

4. RESULT OF BASELINE SURVEY

LOT 1 Baseline Study

1.1 Ambient Air Quality

1.1.1 Sampling Location

Ambient air and noise quality measurements were carried out between December 18 and 23, 2017 at sampling locations along the project site s as shown in Table 1-1and Figure 1-1.

Table 1-1: Sampling Locations for Air Quality and Noise

S/No	Station on Map	Coordinates		Nearest town/Designation
1	AQ1	6.8491	3.2023466	Ejio
2	AQ2	6.8514411	3.1823444	Ayepe
3	AQ3	6.8384879	3.1535053	Sojuolu
4	AQ4	6.84887	3.21305	Soderu
5	AQ5	6.88643	3.23764	Adubi-Aro
6	AQ6	6.93145	3.24742	Oluke -Orile
7	AQ7	6.96769	3.27383	Fallow Land
8	AQ8	7.00249	3.30202	Ijumo-Ologboni
9	AQ9	7.04896	3.34141	Opanigangan (Ogun River Bank)
10	AQ10	7.10539	3.38824	Ototo (Close to New Abeokuta substation)
11	AQ11	6.84681	3.21501	Habited Area (Ejio)
12	AQ12	6.86741	3.24728	Sowunmi
13	AQ13	6.87506	3.28868	Akilagun
14	AQ14	6.88468	3.31266	Olorunsogo Thermal Plant Fenceline

1.1.2 Result of Ambient air quality survey

The result of ambient air quality is presented below. The result shows that the PM10 exceeded the IFC standard at AQ 13 and AQ 14 as well as that TSP exceeded FMEEEn limit at AQ 13. Other parameters are below applicable limit at all locations.

a) Particular mater : 24 hours

Table 1-2: 24 hour measured Particular matter

Sampling Location	Concentrations ($\mu\text{g}/\text{m}^3$)		
	PM _{2.5}	PM ₁₀	TSP
AQ1	16.22	84.65	126.54
AQ2	13.80	99.96	149.21
AQ3	16.02	56.14	66.86
AQ4	20.66	75.82	92.33

AQ5	16.51	59.18	76.51
AQ6	20.29	102.92	143.70
AQ7	18.28	98.94	143.95
AQ8	18.65	87.73	160.62
AQ9	16.02	51.79	75.28
AQ10	17.58	52.20	59.06
AQ11	19.92	72.57	87.60
AQ12	21.19	118.61	196.23
AQ13	31.17	155.37	200.26
AQ14	28.38	176.19	346.18
FME_nV Limit	-	-	250
IFC standatrd¹	25-75	50-150	-

¹ IFC EHS Guideline, AIR EMISSIONS AND AMBIENT AIR QUALITY, table 1.1.1

b) NO, NO₂, CO, SO₂, NH₃, VOCs : 24 hours

Table 1-3: 24 hour measured Particular matter

Sampling Location	Mean Concentration (ppm)					
	NO	NO ₂	CO	SO ₂	NH ₃	VOCs
AQ1	0.00	0.12	0.82	0.00	0.41	0.00
AQ2	0.00	0.00	0.00	0.00	0.00	0.00
AQ3	0.00	0.33	0.82	0.00	0.41	0.00
AQ4	0.00	0.00	0.00	0.00	0.41	0.00
AQ5	0.00	0.00	0.41	0.00	0.82	0.00
AQ6	0.00	0.00	1.00	0.00	0.41	0.41
AQ7	0.00	0.00	0.00	0.00	0.00	0.00
AQ8	0.00	0.00	0.00	0.00	0.41	0.00
AQ9	0.00	0.00	0.00	0.00	0.41	0.00
AQ10	0.00	0.00	0.00	0.00	0.00	0.00
AQ11	0.00	0.00	0.00	0.00	0.82	0.41
AQ12	0.00	0.00	0.00	0.00	0.41	0.00
AQ13	0.00	0.00	0.00	0.00	1.23	0.00
AQ14	0.00	0.45	2.05	0.00	0.00	0.82
FMENV Limit	0.04 - 0.06		10	0.1	0.28	-
IFC Standard¹	-		-	0.007-0.045 (20-125ug/m³)	-	-

¹ IFC EHS Guideline, AIR EMISSIONS AND AMBIENT AIR QUALITY, table 1.1.1

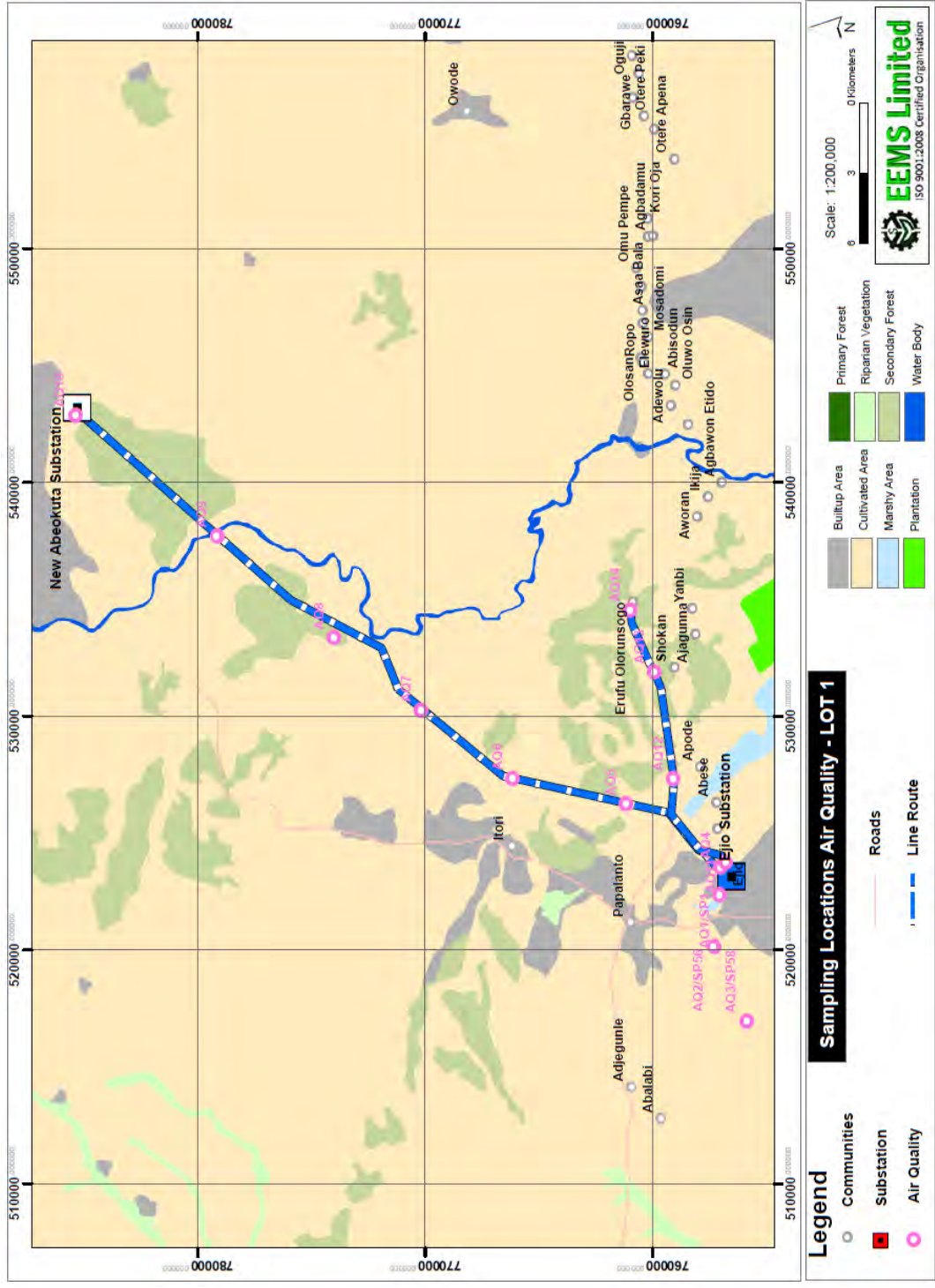


Figure 1-1: Air and Noise Quality sampling point for Lot1

1.2 Noise Quality

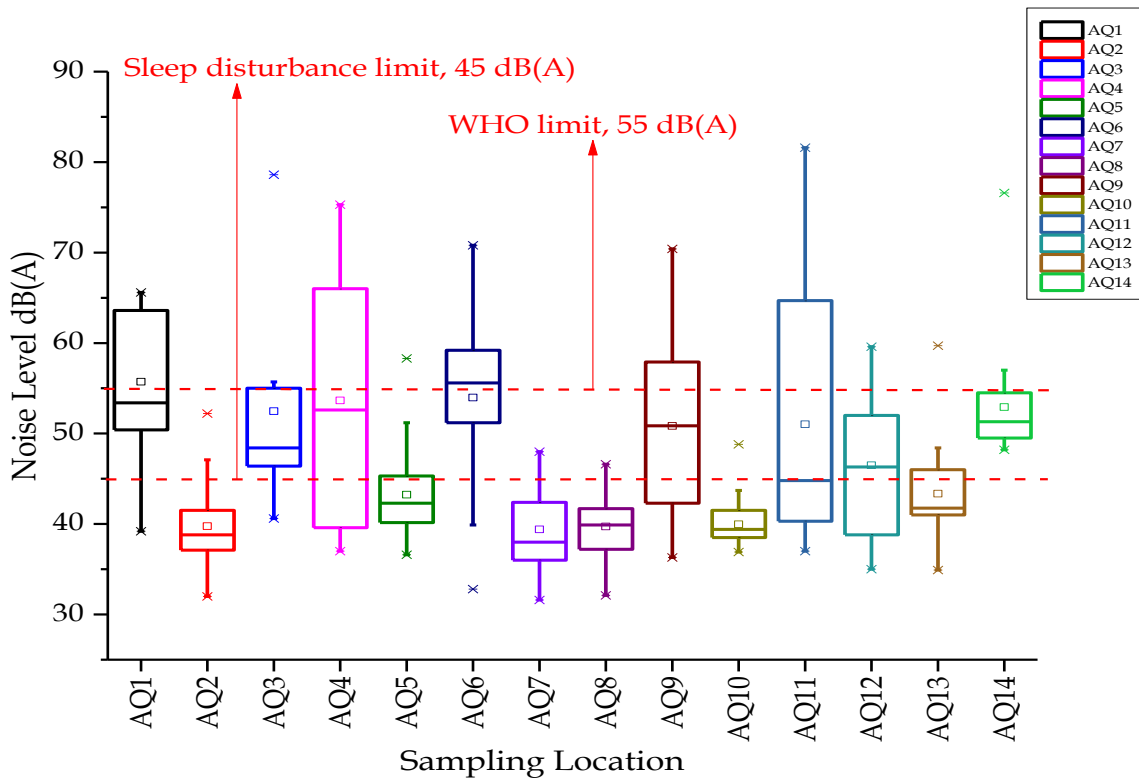
1.2.1 Sampling Location

Sampling location is same as Air Quality.

1.2.2 Result of Noise quality survey

The summary results of the 10-minute measurements are shown in below.

The locations AQ1 – A14 are with the minimum noise levels being 21.6 – 48.2 dB(A) and the maximum levels were of the range 46.6 – 81.2 dB(A). The measured noise level in the location are attributable to heavy cement haulage trailers movement and the presence of Olorunsogo Power Plants Phase I and II. Maximum noise level at some locations (AQ1, 4, 6, 9, 11) exceeded WHO limit. Elevated levels were as a result of heavy sand and cement trucks movement in some locations of the study area.



1.3 Groundwater Quality

1.3.1 Sampling Location

Groundwater quality measurements were carried out at sampling locations along the project site as shown in Table 1-4 and **Error! Reference source not found.**

Table 1-4: Sampling Locations for Meteorology, Air Quality and Noise

S/N	Water Sample Points	Name of Location	Latitude
1	GW1	Ejio	6.85106
2	GW2	Ejio	6.84857
3	GW3	Soderu	6.868056
4	GW4	Mose	6.872
5	GW5	Olorunsogo	6.877111
6	GW6	Ajade	6.991225
7	GW7	Ijumo	7.013636
8	GW8	Oba-Eerin	7.041194

1.3.2 Result of Groundwater quality survey

Groundwater quality measurements were carried out at sampling locations along the project site as shown in Table 1-5. The result shows the exceedance of Magnesium, Iron, Nickel, Chromium and Cadmium against NSDW limit and/or WHO drinking limit at some points.

Table 1-5: The result of Groundwater Quality analysis for Lot 1

Line Route section Parameters	Ejio to Sojuulu		Olorungso to Ejio				Ejio to New Abeokuta				NSDW 2007 ¹ Limit,	WHO Limit
	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8				
Well Depth	3.27	4.01	NA	NA	2.95	NA	NA	NA	NA	NA	NA	NA
pH	6.96	6.52	7.04	7.25	7.12	6.96	7.54	6.93	6.5 – 8.5	6.5 – 8.5	6.5 – 9.2	
Temperature (°C)	27.2	26.0	30.1	29.0	29.0	28.2	27.4	29.1	NS	NS	40°C	
Colour	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Conductivity	55.3	54.3	474	420	1094	498	350	374	1000	1000	250	250
TDS	27.0	27.0	235	208	547	249	175	184	500	500	NS	NS
TSS	33.1	28.2	0.02	0.20	0.29	0.68	0.20	0.54	NS	NS	50	50
Chloride	ND*	ND*	96.09	79.25	59.30	50.28	63.20	40.25	250	250	250	250
Total Hardness	14.2	13.6	14.86	15.32	10.10	19.38	15.20	12.39	150	150	-	-
TSS	33.1	28.2	0.02	1.22	0.40	0.20	0.65	0.50	NS	NS	50	50
Turbidity	6.95	1.35	1.74	4.06	5.00	4.06	4.06	4.06	5	5	5	5
DO	10.90	9.62	5.80	5.40	3.44	4.50	3.40	5.52	NS	NS	<5	<5
COD	10.2	9.8	6.40	7.70	9.20	6.45	5.70	6.73	NS	NS	10	10
BOD	1.48	1.23	1.50	0.60	0.95	0.62	1.60	0.30	NS	NS	10	10
Nitrate	0.21	0.10	0.57	0.44	0.58	1.05	0.84	1.49	50	50	10	10
Phosphate	0.55	0.68	3.98	4.33	3.36	4.98	2.31	4.53	NS	NS	5	5
Sulphate	<1.0	<0.1	0.51	0.52	0.59	0.42	0.25	0.34	100	100	500	500
PAH	ND*	ND*	ND	ND	ND	ND	ND	ND	NS	NS	0.0007	0.0007
BTEX	ND*	ND*	ND	ND	ND	ND	ND	ND	NS	NS	-	-

Line section	Route	Ejio to Sojuolu			Olorunsogo to Ejio			Ejio to New Abeokuta			NSDW 2007 Limit,	WHO Limit
		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8			
Parameter		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8			
Phenols		ND*	ND*	ND	ND	ND	ND	ND	ND	NS		
THC		ND*	ND*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS	0.05	
TPH		ND*	ND*	ND	ND	ND	ND	ND	ND	NS		
PCB		ND*	ND*	ND	ND	ND	ND	ND	ND	NS	0.003	
Oil and Grease		ND*	ND*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS		
Potassium		0.39	0.30	2.64	2.92	1.95	2.02	1.12	0.42	NS	10	
Sodium		ND*	ND*	5.00	4.30	2.30	3.30	3.10	3.80	200	-	
Calcium		ND*	ND*	3.96	3.76	3.55	2.79	3.16	7.75	NS	-	
Magnesium		ND*	ND*	1.19	1.42	1.57	1.02	2.45	3.62	0.20	-	
Copper		0.12	0.01	<0.001	0.02	0.01	0.01	0.02	0.01	1.0	2.0	
Iron		0.15	0.22	2.58	3.11	2.21	1.91	0.25	1.10	0.3	0.3	
Nickel		ND*	ND*	0.03	0.01	0.01	0.01	0.01	0.01	0.02	-	
Chromium		ND*	ND*	0.79	1.27	0.50	0.20	0.14	0.22	0.05	-	
Cadmium		ND*	ND*	0.02	0.04	0.01	0.02	0.01	0.01	0.003	-	
Zinc		ND*	ND*	<0.001	0.01	0.02	0.01	0.01	0.01	3.0	-	
Barium		ND*	ND*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.7	1.3	
Lead		ND*	ND*	<0.001	0.01	<0.001	<0.001	<0.001	<0.001	0.01	0.02	
Mercury		ND*	ND*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	-	

