APPENDIX 1 : SPECIFIC METHODS USED FOR THE ANALYSES OF PARAMETERS INDICATED IN THIS REPORT

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
45	Acidity (mg/l)	STD Method 2310 B (1992)	-	-
94	Alkalinity (mg/l as $CaCO_3$) *	Discrete Analyzer using the Gallery	5.0	11.0
N/A	Algae Identification and Count (per ml)	*(Outsourced)*	-	-
92	Aluminium (µg/l as Al) *	Based on SANS 11885:2008 (ICP)	12.0	40.0
92a	Aluminium (µg/l as Al) *	Based on SANS 11885:2008 (ICP)	2.0	40.0
3	Ammonia (mg/l as N) *	STD Method 4500-NH_3:C (1992)	0.14	0.15
95	Ammonia (mg/l as N) *	Discrete Analyzer using the Gallery	0.09	0.10
92	Antimony (µg/l as Sb) *	Based on SANS 11885:2008 (ICP)	10.0	20.0
92a	Antimony (µg/l as Sb) *	Based on SANS 11885:2008 (ICP)	3.2	20.0
92	Arsenic (µg/l as As) *	Based on SANS 11885:2008 (ICP)	10.0	10.0
92a	Arsenic (µg/l as As) *	Based on SANS 11885:2008 (ICP)	9.9	10.0
92	Barium (µg/l) *	Based on SANS 11885:2008 (ICP)	5.0	20.0
92a	Barium (µg/l) *	Based on SANS 11885:2008 (ICP)	1.4	20.0
92	Beryllium µg/l as Be) *	Based on SANS 11885:2008 (ICP)	1.0	20.0
92a	Beryllium µg/l as Be) *	Based on SANS 11885:2008 (ICP)	0.34	20.0
Calc	Bicarbonate (mg/l)	Calculation	-	-
N/A	Biochemical Oxygen Demand (mg/l O_2)	*(Outsourced)*	-	-
47	Boron (mg/l as B)	Discrete Analyzer using the Gallery	-	-
92a	Boron (µg/l as B) *	Based on SANS 11885:2008 (ICP)	7.0	100
N/A	Bromine (mg/l as Br)	*(Outsourced)*	-	-
N/A	Bromide (mg/l as Br-)	*(Outsourced)*	-	-
92	Cadmium (µg/l as Cd) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Cadmium (µg/l as Cd) *	Based on SANS 11885:2008 (ICP)	0.67	1.0
92	Calcium (mg/l as Ca) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Calcium (mg/l as Ca) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
Calc	Calcium (meq/l as Ca)	Calculation	-	-
Calc	Calcium Carbonate Precipitation Potential	Calculation	-	-
Calc	Calcium Hardness *	Calculation	-	-
Calc	Carbonate (mg/l)	Calculation	-	-
2	Chemical Oxygen Demand (mg/l) *	SANS 6048 (2005)	7.8	8.0
Calc	Chloride (meq/l as Cl^-)	Calculation	-	-
25	Chloride (mg/l as Cl) *	SABS 202	1.0	1.0
96	Chloride (mg/l as Cl) *	Discrete Analyzer using the Gallery	0.20	10.0
69	Chlorine Demand (mg/l)	STD Method 2350 B (1992)	-	0.05
N/A	Chlorophyll-a (µg/l)	*(Outsourced)*	-	-
N/A	Clostridium Perfringens (cfu/100 ml)	*(Outsourced)*	-	-
92	Cobalt (µg/l as Co) *	Based on SANS 11885:2008 (ICP)	14.0	20.0
92a	Cobalt (µg/l as Co) *	Based on SANS 11885:2008 (ICP)	0.57	20.0
N/A	Colony Count (cfu/ml)	*(Outsourced)*	-	-
97	Colour (mg/l as Pt) *	Discrete Analyzer using the Gallery	4.0	4.0
Calc.	Combined Nitrate & Nitrate (mg/l as N)	Calculation	-	-
Calc.	Combined Trihalomethanes	Calculation	-	-
Calc	Corrosivity Ratio *	Calculation	-	-
92	Copper (µg/l as Cu) *	Based on SANS 11885:2008 (ICP)	6.0	20.0
92a	Copper (µg/l as Cu) *	Based on SANS 11885:2008 (ICP)	1.3	20.0
N/A	Cryptosporidium (per 10 litres)	*(Outsourced)*	-	-
51	Cyanide (µg/l as CN^-)	Discrete Analyzer using the Gallery	-	20.0
N/A	Cytopathic Viruses (count per 10 litres)	*(Outsourced)*	-	-
125	D-Glucose (mg/l)	Discrete Analyzer using the Gallery	-	-
105	Dissolved Organic Carbon (mg/l as C)	Hach 10129	-	0.10
68	Dissolved Oxygen (mg/l)	STD Method 4500 O-G	-	1.0
78	Dissolved Solids (mg/l)	STD Method 2501 A (1992)	-	6.0
84	E.coli (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
9	Electrical Conductivity (mS/m) (at 25 °C) *	STD Method 2501 A (1992)	0.32	0.32
87	Enterococci (count per 100 ml) *	Enterolert-24 / Quanti-Tray Method	1.0	1.0
86	Faecal Coliforms (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
N/A	Faecal Streptococcus (count per 100 ml) *	*(Outsourced)*	-	-
N/A	Formaldehyde	*(Outsourced)*	-	-
29	Fluoride (mg/l as F) *	Hach 8029	0.08	0.10

