b.n. kirk (natal) cc Reg.No. CK 1994/015428/23

Water, Sewage & Industrial Effluent Testing Laboratory

45 Eaton Road, Congella, Durban P.O. Box 30140, Mayville, 4058 RSA
Tel : (031) 205 1245 Fax : (031) 205 6904 E-mail: admin@bnkirk.co.za
Web Page: www.bnkirk.co.za

ilac-MRA sanas Testing Laboratory TO535

CERTIFICATE OF ANALYSIS - BN Kirk (Natal) cc

CLIENT:	Illembe District Municipality	JOB NO:	S2 - STANGER RETICULATION
WORKS:	STANGER RETICULATION SITES		
ADDRESS:	P.O. Box 1488 Kwadukuza 4450		
ATTENTION:	***Mr. H.N. Maphumulo***	DATE OF REPORT:	14-04-2014
eMail:	Group 2 Details	DATE RECEIVED:	01-04-2014
In accordance with the visit schedule and procedure QP21.		DATE ANALYSED:	04-04-2014

1		2	3	4																	
Bulwer Farm Reticulation Consumer Point			**BNK REF:**			**ST 1**		**DATE ANALYSED**		**04-04-2014**											
Determinand	**Test Method No**	**SANS 241-1:2011 Physical, aesthetic, operational, chemical and Microbiological determinands**					**2014**														
		Risk	**Unit**	**Standard limits (a)**	**% Analysis Compliance**	**% Sampling Compliance**	**Date Sampled**														
							16-01	**30-01**	**12-02**	**26-02**	**06-03**	**18-03**	**01-04**								
Physical and aesthetic determinands																					
pH at 25°C [c]	P09/042	*Operational*	*pH units*	*≥ 5 to ≤ 9.7*	*100%*	*100%*	**not sampled**	**not sampled**	**not sampled**	**not sampled**	**7.5**	**7.4**	**7.4**								
Colour	P09/011	*Aesthetic*	*mg/L Pt-Co*	*≤ 15*	*50%*	*100%*					**44**		**3.2**								
Turbidity [b] {A}	P09/045	*Operational*	*NTU*	*≤ 1*	*0%*	*100%*					**6.0**	**1.7**	**1.5**								
		Aesthetic	*NTU*	*≤ 5*	*67%*	*100%*					**6.0**	**1.7**	**1.5**								
Conductivity at 25°C	P09/044	*Aesthetic*	*mS/m*	*≤ 170*	*100%*	*100%*					**18**		**21**								
Residual Chlorine - Total	P09/025	*ns*	*mg/L*	*ns*							**0.22**	**0.15**	**1.61**								
Residual Chlorine - Free	P09/025	*Chronic health*	*mg/L*	*≤ 5*	*100%*	*100%*					**0.16**	**0.10**	**0.15**								
Monochloramine	P09/025	*Chronic health*	*mg/L*	*≤ 3*	*100%*	*100%*					**0.06**	**0.05**	**0.11**								