¹ Nigerian Standard for Drinking Water Quality

² WHO Drinking Water Quality Guideline

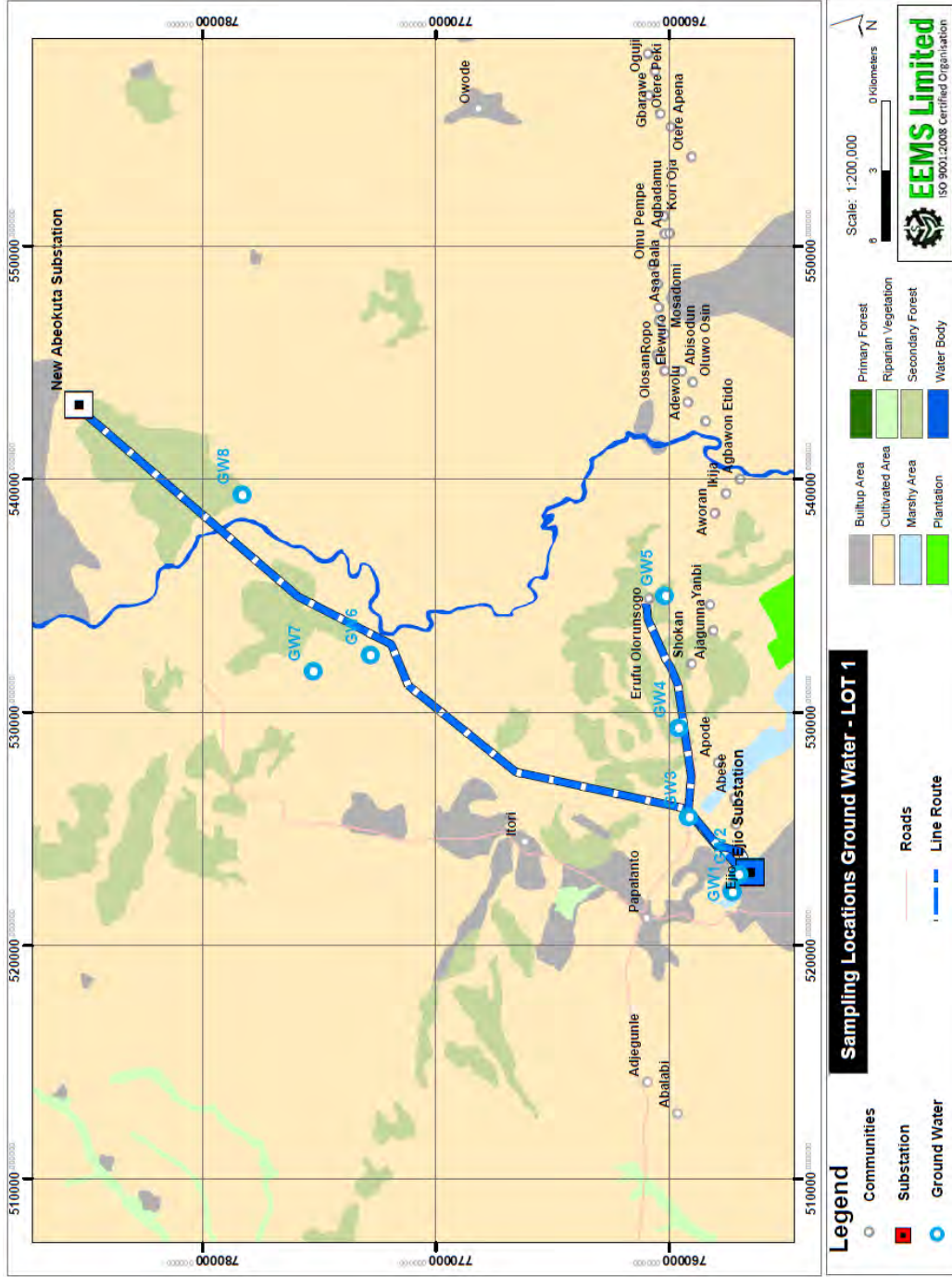


Figure 1-3: Groundwater Quality sampling point for Lot1

1.1 Surface water Quality

1.1.1 Sampling Location

Surface water quality measurements were carried out at sampling locations along the project site as shown in Table 1-6 and Figure 1-4.

Table 1-6: Sampling Locations for Surface water

S/N	Water Sample Points	Name of River/stream	Latitude	Longitude
1	SW1A	Osun stream @ Iludun- Ejio	6.856214	3.218069
2	SW1B	Osun stream @Iludun-Ejio	6.853344	3.218633
3	SW2B	Osun stream @ Abese	6.865411	3.229073
4	SW2C	Osun stream @ Abese	6.865097	3.230619
5	SW3A	Wagunnu River@ Soderu	6.871644	3.233017
6	WS3B	Wagunnu River@ Soderu	6.870361	3.234411
7	SW3C	Wagunnu River@ Soderu	6.869039	3.235658
8	SW4B	Sowunmi stream	6.867981	3.237125
9	SW4C	Sowunmi stream	6.86665	3.236636
10	SW5A	Wagunnu River @ Adubi aro	6.876358	3.234697
11	SW5B	Wagunnu River @ Adubi aro	6.874389	3.235236
12	SW5C	Wagunnu River @ Adubi aro	6.872969	3.236006
13	SW6B	Odoipa stream	7.001128	3.300558
14	SW6C	Odoipa stream	6.999833	3.301781
15	SW7A	Ogun River @ Opanigangan	7.052586	3.341354
16	SW7B	Ogun River @ Opanigangan	7.050886	3.342122
17	SW7C	Ogun River @ Opanigangan	7.048251	3.343675
18	SW8A	Ototo stream	7.106083	3.387217
19	SW8B	Ototo stream	7.104347	3.387406
20	SW8C	Ototo stream	7.102872	3.386906

1.1.2 Result of Surface quality survey

Result of surface water quality is shown in Table 1-7.

Table 1-7: Result of Surface water quality survey

PARAMETER	EJIO - OLORUNSOGO AXIS															Secondary Data (ICCL 2015)	Secondary Data (EMP Baseline 2017)			
	ODO-OSUN @ ILUDUN-EJIO (SW1)					OSUN STREAM (SW2)					WAGUNNU RIVER (SW3)							SOWUNMI STREAM (SW4)		
	min	max	mean	min	max	mean	min	max	mean	min	max	mean	min	max	mean					
	4.39	14.24	9.315	96.09	120.17	108.13	144.26	168.34	156.30	96.09	120.17	108.12	15.23	17.6	16.42					
Chloride	8.39	8.54	8.465	11.87	12.26	12.065	24.70	37.71	30.28	0.02	0.02	0.02	0.02	0.02	0.02	NA	7.54 – 41.07			
Total Hardness	0	0	0	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.01	0.01	0.03	0.02	0.02	NA	79.35 – 93.61			
TSS	0.01	0.21	0.11	2.43	2.55	2.49	1.10	2.68	1.79	2.05	2.18	2.05	2.30	2.18	1 - 45	1.53 – 7.59				
Turbidity	4.8	5.1	4.95	5.6	5.8	5.7	6.00	6.20	6.13	4.70	5.15	4.70	5.60	5.15	2.66 – 45	7.2 – 10.6				
DO	27.7	28.9	28.1	26.7	27.0	26.9	28.30	28.70	28.50	26.9	26.9	26.9	26.9	26.9	26.9	24.4 – 28.1	29.7 – 33.3			
Temperature	7.02	7.1	7.06	7.06	7.2	7.11	6.99	7.15	7.08	6.85	6.83	6.85	6.80	6.83	7.20 – 7.56	8.49 – 9.61				
pH	45	45	42.7	85	86	85.3	371	371	371.0	68	67.5	68	67	67.5	45.1 – 287	314 – 418				
EC	19	20	45.7	43	43	43	184	186	185.0	33	33.5	33	34	33.5	29.- 43.2	213 – 276				
TDS	0.5	0.15	0.33	0.3	0.4	0.35	0.95	0.97	0.96	0.15	0.17	0.15	0.19	0.17	NA	NA				
Depth	1.9	3	2.3	2.1	2.9	2.33	2.50	3.10	2.71	1.50	1.54	1.50	1.58	1.54	NA	NA				
Width	clear	clear	clear	0.3	0.3	0.3	0.13	0.15	0.14	0.20	0.20	0.20	0.20	0.20	NA	0.15 – 0.9				
Transparency	0.21	0.25	0.23	0.12	0.21	0.2	0.22	0.21	0.22	0.10	0.10	0.10	0.10	0.10	NA	NA				
Flow Rate	16.79	31.5	24.145	26.6	31.5	29.05	21.70	26.60	23.33	36.40	77.7	36.40	41.30	77.7	20.6 – 51.3	11.54 – 23.08				
COD	0.6	1.3	0.95	1.3	1.7	1.5	0.80	0.90	0.83	1.00	1.50	1.00	2.00	1.50	8 – 15.6	2.6 – 6.0				
BOD	0.46	0.59	0.525	0.46	0.54	0.5	0.44	0.49	0.46	0.47	0.475	0.47	0.48	0.475	NA	0 – 0.9				
Nitrate	2.43	3.22	2.825	3.11	4.08	3.595	3.98	4.71	4.27	3.81	3.98	3.81	4.15	3.98	NA	0.002 – 0.01				
Phosphate	0.53	0.54	0.535	0.64	0.67	0.655	0.66	0.67	0.67	0.52	0.63	0.52	0.74	0.63	NA	19.14 – 41.99				
Sulphate																				

PAH	0.00	0.02	0.01	0	0.01	0.005	0.000	0.010	0.003	0.02	0.03	0.015	NA
BTEX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
Phenols	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
THC	<0.001	0.12	0.12	0.11	0.21	0.16	0.02	0.12	0.06	0.03	0.14	0.085	NA
TPH	0.00	0.12	0.06	0.1	0.21	0.155	0.10	0.02	0.05	0.03	0.13	0.08	NA

PARAMETER	OLORUNSOGO AXIS												EJJO			Secondary Data (EMP Baseline 2017)						
	ILUDUN (SW1)						OSUN STREAM (SW2)						WAGUNU RIVER (SW3)				SOWUNMI (SW4)			STREAM		
	min	max	mean	min	max	mean	min	max	mean	min	max	mean	min	max	mean		min	max	mean	min	max	mean
	EJJO																					
Sodium	2.60	6.50	4.55	6.10	6.90	6.50	10.00	11.00	10.50	7.30	13.00	10.15	NA	4.21 – 9.85								
Oil & grease	<0.001	<0.001	<0.001	<0.001	0.01	<0.01	<0.001	0.02	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01	1 - 4							
Calcium	1.14	1.4	1.27	2.28	2.37	2.325	7.48	12.40	9.81	3.89	4.54	4.23	NA	21.59-31.87								
Magnesium	1.21	1.33	1.27	1.48	1.52	1.5	1.09	1.61	1.38	1.32	1.51	1.42	NA	3.39 – 6.42								
Copper	0.01	0.02	0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.233 – 0.296								
Iron	0.64	1.24	0.94	1.58	2.4	1.99	1.23	2.6	1.94	1.11	2.71	1.91	2 - 6	18.9 – 24.5								
Nickel	0.03	0.28	0.155	0.1	0.04	0.07	<0.001	<0.001	<0.001	0.01	0.01	0.01	0.00 – 0.12	0.019 – 0.288								
Chromium	0.1	0.3	0.2	0.2	0.5	0.35	0.4	0.07	0.36	0.40	1.20	0.8	NA	0.031 – 0.08								
Cadmium	<0.001	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	0.01 – 0.03								
Zinc	<0.001	0.01	0.01	<0.001	<0.001	<0.001	0.02	<0.001	0.015	<0.001	<0.001	<0.001	3 - 11									
Barium	<0.001	0.02	0.02	<0.001	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA									
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	<0.01	2 - 16	0.033 – 0.348								
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	ND								

PARAMETER	EJJO												Secondary Data
	NEW												
PARAMETER	ABEOKUTA AXIS												Secondary Data (EMP)

	RIVER WAGUNU (SW5)			ODOIPA (SW6)			OGUN RIVER (SW7)			OTOTO STREAM (SW8)			ICCL 2015)	Baseline 2017)
	min	max	mean	min	max	mean	min	max	mean	min	max	mean		
Chloride	72.01	100.91	86.46	93.68	132.21	112.9	127.40	153.89	140.6	129.81	158.70	144.3	NA	7.54 – 41.07
Total Hardness	10.08	16.74	13.41	11.05	16.13	13.59	10.68	15.57	13.12	11.80	17.77	14.78	NA	79.35 – 93.61
TSS	0.01	0.08	0.045	0.00	0.07	0.07	0.03	0.08	0.05	0.01	0.07	0.04	9 -74	
Turbidity	0.28	1.50	0.89	0.31	1.23	0.77	1.32	2.50	1.91	0.30	0.60	0.45	1 - 45	1.53 – 7.59
DO	5.10	5.50	5.30	4.90	5.60	5.25	4.80	5.00	4.90	4.90	5.90	5.40	2.66 - 45	7.2 -10.6
Temperature	28.8	29.0	28.9	27.0	27.2	27.1	30.6	31.5	31.05	29.2	29.8	29.5	24.4 – 28.1	29.7 – 33.3
pH	6.35	6.38	6.37	7.15	7.18	7.16	7.10	7.40	7.25	8.70	8.72	8.71	7.20 -7.56	8.49 – 9.61
EC	375	378	376.5	75.0	75.0	75.0	165	165	165	92.0	92.0	92.0	45.1 - 287	314 - 418
TDS	186	189	187.5	36.0	36.0	36.0	82	82	82	46.0	46.0	46.0	29- 43.2	213 - 276
Depth	0.55	0.67	0.61	1.50	1.56	1.53	6.51	6.70	13.21	0.32	0.35	0.34	NA	
Width	4.2	4.7	4.45	14.3	15.0	14.65	62.5	70.0	66.3	2.92	2.93	2.93	NA	
Transparency	2.14	2.16	2.15	1.10	1.14	1.12	2.60	2.65	2.63	0.24	0.28	0.26	NA	0.15 – 0.9
Flow Rate	0.20	0.22	0.21	0.80	0.83	0.82	1.22	1.24	1.23	2.80	2.88	2.84	NA	
COD	16.79	21.70	19.25	16.79	31.50	24.14	31.50	36.40	33.95	11.50	16.60	14.05	20.6 – 51.3	11.54 – 23.08
BOD	0.30	1.10	0.70	0.40	1.90	0.93	0.50	1.50	1.00	0.70	1.40	1.05	8 – 15.6	2.6 – 6.0
Nitrate	0.76	0.94	0.85	0.77	1.10	0.93	0.51	0.90	0.71	0.50	0.71	0.61	NA	0 – 0.9
Posphate	4.23	5.10	4.66	4.50	4.86	4.68	3.45	4.76	4.11	2.36	3.11	2.74	NA	0.002 – 0.01
Sulphate	0.53	1.11		0.45	1.20	0.82	0.48	0.67	0.57	0.69	0.81	0.75	NA	19.14 – 41.99
PAH	0.00	0.20	0.20	0.03	0.03	0.03	0.01	0.03	0.02	0.00	0.01	0.01	NA	
BTEX	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	NA	
Phenols	0.00	0.01	0.01	0.00	0.02	0.02	0.00	0.01	0.01	0.00	0.00	0.00	NA	
THC	0.05	0.23	0.14	0.14	0.15	0.145	0.03	0.14	0.08	0.02	0.04	0.03	NA	
TPH	0.04	0.21	0.125	0.13	0.14	0.135	0.02	0.13	0.07	0.01	0.01	0.01	NA	