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
98	Fluoride (mg/l as F) *	Discrete Analyzer using the Gallery	0.10	0.50
66	Free Chlorine (mg/l)	Lovibond Method 3	-	0.05
N/A	Giardia (per 10 litres)	*(Outsourced)*	-	-
N/A	Helminth Ova (Total & Viable) (per 4 g dry weight)	*(Outsourced)*	-	-
88	Heterotrophic Plate Count (count per ml) *	MC-Media Pad	1.0	1.0
N/A	Hexavalent Chromium (mg/l)	Hach 8023	-	1.0
N/A	Hydrocarbons	*(Outsourced)*	-	-
46	Hydrogen Sulphide (mg/l)	Hach 8051	-	0.01
92	Iron (µg/l as Fe) *	Based on SANS 11885:2008 (ICP)	24.0	20.0
92a	Iron (µg/l as Fe) *	Based on SANS 11885:2008 (ICP)	1.7	20.0
Calc	Langelier Saturation Index (at 25 °C) *	Calculation	-	Calc
92	Lead (µg/l as Pb) *	Based on SANS 11885:2008 (ICP)	7.0	10.0
92a	Lead (µg/l as Pb) *	Based on SANS 11885:2008 (ICP)	2.9	10.0
N/A	Legionella (cfu/l)	*(Outsourced)*	-	-
92a	Lithium (mg/l as Li) *	Based on SANS 11885:2008 (ICP)	-	-
N/A	Listeria Monocytogenes (per 100 ml)	*(Outsourced)*	-	-
Calc	Magnesium (meq/l as Mg)	Calculation	-	-
92	Manganese (µg/l as Mn) *	Based on SANS 11885:2008 (ICP)	19.0	20.0
92a	Manganese (µg/l as Mn) *	Based on SANS 11885:2008 (ICP)	0.73	20.0
92	Magnesium (mg/l as Mg) *	Based on SANS 11885:2008 (ICP)	1.1	1.1
92a	Magnesium (mg/l as Mg) *	Based on SANS 11885:2008 (ICP)	**1.0**	1.0
Calc	Magnesium Hardness *	Calculation	-	-
92	Mercury (µg/l as Hg)	Based on SANS 11885:2008 (ICP)	-	5.0
N/A	Monochloramine (mg/l)	Lovibond Method	-	-
92	Molybdenum (µg/l as Mo) *	Based on SANS 11885:2008 (ICP)	-	20.0
92a	Molybdenum (µg/l as Mo) *	Based on SANS 11885:2008 (ICP)	0.99	20.0
N/A	Mould (cfu/100 ml)	(Outsourced)	-	-
92	Nickel (µg/l as Ni) *	Based on SANS 11885:2008 (ICP)	6.0	20.0
92a	Nickel (µg/l as Ni) *	Based on SANS 11885:2008 (ICP)	0.47	20.0
4	Nitrate Nitrogen (mg/l as N) *	Hach 8039 *(Applicable to Sewage Analysis)*	0.19	0.20
4B	Nitrate & Nitrite Nitrogen (mg/l as N) *	Lovibond Method using Brucine *(Applicable to Water Analysis)*	0.05	0.20
100	Nitrate Nitrogen (mg/l as N) *	Discrete Analyzer using the Gallery	0.04	0.20
5	Nitrite Nitrogen (mg/l as N) *	Lovibond (Griess-Ilosvay's Reagent)	0.08	0.20
99	Nitrlte Nitrogen (mg/l as N) *	Discrete Analyzer using the Gallery	0.01	0.20
Calc	Nitrate Nitrogen (mg/l as N) *	Calculation	-	-
18	Oil & Grease (mg/l)	SABS 1051 (Nov. 1982)	-	1.0
76	Odour (Threshold Odour Number)	STD Method 2150 (B)	-	1.0
N/A	Organochlorine Pesticides (OCP)	*(Outsourced)*	-	-
N/A	Organophosphorus Pesticides (OPP)	*(Outsourced)*	-	-
10	Ortho Phosphate (mg/l as P) *	Hach 8114	0.19	0.20
101	Ortho Phosphate (mg/l as P) *	Discrete Analyzer using the Gallery	0.10	0.20
1	Oxygen Absorbed (mg/l as O)	SANS 5220 : 2005	-	-
N/A	Pesticides (µg/kg)	*(Outsourced)*	-	-
Calc	Potassium (meq/l as K)	Calculation	-	-
92a	Potassium (mg/l as K) *	Based on SANS 11885:2008 (ICP)	**1.0**	1.0
N/A	Pseudomonas Aeroginosa (cfu/100 ml)	*(Outsourced)*	-	-
19	pH (at 25 °C) – Lab *	SABS 11	0.09	2.0
19	pH (at 25 °C) – Field	SABS 11	-	-
Calc	pHs (at 25 °C) *	Calculation	-	-
52	Phenols (mg/l)	Discrete Analyzer using the Gallery	-	0.01
N/A	Polychlorinated Biphenyls (PCB's)	*(Outsourced)*	-	-
92	Potassium (mg/l as K) *	Based on SANS 11885:2008 (ICP)	**0.32**	1.0
Calc	Ryznar Index *	Calculation	-	-
N/A	Salmonella (per 100 ml)	*(Outsourced)*	-	-
92	Selenium (µg/l as Se) *	Based on SANS 11885:2008 (ICP)	10.0	10.0
92a	Selenium (µg/l as Se) *	Based on SANS 11885:2008 (ICP)	2.6	10.0
67	Settleable Solids (ml/l)	STD Method 2540 F (1992)	-	0.10
N/A	Shingella (per 100 ml)	*(Outsourced)*	-	-
Cal	Silica (mg/l) *	Calculation	-	-

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
92	Silicon (µg/l)	Based on SANAS 11885:2008 (ICP)	-	0.06
92a	Silicon (µg/l) *	Based on SANAS 11885:2008 (ICP)	4.9	20.0
Calc.	Silica (µg/l) *	Calculation	58.0	58.0
Calc	% Sodium *	Calculation	1.0	-
Calc	Sodium Absorption Ratio	Calculation	1.0	-
Calc	Sodium (meq/l as Na)	Calculation	1.0	-
92	Sodium (mg/l as Na) *	Based on SANS 11885:2008 (ICP)	**0.45**	1.0
92a	Sodium (mg/l as Na) *	Based on SANS 11885:2008 (ICP)	**1.0**	1.0
Calc	% Solids	Calculation	-	-
N/A	Somatic Coliphages (count per 10 ml)	Fast Phage Somatic Presence/Absence	-	-
92	Strontium (mg/l) *	Based on SANS 11885:2008 (ICP)	4.0	40.0
92a	Strontium (mg/l) *	Based on SANS 11885:2008 (ICP)	0.88	40.0
126	Sucrose (mg/l)	Discrete Analyzer using the Gallery	0.02	-
24	Sulphate (mg/l as SO_4) *	Hach 8051 (SulfaVer 4 Method)	4.0	4.0
102	Sulphate (mg/l as SO_4) *	Discrete Analyzer using the Gallery	0.20	2.0
46	Sulphide (mg/l as S^{2-})	STD Method 4500-S^2D (1992)	0.01	-
N/A	Taste	*(Outsourced)*	-	-
92	Tin (µg/l as Sn) *	Based on SANS 11885:2008 (ICP)	10.0	20.0
92a	Tin (µg/l as Sn) *	Based on SANS 11885:2008 (ICP)	0.96	20.0
92	Titanium (mg/l as Ti)	*(Outsourced)*	-	-
92a	Titanium (µg/l as Ti)	Based on SANS 11885:2008 (ICP)	-	5.0
28	Total Alkalinity (mg/l as $CaCO_3$)	STD Methods 2320 (1992)	1.0	1.0
Calc	Total Carbonate Species (mg/l)	Calculation	-	-
66	Total Chlorine	Lovibond Method 3	0.01	0.05
92	Total Chromium (µg/l as Cr) *	Based on SANS 11885:2008 (ICP)	-	20.0
92a	Total Chromium (µg/l as Cr) *	Based on SANS 11885:2008 (ICP)	0.72	20.0
85	Total Coliforms Bacteria (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
7	Total Dissolved Solids	STD Method 2501 A (1992)	1.0	1.0
124	Total Glucose (mg/l)	Discrete Analyzer using the Gallery	-	-
Calc	Total Hardness (mg/l as $CaCO_3$) *	Calculation	1.0	1.0
15	Total Kjeldahl Nitrogen (mg/l)	Hach 8075	-	0.15
20	Total Microcystin (µg/l as LR)	Algal Toxin Strip Test	-	0.15
105	Total Organic Carbon (mg/l as C)	Hach 10129	-	0.10
N/A	Total Petroleum Hydrocarbons (TPH)	*(Outsourced)*	-	-
11	Total Phosphorous (mg/l as P)	STD Method 4500-PB (1992) / Hach 8114	-	0.20
13	Total Plate Count (count per ml) *	Petrifilm ™	1.0	1.0
N/A	Total Trihalomethanese (µg/l)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Chloroform)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Bromodichloromethane)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Dibromochloromethane)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Bromoform)	Gas Chromatography	1.0	10.0
27	Turbidity (NTU) *	Hach 8237	0.07	0.08
6A	Total Suspended Solids (mg/l) *	STD Method 2540 D (1992)	3.7	4.0
N/A	TOX (mg/l)	(Outsourced)	-	-
92	Uranium (µg/l as U)	Based on SANS 11885:2008 (ICP)	-	15.0
92a	Uranium (µg/l as U)	Based on SANS 11885:2008 (ICP)	-	5.0
N/A	UV Absorption (nm)	*(Outsourced)*	-	-
92	Vanadium (µg/l as V) *	Based on SANS 11885:2008 (ICP)	-	1.0
92a	Vanadium (µg/l as V) *	Based on SANS 11885:2008 (ICP)	0.56	1.0
N/A	Viable Helminths	*(Outsourced)*	-	-
N/A	Vibrio Cholerae (per 100 ml)	*(Outsourced)*	-	-
17	Volatile Fatty Acids (mg/l)	Hach 8196 (Esterification Method)	-	1.0
Calc	Volatile Fraction (%)	Calculation	-	-
6B	Volatile Suspended Solids (mg/l)	STD Method 2540 E (1992)	4.0	4.0
N/A	Yeast (cfu/100 ml)	(Outsourced)	-	-
92	Zinc (mg/l as Zn) *	Based on SANS 11885:2008 (ICP)	0.001	0.01
92a	Zinc (µg/l as Zn) *	Based on SANS 11885:2008 (ICP)	4.9	10.0