Chemical determinands - micro-determinands																					
Iron as Fe	P09/014	*Chronic health*	*mg/L*	*≤ 2*	*100%*	*100%*					0.50		0.28								
		Aesthetic	*mg/L*	*≤ 0.3*	*50%*	*100%*					0.50		0.28								
Aluminium as Al	P09/053	*Operational*	*mg/L*	*≤ 0.3*	*100%*	*100%*					0.02	0.03	0.23								
MICROBIOLOGICAL RESULTS																					
Heterotrophic plate count [f]	P09/103	*Operational*	*Count per ml*	*< 1000*	*100%*	*100%*					974	76	0								
Total coliforms [e]	P09/102	*Operational*	*Count per 100ml*	*< 10*	*67%*	*100%*					212	1	0								
Faecal coliforms [b] **{A}**	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*67%*	*100%*					36	0	0								
E.coli[a] **{A}**	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*67%*	*100%*					36	0	0								
SANCOUSI TAP			**BNK REF:**			**ST 4**			**DATE ANALYSED**		**04-04-2014**										
Determinand	**Test Method No**	**SANS 241-1:2011 Physical, aesthetic, operational, chemical and Microbiological determinands**					**2014**														
		Risk	**Unit**	**Standard limits (a)**	**% Analysis Compliance**	**% Sampling Compliance**	**Date Sampled**														
							16-01	**30-01**	**12-02**	**26-02**	**06-03**	**18-03**	**01-04**								
Physical and aesthetic determinands																					
pH at 25°C [c]	P09/042	*Operational*	*pH units*	*≥ 5 to ≤ 9.7*	*100%*	*100%*	7.5		7.3	not sampled	7.7	7.6	7.7								
Colour	P09/011	*Aesthetic*	*mg/L Pt-Co*	*≤ 15*	*25%*	*100%*	1.2		141		18		21								
Turbidity [b] **{A}**	P09/045	*Operational*	*NTU*	*≤ 1*	*0%*	*100%*	3.8		139		15	2.2	6.4								
		Aesthetic	*NTU*	*≤ 5*	*40%*	*100%*	3.8		139		15	2.2	6.4								
Conductivity at 25°C	P09/044	*Aesthetic*	*mS/m*	*≤ 170*	*100%*	*100%*	13		13		13		16								
Residual Chlorine - Total	P09/025	*ns*	*mg/L*	*ns*			0.40	0.29	1.81		0.33	0.24	0.22								
Residual Chlorine - Free	P09/025	*Chronic health*	*mg/L*	*≤ 5*	*100%*	*100%*	0.28	0.25	1.57		0.25	0.17	0.14								
Monochloramine	P09/025	*Chronic health*	*mg/L*	*≤ 3*	*100%*	*100%*	0.12	0.04	0.24		0.08	0.07	0.08								
Chemical determinands - micro-determinands																					
Iron as Fe	P09/014	*Chronic health*	*mg/L*	*≤ 2*	*75%*	*100%*	0.34		3.6		0.77		0.54								
		Aesthetic	*mg/L*	*≤ 0.3*	*0%*	*100%*	0.34		3.6		0.77		0.54								
Aluminium as Al	P09/053	*Operational*	*mg/L*	*≤ 0.3*	*40%*	*100%*	1.1		5.1		0.88	0.24	0.20								

MICROBIOLOGICAL RESULTS																					
Heterotrophic plate count [f]	P09/103	*Operational*	*Count per ml*	*< 1000*	*83%*	*100%*	0	20	1		2	12	1300								
Total coliforms [e]	P09/102	*Operational*	*Count per 100ml*	*< 10*	*100%*	*100%*	0	0	0		0	0	0								
Faecal coliforms [b] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*100%*	0	0	0		0	0	0								
E.coli[a] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*100%*	0	0	0		0	0	0								
MADUNDUBE (GLENDALE TAP) @ Bananas			BNK REF:			ST 7			DATE ANALYSED			08-04-2014									
Determinand	**Test Method No**	**SANS 241-1:2011 Physical, aesthetic, operational, chemical and Microbiological determinands**					**2014**														
		Risk	**Unit**	**Standard limits (a)**	**% Analysis Compliance**	**% Sampling Compliance**	**Date Sampled**														
							07-01	**21-01**	**03-02**	**18-02**	**04-03**	**17-03**	**03-04**								
Physical and aesthetic determinands																					
pH at 25°C [c]	P09/042	*Operational*	*pH units*	*≥ 5 to ≤ 9.7*	*100%*	*80%*	No Water		8.6	not sampled	7.7	7.5	7.6								
Colour	P09/011	*Aesthetic*	*mg/L Pt-Co*	*≤ 15*	*100%*	*80%*			4.0		0		2.4								
Turbidity [b] {A}	P09/045	*Operational*	*NTU*	*≤ 1*	*100%*	*80%*			0.50		0.10	0.50	0.40								
		Aesthetic	*NTU*	*≤ 5*	*100%*	*80%*			0.50		0.10	0.50	0.40								
Conductivity at 25°C	P09/044	*Aesthetic*	*mS/m*	*≤ 170*	*100%*	*80%*			18		12		11								
Residual Chlorine - Total	P09/025	*ns*	*mg/L*	*ns*				1.15	0.10		0.53	0.83	0.41								
Residual Chlorine - Free	P09/025	*Chronic health*	*mg/L*	*≤ 5*	*100%*	*83%*		1.11	0.06		0.45	0.70	0.32								
Monochloramine	P09/025	*Chronic health*	*mg/L*	*≤ 3*	*100%*	*83%*		0.04	0.04		0.08	0.13	0.09								
Chemical determinands - micro-determinands																					
Iron as Fe	P09/014	*Chronic health*	*mg/L*	*≤ 2*	*100%*	*67%*			0.05		0.06		0.22								
		Aesthetic	*mg/L*	*≤ 0.3*	*100%*	*67%*			0.05		0.06		0.22								
Aluminium as Al	P09/053	*Operational*	*mg/L*	*≤ 0.3*	*100%*	*75%*			0.05		0.12	nd	0.11								
MICROBIOLOGICAL RESULTS																					
Heterotrophic plate count [f]	P09/103	*Operational*	*Count per ml*	*< 1000*	*80%*	*83%*		0	1400		0	0	0								
Total coliforms [e]	P09/102	*Operational*	*Count per 100ml*	*< 10*	*100%*	*83%*		0	1		0	0	0								
Faecal coliforms [b] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*83%*		0	0		0	0	0								
E.coli[a] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*83%*		0	0		0	0	0								