	EJIO	Secondary	Secondary Data
	–		

PARAMETER	NEW ABEOKUTA AXIS														Data (ICCL 2015)	(EMP Baseline 2017)
	WAGUNU RIVER (SW5)			ODOIPA RIVER (SW6)			OGUN RIVER (SW7)			OTOTO (SW8)			STREAM			
	min	max	mean	min	max	mean	min	max	mean	min	max	mean	max	mean		
Sodium	6.23	8.00	7.12	4.56	6.12	5.34	4.30	8.70	6.50	6.20	7.99	7.09	7.99	7.09	NA	4.21 – 9.85
Oil & Grease	<0.001	0.01	<0.01	0.01	0.02	0.015	<0.001	0.01	<0.01	<0.001	0.02	<0.02	0.02	<0.02	1 - 4	
Calcium	2.20	3.93	3.06	2.42	3.45	2.93	1.67	3.56	2.61	1.87	3.11	2.49	3.11	2.49	NA	21.59-31.87
Magnesium	1.09	1.66	1.37	1.20	1.80	1.50	1.43	1.60	1.51	1.71	2.41	2.06	2.41	2.06	NA	3.39 – 6.42
Copper	<0.001	0.03	<0.01	<0.001	0.02	<0.02	<0.001	<0.001	<0.001	<0.001	0.20	0.105	0.20	0.105	0.01 – 1.3	0.233 – 0.296
Iron	1.20	2.99	2.09	1.44	2.10	1.77	0.20	2.01	1.10	0.30	2.56	1.43	2.56	1.43	2 - 6	18.9 – 24.5
Nickel	0.01	0.02	0.015	<0.001	0.02	<0.02	<0.001	0.02	<0.02	<0.001	0.02	<0.02	0.02	<0.02	0.00 – 0.12	0.019 – 0.288
Chromium	0.01	0.45	0.23	0.01	0.20	0.11	0.02	0.10	0.06	0.003	0.40	0.201	0.40	0.201	NA	0.031 – 0.08
Cadmium	<0.001	0.10	<0.10	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	<0.01	0.01	<0.01	0.01	0.01 – 0.03
Zinc	<0.001	0.01	<0.01	<0.001	0.02	<0.02	<0.001	0.01	<0.01	<0.001	0.10	<0.05	0.10	<0.05	3 - 11	
Barium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	
Lead	<0.001	0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	2 - 16	0.033 – 0.348
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	ND

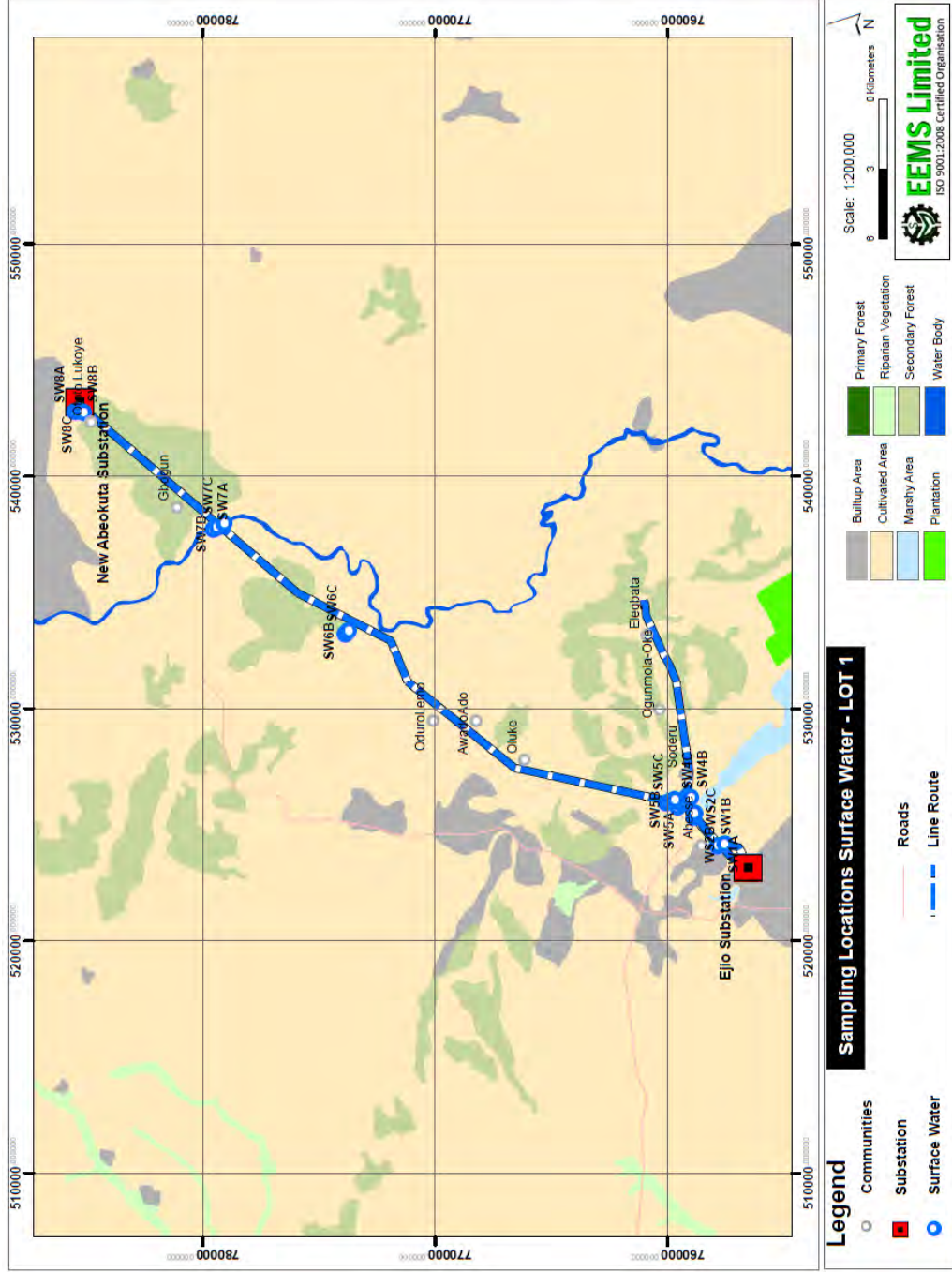


Figure 1-4: Surface water Quality sampling point for Lot1

1.2 Soil Quality

1.2.1 Sampling Location

Soil samples were collected at 14 stations. At each station, soil samples were collected at two depths (0-15cm for top soil and 15-30cm for sub soil). The soil sampling location is shown in Figure 1-5.

1.2.2 Soil Analysis Results

The result of soil analysis is shown in Table 1-8.**Error! Reference source not found.**

Table 1-8: Result of Soil analysis

Parameters	Ejio – Sojuolu					Ejio - Olorunsogo					Ejio - Abeokuta					FMENV Limits (USDA 2017)				
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max					
	Sub soil					Top soil					Sub soil									
Colour	Gray and Brown																			
MC (%)	19.78	10.50	26.30	26.09	25.12	28.30	19.28	18.24	19.80	19.08	16.65	23.95	18.41	13.80	26.10	21.39	19.59	22.76		
pH	7.74	6.65	8.20	7.56	6.42	7.95	7.29	7.08	7.72	7.21	7.01	7.60	7.94	8.01	8.24	7.78	7.20	8.10	5.0 - 8.0	
Sand (%)	73.82	58.30	79.10	73.98	58.50	79.40	70.50	68.10	71.70	71.07	68.60	72.30	76.85	68.20	88.90	77.23	68.70	89.00		
Silt (%)	14.18	11.10	21.70	14.02	11.00	21.50	17.83	13.30	26.90	15.60	12.70	21.40	14.40	6.10	26.80	14.03	6.00	26.30		
Clay (%)	12.00	10.00	20.00	12.00	5.00	20.00	11.67	5.00	15.00	13.33	10.00	15.00	8.75	5.00	15.00	8.75	5.00	15.00		
Texture	Loamy sand and Sandy loam					Loamy sand and Sandy loam					Sandy loam and Loamy sand					Sandy loam and Loamy sand				
Bulk density (g/cm ³)	2.09	1.97	2.33	1.98	1.87	2.08	2.05	2.00	2.07	2.00	1.94	2.12	2.02	1.75	2.27	1.95	1.74	2.14		
Porosity (%)	21.74	12.04	25.63	24.93	21.36	29.38	22.79	21.85	24.67	24.62	20.12	26.87	23.81	14.35	33.97	26.52	19.35	34.41		
WHC (%)	22.04	18.66	25.34	22.10	20.05	24.76	23.98	23.45	25.05	23.40	22.71	23.74	20.84	17.90	23.56	21.16	18.02	24.43		
Ext. Sulphate (mg/kg)	6.88	4.60	14.96	6.14	3.90	13.56	4.80	4.51	5.38	4.18	3.88	4.79	9.23	4.74	15.19	8.34	4.30	14.05		
Bicarbonate (mg/kg)	32.40	8.00	72.00	30.80	12.00	60.00	61.33	56.00	72.00	53.33	48.00	64.00	31.50	16.00	68.00	33.00	20.00	60.00		
CEC (meq/100g)	2.6	2.08	3.61	2.50	1.97	3.50	2.26	3.21	3.56	3.24	3.08	3.32	2.28	1.26	3.77	2.23	1.18	3.70		
Nitrate (mg/kg)	161.32	141.50	210.10	148.88	128.90	196.80	107.33	105.40	111.20	100.33	98.30	101.35	121.45	97.80	162.50	108.34	80.10	143.30	500	

Chloride (mg/kg)	88.6 8	79.62	94.2 0	92.31	84.35	97.35	85.40	83.1 7	89.86	89.3 4	87.89	92.23	89.8 6	87.89	91.83	88.8 8	86.71	91.8 3
TOC (%)	3.46	2.98	3.96	3.01	2.73	3.32	3.96	3.95	3.97	2.65	2.63	2.69	3.18	2.93	3.39	2.96	2.75	3.22
K (mg/kg)	0.38	0.23	0.73	0.51	0.29	0.98	1.17	1.08	1.21	1.29	1.22	1.32	1.18	0.5	2.04	1.56	0.89	2.68
Na (mg/kg)	1.97	1.61	2.23	2.11	1.82	2.44	1.94	1.86	2.10	2.07	1.98	2.24	1.94	1.68	2.24	2.06	1.89	2.41
Cu (mg/kg)	0.01	BDL	0.02	0.03	BDL	0.04	BDL	BD L	BDL	BD L	BDL	BDL	0.02	BDL	0.02	0.02	BDL	0.03 36
Fe (mg/kg)	33.8 7	6.93	44.7 0	30.36	6.10	39.66	32.23	31.0 0	34.70	28.5 9	27.44	30.88	46.4 5	27.90	59.50	42.7 3	25.70	53.7 0
Zn (mg/kg)	0.10	0.07	0.15	0.05	0.02	0.10	0.09	0.09	0.09	0.03	0.02	0.03	0.10	0.07	0.11	0.03	0.01	0.04 140
Ba (mg/kg)	0.02	BDL	0.02	0.03	BD L	0.04	0.13	0.10	0.20	0.05	0.03	0.09	0.02	BDL	0.03	0.01	BDL	0.01
Ni (mg/kg)	0.36	0.02	0.61	0.26	0.01	0.52	0.18	0.17	0.21	0.04	0.01	0.06	0.28	0.03	0.60	0.24	BDL	0.42 35
Cr (mg/kg)	0.05	0.04	0.06	0.03	0.02	0.06	0.06	0.05	0.07	0.04	0.04	0.05	0.07	0.06	0.08	0.06	0.05	0.07
Cd (mg/kg)	0.04	0.01	0.06	0.05	BD L	0.11	0.04	0.01	0.06	0.13	0.06	0.16	0.07	0.01	0.13	0.02	BDL	0.02
Pb (mg/kg)	0.01	BDL	0.01	BDL	BD L	BDL	BDL	BD L	BDL	BD L	BDL	BDL	0.02	BDL	0.02	0.01	BDL	0.01 85
Hg (mg/kg)	BD L	BDL	BD L	BDL	BD L	BDL	BDL	BD L	BDL	BD L	BDL	BDL	BD L	BDL	BDL	BD L	BDL	BD L
PAH (mg/kg)	4.24	0.55	13.1 4	3.21	0.06	11.51	0.38	0.02	1.09	0.30	0.04	0.82	0.00	0.00	0.01	0.00	0.00	0.00
BTEX (mg/kg)	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.04	0.00	0.00	0.01
Phenols (mg/kg)	1.22	0.00	1.32	0.08	0.00	0.30	0.07	0.00	0.11	0.01	0.01	0.02	0.39	0.00	1.53	0.06	0.00	0.22
TPH (mg/kg)	9.74	2.31	27.2 1	7.30	1.15	21.74	0.98	0.32	2.29	0.63	0.06	1.76	1.12	0.00	3.78	0.52	0.00	1.67
THC (mg/kg)	13.2 0	5.93	30.1 9	10.32	4.47	24.47	4.94	4.27	6.28	3.28	2.69	4.46	4.31	2.97	7.17	3.48	2.76	4.89

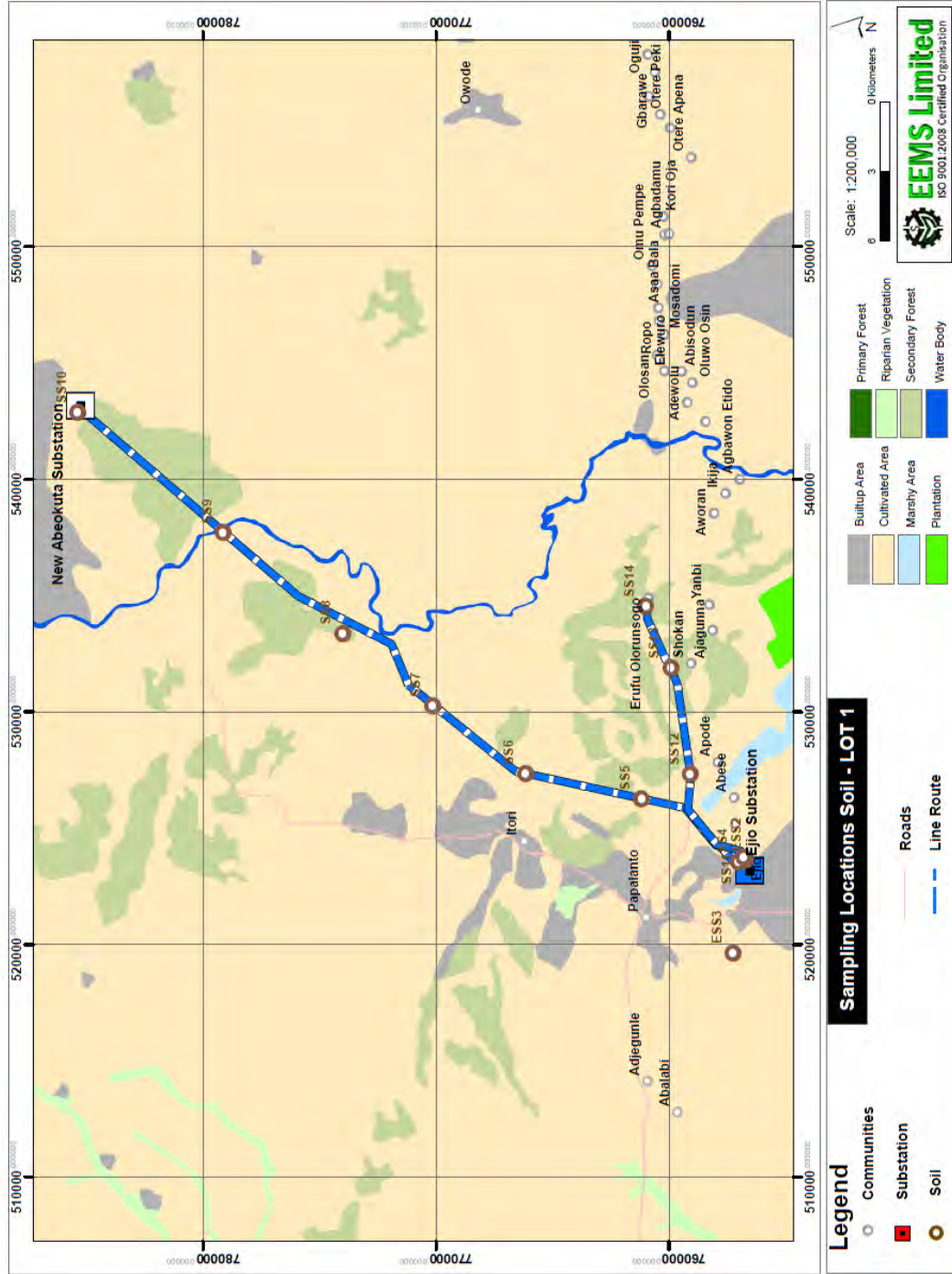


Figure 1-5: Soil sampling locations

LOT 2 Baseline Study

2.1 Ambient Air Quality

2.1.1 Sampling Location

Ambient air and noise quality measurements were carried out at sampling locations along the project site s as shown in Table 2-1 and **Error! Reference source not found..**

Table 2-1: Sampling Locations for Air Quality and Noise

S/N	Location	Coordinate, UTM (WGS 84) Zone 31N	
		Northing (m)	Easting (m)
1	Likosi Sub 1	748706	558515
2	Likosi Sub 2	748677	559029
3	Likos1 Sub 3	749169	559025
4	Likosi Sub 4	749196	558558
5.	Lik-Sag TL 1	749340	561532
6.	Lik-Sag TL 2	748827	560164
7.	Lik-Redeem TL 1	748210	556856
8.	Redeem Sub	749120	554111
9.	Lik-Ejio TL 1 (Control Point)	749695	559345
10.	Lik-Redeem TL 2- Ologbun	748221	556826
11.	Lik-Redeem TL 3- Sosho Ogbara	746593	553379
12.	Lik- Ejio TL 4-Oriola	757327	533450
13.	MFM Sub 1	746637	540975
14	MFM Sub 2	746487	542656
15.	MFM Sub 3	746086	541410
16.	Ikj – MFM TL Pipeline	742646	541718
17.	Ikj-MFM TL Iganun	741020	542120
18.	Lik- Ejio TL 2-Wichtech	758599	560262
19.	Lik- Ejio TL 3- Ori	760273	550492
20.	Lik- Ejio TL 5-Ifesowapo	758522	541694
21.	Lik- Ejio TL 6 Adewolu	759804	543758
22.	Lik- Ejio TL 7 Jaguna	757313	533504
23.	Lik- Ejio TL 8 Ibokuru	757161	525258
24.	Lik- Ejio TL 9 Ejio	756753	523781

2.1.2 Result of Ambient air quality survey

The result of ambient air quality is presented below.