NOTE : -Tests marked with (*) in this Appendix are included in the SANAS Schedule of Accreditation for this laboratory.
-All bacteriological analyses carried out by Colilert Method unless otherwise indicated on the Certificate of Analysis.
-Bacteriological results reported as <1, by the Colilert/Quanti-Tray method is equivalent to "Not Detected" Standard Limit of SANS 241-1:2015.

TERMS AND CONDITIONS OF BUSINESS

All work is undertaken by A.L. Abbott and Associates (Pty) Ltd, (hereinafter called "the Company") on the following conditions :

(i) That the total liability of the Company, its officers, servants, agents or sub-contractors for any loss or damage caused by or resulting from improper or negligent performance, purported performance or non-performance of such work shall not exceed the sum equal to fifteen times the fee payable by the customer or R6000, whichever is the lesser sum.

(ii) That the person with whom the Company shall have contracted to have performed the said work will indemnify the Company, its said officers, servants, agents and sub-contractors against all claims made by the third parties consequent upon the performance, purported performance or non-performance of such work to the extent to which the aggregate of such claims exceeds the maximum liability specified in paragraph (i) above.

(iii) Without the prejudice to the foregoing every person who is or becomes an officer, servant, agent or sub-contractor of the Company shall have the benefit of the limitation of liability and indemnity contained in these conditions as if they were expressly made for his benefit and so far as relates to such conditions any contract entered into by the Company is entered into not only on its own benefit but also as agent and trustee for every such person as aforesaid.

(iv) No employee, agent or representative of the Company (other than a Director) has authority to alter or waive or make any representation which will in any way conflict with or override any of the terms of these conditions.

(v) The present conditions shall be governed by South African law and all disputes arising in relation thereto and/or in connection therewith shall be determined by the South African courts.

APPENDIX 1 : SPECIFIC METHODS USED FOR THE ANALYSES OF PARAMETERS INDICATED IN THIS REPORT

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
45	Acidity (mg/l)	STD Method 2310 B (1992)	-	-
94	Alkalinity (mg/l as $CaCO_3$) *	Discrete Analyzer using the Gallery	5.0	11.0
N/A	Algae Identification and Count (per ml)	*(Outsourced)*	-	-
92	Aluminium (µg/l as Al) *	Based on SANS 11885:2008 (ICP)	12.0	40.0
92a	Aluminium (µg/l as Al) *	Based on SANS 11885:2008 (ICP)	2.0	40.0
3	Ammonia (mg/l as N) *	STD Method 4500-NH_3:C (1992)	0.14	0.15
95	Ammonia (mg/l as N) *	Discrete Analyzer using the Gallery	0.09	0.10
92	Antimony (µg/l as Sb) *	Based on SANS 11885:2008 (ICP)	10.0	20.0
92a	Antimony (µg/l as Sb) *	Based on SANS 11885:2008 (ICP)	3.2	20.0
92	Arsenic (µg/l as As) *	Based on SANS 11885:2008 (ICP)	10.0	10.0
92a	Arsenic (µg/l as As) *	Based on SANS 11885:2008 (ICP)	9.9	10.0
92	Barium (µg/l) *	Based on SANS 11885:2008 (ICP)	5.0	20.0
92a	Barium (µg/l) *	Based on SANS 11885:2008 (ICP)	1.4	20.0
92	Beryllium µg/l as Be) *	Based on SANS 11885:2008 (ICP)	1.0	20.0
92a	Beryllium µg/l as Be) *	Based on SANS 11885:2008 (ICP)	0.34	20.0
Calc	Bicarbonate (mg/l)	Calculation	-	-
N/A	Biochemical Oxygen Demand (mg/l O_2)	*(Outsourced)*	-	-
47	Boron (mg/l as B)	Discrete Analyzer using the Gallery	-	-
92a	Boron (µg/l as B) *	Based on SANS 11885:2008 (ICP)	7.0	100
N/A	Bromine (mg/l as Br)	*(Outsourced)*	-	-
N/A	Bromide (mg/l as Br-)	*(Outsourced)*	-	-
92	Cadmium (µg/l as Cd) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Cadmium (µg/l as Cd) *	Based on SANS 11885:2008 (ICP)	0.67	1.0
92	Calcium (mg/l as Ca) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Calcium (mg/l as Ca) *	Based on SANS 11885:2008 (ICP)	0.37	1.0
Calc	Calcium (meq/l as Ca)	Calculation	-	-
Calc	Calcium Carbonate Precipitation Potential	Calculation	-	-
Calc	Calcium Hardness *	Calculation	-	-
Calc	Carbonate (mg/l)	Calculation	-	-
2	Chemical Oxygen Demand (mg/l) *	SANS 6048 (2005)	7.8	8.0
Calc	Chloride (meq/l as Cl^-)	Calculation	-	-
25	Chloride (mg/l as Cl) *	SABS 202	1.0	1.0
96	Chloride (mg/l as Cl) *	Discrete Analyzer using the Gallery	0.20	10.0
69	Chlorine Demand (mg/l)	STD Method 2350 B (1992)	-	0.05
N/A	Chlorophyll-a (µg/l)	*(Outsourced)*	-	-
N/A	Clostridium Perfringens (cfu/100 ml)	*(Outsourced)*	-	-
92	Cobalt (µg/l as Co) *	Based on SANS 11885:2008 (ICP)	14.0	20.0
92a	Cobalt (µg/l as Co) *	Based on SANS 11885:2008 (ICP)	0.57	20.0
N/A	Colony Count (cfu/ml)	*(Outsourced)*	-	-
97	Colour (mg/l as Pt) *	Discrete Analyzer using the Gallery	4.0	4.0
Calc.	Combined Nitrate & Nitrate (mg/l as N)	Calculation	-	-
Calc.	Combined Trihalomethanes	Calculation	-	-
Calc	Corrosivity Ratio *	Calculation	-	-
92	Copper (µg/l as Cu) *	Based on SANS 11885:2008 (ICP)	6.0	20.0
92a	Copper (µg/l as Cu) *	Based on SANS 11885:2008 (ICP)	1.3	20.0
N/A	Cryptosporidium (per 10 litres)	*(Outsourced)*	-	-
51	Cyanide (µg/l as CN^-)	Discrete Analyzer using the Gallery	-	20.0
N/A	Cytopathic Viruses (count per 10 litres)	*(Outsourced)*	-	-
125	D-Glucose (mg/l)	Discrete Analyzer using the Gallery	-	-
105	Dissolved Organic Carbon (mg/l as C)	Hach 10129	-	0.10
68	Dissolved Oxygen (mg/l)	STD Method 4500 O-G	-	1.0
78	Dissolved Solids (mg/l)	STD Method 2501 A (1992)	-	6.0
84	E.coli (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
9	Electrical Conductivity (mS/m) (at 25 °C) *	STD Method 2501 A (1992)	0.32	0.32
87	Enterococci (count per 100 ml) *	Enterolert-24 / Quanti-Tray Method	1.0	1.0
86	Faecal Coliforms (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
N/A	Faecal Streptococcus (count per 100 ml) *	*(Outsourced)*	-	-
N/A	Formaldehyde	*(Outsourced)*	-	-
29	Fluoride (mg/l as F) *	Hach 8029	0.08	0.10

