	Meter	7/9/2015	Conductivity	µs/cm	9070 ± 18	NGV
2	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	3 + 1	NGV
3	APHA-2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	5510 + 22	<1000
4	APHA 4500-Cl-B	7/9/2015	Chloride (Cl ⁻)	mg/L	1849 + 8	250
5	HACH-8051	10/9/2015	Sulfate	mg/L	980 + 8	400
6	APHA 2320-B	7/9/2015	Bicarbonate	mg/L	630 + 5	NGV
7	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	0.4 + 0.1	50
8	APHA 3500-Mg-E	7/9/2015	Magnesium (Mg)	mg/L	127 + 4	100
9	APHA 3500-Ca-B	7/9/2015	Calcium as (Ca)	mg/L	151 + 3	200
10	APHA 4500 P	16/9/2015	Phosphate*	mg/L	<0.05	NGV
11	AAS/ICP	16/9/2015	Sodium*	mg/L	1781	200
12	AAS/ICP	16/9/2015	Potassium*	mg/L	37.0	NGV
13	AAS/ICP	16/9/2015	Ammonia*	mg/L	<0.1	NGV
14	AAS/ICP	16/9/2015	Boron*	mg/L	0.502	0.3
15	AAS/ICP	16/9/2015	SAR*	-	37.78	NGV
B. Bacteriological Testing						
1	APHA 9221-E	3/9/2015	E.Coli	MPN/100mL	<1.1	Nil

* Test conducted at Sub-Contract lab SGS Lahore, report reference Env-I hr 679/2015-06

-	No Unit	NTU	Nephelometric Turbidity Unit
APHA	American Public Health Association	NGV	No Guideline Value
BDL	Below detection limit		

Note: Results relates only to the sample tested.


M. Zia-ul-Haq

Manager (Technical & Quality)

(End of the Report)


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General Manager



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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4918		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling: Date of sample received:		August 30, 2015 August 31, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Near Diwan pur			
Sample description	Type of sample	Ground water Category-I (Hand pump)		
	Coordinates	E 337760		
		N 3610719		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	APHA 4500-H ⁻ B	1/9/2015	pH	-	8.14 ± 0.08	6.5-8.5
2	HACH-8025	2/9/2015	Color	Pt-Co	23 ± 2	15 (TCU)
3	APHA 2160-B	2/9/2015	Taste	mg/L	Tasteless	Acceptable
4	APHA 2150-B	2/9/2015	Odor	mg/L	Odorless	Acceptable
5	Turbidity Meter	2/9/2015	Turbidity	NTU	10.3 ± 0.7	5
6	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	3 ± 1	NGV
7	APHA-2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	210 ± 3	<1000
8	APHA 2340-C	7/9/2015	Total Hardness	mg/L	164 ± 2	<500
9	Spectrophotometer	16/9/2015	Iodine*	mg/L	<0.10	NGV
10	Spectrophotometer	16/9/2015	Ammonia*	mg/L	<0.1	NGV
11	HACH-8029	9/9/2015	Fluoride	mg/L	BDL	1.5
12	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	1.5 ± 0.4	50
13	HACH-8507	9/9/2015	Nitrite (NO ₂ ⁻ -N)	mg/L	0.29 ± 0.02	3
14	APHA 4500-Cl ⁻ -B	7/9/2015	Chloride (Cl ⁻)	mg/L	15 ± 1	250
15	HACH-8051	10/9/2015	Sulfate	mg/L	11 ± 2	400
16	Flame photometer	16/9/2015	Sodium (Na) ¹ *	mg/L	8.52	200
17	HACH-8008	9/9/2015	Total Iron	mg/L	0.66 ± 0.03	0.3
18	Atomic Absorption	16/9/2015	Zinc (Zn) *	mg/L	<1.0	5
19	Arsenic kit	7/9/2015	Arsenic	mg/L	0.05	0.01
B. Bacteriological Testing						
1	APHA 9221-B	4/9/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	3/9/2015	E. Coli	MPN/100mL	<1.1	NIL

* Test conducted at Sub-Contracted lab SGS Lahore, report reference Env-Lhr 679/2015-02

- No Unit NTU Nephelometric Turbidity Unit
APHA American Public Health Association NGV No Guideline Value
BDL Below detection limit BDL For Fluoride 0.01 mg/L

Note: Results relates only to the sample tested.