Table 2-2: The result of ambient air quality survey

ID	Sampling Station	TSP	SO ₂	NO ₂	CO	H ₂ S	NMHC
		µg.m ⁻³	ppm				
AN1	Likosi Sub 1	90.00	<0.01	<0.01	1.00	<0.10	<0.01
AN2	Likosi Sub 2	91.00	<0.01	<0.01	1.00	0.10	<0.01
AN3	Likos1 Sub 3	89.10	<0.01	<0.01	1.00	<0.10	<0.01
AN4	Likosi Sub 4	90.00	<0.01	<0.01	2.00	<0.10	<0.01
AN5	Lik-Sag TL 1	248.0	<0.01	<0.01	1.00	<0.10	<0.01
AN6	Lik-Sag TL 2	48.0	<0.01	<0.01	4.00	<0.10	<0.01
AN7	Lik-Redeem TL 1	248.0	<0.01	<0.01	2.00	<0.10	<0.01
AN8	Redeem Sub	111.20	<0.01	<0.01	1.00	<0.10	<0.01
AN9	Lik-Ejio TL 1	100.0	<0.01	<0.01	<1.00	<0.10	<0.01
AN10	Lik-Redeem TL 2- Ologbun	65.00	<0.01	<0.01	1.00	<0.10	<0.01
AN11	Lik-Redeem TL 3- Sosho Ogbara	72.00	<0.01	<0.01	1.00	0.010	<0.01
AN12	Lik- Ejio TL 4-Dagunja	98.00	<0.01	<0.01	<1.00	<0.10	<0.01
AN13	MFM Sub 1	84.00	<0.01	<0.01	2.00	0.10	<0.01
AN14	MFM Sub 2	84.00	<0.01	<0.01	1.00	0.10	<0.01
AN15	MFM Sub 3	66.00	<0.01	<0.01	1.00	<0.10	<0.01
AN16	MFM Sub 4	295.0	<0.01	<0.01	1.00	<0.10	<0.01
AN17	Ikj-MFM TL Iganun	86.00	<0.01	<0.01	2.00	<0.10	<0.01
AN18	Lik- Ejio TL 2-Wichtech	82.00	<0.01	<0.01	3.00	<0.10	<0.01
AN19	Lik- Ejio TL 3- Ori	70.00	<0.01	<0.01	1.00	<0.10	<0.01
AN20	Lik- Ejio TL 5-Ifesowapo	132.0	<0.01	<0.01	1.00	<0.10	<0.01
AN21	Lik- Ejio TL 6 Adewolu	133.0	<0.01	<0.01	1.00	<0.10	<0.01
AN22	Lik- Ejio TL 7 Jaguna	179.0	<0.01	<0.01	<1.00	<0.10	<0.01
AN23	Lik- Ejio TL 8 Ibokuru	118.0	<0.01	<0.01	<1.00	<0.10	<0.01
AN24	Lik- Ejio TL 9 Ejio	109.0	<0.01	<0.01	1.00	<0.10	<0.01
Range of EMP Wet Season Baseline data		56-450	0.01	0.04-0.06	1-3	<0.01	<0.10
FMEV Limit		600	0.1	0.04 - 0.06	10	-	-
IFC standatrd¹		-	0.007-0.045	0.1	-	-	-

¹ IFC EHS Guideline, AIR EMISSIONS AND AMBIENT AIR QUALITY, table 1.1.1

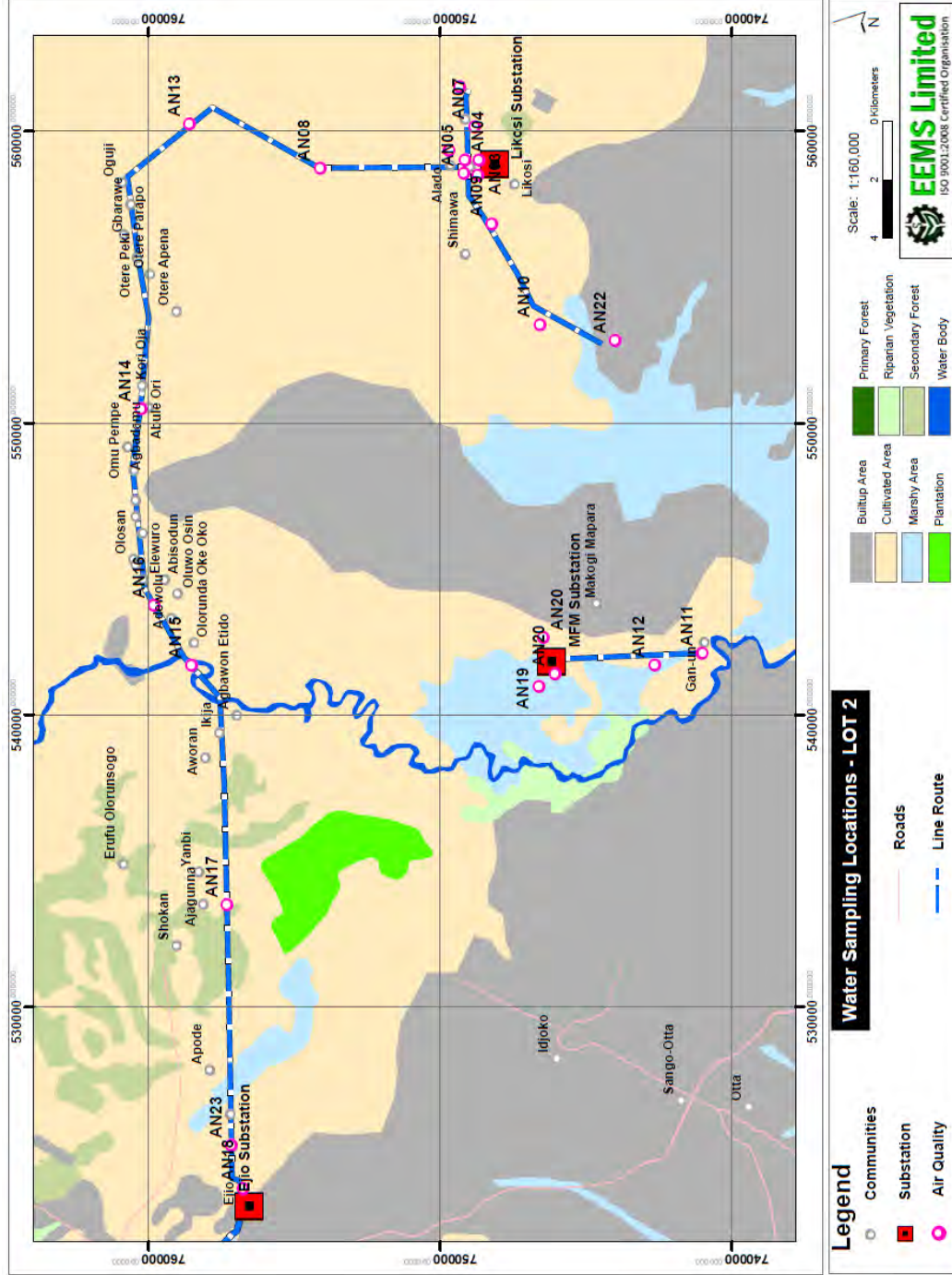


Figure 2-1: Air and noise Quality sampling point for Lot2

2.2 Noise Quality

2.2.1 Sampling Location

Sampling location is same as Air Quality.

2.2.2 Result of Noise quality survey

The summary results of the 10-minute measurements are shown in below.

Noise levels along proposed Transmission Lines and Substations ranged from 34.60 dBA to 66.50 dBA during dry season field work. The highest noise level was obtained at Iganun town due to human conversation and commercial activities. However, the values obtained are within the Federal Ministry of Environment allowable limit.

Table 2-3: Result of Noise Quality Survey

ID	Location	Noise Level (LAeq dBA)
AN1	Likosi Sub 1	39.6
AN2	Likosi Sub 2	40.9
AN3	Likos1 Sub 3	42.3
AN4	Likosi Sub 4	40.8
AN5	Lik-Sag TL 1	51.0
AN6	Lik-Sag TL 2	51.8
AN7	Lik-Redeem TL 1	55.3
AN8	Redeem Sub	32.6
AN9	Lik-Ejio TL 1	40.4
AN10	Lik-Redeem TL 2- Ologbun	38.9
AN11	Lik-Redeem TL 3- Sosho Ogbara	37.4
AN12	Lik- Ejio TL 4-Dagunja	35.2
AN13	MFM Sub 1	36.4
AN14	MFM Sub 2	41.8
AN15	MFM Sub 3	39.8
AN16	MFM Sub 4	40.6
AN17	Ikj-MFM TL Iganun	66.5
AN18	Lik- Ejio TL 2-Wichtech	39.5
AN19	Lik- Ejio TL 3- Ori	34.6
AN20	Lik- Ejio TL 5-Ifesowapo	41.7
AN21	Lik- Ejio TL 6 Adewolu	35.8
AN22	Lik- Ejio TL 7 Jaguna	43.9
AN23	Lik- Ejio TL	36.9
Standard	FME_{env} (Work place)	
	IFC Standard¹	Residential - 55dB: Day - 45dB: Night Industrial - 77dB

¹ IFC EHS guildiene, noise management (table 1.7.1)

2.3 Groundwater and Surface water Quality

2.3.1 Sampling Location

Groundwater and surface water quality measurements were carried out at sampling locations along the project site as shown in Table 1-4 and **Error! Reference source not found.**

Table 2-4: Sampling Locations for Meteorology, Air Quality and Noise

SN	Station	Water Type/Source	Site Description	Location/Grid Coordinate	
				Northing (N)	Easting (E)
1	Station 1	Underground water/Borehole	Road adjacent to Remson Royal Schools around Likosi Sub-Station	0558497	0748469
2	Station 2	Underground water/Borehole	Shagamu Steel Rolling Company Borehole	0561234	0748541
3	Station 3	Surface water/Stream	Stream at Oriola Village, Via Ijagon at the back of proposed Golden Crown Estate by Bustom Homes and Properties Ltd.	0558889	0754209
4	Station 4	Underground water/Borehole	Borehole at the last building before the valley at Ologbun	0556809	0748206
5	Station 5	Surface water/Stream	Stream at the entrance of Shosho-Ogbara village	0554174	0747125
6	Station 6	Underground water/Borehole	Borehole at Shosho-Ogbara village	0554157	0747145
7	Station 7	Underground water/Borehole	Borehole at Gan-Un Community, Magboro	0542420	0741270
8	Station 8	Surface water/River	Rver at the bridge on the road to Gan-Un Community, Magboro	0543116	0741709
9	Station 9	Surface water/Stream	Stream at proposed MFM Sub-Station in Makogi Community	0542512	0746593
10	Station 10	Surface water/Stream	Stream at the channel along the proposed Green Spring Estate Project Magboro.	0541800	0743233
11	Station 11	Surface water/Stream	River at Ori village (River Kori)	0550877	0760129
12	Station 12	Surface water/Stream	Stream down the fish pond at Omu-Apempe Community	0549122	0760463
13	Station 13	Surface water/River	Ogun River at Ifesowapo, Oke-Oko Community	0541662	0758525
14	Station 14	Underground water/Hand-dug well	Hand-dug well at Ifesowapo, Oke-Oko Community	0542368	0758540
15	Station 15	Surface water/River	River at Adewolu Community	0543193	0760502
16	Station 16	Surface water/Stream	Stream at Jaguna village towards the Transmission Line crossing	0533482	0757639
17	Station 17	Underground water/Hand-dug well	Hand-dug well at Jaguna village	0533523	0758126
18	Station 18	Surface water/Stream	Stream at Abese Community	0524119	0757129
19	Station 19	Surface water/Stream	Stream at Ibokuru Community	0526004	0757159
20	Station 20	Underground water/Hand-dug well	Hand-dug well at Ibokuru Community	0525880	0757080
21	Station 21	Underground water/Hand-dug well	Hand-dug well at Ejio Community (with water pumping machine)	0523145	0757042

2.3.2 Result of Groundwater and Surface water quality survey

The result of groundwater and surface water quality survey is shown in Table 2-5 and Table 2-6.

Table 2-5: Result of Underground water quality

S/N	Parameter	Unit	Station									D.W.Stds.
			1	2	4	6	7	14	17	20	21	
Physical parameters/general chemical parameters												
1	Air Temperature	°C	30.1	31.6	28.9	27	29	32.5	32	29	31	Ambient ⁺
2	Water Temperature	°C	28.3	28	28.9	31	27.8	28.9	29.5	28.5	29.2	Ambient ⁺
3	Apparent Colour	Pt-Co	23.49	23.11	24.05	24.60	27.77	73.78	25.16	26.65	27.58	15 (TCU) ⁺
4	True Colour	Pt-Co	27.03	26.09	23.49	21.81	25.35	40.44	23.11	22.00	22.18	15 (TCU) ⁺
5	Turbidity	NTU	59.03	57.72	58.02	57.60	58.58	64.82	58.32	59.21	57.66	5.0 ⁺
6	Total Dissolved Solids (TDS)	mg/L	53.8	24.8	224	43.3	61.6	62.7	344	35.1	87.3	1000*
7	Conductivity	µS/cm	80.7	37.6	335	64.7	92.9	94.4	516	51.8	130.2	1500*
8	pH		4.94	4.75	7.47	5.03	5.67	5.56	6.67	5.34	5.93	6.5 – 8.5 ⁺
9	Acidity	mg/LCaCO ₃	4.0	4.0	8.0	10.0	8.0	10.0	4.0	6.0	12.0	NS
10	Alkalinity	mg/LCaCO ₃	8.0	12.0	186.0	14.0	20.0	30.0	162.0	16.0	54.0	200*
11	Total Hardness	mg/LCaCO ₃	1.56	2.08	48.97	1.85	2.08	1.41	1.51	1.47	1.23	150 ⁺
12	Non-Carbonate Hardness	mg/LCaCO ₃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150 ⁺
Anions and cations												
13	Calcium (Ca ²⁺)	mg/L	0.28	0.39	0.68	0.23	0.39	0.09	0.11	0.26	0.18	NR**
14	Magnesium (Mg ²⁺)	mg/L	0.21	0.27	11.53	0.31	0.27	0.29	0.3	0.2	0.19	NR**
15	Sodium (Na ⁺)	mg/L	3.75	3.90	7.06	3.30	2.81	2.18	1.86	1.22	1.06	200 ⁺
16	Potassium (K ⁺)	mg/L	0.30	0.28	2.34	0.73	1.14	0.62	0.35	0.38	0.63	NS
17	Chloride (Cl ⁻)	mg/L	5.14	3.94	2.15	5.14	0.35	8.13	18.91	3.94	6.34	250 ⁺
18	Sulphate (SO ₄ ²⁻)	mg/L	1.21	1.28	0.93	0.79	1.27	1.21	1.06	1.04	1.22	100 ⁺
19	Bicarbonate (HCO ₃ ⁻)	mg/L	9.6	14.4	223.2	16.8	24.0	36.0	194.4	19.2	64.8	100*
20	Nitrate (NO ₃ ⁻)	mg/L	0.07	0.06	0.07	0.08	0.10	0.09	0.09	0.07	0.07	50 ⁺
Oxygen parameters and nutrient compounds												
21	Dissolved Oxygen (DO)	mg/L	6.0	5.6	4.4	4.0	6.4	1.4	4.8	2.8	4.4	-
22	Dissolved Oxygen (DO % Sat.)	%	77.8	72.3	57.5	53.9	82.4	18.3	63.3	36.4	57.8	-
23	Chemical Oxygen Demand (COD)	mg/L	10.21	8.51	2.27	12.48	9.65	3.97	1.13	19.86	9.08	-
24	Biochemical Oxygen Demand (BOD ₅)	mg/L	1.6	3.0	1.0	0.4	2.6	1.0	1.2	0.6	1.0	-

