

**JOHANNESBURG WATER (PTY) LTD**

**POTABLE WATER QUALITY MONITORING PLAN**



**REVISION 3**

**February 2012**

## EXECUTIVE SUMMARY

The Potable Water Monitoring Policy, September 2001, as revised, has been reviewed and amended to accommodate changing business requirements.

The policy sets out the procedures that are followed and the resources that are used in order to ensure that the drinking water supplied to consumers is suitable and of acceptable standard.

The policy covers the following topics –

An overview of relevant legislation.

The bulk supply of water from Rand Water.

The principles of the sampling programme and the determinands that are included in the monitoring programme.

Staffing requirements of the programme, including maintenance of sampling points.

Information about certain determinands.

Communications, including the manner in which non-compliances are handled.

## APPROVAL

I have reviewed and approved the plan for monitoring water quality in Johannesburg, as set out in this document.



  
E Hugo  
Acting Chief Operating Officer

2012.03.14

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## ABBREVIATIONS

JW	Johannesburg Water (Pty) Ltd
RW	Rand Water
SANS 241	SANS 241 Ed 6.1 Drinking Water (2006)

## INTRODUCTION

### 1.1 GENERAL

Johannesburg Water (JW) (as the water services provider in terms of the Water Services Act, 1997), is responsible for the provision of, among others, the water supply to the Greater Johannesburg Region. The supply area is approximately 35 kilometres from West to East by 65 kilometres from North to South and is divided into six operational regions as shown in Appendix 1. The area served directly by JW is 1 626 square kilometres.

The water is supplied via bulk metered mains to JW's bulk storage reservoirs or towers, as well as, in certain areas, direct feeds to the JW reticulation. The bulk of the water is supplied under an agreement with Rand Water as well as cross-boundary inflows from Ekurhuleni and Tshwane. JW further supplies water to parts of Ekurhuleni, Mogali and Emfuleni. The flows are measured by 84 active meters varying from 12mm to 800mm in diameter (See Appendix 2). JW is responsible for the operation and maintenance of the distribution network within the metropolitan boundaries. In addition there are a number of areas which are supplied by non-piped means. Road tankers belonging to contractors are used for the delivery of chlorinated JW water into static communal tanks in these areas. These contractors are responsible for maintaining and cleaning of the tankers in accordance with the SOP "Cleaning of Water Tankers". Johannesburg Water is responsible for the cleaning of the static tanks, in accordance with the same SOP. In certain informal areas, a ring main feeds either static tanks or communal standpipes.

The purpose of the monitoring program is to:

- protect the public by providing assurance of the quality of the water,
- manage risk by detecting potential problems for corrective actions,
- provide assurance of contractual supply agreements,
- comply with the requirements of the Water Services Act and its Regulations.

### 1.2 QUALITY REQUIREMENTS

The Regulations No 509 dated 8 June, 2001 relating to compulsory National Standards and Measures to Conserve Water in terms of the Water Services Act, 1997 (Act No. 108 of 1997) require that (Regulations No 509, 2001, of Water Services Act):

" 5(1) *Within two years of the promulgation of these Regulations, a water services authority must include a suitable programme for sampling the quality of potable water provided by it to consumers in its water services development plan.*

*(2) The quality sampling programme contemplated in sub-regulation (1) must specify the points at which potable water provided to consumers will be sampled, the frequency of sampling and for which substances and determinants the water will be tested.*

*(3) A water services institution must compare the results obtained from the testing of the samples with SANS 241 or the South African Water Quality Guidelines published by the Department of Water Affairs and Forestry.*

*(4) Should the comparison of the results as contemplated in sub-regulation (3) indicate that the water supplied poses a health risk, the water services institution must inform the Director-General of the Department of Water Affairs and Forestry and the head of the relevant Provincial Department of Health and it must take steps to inform its consumers –*

*(a) the quality of the water that it supplies poses a health risk:*

*(b) of the reasons for the health risk;*

*(c) of any precautions to be taken by the consumers; and*

*(d) of the time frame, if any, within which it may be expected that water of a safe quality will be provided. ....*

*.....10(2) A water services audit must contain details for the previous financial year and if available, comparative figures for the preceding two financial years of-*

*.....(f)the water quality sampling programme contemplated in regulation 5(1), the results of the comparison set out in regulation 5(3) and any occurrence reported in compliance with regulation 5(4): and....."*

There are no legislated standards for the drinking water in South Africa. From the above legislation there is, however, a requirement to "compare the results from the testing of samples with SANS 241, or the South African Water Quality Guidelines published by the Department of Water Affairs and Forestry (DWA, 1996)."

SANS 241 Class 1 as well as Table C3 Alert Levels are used by JW for purposes of comparison.

### 1.3 OPERATIONAL CONTEXT

JW has a Standard Operating Procedure for reservoir cleaning to ensure minimal deterioration in the quality of water during storage. In addition JW has a Standard Operating Procedure for flushing and disinfecting mains prior to re-commissioning of mains or where required by an operational warning.

### 1.4 WATER QUALITY RISK ASSESSMENT

A water quality risk assessment is carried out annually in accordance with SANS 241 Part 2 Ed 1. This assessment identifies hazards that may require the monitoring plan to be modified. These hazards are incorporated into the risks which form part of Water Safety Plan. In addition, any risks identified during a revision of the Water Safety Plan are incorporated into the monitoring plan.

## 2 QUALITY OF TREATED BULK WATER SUPPLY (RW)

### 2.1 CONTRACTURAL RELATIONSHIP

RW is required to supply potable water which complies with SANS 241 Class 1, to the bulk supply meters. RW is also required to provide a total chlorine level of between 0,2 mg/L and 0,3 mg/L at any point in the JW distribution network. There is scope within the contractual agreement for JW to request adjustments to the chlorine limits should there be such a need. JW is responsible for the quality downstream of the bulk meters and for requesting adjustments by RW to their chloramination management to achieve adequate total chlorine residual results in the JW distribution. The relationship is contained in the Bulk Water Supply Contract between JW and RW dated October 2004.

### 2.2 CHECKS AND BALANCES

Rand Water has internal quality targets for production which cover more parameters and have more stringent compliance figures than SANS 241

RW does weekly sampling for microbiological analysis on 35 sampling points in the region, and 5 samples per week on Forest Hill and Yeoville. RW also does weekly sampling for chemical analysis on 20 sampling points.

RW provides JW with a monthly summary of all water quality supplied to it. (See Procedures document).

RW has a database in which it extrapolates water quality from its most appropriate sampling point to each bulk meter. This sampling point can be upstream or downstream of the meter.

JW's water quality monitoring program provides the cross-checks and balances on the data supplied by RW.

## 2.3 CHLORINATION

RW chlorinates at the treatment plants to achieve a free chlorine residual of 1,1 -1,2mg/l just downstream of the injection points. At the booster pump station the chloramination is managed to reach between 0,2 and 0,3 mg/l of total chlorine residual at any point of the J W distribution network.

## 2.4 COMMUNICATION PROTOCOL ON WATER QUALITY

A communication protocol covers the procedure followed between RW and JW with respect to water quality complaints.

# 3 SAMPLING POINTS IN THE DISTRIBUTION SYSTEM

## 3.1 PRINCIPLES

The program allows as far as practically possible to:

- provide assurance about the quality of the water anywhere in the distribution system
- monitor the evolution of the water quality between the Rand Water supply points, including the bulk storage facilities and the customer taps
- accommodate the water quality hazards identified in the Water Safety Plan
- identify (in case of non-compliance), the problematic reservoir, and the origin of take-off etc.
- monitor high risk areas
- monitor all significant supply zones

The suggested minimum frequency of sampling given in SANS 241 is 10 per month per 100 000 of population served (although more samples are indicated for the rainy season). Taking the average water demand for the Greater Johannesburg as 1000ML/day and using a water- consumption estimate of 285 litres/person/day equates to approximately 3,5 million inhabitants. The sampling program suggested by SANS 241 would be 350 samples per month. JW policy is to take a minimum of 500 samples per month.

A sample is defined by JW as: *A grouping of parameters, taken at a particular sample point at a particular time and placed in one or more containers depending on the parameters that are to be analysed.*

## 3.2 DETERMINANDS

SANS 241 requirements specify 36 determinands. Except for dissolved solids, which have been omitted as conductivity gives the same information, all are included in the JW monitoring policy, (Appendix 3).

SANS 241 includes an additional six operational determinands and all except for cytopathic viruses are included in the JW Policy. Cytopathic viruses are very expensive to test and the microbiological testing undertaken provides adequate protection.

The following determinands were identified during the Water Safety Plan Process.

CHEMICAL	BACTERIOLOGICAL	PHYSICAL
Ammonia	<i>E.coli</i>	Colour
Phosphat	Total coliforms	Turbidity

Nitrate  
 Sulphate  
 Chloride  
 Calcium  
 Magnesium  
 Sodium  
 Iron  
 Copper  
 Phenols  
 Trihalomethanes

Heterotrophic plate count  
 Cytopathogenic viruses  
 Cholera  
 Cryptosporidium  
 Giardia

Total dissolved solids  
 pH

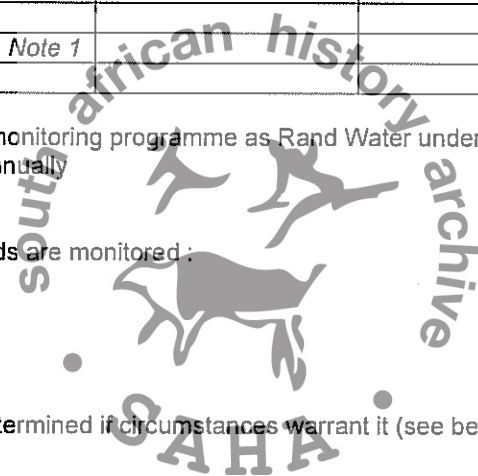
CHEMICAL	BACTERIOLOGICAL	PHYSICAL
		Radioactivity (Note 2)
Pesticides <i>Note 1</i>		
Volatile Organic Compounds <i>Note 1</i>		

Note 1 Not included in the monitoring programme as Rand Water undertakes this analysis.  
 Note 2 To be undertaken annually

Three additional determinands are monitored :

Alkalinity  
 Nitrite  
 Orthophosphate

Cholera and geosmin are determined if circumstances warrant it (see below).