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
98	Fluoride (mg/l as F) *	Discrete Analyzer using the Gallery	0.10	0.50
66	Free Chlorine (mg/l)	Lovibond Method 3	-	0.05
N/A	Giardia (per 10 litres)	*(Outsourced)*	-	-
N/A	Helminth Ova (Total & Viable) (per 4 g dry weight)	*(Outsourced)*	-	-
88	Heterotrophic Plate Count (count per ml) *	MC-Media Pad	1.0	1.0
N/A	Hexavalent Chromium (mg/l)	Hach 8023	-	1.0
N/A	Hydrocarbons	*(Outsourced)*	-	-
46	Hydrogen Sulphide (mg/l)	Hach 8051	-	0.01
92	Iron (µg/l as Fe) *	Based on SANS 11885:2008 (ICP)	24.0	20.0
92a	Iron (µg/l as Fe) *	Based on SANS 11885:2008 (ICP)	1.7	20.0
Calc	Langelier Saturation Index (at 25 ºC) *	Calculation	-	Calc
92	Lead (µg/l as Pb) *	Based on SANS 11885:2008 (ICP)	7.0	10.0
92a	Lead (µg/l as Pb) *	Based on SANS 11885:2008 (ICP)	2.9	10.0
N/A	Legionella (cfu/l)	*(Outsourced)*	-	-
92a	Lithium (mg/l as Li) *	Based on SANS 11885:2008 (ICP)	-	-
N/A	Listeria Monocytogenes (per 100 ml)	*(Outsourced)*	-	-
Calc	Magnesium (meq/l as Mg)	Calculation	-	-
92	Manganese (µg/l as Mn) *	Based on SANS 11885:2008 (ICP)	19.0	20.0
92a	Manganese (µg/l as Mn) *	Based on SANS 11885:2008 (ICP)	0.73	20.0
92	Magnesium (mg/l as Mg) *	Based on SANS 11885:2008 (ICP)	1.1	1.1
92a	Magnesium (mg/l as Mg) *	Based on SANS 11885:2008 (ICP)	0.25	1.0
Calc	Magnesium Hardness *	Calculation	-	-
92	Mercury (µg/l as Hg)	Based on SANS 11885:2008 (ICP)	-	5.0
N/A	Monochloramine (mg/l)	Lovibond Method	-	-
92	Molybdenum (µg/l as Mo) *	Based on SANS 11885:2008 (ICP)	-	20.0
92a	Molybdenum (µg/l as Mo) *	Based on SANS 11885:2008 (ICP)	0.99	20.0
N/A	Mould (cfu/100 ml)	(Outsourced)	-	-
92	Nickel (µg/l as Ni) *	Based on SANS 11885:2008 (ICP)	6.0	20.0
92a	Nickel (µg/l as Ni) *	Based on SANS 11885:2008 (ICP)	0.47	20.0
4	Nitrate Nitrogen (mg/l as N) *	Hach 8039 *(Applicable to Sewage Analysis)*	0.19	0.20
4B	Nitrate & Nitrite Nitrogen (mg/l as N) *	Lovibond Method using Brucine *(Applicable to Water Analysis)*	0.05	0.20
100	Nitrate Nitrogen (mg/l as N) *	Discrete Analyzer using the Gallery	0.04	0.20
5	Nitrite Nitrogen (mg/l as N) *	Lovibond (Griess-Ilosvay's Reagent)	0.08	0.20
99	Nitrlte Nitrogen (mg/l as N) *	Discrete Analyzer using the Gallery	0.01	0.20
Calc	Nitrate Nitrogen (mg/l as N) *	Calculation	-	-
18	Oil & Grease (mg/l)	SABS 1051 (Nov. 1982)	-	1.0
76	Odour (Threshold Odour Number)	STD Method 2150 (B)	-	1.0
N/A	Organochlorine Pesticides (OCP)	*(Outsourced)*	-	-
N/A	Organophosphorus Pesticides (OPP)	*(Outsourced)*	-	-
10	Ortho Phosphate (mg/l as P) *	Hach 8114	0.19	0.20
101	Ortho Phosphate (mg/l as P) *	Discrete Analyzer using the Gallery	0.10	0.20
1	Oxygen Absorbed (mg/l as O)	SANS 5220 : 2005	-	-
N/A	Pesticides (µg/kg)	*(Outsourced)*	-	-
Calc	Potassium (meq/l as K)	Calculation	-	-
92a	Potassium (mg/l as K) *	Based on SANS 11885:2008 (ICP)	0.40	1.0
N/A	Pseudomonas Aeroginosa (cfu/100 ml)	*(Outsourced)*	-	-
19	pH (at 25 ºC) – Lab *	SABS 11	0.09	2.0
19	pH (at 25 ºC) – Field	SABS 11	-	-
Calc	pHs (at 25 ºC) *	Calculation	-	-
52	Phenols (mg/l)	Discrete Analyzer using the Gallery	-	0.01
N/A	Polychlorinated Biphenyls (PCB's)	*(Outsourced)*	-	-
92	Potassium (mg/l as K) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
Calc	Ryznar Index *	Calculation	-	-
N/A	Salmonella (per 100 ml)	*(Outsourced)*	-	-
92	Selenium (µg/l as Se) *	Based on SANS 11885:2008 (ICP)	10.0	10.0
92a	Selenium (µg/l as Se) *	Based on SANS 11885:2008 (ICP)	2.6	10.0
67	Settleable Solids (ml/l)	STD Method 2540 F (1992)	-	0.10
N/A	Shingella (per 100 ml)	*(Outsourced)*	-	-
Cal	Silica (mg/l) *	Calculation	-	-