DRIEFONTEIN WATER			BNK REF:			DRIEFONTEIN	DATE ANALYSED				2014/03/13									
Determinand	Test Method No	SANS 241-1:2011 Physical, aesthetic, operational, chemical and Microbiological determinands					2014													
		Risk	Unit	Standard limits (a)	% Analysis Compliance	% Sampling Compliance	Date Sampled													
							08-01	13-01	06-02	20-02	10-03	19-03								
Physical and aesthetic determinands																				
pH at 25°C [c]	P09/042	*Operational*	*pH units*	*≥ 5 to ≤ 9.7*	*100%*	*60%*	7.5	resample	No Water	not sampled	7.5	7.3								
Colour	P09/011	*Aesthetic*	*mg/L Pt-Co*	*≤ 15*	*100%*	*67%*	0				1.4									
Turbidity [b] {A}	P09/045	*Operational*	*NTU*	*≤ 1*	*67%*	*50%*	0.40				1.70	0.70								
		Aesthetic	*NTU*	*≤ 5*	*100%*	*60%*	0.40				1.70	0.70								
Conductivity at 25°C	P09/044	*Aesthetic*	*mS/m*	*≤ 170*	*0%*	*0%*	199				198									
Residual Chlorine - Total	P09/025	*ns*	*mg/L*	*ns*			0.20				0.16	0.00								
Residual Chlorine - Free	P09/025	*Chronic health*	*mg/L*	*≤ 5*	*100%*	*75%*	0.18				0.00	0.00								
Monochloramine	P09/025	*Chronic health*	*mg/L*	*≤ 3*	*100%*	*75%*	0.02				0.16	0.00								
Chemical determinands - macro-determinands																				
Sulphate as SO_4^{2-} {A}	P09/035	*Acute health - 1*	*mg/L*	*≤ 500*	*0%*	*100%*					1082									
		Aesthetic	*mg/L*	*≤ 250*	*0%*	*100%*					1082									
Chemical determinands - micro-determinands																				
Iron as Fe	P09/014	*Chronic health*	*mg/L*	*≤ 2*	*100%*	*67%*	0.11				0.12									
		Aesthetic	*mg/L*	*≤ 0.3*	*100%*	*67%*	0.11				0.12									
Aluminium as Al	P09/053	*Operational*	*mg/L*	*≤ 0.3*	*100%*	*60%*	0.18				0.10	0.03								
MICROBIOLOGICAL RESULTS																				
Heterotrophic plate count [f]	P09/103	*Operational*	*Count per ml*	*< 1000*	*100%*	*60%*	80				460	710								
Total coliforms [e]	P09/102	*Operational*	*Count per 100ml*	*< 10*	*100%*	*60%*	0				0	0								
Faecal coliforms [b] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*60%*	0				0	0								
E.coli [a] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*60%*	0				0	0								