S/N	Parameter	Unit	Station																		D.W.Stds.						
			1	2	4	6	7	14	17	20	21	15	16	18	19												
25	Total Organic Carbon (TOC)	mg/L	3.83	3.19	0.85	4.68	3.62	1.49	0.43	7.45	3.40	5.0 ⁺															
26	Organic Matter (OM)	mg/L	6.60	5.50	1.47	8.07	6.23	2.57	0.73	12.83	5.87	-															
Heavy metals/trace elements																											
27	Cadmium (Cd)	mg/L	0.013	0.009	0.014	0.013	0.008	0.013	0.007	0.010	0.009	0.005**															
28	Cobalt (Co)	mg/L	0.004	0.001	0.002	0.004	0.016	0.013	0.011	0.004	0.002	0.04*															
29	Chromium (Cr)	mg/L	0.004	0.001	0.002	0.006	0.004	0.004	0.001	0.007	0.004	0.05 ⁺															
30	Copper (Cu)	mg/L	0.030	0.010	0.030	0.050	0.003	0.003	0.003	0.002	0.003	1.0 ⁺															
31	Iron (Fe)	mg/L	0.220	0.100	0.140	0.130	0.002	0.001	0.004	0.002	0.001	0.3 ⁺															
32	Manganese (Mn)	mg/L	0.010	0.001	0.010	0.060	0.006	0.010	0.005	0.002	0.003	0.2 ⁺															
33	Nickel (Ni)	mg/L	0.015	0.022	0.028	0.030	0.016	0.014	0.009	0.009	0.011	0.2 ⁺															
34	Lead (Pb)	mg/L	0.005	0.018	0.006	0.000	0.015	0.005	0.011	0.007	0.003	0.01**															
35	Zinc (Zn)	mg/L	0.060	0.010	0.020	0.030	0.008	0.003	0.005	0.003	0.002	3.0 ⁺															

Table 2-6: Result of Surface water quality survey

S/N	Parameter	Unit	Station																
			3	5	8	9	10	11	12	13	15	16	18	19					
Physical parameters/general chemical parameters																			
1	Depth	m	0.16	0.28	0.12	0.11	0.41	0.6	0.68	0.91	0.22	0.31	0.19	0.21					
2	Transparency	m	0.16	0.28	0.12	0.11	0.23	0.6	0.42	0.25	0.22	0.15	0.19	0.21					
3	Air Temperature	°C	30.0	28.0	30.0	32.0	35.4	25.9	27.2	32.5	32.0	33.9	27.0	27.8					
4	Water Temperature	°C	27.0	27.1	28.0	28.4	31.0	25.8	26.0	32.0	26.7	29.0	27.0	27.5					
5	Apparent Colour	Pt-Co	31.31	35.41	39.32	54.78	50.31	37.83	22.37	60.00	35.59	71.55	34.85	28.14					
6	True Colour	Pt-Co	25.35	26.84	29.45	34.85	28.52	27.58	19.95	32.06	27.77	44.91	34.66	27.96					
7	Turbidity	NTU	56.59	59.00	59.35	60.81	61.43	60.19	59.62	59.68	58.85	64.64	59.38	58.02					
8	Total Dissolved Solids (TDS)	mg/L	29.9	33.3	178.0	120.6	102.1	32.3	38.4	98.7	36.3	73.8	31.4	34.3					
9	Conductivity	µS/cm	43.9	49.2	264.0	183.6	153.1	42.4	56.9	147.6	53.3	109.5	46.3	50.6					
10	pH		5.91	5.87	6.79	6.84	6.60	6.00	6.10	7.02	5.90	6.32	6.81	6.65					
11	Acidity	mg/LCaCO ₃	6.0	6.0	8.0	10.0	2.0	8.0	6.0	6.0	22.0	8.0	10.0	8.0					
12	Alkalinity	mg/LCaCO ₃	8.0	12.0	106.0	64.0	66.0	10.0	16.0	64.0	20.0	38.0	6.0	16.0					
13	Total Hardness	mg/LCaCO ₃	7.41	5.85	1.93	1.45	1.74	2.17	1.93	1.80	1.01	1.14	1.67	1.66					

S/N	Parameter	Unit	Station																
			3	5	8	9	10	11	12	13	15	16	18	19					
14	Non-Carbonate Hardness	mg/LCaCO ₃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Anions and cations																			
15	Calcium (Ca ²⁺)	mg/L	1.52	1.19	0.28	0.27	0.32	0.41	0.33	0.21	0.11	0.08	0.21	0.32					
16	Magnesium (Mg ²⁺)	mg/L	0.88	0.70	0.30	0.19	0.23	0.28	0.27	0.31	0.18	0.23	0.28	0.21					
17	Sodium (Na ⁺)	mg/L	3.31	4.23	3.27	2.36	4.11	1.86	2.12	2.37	3.22	2.74	1.90	1.14					
18	Potassium (K ⁺)	mg/L	0.20	0.59	0.90	0.58	0.63	0.28	0.33	0.36	0.53	0.43	0.29	0.27					
19	Chloride (Cl ⁻)	mg/L	4.54	0.35	17.12	14.12	9.33	4.54	8.73	2.15	5.14	8.73	5.74	5.14					
20	Sulphate (SO ₄ ²⁻)	mg/L	1.04	0.81	1.33	1.27	1.61	1.47	1.38	1.16	1.08	1.23	1.27	1.18					
21	Bicarbonate (HCO ₃ ⁻)	mg/L	9.6	14.4	127.2	76.8	79.2	12.0	19.2	76.8	24.0	45.6	7.2	19.2					
22	Nitrate (NO ₃ ⁻)	mg/L	0.09	0.07	0.12	0.11	0.13	0.11	0.1	0.11	0.10	0.09	0.07	0.07					
Oxygen parameters and nutrient compounds																			
23	Dissolved Oxygen (DO)	mg/L	3.0	1.8	0.4	3.2	5.6	6.4	3.6	5.8	2.2	0.6	4.2	4.4					
24	Dissolved Oxygen (DO % Sat.)	%	38.2	22.9	5.2	41.6	75.5	79.9	45.1	79.2	27.8	7.9	53.4	56.3					
25	Chemical Oxygen Demand (COD)	mg/L	19.86	2.84	15.89	11.35	11.35	9.08	13.62	20.43	16.45	1.13	11.35	9.65					
26	Biochemical Oxygen Demand (BOD ₅)	mg/L	1.8	8.0	128.0	56.0	8.0	2.2	0.6	4.6	8.0	32.0	3.6	0.4					
27	Total Organic Carbon (TOC)	mg/L	7.45	1.06	5.96	4.26	4.26	3.40	5.11	7.66	6.17	0.43	4.26	3.62					
28	Organic Matter (OM)	mg/L	12.83	1.83	10.26	7.33	7.33	5.87	8.80	13.20	10.63	0.73	7.33	6.23					
Heavy metals/trace elements																			
29	Cadmium (Cd)	mg/L	0.013	0.010	0.010	0.006	0.004	0.012	0.013	0.015	0.009	0.010	0.011	0.009					
30	Cobalt (Co)	mg/L	0.002	0.004	0.009	0.019	0.021	0.016	0.019	0.023	0.014	0.018	0.010	0.017					
31	Chromium (Cr)	mg/L	0.002	0.004	0.013	0.006	0.013	0.008	0.004	0.002	0.002	0.005	0.006	0.001					
32	Copper (Cu)	mg/L	0.010	0.020	0.002	0.001	0.003	0.001	0.002	0.001	0.006	0.002	0.003	0.005					
33	Iron (Fe)	mg/L	0.610	0.380	0.001	0.005	0.003	0.002	0.003	0.005	0.002	0.003	0.002	0.001					
34	Manganese (Mn)	mg/L	0.030	0.030	0.010	0.003	0.006	0.008	0.004	0.006	0.008	0.003	0.005	0.003					
35	Nickel (Ni)	mg/L	0.018	0.023	0.023	0.018	0.014	0.015	0.021	0.013	0.020	0.019	0.013	0.017					
36	Lead (Pb)	mg/L	0.003	0.003	0.013	0.018	0.009	0.010	0.008	0.003	0.011	0.008	0.008	0.009					
37	Zinc (Zn)	mg/L	0.030	0.010	0.001	0.005	0.003	0.011	0.010	0.008	0.005	0.007	0.003	0.005					

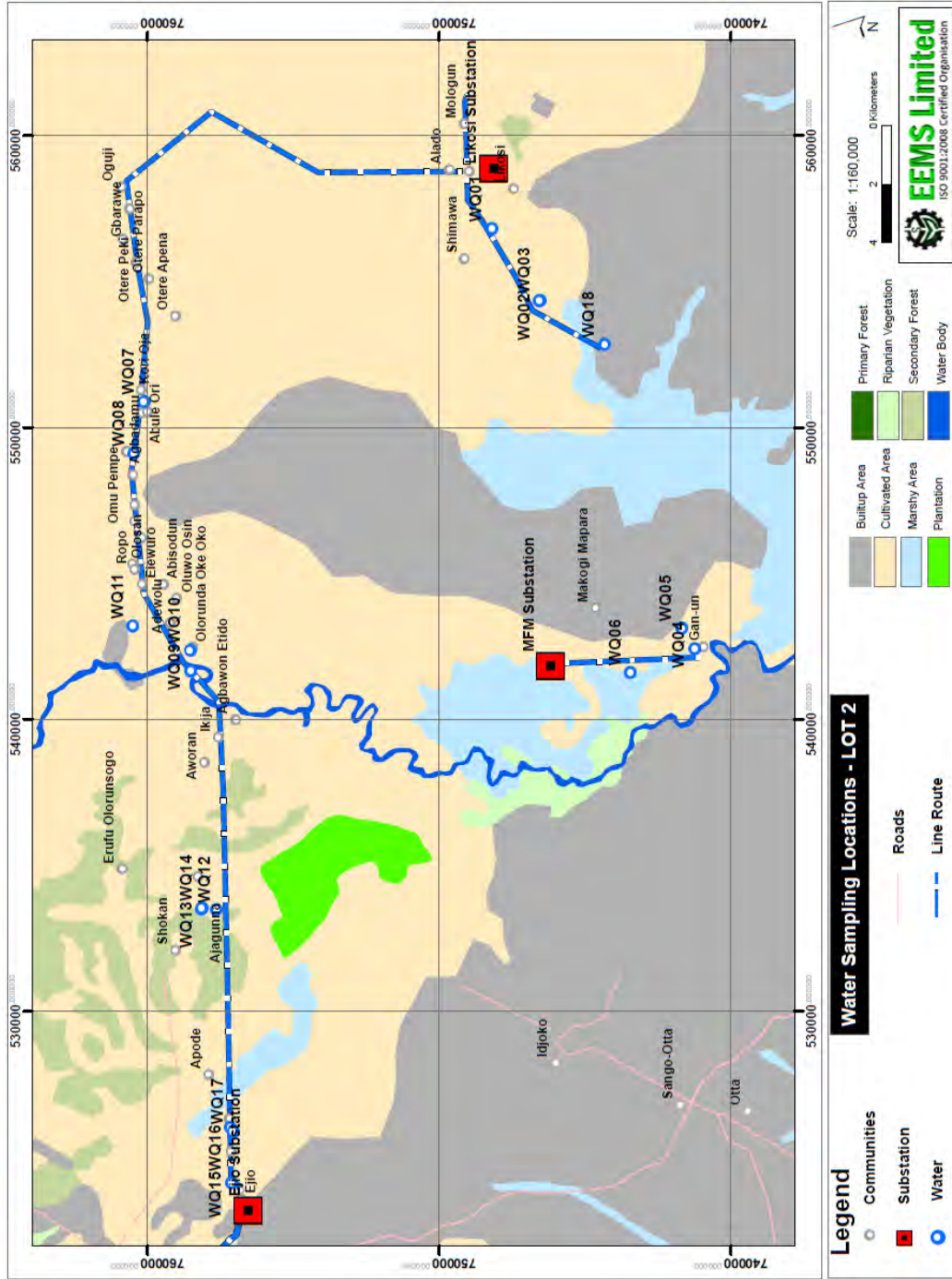


Figure 2-2: Groundwater and Surface water quality sampling point for Lot2

2.4 Soil Quality

2.4.1 Sampling Location

Soil samples were collected at 18 stations. At each observation point, 10 core soil samples spatially distributed around the point were taken using the auger where feasible. The core samples were bulked, mixed and sub-sampled for laboratory analysis. Four composite samples from 0 – 15 cm, and 15–50 cm soil depths were taken at every observation point. The sampling location is shown in Figure 2-3.

2.4.2 Soil Analysis Results

The result of soil analysis is shown in Table 2-7 for Physico-chemical properties and Table 2-8 for Heavy Metal.

Table 2-7: Result of Soil quality survey : Physico-chemical properties

Depth	pHH2O	pHCaCl2	Sand	Silt	Clay	OrgC	NO3	PO4	Ca	Mg	K	Na	Acid	CEC	BS
Likosi Location 1 (UTM 31N 0558885N 0748567E)															
0-15	6.21	4.79	68	21	11	0.05	0.163	71.16	4.63	1.41	0.00	0.16	0.28	6.47	93.26
15-50	5.84	5.31	26	46	28	0.13	0.095	4.69	2.43	0.61	0.46	0.21	0.31	4.03	87.11
Likosi Location 2 (UTM 31N 0558530N 0748778E)															
0-15	7.14	7	65	12	23	0.09	0.044	0.23	2.52	0.68	0.32	0.12	0.09	3.73	94.32
15-50	6.05	5.65	52	46	2	0.87	0.101	4.37	1.91	1.12	0.12	0.12	0.29	3.55	88.40
Likosi Location 3 (UTM 31N 05587645N 0749066E)															
0-15	6.21	5.75	54	41	5				1.87	1.07	0.46	0.16	0.32	3.88	87.70
15-50	5.43	5.36	58	36	6	0.15	0.092	10.80	3.02	0.97	0.12	0.12	0.35	4.58	89.70
Thames Valley College (UTM 31N 0561208N 0748648E)															
0-15	5.3	4.61	63	10	27	0.07	0.079	0.89	1.52	1.09	0.29	0.17	0.33	3.41	85.21
15-50	4.73	4.16	41	8	51	0.15	0.085	0.88	1.15	0.70	0.12	0.17	0.25	2.39	82.26
Ologbun (UTM 31N 0556836N 0748197E)															
0-15	6.02	5.97	74	12	14	0.48	0.176	63.80	3.88	1.38	0.46	0.21	0.24	6.17	92.73
15-50	6.43	5.82	32	46	22	0.30	0.097	8.44	2.43	1.56	0.46	0.21	0.33	4.99	89.20
Shosho Ogbara (UTM 31N 0558885N 0748567E)															
0-15	5.62	4.97	85	8	7	0.07	0.078	4.55	3.15	1.34	0.33	0.14	0.22	5.18	93.07
15-50	5.48	4.45	81	10	9	0.12	0.039	0.78	1.73	0.61	0.46	0.21	0.23	3.24	86.46
Oriola-Ijagbon (UTM 31N 05541345N 0748567E)															
0-15	4.93	4.19	81	10	9	0.11	0.048	0.45	2.99	1.40	0.27	0.17	0.35	5.18	89.88
15-50	5.6	4.2	79	12	9	0.58	0.053	0.33	1.41	2.72	0.35	0.33	0.31	5.11	87.48
Wichtech (UTM 31N 0560240N 0758598E)															
0-15	4.9	4.47	75	10	15	0.22	0.071	7.95	3.02	0.99	0.12	0.16	0.28	4.56	90.43
15-50	5.01	4.63	72	16	12	0.17	0.073	0.74	2.51	1.16	0.46	0.17	0.32	4.62	89.32