M. Zia-ul-Haq
Manager (Technical & Quality)

Shafqat Ullah
General Manager

(End of the Report)

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Laboratory of Environmental Sciences

(Certified by Punjab EPA)

TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4917		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling: Date of sample received:		August 30, 2015 August 31, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Jalapur Sharif			
Sample description	Type of sample	Ground water Category-2 (Agri- Tube well)		
	Coordinates	E 351039 N 3614203		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	Meter	7/9/2015	Conductivity	µs/cm	912	NGV
2	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	3 + 1	NGV
3	APHA-2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	680 ± 10	<1000
4	APHA 4500-Cl-B	7/9/2015	Chloride (Cl)	mg/L	35 + 1	250
5	HACH-8051	10/9/2015	Sulfate	mg/L	45 + 3	400
6	APHA 2320-B	7/9/2015	Bicarbonate	mg/L	348 ± 6	NGV
7	HACH-8039	7/9/2015	Nitrate (NO ₃ -N)	mg/L	4.3 ± 0.4	50
8	APHA 3500-Mg-E	7/9/2015	Magnesium (Mg)	mg/L	20 ± 1	100
9	APHA 3500-Ca-B	7/9/2015	Calcium as (Ca)	mg/L	48 ± 2	200
10	APHA 4500 P	16/9/2015	Phosphate*	mg/L	<0.05	NGV
11	AAS/ICP	16/9/2015	Sodium*	mg/L	231.9	200
12	AAS/ICP	16/9/2015	Potassium*	mg/L	3.4	NGV
13	AAS/ICP	16/9/2015	Ammonia*	mg/L	<0.1	NGV
14	AAS/ICP	16/9/2015	Boron*	mg/L	0.189	0.3
15	AAS/ICP	16/9/2015	SAR*	-	7.06	NGV
B. Bacteriological Testing						
1	APHA 9221-E	3/9/2015	E.Coli	MPN/100mL	16	Nil

* Test conducted at Sub-Contracted lab SGS Lahore, report reference Env-Lhr 679/2015-05

-	No Unit	NTU	Nephelometric Turbidity Unit
APHA	American Public Health Association	NGV	No Guideline Value
BDL	Below detection limit		

Note: Results relates only to the sample tested.


M. Zia-ul-Haq
Manager (Technical & Quality)


Shafqat Ullah
General Manager

(End of the Report)



Laboratory of Environmental Sciences
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TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/NEC/15/4916		Date of Issue	September 22, 2015
Customer	NEC Consultants (Private) Limited Perfect Site, 21-km, Off Ferozepur Road, Near Gajju Matta Metro Bus Station, Lahore Ph: 042-35273741-46			
Sample dates	Date of sampling: Date of sample received:		August 30, 2015 August 31, 2015	
Sampling carried out by	LES team (Abdul Ghaffar)			
Sampling location	Jalalpur Irrigation Project: Shah Kamir			
Sample description	Type of sample	Ground water category -1 (Hand pump)		
	Coordinates	E 353878 N 3614856		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standard
A. Physico-Chemical Testing						
1	APHA 4500-H ⁻ B	1/9/2015	pH	-	8.21 ± 0.08	6.5-8.5
2	HACH-8025	2/9/2015	Color	Pt-Co	4 ± 1	15 (TCU)
3	APHA 2160-B	2/9/2015	Taste	mg/L	Tasteless	Acceptable
4	APHA 2150-B	2/9/2015	Odor	mg/L	Odorless	Acceptable
5	Turbidity Meter	2/9/2015	Turbidity	NTU	11.6 ± 0.5	5
6	APHA 2540-D	2/9/2015	Total Suspended Solids (TSS)	mg/L	4 ± 1	NGV
7	APHA-2540-D	2/9/2015	Total dissolved solid (TDS)	mg/L	370 ± 8	<1000
8	APHA 2340-C	7/9/2015	Total Hardness	mg/L	176 ± 3	<500
9	Spectrophotometer	16/9/2015	Iodine *	mg/L	<0.10	NGV
10	Spectrophotometer	16/9/2015	Ammonia*	mg/L	<0.1	NGV
11	HACH-8029	9/9/2015	Fluoride	mg/L	BDL	1.5
12	HACH-8039	7/9/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	0.6 ± 0.1	50
13	HACH-8507	9/9/2015	Nitrite (NO ₂ ⁻ -N)	mg/L	0.007 ± 0.001	3
14	APHA 4500-Cl ⁻ -B	7/9/2015	Chloride (Cl ⁻)	mg/L	32 ± 1	250
15	HACH-8051	10/9/2015	Sulfate	mg/L	27 ± 2	400
16	Flame photometer	16/9/2015	Sodium (Na) ⁺ *	mg/L	40.05	200
17	HACH-8008	9/9/2015	Total Iron	mg/L	0.34 ± 0.02	0.3
18	Atomic Absorption	16/9/2015	Zinc (Zn)*	mg/L	<1.0	5
19	Arsenic kit	7/9/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	4/9/2015	Total Coliform	MPN/100mL	>23	NHL
2	APHA 9221-E	3/9/2015	E. Coli	MPN/100mL	<1.1	NHL

* Test conducted at Sub-Contracted lab SGS Lahore, report reference # Env-Lhr 679/2015-01

-	No Unit	NTU	Nephelometric Turbidity Unit
APHA	American Public Health Association	NGV	No Guideline Value
BDL	Below detection limit	BDL	For Fluoride 0.01 mg/L
BDL	For Arsenic		

Note: Results relates only to the sample tested.

M. Zia-ul-Haq
Manager (Technical & Quality)

(End of the Report)

Shafqat Ullah
General Manager

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Sampling Point of Surface Water (Rain Water Drain) Near Dhook Sharif



Sampling Point of Agriculture Tubewell Near Kurar