### 3.3 FREQUENCY

#### 3.3.1 SAMPLING FREQUENCY

All sampling points are, as far as is practical, sampled at equal frequency. With a target of 500 samples per month, and approximately 270 active sampling points, each sampling point is sampled approximately twice per month.

#### 3.3.2 TESTING FREQUENCY

The frequency of testing is based on three classes of determinands. Essentially a class is a grouping of parameters which require similar frequencies of sampling depending on the relative importance (or weighting) attached to the determinand. The results of the annual water quality risk assessment inform the frequency of testing, where appropriate.

### 3.4 COVERAGE

In the JW water quality program the RW bulk meters are essentially inlets to the reservoirs and or towers. In addition a *Site* is considered as "one or more reservoir or a tower, or a combination of them, which are in close proximity to each other."

The JW water quality sample points are spread out geographically and are monitored as follows:

- Site inlets
- Site outlets
- distribution taps plus all significant direct feeds
- samples from non-piped areas in Informal Settlements

The list of sample points for routine sampling purposes is shown, with their identification numbers, in the Procedures Document, Appendix 4, and was selected on the following basis:

#### Inlets

Each site inlet has a sampling point. At a number of sites there is more than one reservoir, and at some of these each reservoir has its own inlet sampling point.

#### Outlets

Each site has a sampling point installed. In some cases, individual reservoirs have an outlet sampling point.

#### Distribution

There is a sampling point in each supply zone. These points are either in designated sampling kiosks or in the community such as clinics. Where a tower serves a very local zone or the turnover of water is high then only a tower outlet will be sufficient and a distribution sample point will not be used. It should be noted that, currently, not all supply zones are exactly defined.

#### Informal areas

Numbered static tanks, road tankers and their filling points for informal settlements or communal taps in these areas

The following information relates to distribution sample points.

- the criteria for a suitable sample point (Appendix 5)
- the typical existing fixed sample point sketch (Appendix 6)
- a photo of a typical existing sample point. (Appendix 7)
- a letter of introduction to a prospective customer whose premises has been identified as suitable for sampling (Appendix 8)
- pro forma Agreement for sampling in the distribution (Appendix 9)

## **4 STAFF**

### **4.1 SAMPLERS**

Three samplers take routine samples five days per week.

The Samplers are trained using a Standard Operating Procedure for sampling potable waters. Equipment provided to the samplers is also shown in the SOP. The performance of the samplers will be monitored and they will have incentives attached to their output and quality of sampling. The SOP will be used to do regular refresher courses at which time it will be reiterated that a poorly taken sample is a waste of hundreds of Rand, depending on which parameters are analysed. An important aspect of training will be ensuring that the Sampler understands that he/she is an important representative for JW. As many more samples will be taken in the public eye, it is essential that the behaviour of the Samplers is irreproachable.

The Samplers are provided with reliable, safe and economic vehicles which adequately transport all the samples and equipment. The Samplers and the visibility of their vehicles out in the community aid JW's strategy of improved customer service.



Samplers report all sampling related faults and observations to the Laboratory Manager Microbiology.

The Samplers have a standard key to gain access into secure site areas and a standard key to open the kiosks where they are locked..

The Samplers carry their Johannesburg Water identities on them as well as their letters authorising them to perform sampling (Appendix 10)

#### 4.2 LABORATORY

All samples are analysed at Cydna Laboratory with the exception of Giardia, Cryptosporidium, and Enteric viruses which are analysed by an external laboratory.

Cydna Laboratory is a South African National Accreditation System (SANAS) Accredited Laboratory (Number T0077). Every 12 months a sample is sent to an independent laboratory for quality assurance purposes. In addition, Cydna laboratory takes part in the following proficiency studies:

Watercheck STANSA monthly  
Rand Water Inter laboratory proficiency scheme every second month for Microbiological comparisons

The potable water quality samples, analysed at Cydna, are handled by three separate laboratories namely;

- Microbiology Laboratory
- Water Laboratory
- Analytical Chemistry Laboratory

Total chlorine and pH are measured in the field by the samplers with quality assurance being done by the Water Laboratory on pH. The laboratory data is managed using a Data System.

Cydna Laboratory is able to analyse the volume of samples generated by the potable water quality program.

#### 4.3 MAINTENANCE OF SAMPLING POINTS

Sample points at sites are maintained by the Electro-Mechanical Manager's staff and sample points in the supply zones (i.e. the distribution points) are maintained by the relevant Regional Manager's staff. This allows the samplers to take proper samples in the shortest possible time. Faulty sample points are reported by the sampler to the Laboratory Manager Microbiology, who will inform the relevant depot. A sketch of a typical site is given in Appendix 11.

### 5 DETAILS OF SPECIFIC DETERMINANDS

#### 5.1 pH and chlorine

The Water Laboratory performs routine quality assurance on pH.

Total chlorine levels are taken in the field at each sample point by the sampler. The Water Laboratory performs routine quality assurance on total chlorine as well.

Trends in chlorine levels in the distribution system are plotted graphically every month to determine a risk profile. This helps ensure that the total residual chlorine range of between 0,2 and 0,3 mg/L is achieved and that any deficiencies can be overcome by RW's chloramination management.. Total Trihalomethane (TTHM) levels must be borne in mind while ensuring chlorine levels are adequate. The Trihalomethane group consists of four individual compounds, which are added together to give TTHM.

#### 5.2 FLUORIDE

Regulation R873 dated 8 September 2000, of the Health Act, No 63 of 1977 makes fluoridation mandatory. Although this regulation became ineffective with the promulgation of the National Health Act of 2003 it is currently being reviewed. Natural fluoride levels are at 0,2mg/l which is below the optimal standard of 0,7 mg/l set by the Department of Health. Fluoride is a parameter included in the potable water-monitoring program.

### 5.3 CHOLERA

Cholera is not a determinand listed in SANS 241. This is because the bacteria *Vibrio cholera*, which causes the outbreak of the disease, is often found in untreated sewage. Due to the periodic outbreaks of this disease (from people who obtain their water from surface water) it receives relatively high levels of press attention at times. Testing for Cholera in the potable water will therefore be done if circumstances warrant it.

### 5.4 GEOSMIN

Geosmin is not a parameter or determinand listed in SANS 241. This is because it is a harmless substance, which causes an earthy or musty taste or odour. Algae produce this substance at certain times of the year, usually during summer months. Testing for Geosmin in the potable water is done reactively to a taste or odour complaint, and which fails the taste or odour panel for having an earthy or musty taste or odour. The Analytical Chemistry Laboratory undertakes the test.

## 6. COMMUNICATION AND REMEDIAL ACTION

### 6.1 ADVISORIES

- The monitoring of water quality is the responsibility of Business Support Division. Ensuring quality and remedial action is the responsibility of the Networks Division. When problems are experienced with water quality Business Support will advise Networks as soon as possible via the relevant Laboratory Manager.

The Disaster Management Plan defines three levels of emergency for each of three functional areas, namely Networks, Wastewater and Operations Support (now Business Support). The last of the three is concerned with water quality.

The three levels of emergency relating to water quality are summarised as follows:

Level 1 A water quality standard failure in a single sample. The actions that are followed are commonly referred to as an Operational Alert (Ops Alert) and are set out in SOP OS1.

Level 2 A water quality standard failure is confirmed by a check sample. Alternatively, there is more than one failure in a supply zone. There are no specific actions to be followed, as the response to the failure(s) will be determined by numerous factors, including:

- The level of disinfection
- The extent of poor water quality

The taking of samples over a broader area will be a likely action during a Level 2 emergency. Additional tests will also be considered. SOP OS1 contains more detail of actions to be taken,

Level 3 Widespread contamination of the water supply and/or multiple confirmed failures. Again, there are no specific actions to be followed. However, at this level, a Boil Alert will be considered. Factors that should be taken into account when considering a Boil Alert include:

- The level of disinfection
- The extent of poor microbiological quality
- Evidence of illness that might have resulted from the water supply

- The likelihood that the poor water quality will continue.

Boil Alerts are authorized by the Managing Director.

Any instances when, after an assessment, the water supplied poses a health risk the relevant Laboratory Manager alerts the Scientific Services Manager telephonically and/or via email. After consultation with the relevant senior managers the Managing Director informs the Director-General of Department of Water Affairs and Forestry, the head of the relevant Provincial Department of Health and the public. Although it is not prescribed in terms of the Water Services Act, the City of Johannesburg is informed.

## 6.2 QUALITY QUERIES FROM CALL CENTRE

The call centre staff is trained on screening and coding quality related queries. The Operations Contact Types are shown in Appendix 12. All quality queries are routed directly to Cydna Laboratory via Hansen and telephonically. The appropriate Laboratory Manager will handle the queries. The responsible Laboratory Manager will initially contact the customer regarding each query. A Service Request Water Quality Troubleshooting Reference Guide is used to ensure uniformity of response. If the query is not resolved, then the Laboratory Manager investigates further by checking with the Regional Manager whether there is any operational reason for the problem, and if needed analyse an ad hoc sample as well as additional samples from the neighbourhood. After the investigation the relevant laboratory manager contacts the customer and if possible resolve the problem. After initial investigations any serious queries will be drawn to the attention of the Water Quality Manager. Written queries on quality will be replied to in writing.