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
92	Silicon (µg/l)	Based on SANAS 11885:2008 (ICP)	-	0.06
92a	Silicon (µg/l) *	Based on SANAS 11885:2008 (ICP)	4.9	20.0
Calc.	Silica (µg/l) *	Calculation	58.0	58.0
Calc	% Sodium *	Calculation	1.0	-
Calc	Sodium Absorption Ratio	Calculation	1.0	-
Calc	Sodium (meq/l as Na)	Calculation	1.0	-
92	Sodium (mg/l as Na) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Sodium (mg/l as Na) *	Based on SANS 11885:2008 (ICP)	0.45	1.0
Calc	% Solids	Calculation	-	-
N/A	Somatic Coliphages (count per 10 ml)	Fast Phage Somatic Presence/Absence	-	-
92	Strontium (mg/l) *	Based on SANS 11885:2008 (ICP)	4.0	40.0
92a	Strontium (mg/l) *	Based on SANS 11885:2008 (ICP)	0.88	40.0
126	Sucrose (mg/l)	Discrete Analyzer using the Gallery	0.02	-
24	Sulphate (mg/l as SO_4) *	Hach 8051 (SulfaVer 4 Method)	4.0	4.0
102	Sulphate (mg/l as SO_4) *	Discrete Analyzer using the Gallery	0.20	2.0
46	Sulphide (mg/l as S^{2-})	STD Method 4500-S^2D (1992)	0.01	-
N/A	Taste	*(Outsourced)*	-	-
92	Tin (µg/l as Sn) *	Based on SANS 11885:2008 (ICP)	10.0	20.0
92a	Tin (µg/l as Sn) *	Based on SANS 11885:2008 (ICP)	0.96	20.0
92	Titanium (mg/l as Ti)	*(Outsourced)*	-	-
92a	Titanium (µg/l as Ti)	Based on SANS 11885:2008 (ICP)	-	5.0
28	Total Alkalinity (mg/l as $CaCO_3$)	STD Methods 2320 (1992)	1.0	1.0
Calc	Total Carbonate Species (mg/l)	Calculation	-	-
66	Total Chlorine	Lovibond Method 3	0.01	0.05
92	Total Chromium (µg/l as Cr) *	Based on SANS 11885:2008 (ICP)	-	20.0
92a	Total Chromium (µg/l as Cr) *	Based on SANS 11885:2008 (ICP)	0.72	20.0
85	Total Coliforms Bacteria (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
7	Total Dissolved Solids	STD Method 2501 A (1992)	1.0	1.0
124	Total Glucose (mg/l)	Discrete Analyzer using the Gallery	-	-
Calc	Total Hardness (mg/l as $CaCO_3$) *	Calculation	1.0	1.0
15	Total Kjeldahl Nitrogen (mg/l)	Hach 8075	-	0.15
20	Total Microcystin (µg/l as LR)	Algal Toxin Strip Test	-	0.15
105	Total Organic Carbon (mg/l as C)	Hach 10129	-	0.10
N/A	Total Petroleum Hydrocarbons (TPH)	*(Outsourced)*	-	-
11	Total Phosphorous (mg/l as P)	STD Method 4500-PB (1992) / Hach 8114	-	0.20
13	Total Plate Count (count per ml) *	Petrifilm ™	1.0	1.0
N/A	Total Trihalomethanese (µg/l)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Chloroform)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Bromodichloromethane)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Dibromochloromethane)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Bromoform)	Gas Chromatography	1.0	10.0
27	Turbidity (NTU) *	Hach 8237	0.07	0.08
6A	Total Suspended Solids (mg/l) *	STD Method 2540 D (1992)	3.7	4.0
N/A	TOX (mg/l)	(Outsourced)	-	-
92	Uranium (µg/l as U)	Based on SANS 11885:2008 (ICP)	-	15.0
92a	Uranium (µg/l as U)	Based on SANS 11885:2008 (ICP)	-	5.0
N/A	UV Absorption (nm)	*(Outsourced)*	-	-
92	Vanadium (µg/l as V) *	Based on SANS 11885:2008 (ICP)	-	1.0
92a	Vanadium (µg/l as V) *	Based on SANS 11885:2008 (ICP)	0.56	1.0
N/A	Viable Helminths	*(Outsourced)*	-	-
N/A	Vibrio Cholerae (per 100 ml)	*(Outsourced)*	-	-
17	Volatile Fatty Acids (mg/l)	Hach 8196 (Esterification Method)	-	1.0
Calc	Volatile Fraction (%)	Calculation	-	-
6B	Volatile Suspended Solids (mg/l)	STD Method 2540 E (1992)	4.0	4.0
N/A	Yeast (cfu/100 ml)	(Outsourced)	-	-
92	Zinc (mg/l as Zn) *	Based on SANS 11885:2008 (ICP)	0.001	0.01
92a	Zinc (µg/l as Zn) *	Based on SANS 11885:2008 (ICP)	4.9	10.0

NOTE : -Tests marked with (*) in this Appendix are included in the SANAS Schedule of Accreditation for this laboratory.
-All bacteriological analyses carried out by Colilert Method unless otherwise indicated on the Certificate of Analysis.
-Bacteriological results reported as <1, by the Colilert/Quanti-Tray method is equivalent to "Not Detected" Standard Limit of SANS 241-1:2015.

APPENDIX 1 : SPECIFIC METHODS USED FOR THE ANALYSES OF PARAMETERS INDICATED IN THIS REPORT

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
45	Acidity (mg/l)	STD Method 2310 B (1992)	-	-
94	Alkalinity (mg/l as $CaCO_3$) *	Discrete Analyzer using the Gallery	5.0	11.0
N/A	Algae Identification and Count (per ml)	*(Outsourced)*	-	-
92	Aluminium (µg/l as Al) *	Based on SANS 11885:2008 (ICP)	12.0	40.0
92a	Aluminium (µg/l as Al) *	Based on SANS 11885:2008 (ICP)	2.0	40.0
3	Ammonia (mg/l as N) *	STD Method 4500-NH_3:C (1992)	0.14	0.15
95	Ammonia (mg/l as N) *	Discrete Analyzer using the Gallery	0.09	0.10
92	Antimony (µg/l as Sb) *	Based on SANS 11885:2008 (ICP)	10.0	20.0
92a	Antimony (µg/l as Sb) *	Based on SANS 11885:2008 (ICP)	3.2	20.0
92	Arsenic (µg/l as As) *	Based on SANS 11885:2008 (ICP)	10.0	10.0
92a	Arsenic (µg/l as As) *	Based on SANS 11885:2008 (ICP)	9.9	10.0
92	Barium (µg/l) *	Based on SANS 11885:2008 (ICP)	5.0	20.0
92a	Barium (µg/l) *	Based on SANS 11885:2008 (ICP)	1.4	20.0
92	Beryllium µg/l as Be) *	Based on SANS 11885:2008 (ICP)	1.0	20.0
92a	Beryllium µg/l as Be) *	Based on SANS 11885:2008 (ICP)	0.34	20.0
Calc	Bicarbonate (mg/l)	Calculation	-	-
N/A	Biochemical Oxygen Demand (mg/l O_2)	*(Outsourced)*	-	-
47	Boron (mg/l as B)	Discrete Analyzer using the Gallery	-	-
92a	Boron (µg/l as B) *	Based on SANS 11885:2008 (ICP)	7.0	100
N/A	Bromine (mg/l as Br)	*(Outsourced)*	-	-
N/A	Bromide (mg/l as Br-)	*(Outsourced)*	-	-
92	Cadmium (µg/l as Cd) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Cadmium (µg/l as Cd) *	Based on SANS 11885:2008 (ICP)	0.67	1.0
92	Calcium (mg/l as Ca) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
92a	Calcium (mg/l as Ca) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
Calc	Calcium (meq/l as Ca)	Calculation	-	-
Calc	Calcium Carbonate Precipitation Potential	Calculation	-	-
Calc	Calcium Hardness *	Calculation	-	-
Calc	Carbonate (mg/l)	Calculation	-	-
2	Chemical Oxygen Demand (mg/l) *	SANS 6048 (2005)	7.8	8.0
Calc	Chloride (meq/l as Cl^-)	Calculation	-	-
25	Chloride (mg/l as Cl) *	SABS 202	1.0	**2.0**
96	Chloride (mg/l as Cl) *	Discrete Analyzer using the Gallery	0.20	10.0
69	Chlorine Demand (mg/l)	STD Method 2350 B (1992)	-	0.05
N/A	Chlorophyll-a (µg/l)	*(Outsourced)*	-	-
N/A	Clostridium Perfringens (cfu/100 ml)	*(Outsourced)*	-	-
92	Cobalt (µg/l as Co) *	Based on SANS 11885:2008 (ICP)	14.0	20.0
92a	Cobalt (µg/l as Co) *	Based on SANS 11885:2008 (ICP)	0.57	20.0
N/A	Colony Count (cfu/ml)	*(Outsourced)*	-	-
97	Colour (mg/l as Pt) *	Discrete Analyzer using the Gallery	4.0	4.0
Calc.	Combined Nitrate & Nitrate (mg/l as N)	Calculation	-	-
Calc.	Combined Trihalomethanes	Calculation	-	-
Calc	Corrosivity Ratio *	Calculation	-	-
92	Copper (µg/l as Cu) *	Based on SANS 11885:2008 (ICP)	6.0	20.0
92a	Copper (µg/l as Cu) *	Based on SANS 11885:2008 (ICP)	1.3	20.0
N/A	Cryptosporidium (per 10 litres)	*(Outsourced)*	-	-
51	Cyanide (µg/l as CN^-)	Discrete Analyzer using the Gallery	-	20.0
N/A	Cytopathic Viruses (count per 10 litres)	*(Outsourced)*	-	-
125	D-Glucose (mg/l)	Discrete Analyzer using the Gallery	-	-
105	Dissolved Organic Carbon (mg/l as C)	Hach 10129	-	0.10
68	Dissolved Oxygen (mg/l)	STD Method 4500 O-G	-	1.0
78	Dissolved Solids (mg/l)	STD Method 2501 A (1992)	-	6.0
84	E.coli (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
9	Electrical Conductivity (mS/m) (at 25 °C) *	STD Method 2501 A (1992)	0.32	**5.0**
87	Enterococci (count per 100 ml) *	Enterolert-24 / Quanti-Tray Method	1.0	1.0
86	Faecal Coliforms (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
N/A	Faecal Streptococcus (count per 100 ml) *	*(Outsourced)*	-	-
N/A	Formaldehyde	*(Outsourced)*	-	-
29	Fluoride (mg/l as F) *	Hach 8029	0.08	**0.50**

