RAND WATER

Quarterly Water Quality Status of the Waterval River Catchment — **1 October 2014 - 30 September 2015**

In-stream Water Quality Guidelines

Sample Points	Sample Point Description	Ammonia	Chloride	Fluoride	M-Alkalinity	Nitrate	Phosphate	Sulphate	Chemical Oxygen Demand	Conductivity	pH	*E. coli*
WAW	Winkelhaakspruit @ Secunda 26°31'12.14"S 29° 4'17.79"E	9.00	77	0.54	260	0.74	4.10	47	57	86	7.90	
		7.20	48	0.34	190	4.60	1.40	59	36	68	7.60	
		14.00	59	0.39	200	4.14	2.73	60	41	72	7.57	
		22.00	59	0.35	200	15.77	2.60	75	40	81	7.55	
WAT	Kleinspruit @ Secunda 26°33'9.73"S 29° 4'58.31"E	0.12	23	0.21	130	1.80	0.22	46	23	48	7.60	
		0.25	27	0.72	120	2.20	0.21	63	16	45	7.90	
		1.00	32	0.71	127	1.50	0.21	69	20	46	7.90	
		0.51	36	0.77	122	2.07	0.14	64	24	51	7.70	
WAR	Waterval River @ Roodebank 26°37'44.10"S 29° 1'32.31"E	3.20	46	0.52	210	1.20	1.60	56	39	65	7.90	
		2.60	30	0.54	130	1.40	0.56	55	30	48	7.60	
		4.77	39	0.74	140	4.37	1.01	71	26	56	7.47	
		4.70	38	0.50	160	7.07	1.37	55	26	62	7.65	
WAE	Waterval River @ Elandslaagte 26°51'30.04"S 28°53'23.52"E	0.15	62	0.43	210	1.00	1.40	70	35	71	8.10	
		0.25	16	0.52	92	1.50	0.33	46	26	34	7.70	
		<0.5	32	0.59	153	1.01	0.26	53	23	54	7.95	
		<0.2	42	0.45	162	0.84	0.41	47	23	62	8.19	
WATERVAL_VAAL	WATERVAL_VAAL - Waterval near confluence with Vaal River											
		0.25	20	0.59	100	2.80	0.68	60	25	39	7.60	
		<0.5	46	0.77	148	0.40	<0.2	63	22	51	8.17	
		<0.2	47	0.71	173	0.17	0.14	67	24	62	8.34	
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	15.00	60	0.46	215	3.50	3.10	49	115	73	7.40	2,036,520
		18.00	54	0.28	235	0.18	2.80	48	150	70	7.40	3,255,000
		16.67	48	0.29	187	2.50	3.13	49	79	68	7.37	1384133
		21.93	56	0.19	227	6.10	3.37	46	169	74	7.50	1017767
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	27.00	53	0.50	340	3.50	5.10	105	185	100	8.10	380,100
		12.00	48	0.27	210	0.46	4.20	54	55	74	7.90	650
		37.00	56	0.25	305	0.23	6.13	56	155	90	7.39	2298300
		25.00	45	0.21	308	1.68	4.77	58	147	98	7.44	853800
S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	5.30	62	0.38	150	1.40	0.30	69	35	63	8.00	1
		0.25	48	0.80	150	3.60	0.24	54	21	62	7.60	115
		<0.5	53	0.46	123	1.80	0.33	73	33	55	7.41	3
		0.55	41	0.38	113	2.00	0.27	52	64	63	7.48	5

***The above colour coding is as per the Waterval River Instream Water Quality Guideline and not Water Use License conditions for any mining/ industries.**

Sewage Works Compliance (where applicable) to General Standard (GN 1191 Oct 1999)