## 6.3 MONTHLY REPORTS

The results of the potable water quality monitoring program is compiled into a monthly report which indicates the salient information required for the management of the distribution system.

## 6.4 ANNUAL REPORTS

The potable water quality monitoring annual report summarises the monthly reports. It includes a review over the year highlighting any longer term concerns, consider seasonal variation (where applicable) and recommends any interventions etc. The year under review is compared to previous years.

## 6.5 RAND WATER AND JOHANNESBURG WATER CO-OPERATION

There is a Water Quality Liaison Committee with representatives from both JW and RW. This committee meets bi-monthly and discusses matters of common interest.

## 6.6 PRINTED AND ELECTRONIC INFORMATION

A JW potable water quality brochure (Appendix 13) is available to customers and interested people. A Compliance Statement is published monthly on [johannesburgwater.co.za](http://johannesburgwater.co.za)

## 7 REFERENCES

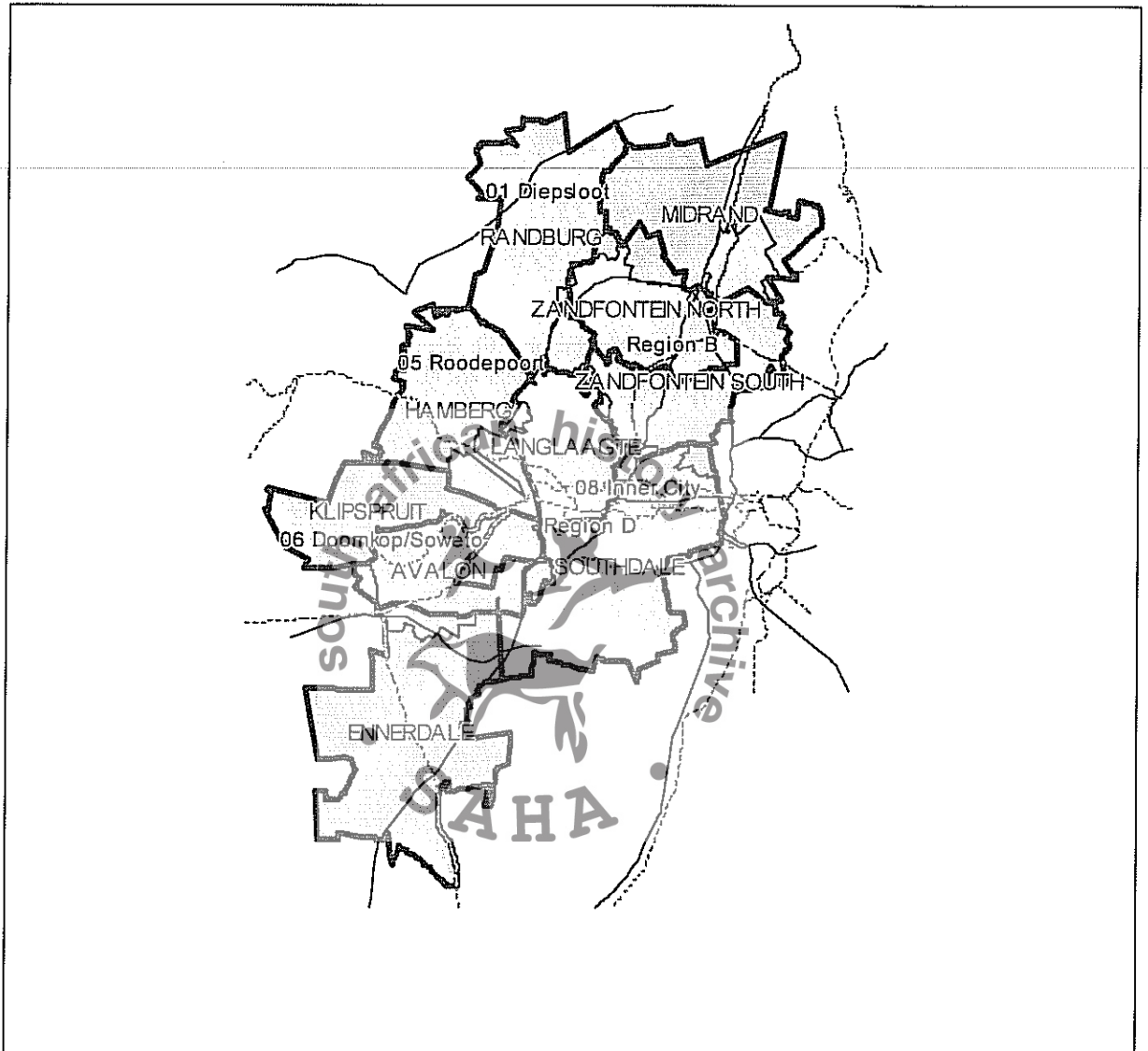
- 7.1 Water Services Act, 1997 Regulations No. 509 March 2001, Relating to compulsory National Standards and Measures to Conserve Water
- 7.2 SANS 241:2006, Edition 6.1 Drinking Water
- 7.3 Department of Water Affairs (1996). South African Water Quality Guidelines.

## 8 APPENDICES

1. Greater Johannesburg Water Regions
2. JW Bulk Supply Meters Including Cross-Boundary Meters
3. Determinands and their Frequency of Testing
4. Sampling Points
5. Criteria for Choosing Suitable Sampling Points
6. Sketch of a sampling point
7. Typical Sampling Point
8. Request Use of a Sampling Point
9. Agreement to Use a Sampling Point
10. ID Document
11. Sketch of a Site
12. Contact Types
13. Brochure



APPENDIX 1 - Greater Johannesburg Water Regions



APPENDIX 2 - JW Bulk Supply Meters Including Cross-Boundary Meters

Seq No	Meter Ref	Billed Consumer	Region Supplied Or Supplying	Meter Details Name	Size	Supplied b where not RW
1	306	Jhb Water	JHB Central	Turf Club (JW Cust)	100	
2	316	Jhb Water	JHB Central	Claremont	550	
3	467	Jhb Water	Soweto	Protea Township	50	
4	805	Jhb Water	JHB Central	Rietvlei Fire Service (JW Cust)	50	
5	879	Jhb Water	Soweto	Diepkloof Central	100	
6	963	Jhb Water	Soweto	Jabulani (Doornkop) Reservoir	700	
7	975	Jhb Water	Soweto	Aeroton Reservoir	600	
8	980	Jhb Water	Soweto	Orlando Power Station (JW Cust)	150	
9	1012	Jhb Water	JHB Central	Yeoville Reservoir	900	
10	1096	Jhb Water	JHB Central	South Hills Water Tower	450	
11	1113	Jhb Water	JHB Central	Aeroton Fire Service	150	
12	1116	Jhb Water	Soweto	Protea Township Temp	50	
13	1242	Jhb Water	JHB Central	Parks & Recreation Depot (JW Cust)	12	
14	1244	Jhb Water	JHB Central	Glenanda Township	100	
15	1284	Jhb Water	JHB Central	Winchester Hills	150	
16	1381	Jhb Water	Soweto	Johannesburg Water (Braam Fischerville Temp)	100	
17	1544	Jhb Water	Soweto	Bram Fischerville	200	
18	1617	Jhb Water	Sandton	North East Areas	600	
19	1651	Jhb Water	JHB Central	Bassonia	100	
20	1659	Jhb Water	JHB Central	Eagles Nest Reservoir	300	
21	1660	Jhb Water	Soweto	Power Park Reservoir	600	
22	1663	Jhb Water	JHB Central	Abattoir & Market	450	
23	1667	Jhb Water	JHB Central	Glenvista Reservoir	300	
24	1748	Jhb Water	JHB Central	Corriemoor Reservoir	450	
25	1797	Jhb Water	JHB Central	Oakdene	100	
26	1798	Jhb Water	JHB Central	Kibler Park Reservoir	150	
27	1984	Jhb Water	Deep South	Lenasia Township	400	
28	2014	Jhb Water	Sandton	Linksfield Ridge Reservoir	400	
29	2038	Jhb Water	JHB Central	Commando Road	600	
30	2068	Jhb Water	Soweto	Noordgesig	150	
31	2179	Jhb Water	Soweto	Diepkloof Reservoir	600	
32	2180	Jhb Water	Soweto	Meadowlands Reservoir (North)	600	
33	2181	Jhb Water	Soweto	Meadowlands Reservoir (South)	450	
34	2425	Jhb Water	Soweto	Chiawelo Reservoir	600	
35	2459	Jhb Water	Soweto	Ptn. 64 Klipspruit	50	
36	2615	Jhb Water	Soweto	New Canada Sports Grounds	50	
37	2733	Jhb Water	Soweto	Klipriviersoog Industries	100	
38	3514	Jhb Water	JHB Central	Crown Gardens Reservoir	400	
39	3682	Jhb Water	JHB Central	Forest Hill No. 2 Temp	300	
40	3908	Jhb Water	JHB Central	Stafford	800	
41	3909	Jhb Water	JHB Central	Forrest Hill Reservoir	800	
42	3910	Jhb Water	JHB Central	Malvern East	400	
43	3911	Jhb Water	JHB Central	Moffat View	600	
44	3917	Jhb Water	Soweto	Zondi	800	
45	4027	Jhb Water	JHB Central	PO Box 3112 Johannesburg	100	
46	4214	Jhb Water	Deep South	Weilers Farm	400	
47	4262	Jhb Water	Deep South	Ennerdale	400	
48	4263	Jhb Water	Deep South	Orange Farm	800	
49	4442	Jhb Water	Soweto	Bram Fischerville Ext 8	300	
50	503	Jhb Water	Roodepoort/Diepsloot	Roodepoort	100	
51	505	Jhb Water	Roodepoort/Diepsloot	Florida South Boundary	150	
52	507	Jhb Water	Roodepoort/Diepsloot	Abattoirs Hamburg	200	
53	510	Jhb Water	Roodepoort/Diepsloot	Industrial Sites Cement Factory (JW Cust)	150	
54	513	Jhb Water	Roodepoort/Diepsloot	Roodepoort Brickworks (JW Cust)	12	
55	514	Jhb Water	Roodepoort/Diepsloot	Florida 250mm	150	
56	515	Jhb Water	Roodepoort/Diepsloot	Princess Crusher Plant (JW Cust)	12	
57	523	Jhb Water	Roodepoort/Diepsloot	Discovery	150	
58	524	Jhb Water	Roodepoort/Diepsloot	Horison	150	
59	525	Jhb Water	Roodepoort/Diepsloot	South East Areas	200	
60	527	Jhb Water	Roodepoort/Diepsloot	Maraisburg	100	
61	528	Jhb Water	JHB Central	De La Rey	150	

