

**EMAKHAZENI LOCAL MUNICIPALITY**

 P.O. Box 17  
 BELFAST  
 1100

**CERTIFICATE OF CHEMICAL ANALYSIS**

 Attention: **MARIANNE JOUBERT**

Date received : 20 September 2018

Date reported : 28 September 2018

Quantity Analyzed : 6

Our Ref : ELM / 466 - 471 / C / 09 / 18

Lab No:

C 466

Analysis Results mg/l	LPM METHOD	SANS Standards -241 - 1: 2015 Ed 2 Domestic Water	EMH 2/09/18
		Standard Limits	Machado Waterworks Inlet
Total Dissolved Solids	LPM 2	≤ 1 200	106
Suspended Solids	LPM 1		3.6
Nitrate & Nitrite as N	LPM 32/76		0.12
Nitrate NO <sub>3</sub> as N	LPM 32/76	≤ 11	0.12
Nitrite NO <sub>2</sub> as N	LPM 32/76	≤ 0.9	<0.1
Chlorides as Cl	LPM 30/76	≤ 300	8.50
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81		73
Fluoride as F	LPM 27/76	≤ 1.5	<0.20
Sulphate as SO <sub>4</sub>	LPM 28/76	Acute Health ≤ 500 - Aesthetic ≤ 250	8.39
Total Hardness as CaCO <sub>3</sub>	LPM 85		68
Calcium Hardness as CaCO <sub>3</sub>	LPM 85		28
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85		39
Calcium as Ca	LPM 15		11.4
Magnesium as Mg	LPM 15		9.56
Sodium as Na	LPM 15	≤ 200	8.98
Potassium as K	LPM 15		1.65
Iron as Fe	LPM 15	Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3	0.21
Manganese as Mn	LPM 15	Chronic Health ≤ 0.4 - Aesthetic ≤ 0.1	<0.01
Conductivity at 25° C in mS/m	LPM 51/82	≤ 170	15.8
pH-Value at 25 ° C	LPM 51/82	≥ 5.0 to ≤ 9.7	6.78
pHs by 21° Celsius	LPM 85		8.38
Langelier Saturation Index	LPM 85		-1.60
Turbidity as N.T.U.	LPM 23/82	Operational ≤ 1.0 - Aesthetic ≤ 5.0	5.77
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84		-
Aluminium as Al	LPM 15	≤ 0.30	0.05

**These results must be read in conjunction with the Uncertainty of Measurement list as provided by Regen Waters Laboratory**

All heavy metal analyses have been performed on filtered samples.

Tests marked with an asterisk \* are not SANAS accredited

These results are related only to the items tested

VALUES HIGHLIGHTED IN GREY ARE NOT WITHIN THE SANS 241 - 1 : 2015 LIMITS AS SPECIFIED

**QUALITY CONTROL CHECKS:**

Cation Balance	1.80
Anion Balance	1.88
% Difference	-2.2
Measured TDS	106
Calculated TDS	94
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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CK. 89/14418/23