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
98	Fluoride (mg/l as F) *	Discrete Analyzer using the Gallery	0.10	0.50
66	Free Chlorine (mg/l)	Lovibond Method 3	-	0.05
N/A	Giardia (per 10 litres)	*(Outsourced)*	-	-
N/A	Helminth Ova (Total & Viable) (per 4 g dry weight)	*(Outsourced)*	-	-
88	Heterotrophic Plate Count (count per ml) *	MC-Media Pad	1.0	1.0
N/A	Hexavalent Chromium (mg/l)	Hach 8023	-	1.0
N/A	Hydrocarbons	*(Outsourced)*	-	-
46	Hydrogen Sulphide (mg/l)	Hach 8051	-	0.01
92	Iron (µg/l as Fe) *	Based on SANS 11885:2008 (ICP)	24.0	20.0
92a	Iron (µg/l as Fe) *	Based on SANS 11885:2008 (ICP)	1.7	20.0
Calc	Langelier Saturation Index (at 25 °C) *	Calculation	-	Calc
92	Lead (µg/l as Pb) *	Based on SANS 11885:2008 (ICP)	7.0	10.0
92a	Lead (µg/l as Pb) *	Based on SANS 11885:2008 (ICP)	2.9	10.0
N/A	Legionella (cfu/l)	*(Outsourced)*	-	-
92a	Lithium (mg/l as Li) *	Based on SANS 11885:2008 (ICP)	-	-
N/A	Listeria Monocytogenes (per 100 ml)	*(Outsourced)*	-	-
Calc	Magnesium (meq/l as Mg)	Calculation	-	-
92	Manganese (µg/l as Mn) *	Based on SANS 11885:2008 (ICP)	19.0	20.0
92a	Manganese (µg/l as Mn) *	Based on SANS 11885:2008 (ICP)	0.73	20.0
92	Magnesium (mg/l as Mg) *	Based on SANS 11885:2008 (ICP)	1.1	1.1
92a	Magnesium (mg/l as Mg) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
Calc	Magnesium Hardness *	Calculation	-	-
92	Mercury (µg/l as Hg)	Based on SANS 11885:2008 (ICP)	-	5.0
N/A	Monochloramine (mg/l)	Lovibond Method	-	-
92	Molybdenum (µg/l as Mo) *	Based on SANS 11885:2008 (ICP)	-	20.0
92a	Molybdenum (µg/l as Mo) *	Based on SANS 11885:2008 (ICP)	0.99	20.0
N/A	Mould (cfu/100 ml)	(Outsourced)	-	-
92	Nickel (µg/l as Ni) *	Based on SANS 11885:2008 (ICP)	6.0	20.0
92a	Nickel (µg/l as Ni) *	Based on SANS 11885:2008 (ICP)	0.47	20.0
4	Nitrate Nitrogen (mg/l as N) *	Hach 8039 *(Applicable to Sewage Analysis)*	0.19	0.20
4B	Nitrate & Nitrite Nitrogen (mg/l as N) *	Lovibond Method using Brucine *(Applicable to Water Analysis)*	0.05	0.20
100	Nitrate Nitrogen (mg/l as N) *	Discrete Analyzer using the Gallery	0.04	0.20
5	Nitrite Nitrogen (mg/l as N) *	Lovibond (Griess-Ilosvay's Reagent)	0.08	0.20
99	Nitrite Nitrogen (mg/l as N) *	Discrete Analyzer using the Gallery	0.01	0.20
Calc	Nitrate Nitrogen (mg/l as N) *	Calculation	-	-
18	Oil & Grease (mg/l)	SABS 1051 (Nov. 1982)	-	1.0
76	Odour (Threshold Odour Number)	STD Method 2150 (B)	-	1.0
N/A	Organochlorine Pesticides (OCP)	*(Outsourced)*	-	-
N/A	Organophosphorus Pesticides (OPP)	*(Outsourced)*	-	-
10	Ortho Phosphate (mg/l as P) *	Hach 8114	0.19	0.20
101	Ortho Phosphate (mg/l as P) *	Discrete Analyzer using the Gallery	0.10	0.20
1	Oxygen Absorbed (mg/l as O)	SANS 5220 : 2005	-	-
N/A	Pesticides (µg/kg)	*(Outsourced)*	-	-
Calc	Potassium (meq/l as K)	Calculation	-	-
92a	Potassium (mg/l as K) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
N/A	Pseudomonas Aeroginosa (cfu/100 ml)	*(Outsourced)*	-	-
19	pH (at 25 °C) – Lab *	SABS 11	0.09	2.0
19	pH (at 25 °C) – Field	SABS 11	-	-
Calc	pHs (at 25 °C) *	Calculation	-	-
52	Phenols (mg/l)	Discrete Analyzer using the Gallery	-	0.01
N/A	Polychlorinated Biphenyls (PCB's)	*(Outsourced)*	-	-
92	Potassium (mg/l as K) *	Based on SANS 11885:2008 (ICP)	0.32	1.0
Calc	Ryznar Index *	Calculation	-	-
N/A	Salmonella (per 100 ml)	*(Outsourced)*	-	-
92	Selenium (µg/l as Se) *	Based on SANS 11885:2008 (ICP)	10.0	10.0
92a	Selenium (µg/l as Se) *	Based on SANS 11885:2008 (ICP)	2.6	10.0
67	Settleable Solids (ml/l)	STD Method 2540 F (1992)	-	0.10
N/A	Shingella (per 100 ml)	*(Outsourced)*	-	-
Cal	Silica (mg/l) *	Calculation	-	-