62	529	Jhb Water	Roodepoort/Diepsloot	Whiteridge	200	
63	817	Jhb Water	Roodepoort/Diepsloot	West Roodepoort	150	
64	887	Jhb Water	Roodepoort/Diepsloot	Florida Lake Township	150	
65	905	Jhb Water	Roodepoort/Diepsloot	Industrial Sites No. 2 (JW Cust)	150	
66	915	Jhb Water	Roodepoort/Diepsloot	Princess Crusher Fire (JW Cust)	100	
67	1024	Jhb Water	Soweto	Vlakfontein (JW Cust)	50	
68	1133	Jhb Water	JHB Central	Waterval Reservoir	300	
69	1411	Jhb Water	Roodepoort/Diepsloot	Whiteridge North	600	
70	1433	Jhb Water	Roodepoort/Diepsloot	Horison North	450	
71	1750	Jhb Water	Roodepoort/Diepsloot	New Unified Maraisburg	100	
72	2103	Jhb Water	Roodepoort/Diepsloot	Grobler Park Reservoir	300	
73	2875	Jhb Water	Roodepoort/Diepsloot	Honeydew Reservoir	300	
74	2889	Jhb Water	Soweto	Cleaning Depot (JW Cust)	100	
75	3660	Jhb Water	Soweto	Marie Louise Landfill Site (JW Cust)	100	
76	3672	Jhb Water	Roodepoort/Diepsloot	Cornelius Street	600	
77	3829	Jhb Water	Roodepoort/Diepsloot	Wilford Shaft (JW Cust)	100	
78	3901	Jhb Water	Soweto	Roodepoort Administration	100	
79	4079	Jhb Water	Soweto	Protea Glen	300	
80	4082	Jhb Water	Soweto	Leratong Informal Settlement	200	
81	4120	Jhb Water	Soweto	Roodepoort Deep Township	400	
82	1531	Jhb Water	JHB Central	Crown Mines North (Deduct)	200	
83	2142	Jhb Water	JHB Central	Lower Crown Mines (Deduct)	100	
84	2508	Jhb Water	JHB Central	Portion 82 Doornfontein 92 (Deduct)	300	
85	2884	Jhb Water	JHB Central	3A-11-Dump (Deduct)	150	
86	3679	Jhb Water	JHB Central	Robinson 82 IR (Deduct)	50	
87	1399	Jhb Water	Sandton	Sandton No.1	800	
88	1042	Jhb Water	Sandton	Modderfontein (JW Cust)	600	
89	2175	Jhb Water	Sandton	Inferential (JW Cust)	600	
90	1007	Jhb Water	JHB Central	Waterval Dal	600	
91	2169	Jhb Water	Roodepoort/Diepsloot	Weltevreden HP BP	300	
92	2185	Jhb Water	Roodepoort/Diepsloot	Weltevreden High Pressure	450	
93	2132	Jhb Water	Midrand	North Western Areas	200	
94	3508	Jhb Water	Midrand	Halfway House South	450	
95	3764	Jhb Water	Midrand	President Park Res No 2	400	
96	2907	Jhb Water	Soweto	Soweto West Doornkop	100	
97	3548	Jhb Water	Soweto	Doornkop North	450	
98	2568	Jhb Water	Midrand	Rem Allendale	150	
99	0	Jhb Water	Deep South	Evaton Reservoir No 1 (Out of use Dec 02)	300	Emfuleni
100	0	Jhb Water	Deep South	Evaton Reservoir No 2 (P/Station By Pass)	200	Emfuleni
101	0	Jhb Water	Deep South	Enderdale Bulk Supply (Decommissioned Oct 02)	300	
102	0	Jhb Water	Midrand	Blue Hills	150	Tswane
103	99	Jhb Water	Sandton	Longmeadow	250	Ekurhuleni
104	101	Jhb Water	Sandton	Modderhill Res-in	200	Ekurhuleni
105	113	Jhb Water	Sandton	Foundersview	150	Ekurhuleni
106	4	Jhb Water	Sandton	Chloorkop res-out	200	Ekurhuleni
107	111	Jhb Water	Sandton	West of N3 (Rietfontein)	150	Ekurhuleni
108	112	Jhb Water	Sandton	Sebenza Ext 6	150	Ekurhuleni
109	0	Jhb Water	Sandton	Dowerglen 7 & 10 (Woolworths)	100	
110	0	Jhb Water	Sandton	Dowerglen 7 & 10 (Garage)	25	
111	0	Ekurhuleni	Sandton	Bedfordview No 1	150	
112	0	Ekurhuleni	Sandton	Bedfordview No 2	150	
113	102	Ekurhuleni	Sandton	Marais Steyn (Edenvale low areas)	200	
114	20	Ekurhuleni	Midrand	Umthambeka Res Emergency Supply	200	
115	38	Ekurhuleni	Midrand	Phomolong (link from Rabie Ridge)	150	
116	0	Ekurhuleni	Midrand	Ski Resort	50	
117	0	Ekurhuleni	JHB Central	Linnmeyer Ext 2 (Alberton)	50	
118	0	Emfuleni	Deep South	Palm Springs	200	
119	0	Mogale	Roodepoort/Diepsloot	Sonnendal	150	
120	0	Mogale	Roodepoort/Diepsloot	Ruimsig	150	

JW customers

Deduct meters

Selling to other Municipalities

Purchasing from Authority other than RW

APPENDIX 3 - Determinands and their frequency of testing

	Class	Determinand	Unit	Analyses per month
<b>Microbiological safety requirements</b>				
1	1	E.coli	Count/100ml	500
<b>Physical, organoleptic and chemical requirements</b>				
2	1	Colour	mg/L as Pt	500
3	1	Conductivity	mS/m	500
4	1	Odour	TON	44
5	1	pH	pH units	500
6	2	Taste	TTN	44
7	1	Turbidity	NTU	500
<b>Chemical requirements - macro-determinands</b>				
8	2	Ammonia	mg/L as N	44
9	2	Calcium	mg/L as Ca	44
10	2	Chloride	mg/L as Cl	44
11	2	Fluoride	mg/L as F	44
12	2	Magnesium	mg/L as Mg	44
13	2	Nitrate and nitrite	mg/L as N	44
14	2	Potassium	mg/L as K	44
15	2	Sodium	mg/L as Na	44
16	2	Sulphate	mg/L as SO <sub>4</sub>	44
17	2	Zinc	mg/L as Zn	44
<b>Chemical requirements - micro-determinands</b>				
18	2	Aluminium	mg/L as Al	44
19	2	Antimony	µg/L as Sb	44
20	2	Arsenic	µg/L as As	44
21	2	Cadmium	µg/L as Cd	44
22	2	Chromium	µg/L as Cr	44
23	2	Cobalt	µg/L as Co	44
24	2	Copper	mg/L as Cu	44
25	2	Cyanide (Free)	µg/L as CN	44
26	2	Iron	mg/L as Fe	44
27	2	Lead	µg/L as Pb	44
28	2	Manganese	mg/L as Mn	44
29	2	Mercury	µg/L as Hg	44
30	2	Nickel	µg/L as Ni	44
31	2	Selenium	µg/L as Se	44
32	2	Vanadium	µg/L as V	44
<b>Chemical requirements - organic determinands</b>				
33	2	Dissolved Organic Carbon	mg/L as C	44
34	See note 1	Total Trihalomethanes	µg/L	14
35	2	Phenols as C <sub>6</sub> H <sub>5</sub> OH	µg/L	44
<b>Operational water quality alert values</b>				
	1	Turbidity	NTU	500
36	1	Residual chlorine	mg/L	500
37	1	Heterotrophic Plate Count	count/mL	500
38	1	Total coliforms	count/100 mL	500
39	3	Somatic coliphages	count/10 mL	10 samples 4 times a year
40	3	Giardia / Cryptosporidium	count/10 L	10 samples once a year
<b>Other Determinands</b>				
41	2	Alkalinity	mg/L as CaCO <sub>3</sub>	44
42	2	Nitrite	mg/l as L	44
43	2	Phosphate	mg/L as P	44