**REGEN WATERS**  
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**P.L.G. UYS / A.KOHR**  
*Technical Signatory*

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Analysis Results mg/l	LPM METHOD	SANS Standards -241 - 1: 2015 Ed 2 Domestic Water	EMH 4/09/18
		Standard Limits	Machado Waterworks Final
Total Dissolved Solids	LPM 2	≤ 1 200	110
Suspended Solids	LPM 1		1.6
Nitrate & Nitrite as N	LPM 32/76		<0.1
Nitrate NO <sub>3</sub> as N	LPM 32/76	≤ 11	<0.1
Nitrite NO <sub>2</sub> as N	LPM 32/76	≤ 0.9	<0.1
Chlorides as Cl	LPM 30/76	≤ 300	13.4
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81		71
Fluoride as F	LPM 27/76	≤ 1.5	<0.20
Sulphate as SO <sub>4</sub>	LPM 28/76	Acute Health ≤ 500 - Aesthetic ≤ 250	7.30
Total Hardness as CaCO <sub>3</sub>	LPM 85		71
Calcium Hardness as CaCO <sub>3</sub>	LPM 85		33
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85		38
Calcium as Ca	LPM 15		13.1
Magnesium as Mg	LPM 15		9.33
Sodium as Na	LPM 15	≤ 200	7.86
Potassium as K	LPM 15		1.51
Iron as Fe	LPM 15	Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3	0.01
Manganese as Mn	LPM 15	Chronic Health ≤ 0.4 - Aesthetic ≤ 0.1	0.01
Conductivity at 25° C in mS/m	LPM 51/82	≤ 170	17.0
pH-Value at 25° C	LPM 51/82	≥ 5.0 to ≤ 9.7	7.02
pHs by 21° Celsius	LPM 85		8.34
Langelier Saturation Index	LPM 85		-1.32
Turbidity as N.T.U.	LPM 23/82	Operational ≤ 1.0 - Aesthetic ≤ 5.0	2.75
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84		0.13
Aluminium as Al	LPM 15	≤ 0.30	0.07

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VALUES HIGHLIGHTED IN GREY ARE NOT WITHIN THE SANS 241 - 1 : 2015 LIMITS AS SPECIFIED

**QUALITY CONTROL CHECKS:**

Cation Balance	1.81
Anion Balance	1.95
% Difference	-3.7
Measured TDS	110
Calculated TDS	96
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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Analysis Results mg/l	LPM METHOD	SANS Standards -241 - 1: 2015 Ed 2 Domestic Water	EMH 21/09/18
		Standard Limits	Cement Reservoir
Total Dissolved Solids	LPM 2	≤ 1 200	112
Suspended Solids	LPM 1		26.0
Nitrate & Nitrite as N	LPM 32/76		<0.1
Nitrate NO <sub>3</sub> as N	LPM 32/76	≤ 11	<0.1
Nitrite NO <sub>2</sub> as N	LPM 32/76	≤ 0.9	<0.1
Chlorides as Cl	LPM 30/76	≤ 300	13.4
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81		69
Fluoride as F	LPM 27/76	≤ 1.5	<0.20
Sulphate as SO <sub>4</sub>	LPM 28/76	Acute Health ≤ 500 - Aesthetic ≤ 250	7.92
Total Hardness as CaCO <sub>3</sub>	LPM 85		70
Calcium Hardness as CaCO <sub>3</sub>	LPM 85		32
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85		38
Calcium as Ca	LPM 15		12.7
Magnesium as Mg	LPM 15		9.34
Sodium as Na	LPM 15	≤ 200	7.85
Potassium as K	LPM 15		1.59
Iron as Fe	LPM 15	Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3	0.03
Manganese as Mn	LPM 15	Chronic Health ≤ 0.4 - Aesthetic ≤ 0.1	0.01
Conductivity at 25° C in mS/m	LPM 51/82	≤ 170	16.9
pH-Value at 25 ° C	LPM 51/82	≥ 5.0 to ≤ 9.7	7.20
pHs by 21° Celsius	LPM 85		8.36
Langelier Saturation Index	LPM 85		-1.16
Turbidity as N.T.U.	LPM 23/82	Operational ≤ 1.0 - Aesthetic ≤ 5.0	25.8
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84		<0.1
Aluminium as Al	LPM 15	≤ 0.30	0.05

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VALUES HIGHLIGHTED IN GREY ARE NOT WITHIN THE SANS 241 - 1 : 2015 LIMITS AS SPECIFIED

**QUALITY CONTROL CHECKS:**

Cation Balance	1.79
Anion Balance	1.92
% Difference	-3.5
Measured TDS	112
Calculated TDS	95
Limits > 1.0 - <1.2	1.2
Calcu TDS / E.C. (0.55 - 0.70)	0.6

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