ALA Method No.	Parameter	Method	Limit of Detection	Limit of Quantification
92	Silicon (µg/l)	Based on SANAS 11885:2008 (ICP)	-	0.06
92a	Silicon (µg/l) *	Based on SANAS 11885:2008 (ICP)	4.9	20.0
Calc.	Silica (µg/l) *	Calculation	58.0	58.0
Calc	% Sodium *	Calculation	1.0	-
Calc	Sodium Absorption Ratio	Calculation	1.0	-
Calc	Sodium (meq/l as Na)	Calculation	1.0	-
92	Sodium (mg/l as Na) *	Based on SANS 11885:2008 (ICP)	0.45	1.0
92a	Sodium (mg/l as Na) *	Based on SANS 11885:2008 (ICP)	1.0	1.0
Calc	% Solids	Calculation	-	-
N/A	Somatic Coliphages (count per 10 ml)	Fast Phage Somatic Presence/Absence	-	-
92	Strontium (mg/l) *	Based on SANS 11885:2008 (ICP)	4.0	40.0
92a	Strontium (mg/l) *	Based on SANS 11885:2008 (ICP)	0.88	40.0
126	Sucrose (mg/l)	Discrete Analyzer using the Gallery	0.02	-
24	Sulphate (mg/l as SO_4) *	Hach 8051 (SulfaVer 4 Method)	4.0	4.0
102	Sulphate (mg/l as SO_4) *	Discrete Analyzer using the Gallery	0.20	2.0
46	Sulphide (mg/l as S^{2-})	STD Method 4500-S^2D (1992)	0.01	-
N/A	Taste	*(Outsourced)*	-	-
92	Tin (µg/l as Sn) *	Based on SANS 11885:2008 (ICP)	10.0	20.0
92a	Tin (µg/l as Sn) *	Based on SANS 11885:2008 (ICP)	0.96	20.0
92	Titanium (mg/l as Ti)	*(Outsourced)*	-	-
92a	Titanium (µg/l as Ti)	Based on SANS 11885:2008 (ICP)	-	5.0
28	Total Alkalinity (mg/l as $CaCO_3$)	STD Methods 2320 (1992)	1.0	1.0
Calc	Total Carbonate Species (mg/l)	Calculation	-	-
66	Total Chlorine	Lovibond Method 3	0.01	0.05
92	Total Chromium (µg/l as Cr) *	Based on SANS 11885:2008 (ICP)	-	20.0
92a	Total Chromium (µg/l as Cr) *	Based on SANS 11885:2008 (ICP)	0.72	20.0
85	Total Coliforms Bacteria (count per 100 ml) *	Colilert - 18 / Quanti-Tray Method	1.0	1.0
7	Total Dissolved Solids	STD Method 2501 A (1992)	1.0	1.0
124	Total Glucose (mg/l)	Discrete Analyzer using the Gallery	-	-
Calc	Total Hardness (mg/l as $CaCO_3$) *	Calculation	1.0	1.0
15	Total Kjeldahl Nitrogen (mg/l)	Hach 8075	-	0.15
20	Total Microcystin (µg/l as LR)	Algal Toxin Strip Test	-	0.15
105	Total Organic Carbon (mg/l as C)	Hach 10129	-	0.10
N/A	Total Petroleum Hydrocarbons (TPH)	*(Outsourced)*	-	-
11	Total Phosphorous (mg/l as P)	STD Method 4500-PB (1992) / Hach 8114	-	0.20
13	Total Plate Count (count per ml) *	Petrifilm ™	1.0	1.0
N/A	Total Trihalomethanese (µg/l)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Chloroform)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Bromodichloromethane)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Dibromochloromethane)	Gas Chromatography	1.0	10.0
N/A	Trihalomethane (Bromoform)	Gas Chromatography	1.0	10.0
27	Turbidity (NTU) *	Hach 8237	0.07	0.08
6A	Total Suspended Solids (mg/l) *	STD Method 2540 D (1992)	3.7	4.0
N/A	TOX (mg/l)	(Outsourced)	-	-
92	Uranium (µg/l as U)	Based on SANS 11885:2008 (ICP)	-	15.0
92a	Uranium (µg/l as U)	Based on SANS 11885:2008 (ICP)	-	5.0
N/A	UV Absorption (nm)	*(Outsourced)*	-	-
92	Vanadium (µg/l as V) *	Based on SANS 11885:2008 (ICP)	-	1.0
92a	Vanadium (µg/l as V) *	Based on SANS 11885:2008 (ICP)	0.56	1.0
N/A	Viable Helminths	*(Outsourced)*	-	-
N/A	Vibrio Cholerae (per 100 ml)	*(Outsourced)*	-	-
17	Volatile Fatty Acids (mg/l)	Hach 8196 (Esterification Method)	-	1.0
Calc	Volatile Fraction (%)	Calculation	-	-
6B	Volatile Suspended Solids (mg/l)	STD Method 2540 E (1992)	4.0	4.0
N/A	Yeast (cfu/100 ml)	(Outsourced)	-	-
92	Zinc (mg/l as Zn) *	Based on SANS 11885:2008 (ICP)	0.001	0.01
92a	Zinc (µg/l as Zn) *	Based on SANS 11885:2008 (ICP)	4.9	10.0

NOTE : -Tests marked with (*) in this Appendix are included in the SANAS Schedule of Accreditation for this laboratory.
-All bacteriological analyses carried out by Colilert Method unless otherwise indicated on the Certificate of Analysis.
-Bacteriological results reported as <1, by the Colilert/Quanti-Tray method is equivalent to "Not Detected" Standard Limit of SANS 241-1:2015.

TERMS AND CONDITIONS OF BUSINESS

All work is undertaken by A.L. Abbott and Associates (Pty) Ltd, (hereinafter called "the Company") on the following conditions :

(i) That the total liability of the Company, its officers, servants, agents or sub-contractors for any loss or damage caused by or resulting from improper or negligent performance, purported performance or non-performance of such work shall not exceed the sum equal to fifteen times the fee payable by the customer or R6000, whichever is the lesser sum.

(ii) That the person with whom the Company shall have contracted to have performed the said work will indemnify the Company, its said officers, servants, agents and sub-contractors against all claims made by the third parties consequent upon the performance, purported performance or non-performance of such work to the extent to which the aggregate of such claims exceeds the maximum liability specified in paragraph (i) above.

(iii) Without the prejudice to the foregoing every person who is or becomes an officer, servant, agent or sub-contractor of the Company shall have the benefit of the limitation of liability and indemnity contained in these conditions as if they were expressly made for his benefit and so far as relates to such conditions any contract entered into by the Company is entered into not only on its own benefit but also as agent and trustee for every such person as aforesaid.

(iv) No employee, agent or representative of the Company (other than a Director) has authority to alter or waive or make any representation which will in any way conflict with or override any of the terms of these conditions.