Note 1 : 14 fixed sample points are monitored once per month



## APPENDIX 4 - Sampling Points

Sample Point	Description	Address
RW_0319	Aeroton Reservoir distr., Diepkloof	cnr Ngaba/Martinus Smuts, Diepkloof, Zone 5
RW_0001	Aeroton Reservoir Inlet R.W.B. Ex	Lange St Aeroton
RW_0002	Aeroton Reservoir Outlet	Lange St Aeroton
RW_0090	Alan Manor - Distribution - Kibler Park	c/r Mountbank/Fairway Kibler Pk
RW_0091	Alan Manor - Distribution - Mondeor	174 Endwell St Mondeor
RW_0089	Alan Manor - Reservoir Inlet Ex Eagles N	16 Constantia Drive Alan Manor
RW_0088	Alan Manor - Reservoir Outlet	16 Constantia Drive Alan Manor
RW_0036	Alexander Park Distribution - Cyrildene	Dixon Park Bayne Ave Cyrildene
RW_0132	Alexander Park reservoir inlet	Persimmons St
RW_0133	Alexander Park Reservoir Outlet	Persimmons St
RW_0035	Berea - Distribution - Kensington	Rhodes Park Bowl. Green Kensington
RW_0033	Berea - Reservoir Inlet Rwb Via City Dis	c/r Tudhope & Prospect Berea
RW_0034	Berea - Reservoir Outlet	c/r Tudhope & Prospect Berea
RW_0253	Blairgowrie Res Distr Old Parks	Old Parktonians Sports Club
RW_0251	Blairgowrie Res Inlet	Equity & Susman
RW_0252	Blairgowrie Res Outlet	Equity & Susman
RW_0259	Boschkop Res 1, 2 Distr., Kelly Ave	Boskruin Community Centre
RW_0255	Boschkop Res Inlet	Pikkewyn Ave
RW_0380	Braam Fischer Reservoir Inlet	DRD Road
RW_0381	Braam Fischer Reservoir Outlet	DRD Road
RW_0055	Brixton - Distribution Reservoir - Cemet	c/r Caroline & Krause (in cemetery)
RW_0054	Brixton - Distribution Reservoir - Mayfair	Arthur Bloch Park 9th St Mayfair
RW_0058	Brixton - Distribution Tower - Auckland	K Frost Park c/r Chiswick & Beverley Brx
RW_0053	Brixton - Reservoir Outlet	Ilseworth St btw Barnes & Fulham Bx
RW_0057	Brixton - Tower Inlet	Fulham off Ilseworth St Brixton
RW_0056	Brixton - Tower Outlet	Fulham off Ilseworth St Brixton
RW_0052	Brixton Reservoir Inlet Ex Yeoville	Ilseworth St Brixton
RW_0138	Bryanston - Reservoir Outlet	Cross/Mount/Main, Bryanston
RW_0143	Bryanston Res Distr Petervale Srv.Sta	Petervale Service Station
RW_0162	Bryanston Reservoir Inlet Fm Rand Water	Cross/Mount/Main Bryanston
RW_0445	Bryanston Tower - Inlet & Outlet (445)	Bryanston Tower Inlet/ Outlet
RW_0399	Chiawelo Reservoir	Church of Nazarene, 2537 cnr Potch/Mhalaba x2
RW_0395	Chiawelo Reservoir Inlet	Baraneng Street
RW_0396	Chiawelo Reservoir Outlet	Baraneng Street
RW_0481	Constantia Kloof Tower Total Garage J Lister	Constantia Kloof Tower, Total Garage, Joseph Lister
RW_0152	Constantia Tower Inlet/Outlet	Golf Club Terrace, Constantia Kloof
RW_0630	Coporate Park Reservoir & Tower Inlet Old Pta Rd	Coporate Park Reservoir old Pretoria Rd Randjes Pa
RW_0631	Corporate Park Reservoir Outlet	Country View Reservoir Outlet Old Pretoria Rd Rand
RW_0633	Corporate Park Wt Outlet Old Pta Rd	Old Pretoria Rd Randjes Park
RW_0106	Corriemoor - Distribution - Fairland	c/r 4th & Market Fairland
RW_0104	Corriemoor - Reservoir Inlet Rwb Ex Corr	Washington Dr Northcliff Exts
RW_0105	Corriemoor Reservoir Outlet	Washington Dr Northcliff Exts
RW_0634	Country View - Reservoir	Country View Res, DBSA Building, off Lever Rd, Cou
RW_0134	Crosby Distrib. Price Off Kelvin - Indus	c/r Kelvin & Newclare Industria
RW_0129	Crosby Pump Station - Outlet to ind. area	Harmony Rd at Fuel Rd frk Coronatnville
RW_0127	Crosby Pump Station - Outlet - to Brixton	Harmony Rd at Fuel Rd frk Coronatnville
RW_0128	Crosby Pump Station - Pump Station Inlet	Harmony Rd at Fuel Rd frk Coronatnville
RW_0072	Crown Gardens - Distribution Res -	Crown Gardens Res Distr - Boosens Reserve/Crownwo
RW_0071	Crown Gardens - Distribution Reservoir -	Crown Gardens Reservoir Distr - Roads Depot Ophirt
RW_0073	Crown Gardens - Distribution Tower	Crown Gardens Tower Distr - c/r Harry & Jasper Rob
RW_0067	Crown Gardens - Reservoir Inlet ex RW	Rifle Range/Xavier Crwn Grdn
RW_0068	Crown Gardens - Reservoir Outlet	Rifle Range btw Limerick/Woodgreen
RW_0070	Crown Gardens - Tower Inlet	Woodgreen St Crown Gardens
RW_0069	Crown Gardens - Tower Outlet Ex Crown Gar	Woodgreen St Crown Gardens
RW_1004	Devland Filling Point	Settlement Filling Point - Devland
RW_0273	Diepkloof - Reservoir	Total circle gar
RW_0270	Diepkloof Reservoir Inlet	Ben Naude Road
RW_0271	Diepkloof Reservoir Outlet	Ben Naude Road
RW_1001	Diepsloot Filling Point	Settlement Filling Point - Diepsloot
RW_0450	Doornkop West Reservoir Inlet	Doornkop West Reservoir Inlet Roodepoort/Randfontein
RW_0451	Doornkop West Reservoir Outlet	Roodepoort/Randfontein Roads
RW_0047	Dunkeld - Distribution - Craighall Park	Craighall Bowling Club 29 Abercom C/hall Park
RW_0048	Dunkeld - Distribution - Parkhurst	Dunkeld - Reservoir - Parkhurst Rec Centre 13th St
RW_0045	Dunkeld - Reservoir Inlet Ex Parktown No	51 Kent Ave Dunkeld
RW_0046	Dunkeld - Reservoir Outlet	Dunkeld - Reservoir outlet c/r Bompas/Christpherso
RW_0086	Eagles Nest - Reservoir Inlet Rwb Ex Eag	Eikenhof Quarry Vereeniging Rd Eikhnhf
RW_0405	Eagles Nest Res	Eagles Nest Res Hotel Formula 1 47 Murray str cnr
RW_0087	Eagles Nest Reservoir Outlet	Eikenhof Quarry Vereeniging Rd Eikhnhf
RW_1244	Eikenhof Settlement Tank No. A42	Eikenhof settlement tank no. A42
RW_1246	Eikenhof Settlement Tank No. A43	Eikenhof settlement tank no. A43
RW_1245	Eikenhof Settlement Tank No. A47	Eikenhof settlement tank no. A47
RW_0332	Ennerdale Res. Distr. Town Road	BP garage Reservoir
RW_0330	Ennerdale Reservoir Inlet	1st ave Mid-Ennerdale
RW_0331	Ennerdale Reservoir Outlet	1st ave mid Ennerdale
RW_0650	Erand Reservoir 1 Inlet	c/r New & 6th Roads Halfway Gardens
RW_0652	Erand Reservoir 1Outlet & Tower Inlet	c/r New & 6th Roads Halfway Gardens
RW_0655	Erand Reservoir 2 Inlet	c/r New & 6th Roads Halfway Gardens
RW_0651	Erand Reservoir 2 Outlet	c/r New & 6th Roads Halfway Gardens
RW_0654	Erand Reservoir distr - Kyalami Country Club	Kyalami Country Club, Maple Rd Kyalami AH
RW_0653	Erand Wt Outlet	c/r New & 6th Roads Halfway Gardens
RW_0109	Fairland - Distribution - Fairland	273 Castle Hill St Northcliff