GROUTVILLE WATER			BNK REF:			NDW 18	DATE ANALYSED		10-04-2014											
Determinand	Test Method No	SANS 241-1:2011 Physical, aesthetic, operational, chemical and Microbiological determinands					2014													
		Risk	Unit	Standard limits (a)	% Analysis Compliance	% Sampling Compliance	Date Sampled													
							13-01	27-01	10-02	26-02	10-03	24-03	07-04							
Physical and aesthetic determinands																				
pH at 25°C [c]	P09/042	*Operational*	*pH units*	*≥ 5 to ≤ 9.7*	*100%*	*100%*	8.7		8.8	not sampled	9.0	8.6	8.1							
Colour	P09/011	*Aesthetic*	*mg/L Pt-Co*	*≤ 15*	*100%*	*100%*	7.0		7.0		3.4		4.1							
Turbidity [b] {A}	P09/045	*Operational*	*NTU*	*≤ 1*	*40%*	*100%*	1.3		1.5		0.50	0.40	2.1							
		Aesthetic	*NTU*	*≤ 5*	*100%*	*100%*	1.3		1.5		0.50	0.40	2.1							
Conductivity at 25°C	P09/044	*Aesthetic*	*mS/m*	*≤ 170*	*100%*	*100%*	18		19		18		19							
Residual Chlorine - Total	P09/025	*ns*	*mg/L*	*ns*			0.12	0.07	0.12		0.23	0.14	0.26							
Residual Chlorine - Free	P09/025	*Chronic health*	*mg/L*	*≤ 5*	*100%*	*100%*	0.05	0.05	0.10		0.15	0.08	0.19							
Monochloramine	P09/025	*Chronic health*	*mg/L*	*≤ 3*	*100%*	*100%*	0.07	0.02	0.02		0.08	0.06	0.07							
Chemical determinands - micro-determinands																				
Iron as Fe	P09/014	*Chronic health*	*mg/L*	*≤ 2*	*100%*	*100%*	0.14		0.17		0.08		0.09							
		Aesthetic	*mg/L*	*≤ 0.3*	*100%*	*100%*	0.14		0.17		0.08		0.09							
Aluminium as Al	P09/053	*Operational*	*mg/L*	*≤ 0.3*	*100%*	*100%*	0.20		0.13		0.06	0.03	0.05							
MICROBIOLOGICAL RESULTS																				
Heterotrophic plate count [f]	P09/103	*Operational*	*Count per ml*	*< 1000*	*83%*	*100%*	18	124	140		284	2144	7							
Total coliforms [e]	P09/102	*Operational*	*Count per 100ml*	*< 10*	*100%*	*100%*	0	0	0		0	0	0							
Faecal coliforms [b] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*100%*	0	0	0		0	0	0							
E.coli [a] {A}	P09/046	*Acute health - 1*	*Count per 100ml*	*Not detected*	*100%*	*100%*	0	0	0		0	0	0							

a = Definitive, preferred indicator of faecal pollution.

b = Indicator of unacceptable microbial water quality, could be tested instead of E.coli , but is not the preferred indicator of faecal pollution.
Also provides information on treatment efficiency and aftergrowth in distribution networks.

c = Confirms a risk of human infection and faecal pollution and also provides information on treatment efficiency. The detection of selected viruses confirms faecal pollution of human origin.
d = Confirms a risk of infection and faecal pollution and also provides information on treatment efficiency. The detection of selected protozoan parasites confirms a human health risk.
e = Indicates potential faecal pollution and provides information on treatment efficiency and aftergrowth.
f = Process indicator that provides information on treatment efficiency, aftergrowth in distribution networks and adequacy of disinfectant residuals.
g = Process indicator that provides information on treatment efficiency.

KEY ** = TOO NUMEROUS TO COUNT ns = NOT SPECIFIED

for and on behalf of B N KIRK (Natal)cc

Dawn Bester - Laboratory Manager	***D Subban - Chemistry Lab Supervisor***	14-04-2014
Technical Signatory	***Technical signatory***	***Date***

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1. While every reasonable precaution is taken in obtaining these results the Company does not accept responsibility for any matters arising from the further use of these results.
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1. Results marked **{A}** *are included in the SANAS Schedule of accreditation for this laboratory.*
2. Results marked "Subcontracted Test" in this report, are not included in the SANAS Schedule of accreditation for this laboratory.
3. The estimated uncertainty of measurements for the accredited test results is obtainable from the laboratory - QP24 Appendix A
4. The results relate to the sample tested and the most recent methods available with a 95% confidence level.

End of Report