Ori (UTM 31N 0550496N 0760275E)															
0-15	5.86	5.56	68	21	11	0.09	0.149	7.01	1.80	1.00	0.35	0.17	0.37	3.69	85.27
15-50	5.12	5	58	18	24	0.51	0.144	3.75	3.37	1.31	0.92	0.14	0.38	6.13	91.53
Oke-Oko (UTM 31N 0541721N 0758526E)															
0-15	5.2	4.59	55	28	17	0.05	0.076	0.43	2.53	0.73	0.12	0.17	0.34	3.89	86.78
15-50	5.47	5.01	77	14	9	0.12	0.054	0.42	1.30	0.36	0.35	0.12	0.34	2.47	81.30
Adewolu (UTM 31N 0543771N 0759816E)															
0-15	6.59	5.76	24	51	25	0.27	0.086	7.10	2.05	0.73	1.04	0.14	0.34	4.30	88.85
15-50	6.39	5.29	28	41	31	0.08	0.063	2.37	2.68	1.86	0.23	0.19	0.38	5.34	89.30
Jaguna (UTM 31N 0533528N 0757318E)															
0-15	6.7	6.01	72	9	9	0.05	0.125	0.51	1.13	0.74	0.26	0.12	0.32	2.57	82.82
15-50	6.5	5.26	71	18	11	0.19	0.102	0.39	1.00	0.60	0.12	0.17	0.41	2.30	74.65
Ibokuru (UTM 31N 0525306N 0757140E)															
0-15	6.76	6.37	48	27	25	0.13	0.069	0.66	1.90	0.96	0.23	0.12	0.28	3.50	88.52
15-50	5.87	5.32	46	12	42	0.08	0.056	0.34	1.63	1.15	0.35	0.19	0.32	3.63	85.93
Ejio (UTM 31N 0523333N 0757111E)															
0-15	6.7	6.6	67	14	19	0.27	0.116	0.56	4.27	1.45	0.33	0.19	0.12	6.36	95.11
15-50	6.43	6.03	51	18	31	0.40	0.128	0.34	2.02	0.92	0.35	0.14	0.08	3.50	93.74
MFPM Location 1 (UTM 31N 0542626N 0746296E)															
0-15	4.85	4.03	37	36	27	0.07	0.070	5.00	1.31	0.57	0.23	0.77	0.36	3.23	65.17
15-50	4.94	3.61	57	30	13	0.11	0.089	0.87	1.45	0.67	0.12	0.10	0.34	2.68	83.43
MFPM Location 2 (UTM 31N 0542633N 0746174E)															
0-15	4.57	3.78	56	19	25	0.74	0.011	4.95	2.67	2.08	0.81	0.42	0.36	6.34	87.73
15-50	4.58	3.84	44	34	22	0.17	0.095	6.47	2.92	1.36	0.58	0.50	0.33	5.69	85.34
Magboro (UTM 31N 0541952N 0743058E)															
0-15	5.05	4.14	76	17	7	0.06	0.090	1.38	2.49	1.97	0.35	0.31	0.41	5.52	86.91
15-50	5.85	4.19	54	18	28	0.15	0.165	12.72	2.08	0.82	0.23	0.45	0.43	4.01	77.99

Ganum (UTM 31N 0542416N 0741227E)															
0-15	5.85	5.47	72	5	23	0.05	0.042	0.64	1.59	0.82	0.31	0.12	0.34	3.18	85.50
15-50	5.01	3.55	57	14	29	0.10	0.036	0.21	1.80	0.85	0.28	0.19	0.23	3.35	87.44

Table 2-8: Result of Soil quality survey : Heavy Metal

Depth	Cu	Zn	Cr	Cd	Pb	Ni
Likosi Location 1 (UTM 31N 05558885N 0748567E)						
0-15	0.05	0.518	0.005	0.009	0.014	0.026
15-50	0.207	1.261	0.001	0.001	0.001	0.024
Likosi Location 2 (UTM 31N 0558530N 0748778E)						
0-15	0.152	1.529	0.005	0.007	0.255	0.004
15-50	0.231	1.147	0.001	0.001	0.001	0.023
Likosi Location 3 (UTM 31N 05587645N 0749066E)						
0-15						
15-50	0.193	1.642	0.006	0.011	0.026	0.011
Thames Valley College (UTM 31N 0561208N 0748648E)						
0-15	0.214	0.906	0.006	0.012	0.532	0.008
15-50	0.185	0.441	0.004	0.01	0.223	0.009
Ologbun (UTM 31N 0556836N 0748197E)						
0-15	0.12	0.425	0.004	0.009	0.011	0.023
15-50	0.133	1.682	0.001	0.015	0.012	0.034
Shosho Ogbara (UTM 31N 05558885N 0748567E)						
0-15	0.094	0.794	0.005	0.008	0.008	0.008
15-50	0.057	0.565	0.001	0.009	0.016	0.001

Oriola-Ijagbon (UTM 31N 05541345N 0748567E)									
0-15		0.097	0.947	0.01	0.008	0.018	0.01	0.008	0.01
15-50		0.05	0.819	0.01	0.008	0.011	0.016	0.008	0.016
Wichtech (UTM 31N 0560240N 0758598E)									
0-15		0.271	0.459	0.001	0.012	0.399	0.008	0.012	0.008
15-50		0.102	0.51	0.001	0.011	0.199	0.023	0.011	0.023
Ori (UTM 31N 0550496N 0760275E)									
0-15		0.239	0.599	0.001	0.008	0.01	0.028	0.008	0.028
15-50		0.101	0.877	0.005	0.009	0.01	0.019	0.009	0.019
Oke-Oko (UTM 31N 0541721N 0758526E)									
0-15		0.35	1.077	0.005	0.01	0.215	0.008	0.01	0.008
15-50		0.166	0.589	0.008	0.009	0.03	0.004	0.009	0.004
Adewolu (UTM 31N 0543771N 0759816E)									
0-15		0.224	0.753	0.005	0.008	0.011	0.018	0.008	0.018
15-50		0.143	0.855	0.001	0.001	0.011	0.022	0.001	0.022
Jaguna (UTM 31N 0533528N 0757318E)									
0-15		0.102	0.435	0.01	0.011	0.065	0.01	0.011	0.01
15-50		0.1	0.268	0.001	0.013	0.022	0.001	0.013	0.001
Ibokuru (UTM 31N 0525306N 0757140E)									
0-15		0.101	0.807	0.005	0.014	0.087	0.019	0.014	0.019
15-50		0.095	0.594	0.001	0.012	0.016	0.015	0.012	0.015
Ejio (UTM 31N 0523333N 0757111E)									
0-15		0.022	0.525	0.001	0.009	0.001	0.005	0.009	0.005
15-50		0.051	0.387	0.004	0.009	0.189	0.003	0.009	0.003
MFM Location 1 (UTM 31N 0542626N 0746296E)									
0-15		0.061	0.676	0.014	0.011	0.008	0.014	0.011	0.014
15-50		0.299	0.694	0.001	0.013	0.59	0.01	0.013	0.01

MFM Location 2 (UTM 31N 0542633N 0746174E)									
0-15		0.15	0.501	0.005	0.001	0.001	0.001	0.001	0.016
15-50		0.271	0.691	0.005	0.001	0.001	0.01	0.018	
Magboro (UTM 31N 0541952N 0743058E)									
0-15		0.103	1.571	0.007	0.009	0.016	0.025		
15-50		0.226	0.809	0.005	0.008	0.008	0.036		
Ganum (UTM 31N 0542416N 0741227E)									
0-15		0.236	0.621	0.009	0.013	0.507	0.005		
15-50		0.168	0.435	0.001	0.011	0.372	0.007		

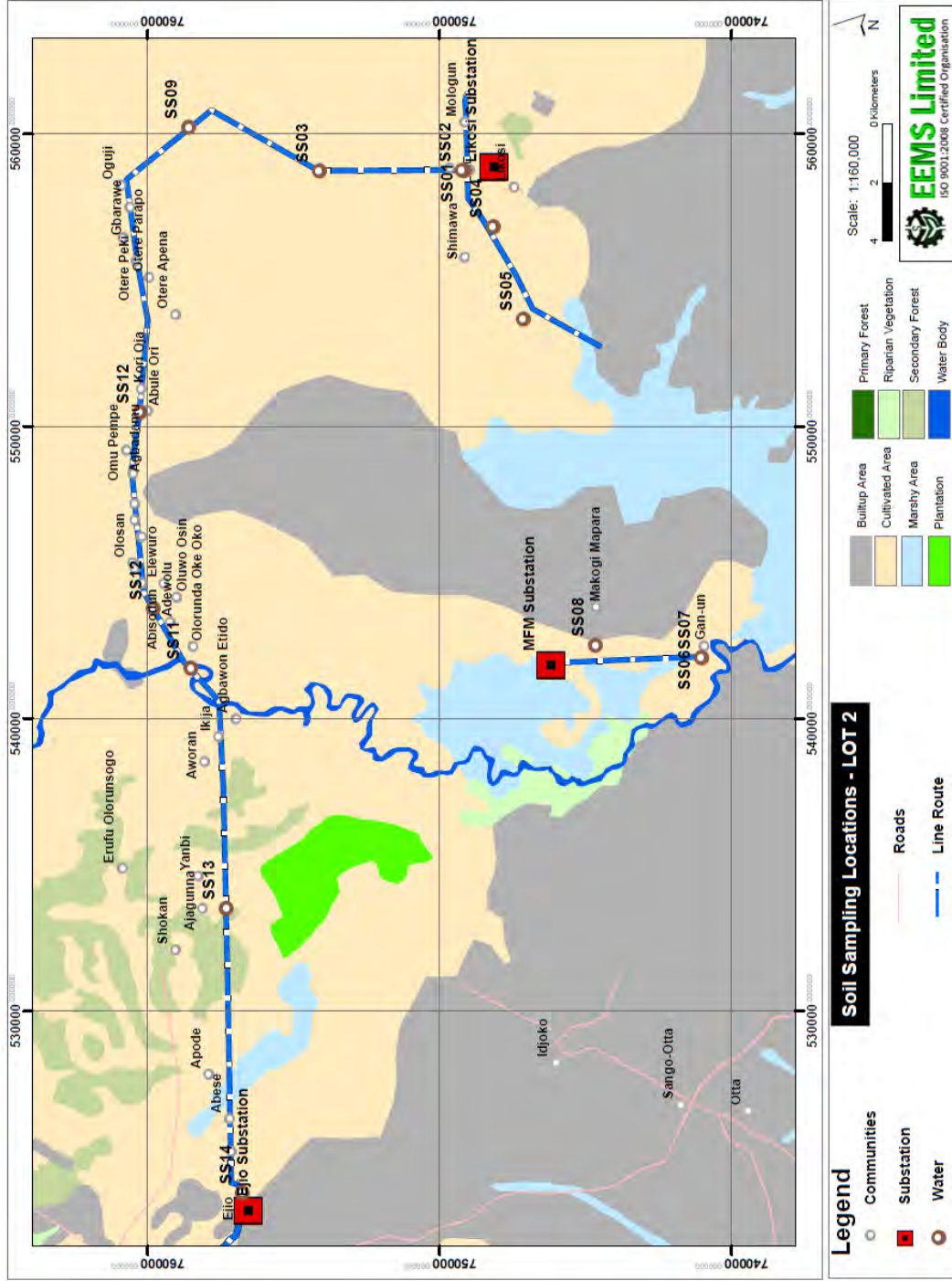


Figure 2-3: Soil quality sampling point for Lot2

LOT 3 Baseline Study

3.1 Ambient Air Quality

3.1.1 Sampling Location

Ambient air and noise quality measurements were carried out at sampling locations along the project sites as shown in Table 1-1 and **Error! Reference source not found.**

Table 3-1: Sampling Locations for Air Quality and Noise

CODE	Latitude	Longitude	Description
AN1	6.848333	3.212303	Ejio proposed substation; built-up environment mostly residential, a lot domestic activities, etc.
AN2	6.835194	3.215243	Ejio: Perennial water body; built up areas, mostly residential etc.
AN3	6.84818	3.19353	Apomu; Buildings and farmlands
AN4	6.82091	3.14915	Ekundayo; Secondary forest interspersed with farmlands, unpaved road.
AN5	6.79127	3.12773	Alakpako-Isale; built-up mostly residential, secondary forest, unpaved road, fire spots for commercial and domestic activities, etc
AN6	6.78117	3.12114	Ogunwede; sand mining activities, sparsely built up, secondary forest interspersed with farmlands, etc
AN7	6.76281	3.12012	Oke-Oji; residential area, partially paved road, etc.
AN8	6.74336	3.11125	Ijemo/Olori; built up, secondary forest interspersed with farmland, etc.
AN9	6.72053	3.11173	Adie-Owe; Farmlands and buildings
AN10	6.70468	3.09478	Leshi; residential, Track roads and farmlands
AN11	6.598534	3.050337	Iberese Buildings, secondary vegetation and track road
AN12	6.65396	3.07285	Ajeginle proposed substation; Buildings, river and track road
AN13	6.623711	3.044007	Apena; Buildings, swamp, sacred sites and farmlands
AN14	6.62757	3.06336	Ojuiroko; Buildings, secondary vegetation and track road
AN15	6.50876	3.08114	Agbara Buildings, factories swamp,
AN16	6.493144	3.085523	Olaoparun; built-up environment mostly residential, a lot domestic activities, etc.
AN17	6.493657	3.06941	Buildings, secondary vegetation and track road
AN18	6.50758	3.06592	Idoluba; Track road, buildings and farmlands
AN19	6.51776	3.05383	Kofelerin; Buildings, secondary vegetation and track road
AN20	6.52505	3.05039	Idayin Buildings, secondary vegetation and track road
AN21	6.54203	3.04022	Egudu; Buildings, secondary vegetation and track road
AN22	6.58203	3.02676	Buildings, secondary vegetation and track road
AN23	6.55845	3.03179	Ajogb-Akia; built-up mostly residential, and primary school, secondary forest, unpaved road, fire spots for commercial and domestic activities.
AN24	6.57327	3.00441	Whezume; residential area, Buildings, secondary vegetation and tracks.
AN25	6.55814	2.99707	Isunba; built-up environment mostly residential, domestic activities, etc.
AN26	6.857577	3.175392	Kooko Health Resort, builtup area, secondary vegetation
AN27	6.54501	2.97633	Onilogbo; sparsely built-up; unpaved road, etc.
AN28	6.43715	2.854784	Yafin/ Alakotomeji; Swamp, sacred site and secondary forest
AN29	6.454805	2.877052	Okushuldolomo; sparsely built up, Gmalina and Shea plantation, secondary forest interspersed with farmlands,

CODE	Latitude	Longitude	Description
AN30	6.52727	2.95207	Bandu; residential area, Swamp, secondary vegetation and farmlands
AN31	6.43063	2.866802	Buildings, secondary vegetation and track road
AN33	6.520993	2.926793	janvhe; Buildings, secondary vegetation and track road
AN34	6.472078	2.902143	Tohun, swamp
AN35	6.498304	2.915149	Erekiti/Iragbon axis, Swamp
AN36	6.411563	2.857518	Yafin/ Alakotomeji; Swamp , sacred site and secondary forest

3.1.2 Result of Ambient air quality survey

The result of ambient air quality is presented below.