RW_0107	Fairland Reservoir Inlet	8th Ave., off Kessel St Fairland
RW_0108	Fairland Reservoir Outlet	8th Ave., off Kessel St Fairland
RW_0500	Finch Street Tower Inlet/Outlet	Horison Finch Tower Inlet
RW_0501	Finch Street Tower Dist. Trichardt St	Finch St Tower, Discovery Bowling Club, 4 Trichard
RW_0660	Fire Station - 1 Persimmon Str, Malvern	Yeoville Reservoir Distrbution - Malvern Fire Stat
RW_0491	Florida N Tower Dist., 134 Shamrock St	Florida North Tower 134 Shamrock Street Florida
RW_0153	Florida North Tower Inlet/Outlet	Beacon Road Florida North
RW_0076	Forest Hill - Distribution Tower	Forest Hill Distr - Charles Preddy Pk Alexander Rd
RW_0075	Forest Hill - Pump Station Outlet	418 Rifle Range Rd Towerby
RW_0074	Forest Hill - Tower Inlet Rwb Ex Forest	418 Rifle Range Rd Towerby
RW_0661	Forest Hills Distr - Traduna House	Forest Hill Distribution - Traduna House
RW_0103	Glenvista - Distribution - Mulbarton	c/r The Broads/Sneueberg Mlbrtn
RW_0101	Glenvista - Reservoir Inlet Rwb Ex Glenv	c/r Rolene & Van Beek Glenvista
RW_0102	Glenvista Reservoir Outlet	c/r Rolene & Van Beek Glenvista
RW_0615	Grand Central - Res Dist AA	Grand Central Reservoir Distr. AA c/r Le Roux and
RW_0610	Grand Central Reservoir Inlet	Grand Central Reservoir Inlet Dale Road
RW_0611	Grand Central Reservoir Outlet	Grand Central Reservoir Outlet (Midrand)
RW_0614	Grand Central Tower Distr. Conf. Centre	Grand Central Tower M/rand Conf Centre, 280 Pendul
RW_0612	Grand Central Tower Inlet, Dale Rd	Grand Central Tower Inlet Dale Road
RW_0613	Grand Central Tower Outlet	Grand Central Tower Outlet Dale Road
RW_0463	Helderkruiin Res Distr Ouklip/cr Swart	Car wash, cnr Ouklip/CR Swart, Wilro Park
RW_0460	Helderkruiin Reservoir Inlet	Helderkruiin reservoir inlet
RW_0461	Helderkruiin Reservoir Outlet	Helderkruiin reservoir outlet
RW_0644	Hikhensile Clinic - Ivory Park	Rabie Ridge, Hikhensile Clinic, 8786 Koko Str, Ivo
RW_0275	Honeydew Res Inlet	Boundary & Wilgespr
RW_0279	Honeydew - Exel Garage	Excel Garage
RW_0276	Honeydew - Reservoir Outlet	Honeydew Res Outlet
RW_0277	Honeydew - Tower Inlet	Honeydew Tower Inlet
RW_0278	Honeydew - Tower Outlet	Honeydew Tower Outlet
RW_0064	Hurst Hill - Distribution Reservoir 1 -	Nville RC Italian/12th Newlnd
RW_0065	Hurst Hill - Distribution Reservoir 2 -	Marks Park Judith Rd Emmrntia
RW_0066	Hurst Hill - Distribution Reservoir 2 -	Pirates B Cb Cruden Bay Grnsd
RW_0063	Hurst Hill - Distribution Reservoir 2 -	Academie & Studente Rossmore
RW_0059	Hurst Hill - Reservoir 1 Inlet Rwb Via C	Inlet - Prosperine & Mercury Mfair W
RW_0060	Hurst Hill - Reservoir 1 Outlet	Outlet - Harmony & Portland Westbury
RW_0061	Hurst Hill - Reservoir 2 Inlet Rwb Via C	Ingelby & High St Crosby
RW_0062	Hurst Hill - Reservoir 2 Outlet	Outlet - Ingelby & High St Brixton
RW_0140	Illovo Res Distr Cnr Republic & William Ni	Engen Garage
RW_0163	Illovo Reservoir Inlet Fm Rand Water	Fricker / Harries/Ferguson/Melville
RW_0139	Illovo Reservoir Outlet	Fricker/Harries/Ferguson/Melville
RW_0435	Illovo Tower - Inlet & Outlet (436)	Illovo Tower Inlet/Outlet Fricker/Harries/Ferguson
RW_1012	Ivory Park Settlement Tank 3651	Settlement Tank - Ivory Park Tank 3651
RW_1013	Ivory Park Settlement Tank 3652	Settlement Tank - Ivory Park Tank 3652
RW_1008	Ivory Park Settlement Tank 3653	Settlement Tank - Ivory Park Tank 3653
RW_1010	Ivory Park Settlement Tank 3665	Settlement Tank - Ivory Park Tank 3665
RW_1011	Ivory Park Settlement Tank 3674	Settlement Tank - Ivory Park Tank 3674
RW_1009	Ivory Park Settlement Tank 3676	Settlement Tank - Ivory Park Tank 3676
RW_0131	Jabulani reservoir distribution	Civic Centre Koma Rd Jabulani
RW_0016	Jabulani Reservoir Distribution - Moroka	Police Station c/r Potch & Koma Moroka
RW_0013	Jabulani Reservoir Inlet	Boland Road
RW_0390	Jabulani Tower distribution	SAPS Jabulani, Bolani rd, Jabulani
RW_0284	Kensington B Res Dist Vale Ave	Vale Ave, Cnr Fleet St
RW_0280	Kensington B Reservoir Inlet	Bayewater & Grey St
RW_0281	Kensington B Reservoir Outlet	cnr Bayewater & Grey St
RW_0282	Kensington B Tower Inlet	Grey & Bayswater
RW_0283	Kensington B Tower Outlet	Grey & Bayswater
RW_0096	Kibler Park - Distribution - Mayfield Pa	c/r Japis & Corundum St Mayfield Prk
RW_0097	Kibler Park - Distribution Kibler Park	Stanmore / Main St Kibler Park
RW_0094	Kibler Park - Reservoir Inlet Rwb Via Ci	163 Peggy Vera Kibler Park
RW_0095	Kibler Park - Reservoir Outlet Rwb Via Ci	163 Peggy Vera Kibler Park
RW_0496	Kite Street - Biokinetics Clinic	Kite str tower, Biokinetics clinic Pheasant str, H
RW_0495	Kite Street Tower Inlet/Outlet	Horison Kite Tower Inlet
RW_1235	Lawley Estates Settlement Tank No. 15	Lawley Estates settlement tank no. 15
RW_1230	Lawley Estates Settlement Tank No. 18	Lawley Estates settlement tank no. 18
RW_1006	Lawley Filling Point	Settlement Filling Point - Lawley
RW_0124	Lenasia Cosmos Reservoir Inlet	off c/r Impala/Cosmos Lenasia South
RW_0125	Lenasia Cosmos Reservoir Outlet	off c/r Impala/Cosmos Lenasia S
RW_0327	Lenasia High Level Reservoir Distr Zach	Zacharia Park Engen Garage
RW_0325	Lenasia High Level Reservoir Inlet	Lenasia High Level - Reservoir inlet
RW_0326	Lenasia High Level Reservoir Outlet	Lenasia High Level - Reservoir outlet
RW_0341	Lenasia Hospital Hill Res. Outlet	Lenasia South Terminal reservoir inlet
RW_0340	Lenasia Hospital Hill Reservoir Inlet	Lenasia South Terminal reservoir outlet
RW_0126	Lenasia Reservoir Distr. - Lenasia	Total Garage c/r Flamingo & Rose Lenasia
RW_0118	Lenasia Reservoir Distr. - Lenasia Ext 6	c/r Olive & Palm Lenasia Ext 6
RW_0333	Lenasia Se Res. Distr. Lenasia S	Clinic, cnr Wimbledon & Wellington, Lenasia S
RW_1002	Lenasia South Filling Point	Settlement Filling Point - Lenasia South
RW_0135	Linbro Park Reservoir 1 Outlet	c/r Clulee & Clifford Linbro Pk
RW_0425	Linbro Res 1, 2 Distr. - Linbro Landfill	Linbro Landfill
RW_0144	Linbro Res 1,2 distr. Gibson Dr	Caltex Garage, Bridge Shopping Centre,
RW_0159	Linbro Reservoir 1 Inlet ex RW	c/r Clulee Rd & Clifford Ave.
RW_0294	Linden 1 Res Distr. Randburg Fire Statn	Randburg Fire Station, 136 Hendrik Ver dr, Ferndal
RW_0290	Linden 1 Reservoir Inlet	Cnr 2nd str & 1st Ave
RW_0291	Linden 1 Reservoir Outlet	Cnr 2nd str & 1st ave Linden
RW_0295	Linden 2 Res Distr. Strydom Park	Pikitung Strydompark Depot
RW_0675	Linden 2 Reservoir Inlet	c/r End, Hans Strijdom
RW_0676	Linden 2 Reservoir Outlet	c/r End, Hans Strijdom
RW_0292	Linden Tower Inlet	Cnr 2nd str & 1st Ave Linden

