RAND WATER

**Quarterly Water Quality Status of the Waterval River Catchment** — **1 July 2015 30 June 2016**

**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 | 22.00 | 59 | 0.35 | 172 | 15.77 | 2.60 | 75 | 40 | 81 | 7.55 | |
| | | 12.30 | 44 | 0.50 | 198 | 1.11 | 2.15 | 38 | 52 | 71 | 7.45 | |
| | | 5.93 | 52 | 0.33 | 129 | 0.57 | 2.27 | 39 | 40 | 57 | 7.17 | |
| | | 5.40 | 38 | 0.43 | 129 | 2.73 | 1.08 | 48 | 31 | 48 | 7.99 | |
| WAT | Kleinspruit @ Secunda 26°33'9.73"S 29° 4'58.31"E | 0.51 | 36 | 0.77 | 122 | 2.07 | 0.14 | 64 | 24 | 51 | 7.70 | |
| | | 0.64 | 21 | 0.39 | 110 | 1.87 | 0.22 | 37 | 24 | 44 | 7.81 | |
| | | <0.2 | 29 | 0.69 | 97 | 1.60 | 0.23 | 86 | 27 | 52 | 7.51 | |
| | | 0.46 | 43 | 0.15 | 142 | 4.47 | 1.61 | 62 | 31 | 58 | 7.90 | |
| WAR | Waterval River @ Roodebank 26°37'44.10"S 29° 1'32.31"E | 4.70 | 38 | 0.50 | 160 | 7.07 | 1.37 | 55 | 26 | 62 | 7.65 | |
| | | 8.50 | 41 | 0.57 | 163 | 2.37 | 1.50 | 63 | 24 | 60 | 7.62 | |
| | | 3.80 | 59 | 0.62 | 115 | 0.73 | 0.78 | 69 | 19 | 60 | 7.15 | |
| | | 4.73 | 41 | 0.49 | 170 | 1.31 | 1.13 | 67 | 35 | 60 | 8.11 | |
| WAE | Waterval River @ Elandslaagte 26°51'30.04"S 28°53'23.52"E | <0.2 | 42 | 0.45 | 162 | 0.84 | 0.41 | 47 | 23 | 62 | 8.19 | |
| | | <0.5 | 9 | 0.63 | 218 | 0.54 | <0.2 | 24 | 25 | 67 | 7.97 | |
| | | <0.2 | 27 | 0.44 | 89 | 0.54 | 0.32 | 42 | 29 | 39 | 7.40 | |
| | | 0.28 | 37 | 0.59 | 138 | 0.64 | 0.14 | 65 | 32 | 58 | 8.27 | |
| WATERVAL_VAAL | WATERVAL_VAAL - Waterval near confluence with Vaal River | <0.2 | 47 | 0.71 | 173 | 0.17 | 0.14 | 67 | 24 | 62 | 8.34 | |
| | | <0.5 | 63 | 0.80 | 215 | <0.1 | 0.23 | 64 | 32 | 72 | 8.19 | |
| | | <0.2 | 19 | 0.49 | 78 | 0.73 | 0.43 | 39 | 33 | 33 | 7.46 | |
| | | 0.25 | 26 | 0.44 | 91 | 0.93 | 0.12 | 58 | 34 | 43 | 7.86 | |
| S-EVAN_W | Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E | 21.93 | 56 | 0.19 | 227 | 6.10 | 3.37 | 46 | 169 | 74 | 7.50 | 1017767 |
| | | 12.00 | 50 | 0.30 | 155 | 3.01 | 1.36 | 44 | 60 | 61 | 7.32 | 886850 |
| | | 13.43 | 38 | 0.39 | 213 | 7.65 | 2.35 | 61 | 53 | 72 | 7.44 | 1224867 |
| | | 21.50 | 23 | 18.63 | 223 | <0.1 | 2.85 | 46 | 106 | 75 | 7.35 | 1986300 |
| S-SEC_LOC | Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E | 25.00 | 45 | 0.21 | 308 | 1.68 | 4.77 | 58 | 147 | 98 | 7.44 | 853800 |
| | | 47.00 | 53 | 0.36 | 368 | 2.75 | 3.86 | 57 | 125 | 104 | 7.65 | 793050 |
| | | 33.50 | 44 | 0.24 | 83 | <0.1 | <0.1 | 42 | 58 | 49 | 7.51 | 1869450 |
| | | 31.00 | 68 | 0.3 | 343 | <0.1 | 7.10 | 79 | 98 | 113 | 7.44 | 490319 |
| S-SEC_SEW | Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E | 0.55 | 41 | 0.38 | 113 | 2.00 | 0.27 | 52 | 64 | 63 | 7.48 | 5 |
| | | <0.5 | 53 | 0.46 | 113 | 2.87 | 0.75 | 73 | 41 | 56 | 7.84 | 3 |
| | | 2.12 | 48 | 0.38 | 90 | 0.87 | 0.48 | 67 | 44 | 51 | 7.74 | 6 |
| | | 1.20 | 52 | 0.54 | 125 | 2.83 | 0.28 | 75 | 22 | 61 | 7.46 | 85 |

***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 | 21.93 | 56 | 0.19 | 227 | 6.10 | 3.37 | 46 | 169 | 74 | 7.50 | 1017767 |
| | | 12.00 | 50 | 0.30 | 155 | 3.01 | 1.36 | 44 | 60 | 61 | 7.32 | 886850 |
| | | 13.43 | 38 | 0.39 | 213 | 7.65 | 2.35 | 61 | 53 | 72 | 7.44 | 1224867 |
| | | 21.50 | 23 | 18.63 | 223 | <0.1 | 2.85 | 46 | 106 | 75 | 7.35 | 1986300 |
| S-SEC_LOC | Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E | 25.00 | 45 | 0.21 | 308 | 1.68 | 4.77 | 58 | 147 | 98 | 7.44 | 853800 |
| | | 47.00 | 53 | 0.36 | 368 | 2.75 | 3.86 | 57 | 125 | 104 | 7.65 | 793050 |
| | | 33.50 | 44 | 0.24 | 83 | <0.1 | <0.1 | 42 | 58 | 49 | 7.51 | 1869450 |
| | | 31.00 | 68 | 0.29 | 343 | <0.1 | <0.1 | 79 | 98 | 113 | 7.44 | 490319 |

*** 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 | 0.55 | 41 | 0.38 | 113 | 2.00 | 0.27 | 52 | 64 | 63 | 7.48 | 5 |
| | | <0.5 | 53 | 0.46 | 113 | 2.87 | 0.75 | 73 | 41 | 56 | 7.84 | 3 |
| | | 2.12 | 48 | 0.38 | 90 | 0.87 | 0.48 | 67 | 44 | 51 | 7.74 | 6 |
| | | 1.20 | 52 | 0.54 | 125 | 2.83 | 0.28 | 75 | 22 | 61 | 7.46 | 85 |

**Key**

| | | | | |
|---|---|---|---|---|
| WAB | Bossiespruit @ Secunda | 0.59 | - | 1 July 15 - 30 Sept 15 |
| | | 0.12 | - | 1 Oct 15 - 31 Dec 15 |
| | | 2.1 | - | 1 Jan 16 - 31 Mar 16 |
| | | 0.28 | - | 1 Apr 16- 30 Jun 16 |

**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