Sample Points	Sample Point Description	Ammonia		Fluoride		Nitrate	Phosphate		Chemical Oxygen Demand	Conductivity	pH	*E. coli*
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	15.00	48	0.46	215	3.50	3.10	65	115	73	7.40	2,036,520
		18.00	60	0.28	215	0.18	2.80	49	150	70	7.40	3,255,000
		16.67	54	0.29	235	2.50	3.13	48	79	68	7.37	1384133
		21.93	48	0.19	187	6.10	3.37	49	169	74	7.50	1017767
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	27.00	41	0.50	360	3.50	5.10	110	185	100	8.10	380,100
		12.00	53	0.27	340	0.46	4.20	105	55	74	7.90	650
		37.00	48	0.25	210	0.23	6.13	54	155	90	7.39	2298300
		25.00	56	0.21	305	1.68	1.68	56	147	98	7.44	853800

*** Applicable Water Quality Standards for final effluent discharge from Secunda Sewage Works (as per DWA licence)**

S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	5.30	48	0.38	105	1.40	0.30	74	35	63	8.00	1
		0.25	62	0.80	150	3.60	0.24	69	21	62	7.60	115
		<0.5	48	0.46	150	1.80	0.33	54	33	55	7.41	3
		0.55	53	0.38	123	2.00	0.27	73	64	63	7.48	5

Key

WAB	Bossiespruit @ Secunda	0.59	-	1 Oct 14 - 31 Dec 14
		0.12	-	1 Jan 15 - 31 Mar 15
		2.1	-	1 Apr 15- 30 Jun 15
		0.28	-	1 July 15 - 30 Sept 15

Water Quality Guidelines

	-	Ideal
	-	Acceptable
	-	Tolerable
	-	Unacceptable
	-	No sample or result available

In-stream Water Quality Guidelines for the Waterval Catchment

Variables	Measured as	Ideal Catchment Background	Acceptable Management Target	Tolerable Interim Target	Unacceptable
Physical					
Conductivity	mS/m	< 10	10 - 30	30 - 45	> 45
pH	pH units	6.5 - 8.5			< 6.5; > 8.5
Organic					
Chemical Oxygen Demand (COD)	mg/l	< 10	10 - 15	15 - 20	> 20
Macro Elements					
Ammonia (NH_4)	mg/l	< 0.2	0.2 - 0.5	0.5 - 1.0	> 1.0
Chloride (Cl)	mg/l	< 25	25 - 50	50 - 75	> 75
Fluoride (F)	mg/l	< 0.05	0.05 - 0.20	0.2 - 0.4	> 0.4
Alkalinity	CaCO3 mg/l	< 40	40 - 75	75 - 120	> 120
Nitrate (NO_3)	mg/l	< 0.1	0.1 - 0.2	0.2 - 0.3	> 0.3
Phosphate (PO_4)	mg/l	<0.05	0.05 - 0.25	0.25 - 0.50	> 0.50
Sulphate (SO_4)	mg/l	< 20	20 - 45	45 - 70	> 70
Bacteriological					
Faecal coliforms	counts/100ml	<10	10 - 60	60 - 120	> 120

*** Applicable Water Quality Standards for final effluent discharge from Secunda Sewage Works (as per DWA licence)**

Variable	Limit
pH	5.5 - 9.5
Electrical Conductivity	≤70 mS/m
Chemical Oxygen Demand	≤75 mg/l
Ammonia as N	≤6 mg/l
Nitrate / Nitrite as Nitrogen	≤15 mg/l
Orthophosphate as P	≤10 mg/l
Fluoride	≤1 mg/l
Faecal coliform units (FCU)	0 per 100ml

Sewage Works Compliance to General Standard

(GN 1191 Oct 1999)

Variables	Measured as	Acceptable Management Target	Unacceptable
Physical			
Conductivity	mS/m	<150	>=150
pH	pH units	5.5 - 9.5	< 5.5; >9.5
Organic			
Chemical Oxygen Demand (COD)**	mg/l	<75	>=75
Macro Elements			
Ammonia (NH_4)	mg/l	<3	>=3
Fluoride (F)	mg/l	<1	>=1
Nitrate (NO_3)	mg/l	<15	>=15
Phosphate (PO_4)	mg/l	<10	>10
Bacteriological			
Faecal coliforms	counts/100ml	<1000	>=1000

** After removal of algae