RW_0293	Linden Tower Outlet	Cnr 2nd str & 1st Ave Linden
RW_0123	Linksfield - Distribution	12th St off Council Rd
RW_0122	Linksfield res Outlet	Club St
RW_1550	Lion Park Filling Point	Settlement Filling Point - Lion Park
RW_0430	Marlboro Res - Distrib - Rivonia Library	Marlboro Res - Rivonia Library, c/r 10th Ave/Riv.
RW_0160	Marlboro Reservoir Inlet From Rand Water	9th St Marlboro Gardens
RW_0466	Meadowlands East & West, Outlet	Lekankagata and Masreru Street
RW_0662	Meadowlands North Res Inlet	Meadowlands North Res Inlet
RW_0469	Meadowlands Tower	Afr Meth Church
RW_1184	Miriting Settlement Tank No. A1	Miriting settlement tank no. A1
RW_1183	Miriting Settlement Tank No. A3	Miriting settlement tank no. A3
RW_1182	Miriting Settlement Tank No. A7	Miriting settlement tank no. A7
RW_0560	Modderhill reservoir Inlet	van Riebeeck Rd, Edenvale
RW_0561	Modderhill Reservoir outlet	Van Riebeeck Rd. Edenvale
RW_0141	Morningside Pre Primary Cnr Summit/coler	Pre-primary
RW_0161	Morningside Reservoir Inlet From Rw	West Road South
RW_0137	Morningside Reservoir Outlet	West Road South
RW_0092	Naturena - Reservoir Inlet Ex Eagles Nes	Carmen St Naturena
RW_0093	Naturena - Reservoir Outlet	Marguerite Place Naturena
RW_0550	Naturena Distribution Cnr. Pienaar & Malta Streets	Naturena Distribution Cnr. Pienaar & Malta Streets
RW_0085	Northcliff - Distribution Tower	c/r Hearn Rd & Rocky St Northcliff
RW_0082	Northcliff - Linden Bowling Club	Emma Park 1st St Linden
RW_0080	Northcliff - Reservoir Inlet	14 Bernard Lane Northcliff
RW_0081	Northcliff - Reservoir Outlet	14 Bernard Lane Northcliff
RW_0084	Northcliff - Tower Inlet Ex Northcliff	Lucky St Northcliff
RW_0083	Northcliff - Tower Outlet	Lucky St Northcliff
RW_3075	Northern Works Farm Reservoir	Northern Works Farm Reservoir
RW_3010	Olivedale Reservoir Distribution - Northern Works	Olivedale Res Northern Works Main Administration
RW_0300	Olivedale Reservoir Inlet	Olivedale Reservoir Inlet
RW_0301	Olivedale Reservoir Outlet	Olivedale Reservoir Outlet
RW_0364	Orange Farm High Level Distribution	Ext 8 (next to Pudumo Primary School)
RW_0360	Orange Farm High Level Inlet	Orange Farm High Level inlet
RW_0352	Orange Farm Low Level Distribution	BP Garage Orange Farm - Main Rd
RW_0350	Orange Farm Low Level Inlet	Orange Farm low level inlet
RW_0351	Orange Farm Low Level Outlet	Orange Farm low lever outlet
RW_0006	Orlando Res. Distribution - Klipspruit	Orlando Reservoir Distribution - Tsolo St Klipspru
RW_0312	Orlando Reservoir distr.	Orlando E. Meth Church, 6452 Mooki st, Orl East
RW_0310	Orlando Reservoir Inlet	Moshoeshoe Road
RW_0311	Orlando Reservoir Outlet	Moshoeshoe Road
RW_0041	Parktown - Distribution Reservoir 2 - Cy	Distr Cydna 75 4th St Houghton
RW_0042	Parktown - Distribution Reservoir 2 - Zo	Zoo Upper Park Dr Forest Town
RW_0037	Parktown - Reservoir 1 Inlet Rwb Via Cit	York Rd Parktown
RW_0039	Parktown - Reservoir 2 Inlet Rwb Via Cit	York Rd Parktown
RW_0040	Parktown - Reservoir 2 Outlet	Princess of Wales St Parktown
RW_0043	Parktown 1 & Linksfield Reservoir Distr	Paterson Park Bowl Green
RW_0044	Parktown 1 & Linksfield Reservoir Distr	Bpk S/Centre Northview Bpk
RW_0357	Poortjie Distribution Main Rd	Thusa Setshaba Sec School, Main rd Poortjie
RW_0098	Power Park - Reservoir Inlet Rwb Ex Pump	off Axle St Power Park
RW_0099	Power Park - Reservoir Outlet	off Axle St Power Park
RW_0313	Power Park Res Distr. O/vlei Wwtw	O/vlei Wastewater Works
RW_0605	President Park res 2 Outlet	Modderfontein Road
RW_0601	President Park Reservoir 1 Outlet	Modderfontein Road
RW_0600	President Park Reservoir 1, 2, WT Inlet	Modderfontein Road
RW_0603	President Park Wt Outlet	Modderfontein Road
RW_0156	Princess - Reservoir Outlet	c/r Vermooten/South,Witpoortjie
RW_0472	Princess Reservoir Distr. Dromedaris	Witpoortjie Senior Park
RW_0470	Princess Reservoir Inlet	cnr Vermooten & South Rd
RW_0471	Princess Tower Inlet	Vermooten & South Rd
RW_0515	Quellerina Tower Inlet	Quellerina Tower Inlet - Maluti Street
RW_0640	Rabie Ridge Reservoir Inlet	Rabie Ridge Reservoir Inlet K56 Commercia
RW_0641	Rabie Ridge Reservoir Outlet	Rabie Ridge Reservoir Outlet K56 Commercia
RW_0642	Rabie Ridge Wt Inlet K56 Commercia	Rabie Ridge Water Tower Inlet K56 Commercia
RW_0643	Rabie Ridge Wt Outlet K56 Commercia	Rabie Ridge Water Tower Outlet - K56 Comercia
RW_0664	Rand Water feed - Morninghill	Sugarbush Road
RW_0620	Randjiesfontein Res Inlet	Ballyjamesduff Road
RW_0623	Randjiesfontein Res Outlet	Ballyjamesduff Road
RW_0621	Randjiesfontein Tower Outlet	Randjiesfontein Reservoir Outlet Ballyjamesduff Rd
RW_0622	Randjiesfontein WT Inlet	Ballyjamesduff Road
RW_0113	Randjieslaagte - Distribution - Kew	Corlett Drive
RW_0112	Randjieslaagte - Distribution - Lombardy	33 Dante Rd Lombardy East
RW_0145	Randjieslaagte - Outlet,	3rd Avenue Library,
RW_0146	Randjieslaagte - Outlet,	Zenzeleni School,
RW_0110	Randjieslaagte - Reservoir Inlet Rwb Via	92 Sandler Road Glenhazel
RW_0111	Randjieslaagte - Reservoir Outlet	Northfield Rd
RW_0317	Randpark Res Distr Rhema Church	cnr Hans Schoeman/Rabie Bromhof
RW_0315	Randpark Ridge Reservoir Inlet	cnr Beyers Naude & J Vorster
RW_0316	Randpark Ridge Reservoir Outlet	cnr Beyers Naude & J Vorstr
RW_0476	Robertville - Res Outlet	Leader Road
RW_0475	Robertville Reservoir Inlet	Leader Road
RW_0474	Rw Df Davidsville, Campbell Street	RW DF Davidsville clinic, Campbell str, Davidsvill
RW_0473	RW Df Florida, water Depot, hamberg/w.Lake	Johannesburg Water Depot
RW_0502	RW DF from RW Horison res	c/r Bickel & du Toit
RW_0318	RW Df Weltevreden Park Clinic	Weltevreden Pk/Clinic, cnr JG Strydom/Jim Fouche
RW_0497	Rw Df-ruimsig, C/r Doreen & H Potgieter	RW DF Ruimsig Caltex Gar,Cr Doreen/Hendrik Potgiet
RW_0116	Senaoane Reservoir - Distribution - Aval	Avalon Depot
RW_1007	Setswetla Filling Point	Settlement Filling Point - Setswetla
RW_1251	Setswetla Settlement Tank No. 32	Setswetla tank 32