SAMPLING PARAMETER	SO ₂ (ppm)	NO ₂ (ppm)	CO ₂ (ppm)	VOC (ppm)	HCl (ppm)	CO (ppm)	H ₂ S (ppm)	SPM ₁₀ (ppm)
EJIO - AJEGUNLE SECTION								
Mean	0.6	0	441.6	0.17	0	0.68	0.4	0.04380
Min	0	0	303	0.06	0	0	0	0.007
Max	3.5	0	676	0.41	0	3.7	2.7	0.1318
AJEGUNLE - AGBARA SECTION								
Mean	2.6	0	518.6	0.11	0	0.15	1.8	0.00692
Min	0	0	313	0.05	0	0	0	0
Max	6.7	0	847	0.17	0	1.4	3.4	0.0127
BERESE - BADAGRY SECTION								
Mean	3.2	0	414.7	0.14	0	0.5	1.2	0.01164
Min	0	0	297	0.04	0	0	0	0.0026
Max	5.9	0	491	0.65	0	2.8	3.1	0.0366
Overall mean for all areas	2.8	0	465.9	0.14	0	0.5	1.1	0.020925
Secondary data (ICCL 2015)	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA
WHO/FMENV daily limit (ppm)	0.002	0.04-0.06	5000	0.1	-	10-20	<10	0.15- 0.25
IFC Standard	0.007-0.045 (20-125ug/m³)	-	-	-	-	-	-	-

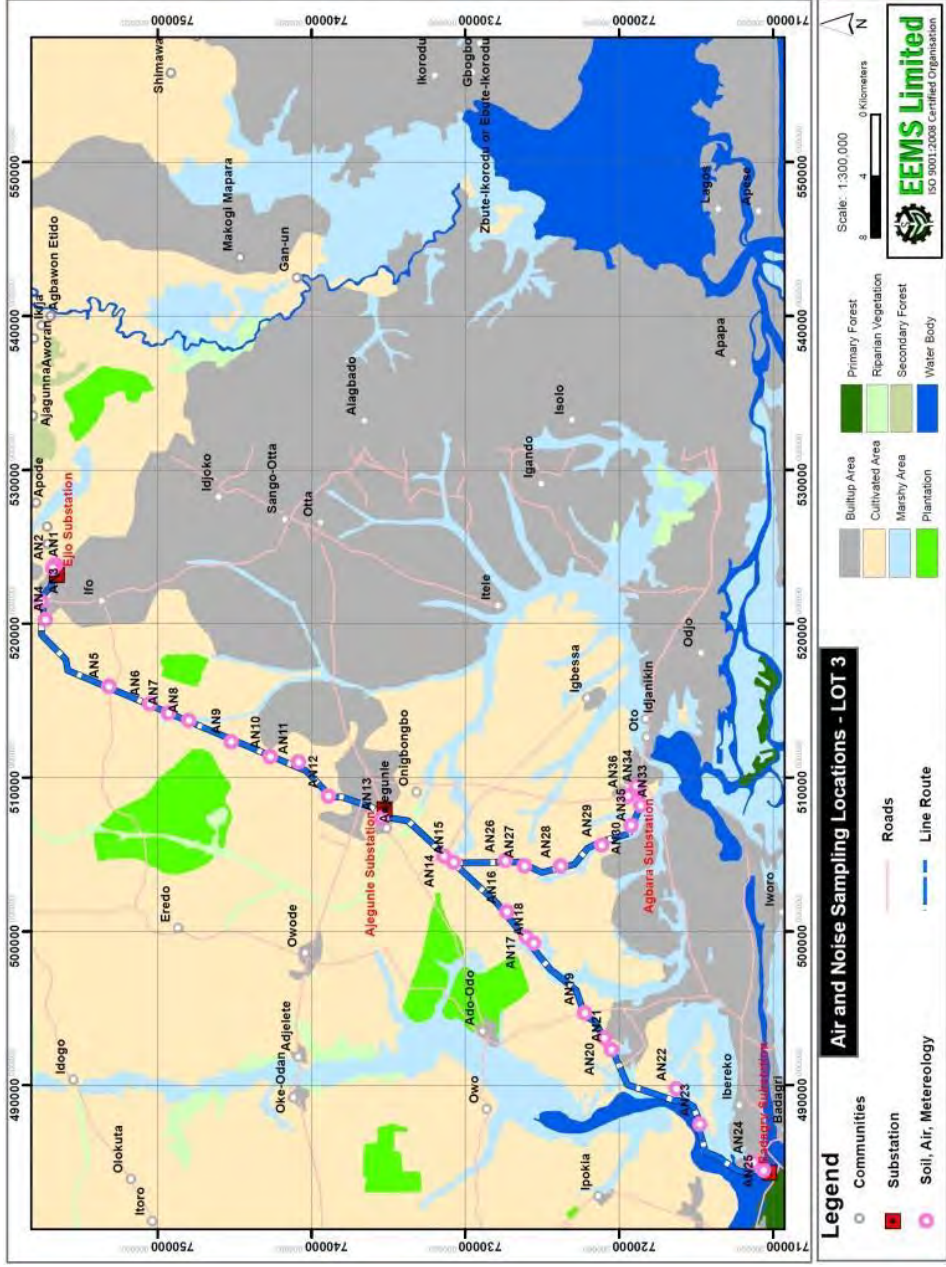


Figure 3-1: Air and Noise Quality sampling point for Lot3

3.1 Noise Quality

3.1.1 Sampling Location

Sampling location is same as Air Quality.

3.1.2 Result of Noise quality survey

The summary results of the 12 hours measurements (7:00-19:00) are shown in below.

The result shows that the noise level at Ejio-Ajegunle section and Ahegunle-Agbara section has relatively high noise and exceeds the IFC noise standard. The noise level around Badagry section was below IFC noise standard.

SAMPLING CODE	Noise dB(A)	LAF (dBA)	LMIN. (dBA)	LMAX. (dBA)
EJIO - AJEGUNLE SECTION				
Mean	60.3	66.7	34	61.4
Min.	52	57	29	54
Max.	75.6	88.2	43	70
AJEGUNLE - AGBARA SECTION				
Mean	63.2	67.9	28.3	60.1
Min.	53	57.7	23	47
Max.	74.7	84.5	42	78
BERESE - BADAGRY SECTION				
Mean	40.6	60.2	30.9	59.6
Min.	30.8	49.9	22	40
Max.	51	72.7	38	76
Secondary data (ICCL)	28.4 - 60			
FMEEnv(Work place)	- 85 dB			
IFC Standard	Residential			
	- 55dB: Day - 45dB: Night			
IFC Standard	Industrial			
	- 70dB			

3.2 Groundwater Quality

3.2.1 Sampling Location

Groundwater quality measurements were carried out at sampling locations along the project site as shown in Table 3-2 and

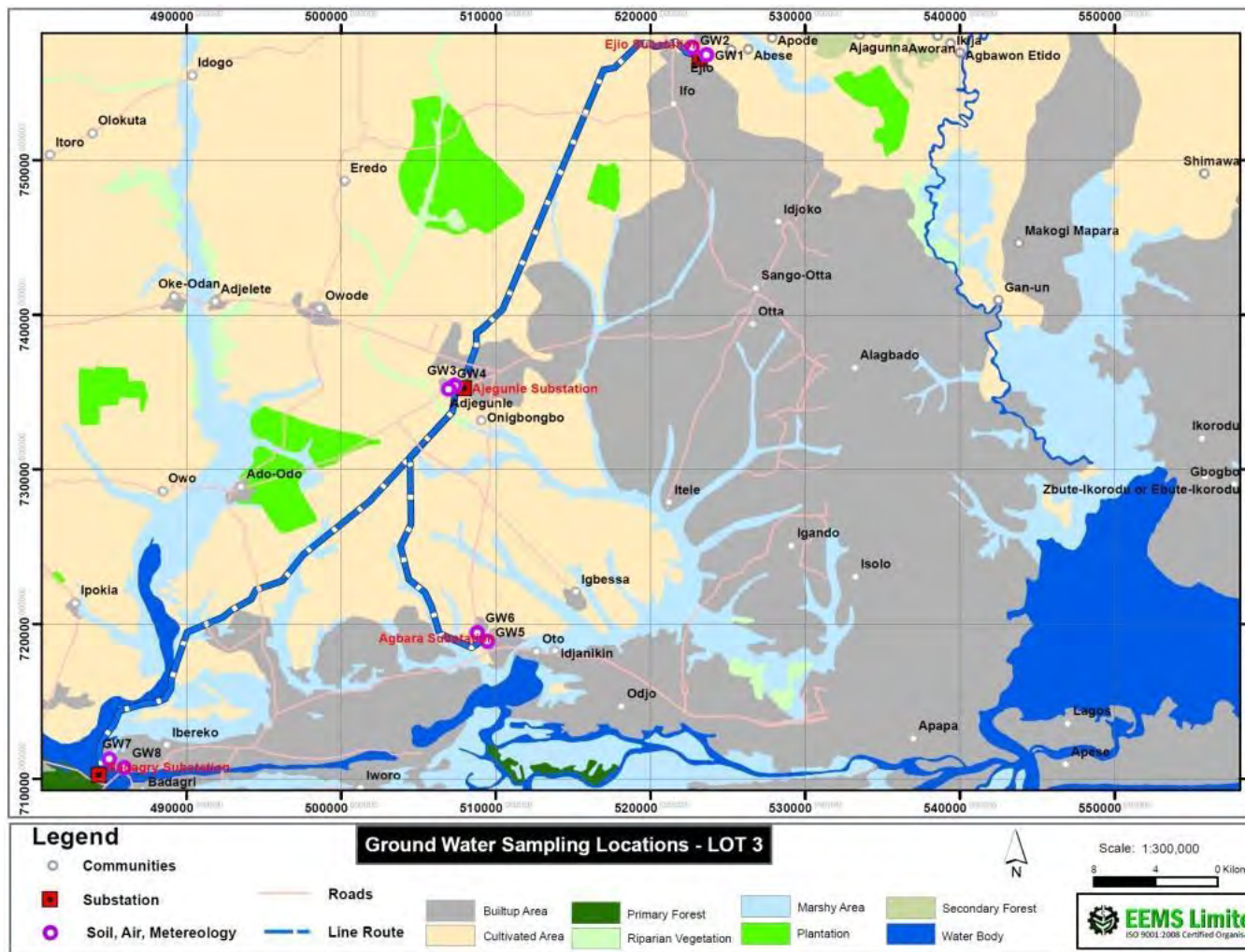


Figure 3-2.

Table 3-2: Sampling Locations for groundwater

CODE	LOCATION	LAT	LONG
GW1	Ejio Substation1	6.8467115	3.2136834
GW2	Ejio Substation2	6.8511216	3.2052827
GW3	Ajegunle Substation 1	6.6535888	3.0664301
GW4	Ajegunle Substation 2	6.6513829	3.0629164
GW5	Agbara Substation 1	6.5039265	3.0854416
GW6	Agbara Substation 2	6.508766	3.0795622
GW7	Badagry Substation 1	6.4350596	2.8644276
GW8	Badagry Substation 2	6.4297716	2.8730106

3.2.2 Result of Groundwater quality survey

Groundwater quality measurements were carried out at sampling locations along the project site. The result shows that the lead and total iron was observed to exceed the Nigerian Drinking Standard as well as WHO drinking water quality guideline.

Table 3-3: Result of Ground water quality survey

Study section Parameter	Ejio substation		Ajegunle substation		Berese substation		Badagry substation		ICCL baseline data (2015)	NSDW Limit, 2007 ¹	WHO limits
	GW1	GW2 CrtII	GW3	GW4-CrtII	GW5	GW6 CrtI3	GW7	GW8 CrtI4			
Well Depth (m)	3.27	4.01	3.10	3.09	3.24	3.48	3.01	3.00	3-4	NA	NA
Water Level(m)	0.98	1.4	1.12	0.93	1.05	0.84	1.10	1.61	0.7-1.4	NA	NA
Colour	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
BOD (mg/l)	1.48	1.23	2.66	2.16	4.74	3.23	3.01	2.45			10
DO(mg/l)	10.93	9.62	8.58	8.77	7.84	9.63	7.84	8.52		5	<5
COD(mg/l)	10.2	9.8	8.2	9.2	10.2	9.8	8.5	8.2			10
Hardness (mg/l)	14.2	13.6	20.6	19.9	15.4	13.9	9.73	10.1	200	150	-
PCB (ng/m ³)	ND	ND	ND	ND	ND	ND	ND	ND	NA		0.003
TSS (mg/l)	33.1	28.2	11.05	27.6	28.2	33.1	28.4	42.1	-	500	50
Salinity (g/l)	0.08	0.06	0.10	0.02	0.08	0.12	0.10	0.06			
pH	3.96	6.52	6.61	7.86	6.75	6.64	7.86	6.75	5.46 - 5.84	6.5- 8.5	6.5-9.2
Temperature (°C)	27.2	26.0	27.6	27.9	27.3	27.7	26.8	27.4	26.50-27.20		40°C
Conductivity (mS/cm)	55.3	54.3	18.2	50.2	54.3	55.3	55.2	55.3	41.5-126.8	1000	250
Turbidity (NTU)	6.95	1.35	1.85	2.25	4.85	2.95	2.75	1.55	1.46-9.51	-	5
Nitrate (mg/l)	0.21	0.1	0.5	0.3	0.4	0.2	0.15	0.1	<0.1-0.21	50	10
Sulphate (mg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100	500
Phosphate (mg/L)	0.55	0.68	0.22	0.25	1.10	0.32	0.45	0.65	0.22-1.14	≤0.2	5
THC (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	NA	0.3	0.05
Potassium (mg/l)	0.39	0.30	0.35	0.36	0.39	0.37	0.34	0.31	NA		10
Lead (mg/l)	0.041	0.010	0.012	0.020	0.021	0.010	0.24	0.073	0.012-0.24	0.05	0.02
Copper (mg/l)	0.120	0.010	0.015	0.012	0.025	0.032	0.110	0.015	0.012-0.120	1.0	2.0
Total Iron (mg/l)	0.15	0.22	0.33	0.30	1.22	0.70	2.05	0.45	0.24-2.11	1.0	0.3
Barium (mg/l)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	NA	0.7	1.3
Total Coliform (cfu/100ml)	ND	ND	ND	ND	4.2x10 ¹	5.1x10 ¹	4.2x10 ¹	5.1x10 ¹	NA		0.00
Faecal Coliform (cfu/100ml)	ND	ND	ND	ND	11	19	ND	ND	NA		0.00
E-coli (cfu/100ml)	ND	ND	ND	ND	ND	ND	ND	ND	NA		0.00
Faecal Streptococci (cfu/100ml)	ND	ND	ND	ND	ND	ND	ND	ND	NA		0.00

¹ Nigerian Standard for Drinking Water Quality

²WHO Drinking Water Quality Guideline

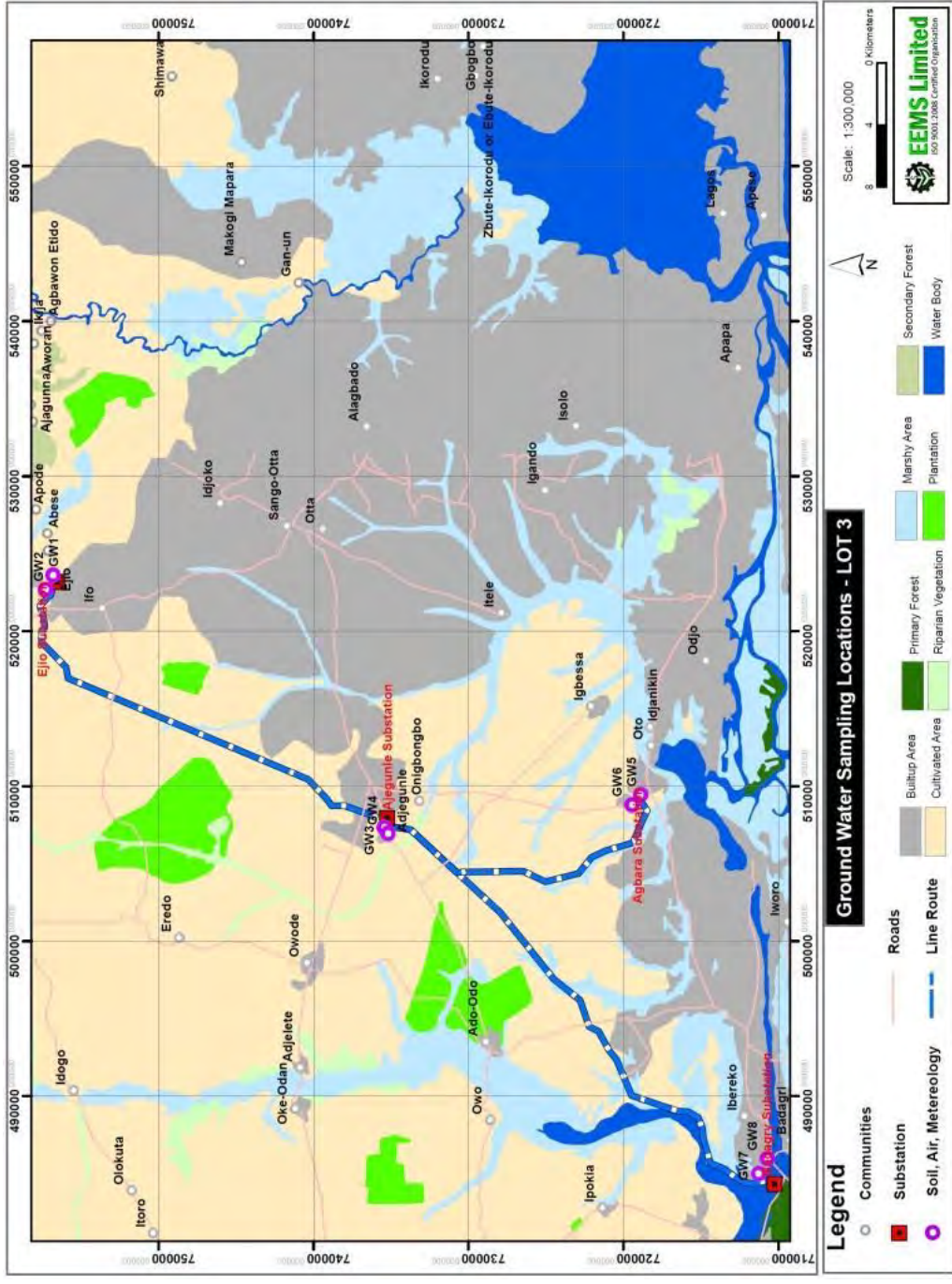


Figure 3-2: Groundwater quality sampling point for Lot3

3.1 Surface water Quality

3.1.1 Sampling Location

Surfacewater quality measurements were carried out at sampling locations along the project site as shown in Table 3-4 and Figure 3-3.

