RAND WATER

Quarterly Water Quality Status of the Waterval River Catchment — **1 January 2017- 31 December 2017**

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	7.20	74	0.40	210	1.20	2.00	40	35	76	7.70	
		9.00	60	0.33	185	0.57	1.30	52	48	65	7.20	
		17.50	60	0.28	193	0.16	2.85	50	57	71	7.45	
		14.00	60	0.30	330	1.00	1.70	54	37	97	7.40	
WAT	Kleinspruit @ Secunda 26°33'9.73"S 29° 4'58.31"E	0.84	48	0.58	150	3.60	0.19	97	31	61	7.80	
		1.10	39	0.39	165	2.10	0.21	97	28	64	7.50	
		1.95	43	0.32	153	3.60	0.39	92	26	64	7.21	
		3.60	64	0.46	325	2.40	0.85	93	37	65	7.30	
WAR	Waterval River @ Roodebank 26°37'44.10"S 29° 1'32.31"E	0.92	38	0.49	120	2.20	0.19	57	37	47	7.60	
		8.70	65	0.46	175	0.22	1.40	58	35	66	7.40	
		11.10	66	0.40	129	0.19	2.10	70	40	44	6.83	
		12.00	74	0.43	340	2.10	1.40	91	23	71	7.30	
WAE	Waterval River @ Elandslaagte 26°51'30.04"S 28°53'23.52"E	0.20	13	0.45	58	0.56	0.10	22	32	21	7.40	
		0.12	54	0.43	170	0.71	0.20	69	28	56	8.00	
		0.08	69	0.45	175	1.30	0.43	80	29	58	7.82	
		0.75	74	0.44	180	1.10	1.20	46	28	61	7.40	
WATERVAL_VAAL	WATERVAL_VAAL - Waterval near confluence with Vaal River	0.2	34	0.40	72	1.70	0.12	21	34	27	7.50	
		<0.092	51	0.34	150	0.37	0.20	57	28	57	8.10	
		<0.05	55	0.40	178	0.14	<0.2	72	25	73	7.59	
		0.12	84	0.48	370	0.79	<0.2	72	30	62	7.70	
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	21.00	99	0.26	225	4.70	2.00	58	63	72	7.50	2672200
		14.00	61	0.52	150	1.60	2.00	46	40	66	7.20	1,769,750
		20.67	49	0.55	205	1.65	2.63	43	82	66	7.31	1337633
		11.00	49	0.24	135	9.10	3.20	44	51	66	6.80	1,215,200
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	28.00	96	0.22	295	0.18	3.40	95	125	99	7.70	1185300
		38.00	62	0.34	315	0.11	4.80	68	74	100	7.40	814,600
		29.00	55	0.26	278	0.52	5.80	73	109	92	7.75	173290
		26.00	66	0.30	265	1.10	4.80	73	61	91	7.30	906,500
S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	0.23	79	0.48	185	2.30	0.32	99	53	73	7.40	3
		1.40	60	0.46	145	2.60	0.20	72	46	64	7.40	1
		4.65	66	0.44	150	2.65	2.10	86	35	70	7.30	4530
		3.20	62	0.28	170	3.40	1.70	66	47	66	7.10	810

***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	21.00	99	0.26	225	4.70	2.00	58	63	72	7.50	2672200
		14.00	61	0.52	150	1.60	2.00	46	40	66	7.20	1,769,750
		20.67	49	0.55	205	1.65	2.63	43	82	66	7.31	1337633
		11.00	49	0.24	135	9.10	3.20	44	51	66	6.80	1,215,200
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	28.00	96	0.22	295	0.18	3.40	95	125	99	7.70	1185300
		38.00	62	0.34	315	0.11	4.80	68	74	100	7.40	814,600
		29.00	55	0.26	278	0.52	5.80	73	109	92	7.75	173290
		26.00	66	0.30	265	1.10	1.10	73	61	91	7.30	906,500

*** 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	0.23	79	0.48	185	2.30	0.32	99	53	73	7.40	3
		1.40	60	0.46	145	2.60	0.20	72	46	64	7.40	1
		4.65	66	0.44	150	2.65	2.10	86	35	70	7.30	4,530
		3.20	62	0.28	170	3.40	1.70	66	47	66	7.10	810

Key

WAB	Bossiespruit @ Secunda	0.59	-	1 Jan 17 - 31 Mar 17
		0.12	-	1 Apr 17- 30 Jun 17
		2.1	-	1 July 17 - 30 Sept 17
		0.28	-	1 Oct 17 - 31 Dec 17

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	$CaCO_3$ 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

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

*** 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