(v) The present conditions shall be governed by South African law and all disputes arising in relation thereto and/or in connection therewith shall be determined by the South African courts.

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Certificate of Analysis

BIGEN (HENK AARTSMA)

ANALYSES

ZONQUASDRIFT RIVER AFTER RAIN

DATE SAMPLED : 2021/07/30
DATE RECEIVED : 2021/07/30
DATE ANALYSIS COMMENCED : 2021/07/30

OUR REF. : 2021/07/30/20583
REPORT NO . : 4213

	Sample Number	20583		
Mthd ALA No.	**Analyses**	**Results**	**SANS 241-1:2015**	**% Uncertainty of Measurement**
9	Conductivity (mS/m) (at 25 ºC)	30.5	≤170 Aesthetic	4.5
7	Total Dissolved Solids (mg/l)	202	≤1200 Aesthetic	-
19	pH (at 25 ºC) Field	7.40	≥5 - ≤ 9.7 Operational	-
19	pH (at 25 ºC) Field	7.51	≥5 - ≤ 9.7 Operational	-
6A	Total Suspended Solids (mg/l)	31	N/A	18
27	Turbidity (NTU)	39.3	≤1 Operational : ≤5 Aesthetic	11
Calc	Langelier Saturation Index (at 25 °C)	-1.7	N/A	-
19	pH (at 25 ºC)	7.23	≥5 - ≤ 9.7 Operational	1.5
N/A	Temperature (ºC) (Field)	15.2	N/A	-
Calc	Ryznar Index	-7.2	N/A	-
100	Nitrate & Nitrite Nitrogen (mg/l as N)	2.1	≤12 Acute Health	10.2
Calc	Nitrate Nitrogen (mg/l as N)	1.9	≤11 Acute Health	3.4
99	Nitrite Nitrogen (mg/l as N)	<0.20	≤0.9 Acute Health	4
102	Sulphate (mg/l as SO4)	14.6	≤250 Aesthetic ≤500 Acute Health	8.3
95	Ammonia Nitrogen (mg/l as N)	<0.10	≤1.5 Aesthetic	5.2
96	Chloride (mg/l as Cl)	54.1	≤300 Aesthetic	10
94	Total Alkalinity (mg/l as CaCO3)	32.7	N/A	4
92a	Sodium (mg/l as Na)	38.9	≤200 Aesthetic	5.1
Calc	Total Hardness (mg/l as CaCO3)	49.3	N/A	-
92a	Calcium (mg/l as Ca)	9.7	N/A	5.6
Calc	Calcium Hardness (mg/l as CaCO3)	24.3	N/A	-

Sampler : Eden van Eyssen (ALA)

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	Sample Number	20583		
Mthd ALA No.	**Analyses**	**Results**	**SANS 241-1:2015**	**% Uncertainty of Measurement**
92a	Magnesium (mg/l as Mg)	6.1	N/A	5.1
Calc	Magnesium Hardness (mg/l as CaCO3)	25.0	N/A	-
Calc	Carbonate (mg/l)	39.1	N/A	-
11	Total Phosphate (mg/l as P)	0.60	N/A	-
Calc	CaCO3 Precipitation Potential (mg/l)	-11.0	N/A	-
92a	Potassium (mg/l as K)	4.9	N/A	4.5
19	pH (at 25 °C) Field	7.40	≥5 - ≤ 9.7 Operational	-
19	pH (at 25 °C) Field	7.51	≥5 - ≤ 9.7 Operational	-

Notes:
1. Test marked with an asterisk (*) on attached Appendix 1 (Doc. 7.8#3) are SANAS Accredited and are included in the SANAS Schedule of Accreditation for this laboratory.
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4. Uncertainty of Measurement and Method Description will be provided upon request.
5. Results are reported at the 95% Confidence Interval with a Coverage Factor K = 2.
6. The laboratory does not normally issue any statement of conformity, unless by prior arrangement.
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J.L. DA SILVA (Cert.Sci.Nat.)
TECHNICAL MANAGER
13 August 2021

TO: BIGEN GROUP
Attention: Henk Aartsma <Henk.Aartsma@bigengroup.com>

Sampler : Eden van Eyssen (ALA)

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ANALYSES

ZONQUASDRIFT-NORMAL FLOW CONDITIONS

DATE SAMPLED : 2021/10/25
DATE RECEIVED : 2021/10/25
DATE ANALYSIS COMMENCED : 2021/10/25

OUR REF. : 2021/10/25/29170
REPORT NO . : 6000

	Sample Number	29170		
Mthd ALA No.	**Analyses**	**Results**	**SANS 241-1:2015**	**% Uncertainty of Measurement**
9	Conductivity (mS/m) (at 25 ºC)	14.0	≤170 Aesthetic	4.5
7	Total Dissolved Solids (mg/l)	90	≤1200 Aesthetic	-
19	pH (at 25 ºC) Field	7.11	≥5 - ≤ 9.7 Operational	-
6A	Total Suspended Solids (mg/l)	53	N/A	18
27	Turbidity (NTU)	66.5	≤1 Operational : ≤5 Aesthetic	11
Calc	Langelier Saturation Index (at 25 °C)	-2.5	N/A	-
19	pH (at 25 ºC)	7.30	≥5 - ≤ 9.7 Operational	1.5
N/A	Temperature (ºC) (Field)	18.9	N/A	-
Calc	Ryznar Index	-7.3	N/A	-
4B	Nitrate & Nitrite Nitrogen (mg/l as N)	<0.20	≤12 Acute Health	10.2
Calc	Nitrate Nitrogen (mg/l as N)	<0.20	≤11 Acute Health	3.4
5	Nitrite Nitrogen (mg/l as N)	<0.08	≤0.9 Acute Health	3.8
102	Sulphate (mg/l as SO4)	7.0	≤250 Aesthetic ≤500 Acute Health	8.3
3	Ammonia Nitrogen (mg/l as N)	0.56	≤1.5 Aesthetic	3.8
96	Chloride (mg/l as Cl)	25.9	≤300 Aesthetic	10
94	Total Alkalinity (mg/l as CaCO3)	12.9	N/A	4
92a	Sodium (mg/l as Na)	17.9	≤200 Aesthetic	5.1
Calc	Total Hardness (mg/l as CaCO3)	16.2	N/A	-
92a	Calcium (mg/l as Ca)	3.2	N/A	5.6
Calc	Calcium Hardness (mg/l as CaCO3)	8.0	N/A	-
92a	Magnesium (mg/l as Mg)	2.0	N/A	5.1

Sampler : V. Opperman (ALA)

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DATE ANALYSIS COMMENCED : 2021/10/25

OUR REF. : 2021/10/25/29170
REPORT NO . : 6000

	Sample Number	29170		
Mthd ALA No.	**Analyses**	**Results**	**SANS 241-1:2015**	**% Uncertainty of Measurement**
Calc	Magnesium Hardness (mg/l as CaCO3)	8.2	N/A	-
Calc	Carbonate (mg/l)	15.4	N/A	-
11	Total Phosphate (mg/l as P)	0.78	N/A	-
Calc	CaCO3 Precipitation Potential (mg/l)	-8.4	N/A	-
92a	Potassium (mg/l as K)	2.1	N/A	4.5

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J.L. DA SILVA (Cert.Sci.Nat.)
TECHNICAL MANAGER
03 November 2021

TO: BIGEN GROUP
Attention: Henk Aartsma <Henk.Aartsma@bigengroup.com>

Sampler : V. Opperman (ALA)