Table 3-4: Sampling Locations for Surfacewater

CODE	Location	LATITUDE	LONGITUDE
SW1	Ayepe	6.8474998	3.1686115
SW2C	sojuolu	6.8382535	3.158505
SW3	Sojuolu	6.8359526	3.1594491
SW4	Oji/AN8	6.7670468	3.1238723
SW5	Igbele Ajana	6.6744113	3.0763865
SW6	Kooko	6.6647994	3.0743051
SW7	AJEGUNLE	6.6548889	3.0724168
SW8	Ojuiroko	6.6360904	3.0623102
SW9	Agbara	6.4991936	3.0753136
SW10	Okaran Akinyele	6.54230	2.9672098
SW11	Ajobe Zebbe	6.5243503	2.9378128
SW12	Erekiti	6.4826491	2.8999615
SW13	Panko	6.4585991	2.8660583
SW14	YafinSS	6.4269144	2.8547287
SW15	YafinSS2	6.4214983	2.8622818
SW16C	YafinCtrl	6.4288121	2.8460598

3.1.2 Result of Surface quality survey

Groundwater quality measurements were carried out at sampling locations along the project site. The result shows that the lead and total iron was observed to exceed the Nigerian Drinking Standard as well as WHO drinking water quality guideline.

Table 3-5: Result of Surface water quality

PARAMTERS	Ejio –Ajegunle			Ajegunle to Agbara			Berese to Badagry			Secondary Data (ICCL 2015)
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
Colour	Cloudy			Cloudy			cloudy			NA
Odour	Nil			Nil			Nil			NIL
pH (H ₂ O) @24.2°C	7.32	7.55	7.46	7.36	7.44	7.4	6.36	7.59	7.17	7.20 - 7.56
Temp (°C)	25.8	27.4	23.2	26.7	27.3	27.0	32.8	27.7	26.79	24.4-28.1
Conductivity(µS/cm)	46.2	259	77.79	46.2	56.6	55.9	45.8	77.2	58.27	45.1- 287
Salinity(mg/l)	0.03	0.09	0.04	0.03	0.06	0.05	0.03	0.06	0.04	0.04 -0.08
DO(mg/l)	3.84	4.88	4.54	2.68	3.50	3.09	2.84	4.46	3.75	2.66 - 4.89
Turbidity(NTU)	3	60	16	8.0	91.0	49.5	2.0	39.0	18.71	1-45
TSS(mg/l)	4	50	16.86	26.0	122	74.0	4.0	66.0	23.43	9 - 74
TDS(mg/l)	27.2	155	46.61	27.7	39.4	33.55	27.5	46.3	31.0	29 - 43.2
Oil and Grease(mg/l)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.41	<0.40	<0.40	1- 4
BOD(mg/l)	10	10	10	10.0	20.0	20	15.0	20.0	11.43	8 - 15.6
COD(mg/l)	19.8	59.4	39.6	49.5	49.5	49.5	19.9	39.7	29.7	20.6 - 51.3
Lead(mg/l)	<0.08	<0.08	<0.08	0.008	<0.008	<0.008	<0.008	<0.008	<0.08	2 - 16
Zinc(mg/l)	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	3-11
Copper(mg/l)	<0.02	<0.02	<0.02	<0.02	<6.02	<0.02	<0.02	<0.6	<0.6	0.01 - 1.3
Total Iron(mg/l)	0.24	1.47	0.47	0.22	3.17	1.695	1.22	3.29	0.85	2 – 6
Manganese (mg/l)	0.11	0.11	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA
PCB (ng/m ³)	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Chromium (mg/l)	<0.01	<0.02	<0.01	<0.01	<0.01	<0.05	<0.01	<0.03	<0.01	NA
Cadmium (mg/l)	0.002	0.002	0.002	<0.01	<0.02	<0.01	<0.02	<0.02	<0.02	0.01
Mercury (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Nickel(mg/l)	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.00 - 0.12
Vanadium(mg/l)	0.02	0.02	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.00 - 0.15

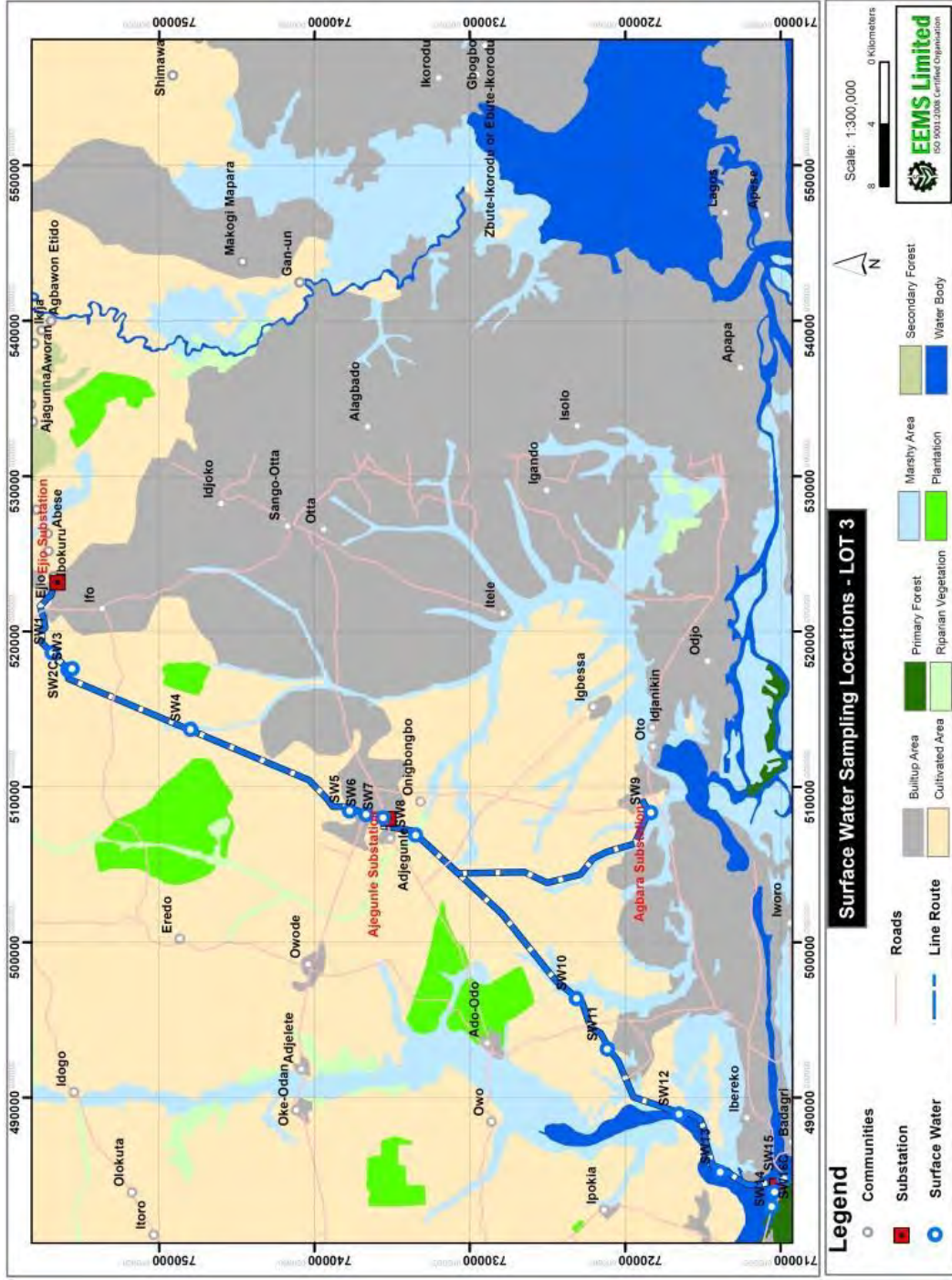


Figure 3-3: Surface water quality sampling point for Lot3

3.1 Soil Quality

3.1.1 Sampling Location

Soil samples were collected at 36 stations. At each station, soil samples were collected at two depths (0-15cm for top soil and 16-30cm for sub soil). Sampling locations are shown in

Table 3-6: Location for Soil sampling

CODE	LATITUDE	LONGITUDE	DESCRIPTION
SS1	6.8450498	3.2155609	Ejio proposed substation; built-up environment mostly residential, a lot of domestic activities, etc.
SS2	6.8467115	3.2136834	Ejio: Perennial water body; built up areas, mostly residential etc.
SS3	6.8536781	3.1938887	Arigbajo: residential buildings, highway (Lagos-Abeokuta Expressway)
SS4	6.8514305	3.1832242	Apomu; Buildings and farmlands
SS5	6.8139012	3.1439352	Ekundayo; Secondary forest interspersed with farmlands, unpaved road.
SS6	6.7897395	3.1337643	Alakpako-Isale; built-up mostly residential, secondary forest, unpaved road, fire spots for commercial and domestic activities, etc
SS7	6.7790645	3.1283462	Ogunwede; sand mining activities, sparsely built up, secondary forest interspersed with farmlands, etc
SS8	6.7670468	3.1238723	Oke-Oji; residential area, partially paved road, etc.
SS9	6.7420304	3.1114483	Ijemo/Olori; built up, secondary forest interspersed with farmland, etc.
SS10	6.7190105	3.1028438	Adie-Owe; Farmlands and buildings
SS11	6.7025853	3.0995178	Leshi; residential, Track roads and farmlands
SS12	6.6849607	3.0796051	Igbele Ajana: Residential, palm plantation, factory
SS13	6.6535888	3.0664301	Ajegunle: proposed substation, busy road partially paved, building buildings
SS14	6.6168222	3.0441999	Olakitan: Buildings, secondary vegetation and paved road
SS15	6.6112298	3.0407506	Iberese: Buildings, secondary vegetation and track road
SS16	6.5809269	3.0415177	Akpabiekun: secondary forest, track road
SS17	6.5697144	3.0384707	Ago-Iboro; Buildings, secondary vegetation and track road
SS18	6.5483119	3.0384064	Egudu; Buildings, secondary vegetation and track road
SS19	6.5240944	3.0507231	Idayin Ishaga: Buildings, secondary vegetation and track road
SS20	6.5070392	3.062396	Idayin Idah: Buildings, secondary vegetation and track road
SS21	6.5013255	3.073951	Idoluba; Track road, buildings and farmlands
SS22	6.5027859	3.0829096	Agbara: Buildings, factories, swamp,
SS23	6.5039265	3.0854416	Agbara: Buildings, factories, vehicular movements
SS24	6.508766	3.0795622	Agabara: substation site
SS25	6.5799677	3.0115843	Ajogb-Akia: built-up mostly residential, and primary school, secondary forest, unpaved road, fire spots for commercial and domestic activities.
SS26	6.5687125	2.9966497	Whezume; residential area, Buildings, secondary vegetation and tracks.
SS27	6.5640867	2.9928303	Isunba; built-up environment mostly residential, domestic activities, etc.
SS28	6.534242	2.9517817	Bandu; residential area, Swamp, secondary vegetation and farmlands
SS29	6.5226661	2.937448	Gbojo; Buildings, secondary vegetation and track road
SS30	6.5184236	2.9303026	Janvhe; Buildings, secondary vegetation and track road
SS31	6.4802186	2.9075575	Erekiti/Iragbon axis, Swamp
SS32	6.4665732	2.8865719	Tohun, swamp
SS33	6.4289827	2.8594923	Yafin: proposed substation, swamp, secondary forest
SS34	6.4350596	2.8644276	Yafin/ Alakotomeji; Swamp, sacred site and secondary forest

3.1.2 Soil Analysis Results

The result of soil analysis is shown in Table 3-7.

Table 3-7: Soil Analysis Results

Parameters	EJIO TO AJEGUNLE						AJEGUNLE TO AGBARA						BERESE TO BADAGRY						2 ^o (ICCL 2015)	WHO/F MENV Limits (USD/A 2017)
	Top soil			Sub soil			Top soil			Sub soil			Top soil			Sub soil				
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max		
pH (H ₂ O) @ 23.3°C	5.86	5.26	6.89	5.87	5.21	6.51	5.45	5.04	5.92	5.65	5.34	6.01	5.35	5.16	5.5	5.64	5.39	5.77	5.01 - 6.85	5.0- 8.0
Moisture Content (%)	12.26	9.57	16	11.41	8.65	14.2	13.97	10.5	17.8	12.03	7.66	14.4	12.12	8.79	16.79	10.10	7.89	15.22	7.62 - 18.03	
THC (mg/kg)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	3 - 8	
Clay (%)	4.5	2	9	4.75	2	9	4.36	2	8	5.73	2	9	3.53	0	9	4.46	0.2	10	0 - 16	
Silt (%)	7.92	3	17	12.58	3	54	15.55	3	40	16.64	4	44	9.15	0.9	19	16.08	1.8	45	1-66	
Sand (%)	87.58	81	95	82.67	41	95	80.09	56	95	77.64	48	93	87.32	72	98.9	79.62	98	97.5	34 - 86	
Ext. Nitrate (mg/kg)	14.27	0.02	36.3	23.09	0.02	62.9	19.77	1.91	31	32.24	10.9	64.7	23.67	3.6	59.33	28.82	5.67	65.33	0.01 - 10	500
Ext. Sulphate (mg/kg)	168.5	35	410	269.25	37.5	588	157.53	35	345	190.25	10	498	70.89	10.306	200	194.08	9.98	366	14 - 688	
Ext. Phosphate (mg/kg)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.86	0.001	6	0.69	0.001	6.4	0.01 - 26	5
Total Iron (mg/kg)	6,695	4,333	8,380	7,598	5,256	11,050	9,466	6,758	14,630	9,958	7,619	15,560	4,110	48	7,770	5,283	73	11,260	36 - 15,783	30,000
Copper (mg/kg)	31.12	0.5	97.6	21.45	0.5	76.9	13.441	5.2	41.5	33.74	4.34	93.6	34.30	0.5	90.3	34.06	0.5	99.1	1.0 - 120	36
Lead (mg/kg)	11.85	3.9	39.6	11.09	1	30.7	12.10	4.5	29.1	21.52	4.6	49	4.40	0.001	8.5	5.24	0.001	11.5	0.001 - 65	85
Nickel (mg/kg)	9.5	5.5	14.3	11.35	6	15.8	10.55	6.8	12.4	11.84	8.2	17.9	4.62	0.09	9	6.39	0.04	11.7	2-21	35
Zinc (mg/kg)	26.66	18.3	35.6	28.13	19.8	35.8	30.95	20.7	41.9	34.55	22.7	41.9	16.06	0.211	29.6	18.25	0.12	31.4	10 - 138	140
Vanadium (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	9.00	1	45.5	11.4	1	53.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 - 187	

