

Appendix – 4.8**Physico-chemical properties of Surface water (Okulu Stream) – Up Stream**

Parameters	26-Jan'17	24-Feb'17	16-Mar'17	Average	FMEnv Limit Aquatic Life	IFC LIMITS
pH	7.27	6.54	6.39	6.73	6.0-9.0	6-9
EC us/cm	478.0	446.0	852.0	592.0	-	-
Temperature °C	24	24.4	28.7	25.7	20-33	-
TDS (mg/l)	240	228	426	298.0	-	-
Turbidity NTU	24.2	27.8	13.1	21.7	-	-
D.O (mg/l)	6.50	6.30	6.09	6.30	6.8	-
TSS (mg/l)	10.5	11.5	9.1	10.4	NS	-
COD (mg/l)	16.00	19.00	17.00	17.33	40*	150
BOD ₅ (mg/l)	2.40	2.40	2.40	2.40	4.0	30
Total Hardness (mg/l)	4.0	4.0	2.0	3.3	NS	-
Nitrate (mg/l)	1.17	0.22	<0.10	0.46	NS	-
Sulphate (mg/l)	1.08	17.51	15.14	11.24	NS	-
Phosphate (mg/l)	2.04	<0.001	<0.001	0.68	NS	-
Ammonia (mg/l)	<0.10	<0.10	<0.10	<0.10	-	-
Chloride Cl ⁻ (mg/l)	21.98	27.08	25.08	24.71	-	-
Alkalinity (mg/l)	60.0	70.0	70.0	66.7	-	-
Calcium (mg/l)	10.20	10.21	11.00	10.47	-	-
Iron (mg/l)	0.98	1.99	0.64	1.20	1.0	-
Lead (mg/l)	0.050	0.070	0.042	0.054	0.05	-
Zinc (mg/l)	0.160	1.126	0.624	0.637	50	-
Cadmium (mg/l)	<0.001	<0.001	<0.001	<0.001	0.002	<0.1
Manganese (mg/l)	0.050	0.050	0.008	0.036	-	-
Chromium, (mg/l)	0.016	0.216	0.209	0.147	0.03	<0.1
Mercury (mg/l)	<0.001	<0.001	<0.001	<0.001	0.001	-
Silver (mg/l)	<0.001	<0.001	<0.001	<0.001	0.1	-
Copper (mg/l)	0.004	0.005	0.015	0.008	1.0	-
Oil and grease (mg/l)	<1.00	<1.00	<1.00	<1.00	NS	10

Physico-chemical properties of Surface water (Okulu Stream) – Mid Stream

Parameters	26-Jan'17	24-Feb'17	16-Mar'17	Average	FMEnv Limit Aquatic Life	IFC LIMITS
pH	8.24	8.17	8.31	8.24	6.0-9.0	6-9
EC us/cm	448.0	283.8	162.5	298.1	-	-
Temperature °C	23.8	24.5	28.7	25.7	20-33	-
TDS (mg/l)	225	142	81	149	-	-
Turbidity NTU	19.2	27.8	13.8	20.3	-	-
D.O (mg/l)	6.40	6.41	6.27	6.36	6.8	-
TSS (mg/l)	11.0	12.0	11.5	11.5	NS	-
COD (mg/l)	16.00	14.00	11.00	13.67	40*	150
BOD ₅ (mg/l)	2.40	2.20	2.10	2.23	4.0	30
Total Hardness (mg/l)	4.0	4.0	4.0	4.0	NS	-
Nitrate (mg/l)	0.62	1.79	1.89	1.43	NS	-
Sulphate (mg/l)	2.32	14.85	15.88	11.02	NS	-
Phosphate (mg/l)	<0.001	<0.001	<0.001	<0.001	NS	-
Ammonia (mg/l)	<0.10	<0.10	<0.10	<0.10	-	-
Chloride Cl ⁻ (mg/l)	19.14	20.02	18.04	19.07	-	-
Alkalinity (mg/l)	110.0	70.0	50.0	76.7	-	-
Calcium (mg/l)	9.42	9.44	5.47	8.11	-	-
Iron (mg/l)	1.72	0.87	1.05	1.21	1.0	-
Lead (mg/l)	0.040	0.080	0.040	0.053	0.05	-
Zinc (mg/l)	0.070	0.190	0.447	0.236	50	-
Cadmium (mg/l)	<0.001	<0.001	<0.001	<0.001	0.002	<0.1
Manganese (mg/l)	0.018	0.010	0.001	0.010	-	-
Chromium, (mg/l)	0.030	0.090	0.002	0.041	0.03	<0.1
Mercury (mg/l)	<0.001	<0.001	<0.001	<0.001	0.001	-
Silver (mg/l)	<0.001	<0.001	<0.001	<0.001	0.1	-
Copper (mg/l)	<0.001	<0.001	<0.001	<0.001	1.0	-
Oil and grease (mg/l)	<1.00	<1.00	<1.00	<1.00	NS	10

Physico-chemical properties of Surface water (Okulu Stream) – Down Stream

Parameters	26-Jan'17	24-Feb'17	16-Mar'17	Average	FMEnv Limit Aquatic Life	IFC LIMITS
pH	6.59	6.35	7.29	6.74	6.0-9.0	6-9
EC us/cm	208.4	153.9	152.7	171.7	-	-
Temperature °C	23.7	24.4	28.7	25.6	20-33	-
TDS (mg/l)	104	77	76	85.7	-	-
Turbidity NTU	32.1	28.2	26.1	28.8	-	-
D.O (mg/l)	6.40	6.20	6.06	6.22	6.8	-
TSS (mg/l)	9.8	8.8	8.2	8.9	NS	-
COD (mg/l)	18.00	17.00	15.00	16.67	40*	150
BOD ₅ (mg/l)	2.30	2.30	2.30	2.30	4.0	30
Total Hardness (mg/l)	4.0	4.0	2.0	3.3	NS	-
Nitrate (mg/l)	3.14	<0.001	<0.001	3.14	NS	-
Sulphate (mg/l)	0.80	12.30	11.40	8.17	NS	-
Phosphate (mg/l)	<0.001	<0.001	<0.001	<0.001	NS	-
Ammonia (mg/l)	<0.10	<0.10	<0.10	<0.10	-	-
Chloride Cl ⁻ (mg/l)	16.31	20.31	20.30	18.97	-	-
Alkalinity (mg/l)	90.0	80.0	60.0	76.7	-	-
Calcium (mg/l)	12.05	12.00	12.09	12.05	-	-
Iron (mg/l)	2.40	2.72	0.54	1.89	1.0	-
Lead (mg/l)	0.070	2.170	0.031	0.757	0.05	-
Zinc (mg/l)	0.240	1.024	0.478	0.581	50	-
Cadmium (mg/l)	<0.001	<0.001	<0.001	<0.001	0.002	<0.1
Manganese (mg/l)	0.050	0.050	0.004	0.035	-	-
Chromium, (mg/l)	0.017	0.117	0.107	0.080	0.03	<0.1
Mercury (mg/l)	<0.001	<0.001	<0.001	<0.001	0.001	-
Silver (mg/l)	<0.001	<0.001	<0.001	<0.001	0.1	-
Copper (mg/l)	0.007	0.010	0.018	0.012	1.0	-
Oil and grease (mg/l)	<1.00	<1.00	<1.00	<1.00	NS	10