RW_1252	Setswetla Settlement Tank No. 33	Setswetla tank 33
RW_1253	Setswetla Settlement Tank No. 40	Setswetla tank 40
RW_1250	Setswetla Settlement Tank No. CK10	Setswetla tank CK10
RW_0935	Settlement Ring Main - Finetown East	Settlement Tank - Finetown East
RW_0955	Settlement Ring Main - Hani Park	Settlement Tank - Hani Park
RW_0930	Settlement Ring Main - Vlakfontein	Settlement Tank - Vlakfontein
RW_0925	Settlement Ring Main - Weilers Farm	Settlement Tank - Weilers Farm
RW_0950A	Settlement Tank	Settlement Tank
RW_1254	Settlement Tank - Diepsloot No 1	Settlement Tank - Diepsloot Tank No 1
RW_1261	Settlement Tank - Diepsloot No 10	Settlement Tank - Diepsloot No 10
RW_1262	Settlement Tank - Diepsloot No 11	Settlement Tank - Diepsloot No 11
RW_1263	Settlement Tank - Diepsloot No 12 & SP19	Settlement Tank - Diepsloot No 12 & SP19
RW_1271	Settlement Tank - Diepsloot No 18	Settlement Tank - Diepsloot Tank No 18
RW_1272	Settlement Tank - Diepsloot No 19	Settlement Tank - Diepsloot Tank No 19
RW_1255	Settlement Tank - Diepsloot No 2	Settlement Tank - Diepsloot No 2
RW_1273	Settlement Tank - Diepsloot No 20	Settlement Tank - Diepsloot Tank No 20
RW_1264	Settlement Tank - Diepsloot No 21	Settlement Tank - Diepsloot No 21
RW_1265	Settlement Tank - Diepsloot No 22	Settlement Tank - Diepsloot No 22
RW_1258	Settlement Tank - Diepsloot No 5	Settlement Tank - Diepsloot Tank No 5
RW_1256	Settlement Tank - Diepsloot No 6	Settlement Tank - Diepsloot No 6
RW_1259	Settlement Tank - Diepsloot No 7	Settlement Tank - Diepsloot No 7
RW_1257	Settlement Tank - Diepsloot No 8	Settlement Tank - Diepsloot No 8
RW_1260	Settlement Tank - Diepsloot No 9	Settlement Tank - Diepsloot No 9
RW_1269	Settlement Tank - Diepsloot No30	Settlement Tank - Diepsloot No 30
RW_1268	Settlement Tank - Diepsloot No32	Settlement Tank - Diepsloot No 32
RW_1266	Settlement Tank - Diepsloot No36	Settlement Tank - Diepsloot No 36
RW_1267	Settlement Tank - Diepsloot No37	Settlement Tank - Diepsloot No 37
RW_0905	Settlement Tank - Diepsloot Reception	Settlement Tank - Diepsloot Reception
RW_0995	Settlement Tank - Drieziek	Settlement Tank - Drieziek
RW_0950	Settlement Tank - Eikenhof A, B, C	Settlement Tank - Eikenhof A, B, C
RW_0940	Settlement Tank - Ennerdale East/Mountain View	Settlement Tank - Ennerdale East
RW_0941	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A6
RW_0942	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A5
RW_0943	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A4 (creche)
RW_0944	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A3
RW_0946	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A8
RW_0947	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A7
RW_0948	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A9
RW_0949	Settlement Tank - Ennerdale East/Mountain View Tan	Settlement Tank - Ennerdale East Tank A10
RW_0934	Settlement Tank - Itsoseng	Settlement Tank - Itsoseng
RW_0936	Settlement Tank - Kyasand	Settlement Tank -Kyasand
RW_0910	Settlement Tank - Lawley	Settlement Tank - Lawley
RW_0965	Settlement Tank - Lawley Extension	Settlement Tank - Lawley Extension
RW_0968	Settlement Tank - Lawley Extension Tank 10	Settlement Tank - Lawley Extension Tank 10
RW_0969	Settlement Tank - Lawley Extension Tank 13	Settlement Tank - Lawley Extension Tank 13
RW_0973	Settlement Tank - Lawley Extension Tank 17	Settlement Tank - Lawley Extension Tank 17
RW_0974	Settlement Tank - Lawley Extension Tank 18	Settlement Tank - Lawley Extension Tank 18
RW_0981	Settlement Tank - Lawley Extension Tank 19	Settlement Tank - Lawley Extension Tank 19
RW_0986	Settlement Tank - Lawley Extension Tank 25	Settlement Tank - Lawley Extension Tank A20
RW_0982	Settlement Tank - Lawley Extension Tank 32	Settlement Tank - Lawley Extension Tank 32
RW_0983	Settlement Tank - Lawley Extension Tank 33	Settlement Tank - Lawley Extension Tank 33
RW_0967	Settlement Tank - Lawley Extension Tank A11	Settlement Tank - Lawley Extension Tank A11
RW_0972	Settlement Tank - Lawley Extension Tank A15	Settlement Tank - Lawley Extension Tank A15
RW_0984	Settlement Tank - Lawley Extension Tank A20	Settlement Tank - Lawley Extension Tank A20
RW_0961	Settlement Tank - Lawley Extension Tank A21	Settlement Tank - Lawley Extension Tank A21
RW_0962	Settlement Tank - Lawley Extension Tank A22	Settlement Tank - Lawley Extension Tank A22
RW_0966	Settlement Tank - Lawley Extension Tank A27	Settlement Tank - Lawley Extension Tank A27
RW_0963	Settlement Tank - Lawley Extension Tank A31	Settlement Tank - Lawley Extension Tank A31
RW_0933	Settlement Tank - Lion Park	Settlement Tank - Lion Park
RW_0960	Settlement Tank - Miriting	Settlement Tank - Miriting
RW_0900	Settlement Tank - Orange Farm	Settlement Tank - Orange Farm
RW_0937	Settlement Tank - Pipeline Section A	Settlement Tank - Pipeline Section A
RW_0938	Settlement Tank - Pipeline Section B	Settlement Tank - Pipeline Section B
RW_0939	Settlement Tank - Pipeline Section C	Settlement Tank - Pipeline Section C
RW_0977	Settlement Tank - Rabie Ridge Tank 2	Settlement Tank - Rabie Ridge Tank 2
RW_0978	Settlement Tank - Rabie Ridge Tank 3	Settlement Tank - Rabie Ridge Tank 3
RW_0979	Settlement Tank - Rabie Ridge Tank 4	Settlement Tank - Rabie Ridge Tank 4
RW_0976	Settlement Tank - Rabie Ridge, from main	Settlement Tank - Rabie Ridge
RW_0985	Settlement Tank - Setswetla (Alex)	Settlement Tank - Setswetla
RW_0988	Settlement Tank - Setswetla (Alex) Tank 2420	Settlement Tank - Setswetla Tank 2420
RW_0991	Settlement Tank - Setswetla (Alex) Tank 2431	Settlement Tank - Setswetla Tank 2431
RW_0970	Settlement Tank - Slovo Lenz	Settlement Tank - Slovo Lenz
RW_0971	Settlement Tank - Slovo Lenz Tank A5	Settlement Tank - Slovo Lenz Tank A5
RW_0945	Settlement Tank - Sweetwaters	Settlement Tank - Sweetwaters
RW_0915	Settlement Tank - Thulaumntwana	Settlement Tank - Thulaumntwana
RW_0920	Settlement Tank - Zevenfontein	Settlement Tank - Zevenfontein
RW_1323	Settlement Tank - Zevenfontein 10	Settlement Tank - Zevenfontein Tank 10
RW_1305	Settlement Tank - Zevenfontein 15	Settlement Tank - Zevenfontein Tank 15
RW_1288	Settlement Tank - Zevenfontein 17	Settlement Tank - Zevenfontein Tank 17
RW_1307	Settlement Tank - Zevenfontein 17PS22	Settlement Tank - Zevenfontein Tank 17PS22
RW_1289	Settlement Tank - Zevenfontein 19	Settlement Tank - Zevenfontein Tank 19
RW_1322	Settlement Tank - Zevenfontein 2	Settlement Tank - Zevenfontein Tank 2
RW_1310	Settlement Tank - Zevenfontein 20	Settlement Tank - Zevenfontein Tank 20
RW_1320	Settlement Tank - Zevenfontein 2071 & 49	Settlement Tank - Zevenfontein Tank 2071 & 49
RW_1311	Settlement Tank - Zevenfontein 21	Settlement Tank - Zevenfontein Tank 21
RW_1334	Settlement Tank - Zevenfontein 2138	Settlement Tank - Zevenfontein Tank 2138
RW_1293	Settlement Tank - Zevenfontein 23	Settlement Tank - Zevenfontein Tank 23

RW_1321	Settlement Tank - Zevenfontein 25	Settlement Tank - Zevenfontein Tank 25
RW_1290	Settlement Tank - Zevenfontein 27	Settlement Tank - Zevenfontein Tank 27
RW_1295	Settlement Tank - Zevenfontein 28	Settlement Tank - Zevenfontein Tank 28
RW_1287	Settlement Tank - Zevenfontein 28	Settlement Tank - Zevenfontein Tank 28
RW_1309	Settlement Tank - Zevenfontein 2838	Settlement Tank - Zevenfontein Tank 2838
RW_1308	Settlement Tank - Zevenfontein 2886	Settlement Tank - Zevenfontein Tank 2886
RW_1327	Settlement Tank - Zevenfontein 2889	Settlement Tank - Zevenfontein Tank 2889
RW_1299	Settlement Tank - Zevenfontein 2890	Settlement Tank - Zevenfontein Tank 2890
RW_1306	Settlement Tank - Zevenfontein 29	Settlement Tank - Zevenfontein Tank 29
RW_1301	Settlement Tank - Zevenfontein 3	Settlement Tank - Zevenfontein Tank 3
RW_1294	Settlement Tank - Zevenfontein 30	Settlement Tank - Zevenfontein Tank 30
RW_1324	Settlement Tank - Zevenfontein 31	Settlement Tank - Zevenfontein Tank 31
RW_1296	Settlement Tank - Zevenfontein 32	Settlement Tank - Zevenfontein Tank 32
RW_1329	Settlement Tank - Zevenfontein 34	Settlement Tank - Zevenfontein Tank 34
RW_1298	Settlement Tank - Zevenfontein 35	Settlement Tank - Zevenfontein Tank 35
RW_1331	Settlement Tank - Zevenfontein 37	Settlement Tank - Zevenfontein Tank 37
RW_1330	Settlement Tank - Zevenfontein 38	Settlement Tank - Zevenfontein Tank 38
RW_1332	Settlement Tank - Zevenfontein 39 & SP44	Settlement Tank - Zevenfontein Tank 39 & SP44
RW_1300	Settlement Tank - Zevenfontein 40	Settlement Tank - Zevenfontein Tank 40
RW_1319	Settlement Tank - Zevenfontein 42	Settlement Tank - Zevenfontein Tank 42
RW_1333	Settlement Tank - Zevenfontein 43 & SP39	Settlement Tank - Zevenfontein Tank 43 & SP39
RW_1326	Settlement Tank - Zevenfontein 44	Settlement Tank - Zevenfontein Tank 44
RW_1325	Settlement Tank - Zevenfontein 45SP	Settlement Tank - Zevenfontein Tank 45SP
RW_1317	Settlement Tank - Zevenfontein 46	Settlement Tank - Zevenfontein Tank 46
RW_1315	Settlement Tank - Zevenfontein 47	Settlement Tank - Zevenfontein Tank 47
RW_1316	Settlement Tank - Zevenfontein 48	Settlement Tank - Zevenfontein Tank 48
RW_1314	Settlement Tank - Zevenfontein 50	Settlement Tank - Zevenfontein Tank 50
RW_1302	Settlement Tank - Zevenfontein 6	Settlement Tank - Zevenfontein Tank 6
RW_1304	Settlement Tank - Zevenfontein 9	Settlement Tank - Zevenfontein Tank 9
RW_1283	Settlement Tank - Zevenfontein No. 2	Settlement Tank - Zevenfontein Tank 2
RW_1284	Settlement Tank - Zevenfontein No. 45	Settlement Tank - Zevenfontein Tank 45
RW_1285	Settlement Tank - Zevenfontein No. SP21	Settlement Tank - Zevenfontein Tank SP21
RW_1286	Settlement Tank - Zevenfontein No. 2853	Settlement Tank - Zevenfontein Tank 2853
RW_1291	Settlement Tank - Zevenfontein SP12	Settlement Tank - Zevenfontein Tank SP12
RW_1312	Settlement Tank - Zevenfontein SP20	Settlement Tank - Zevenfontein Tank SP20
RW_1303	Settlement Tank - Zevenfontein SP23	Settlement Tank - Zevenfontein Tank SP23
RW_1313	Settlement Tank - Zevenfontein SP30	Settlement Tank - Zevenfontein Tank SP30
RW_1292	Settlement Tank - Zevenfontein SP31 & 26	Settlement Tank - Zevenfontein Tank SP31 & 26
RW_1297	Settlement Tank - Zevenfontein SP39	Settlement Tank - Zevenfontein Tank SP39
RW_1328	Settlement Tank - Zevenfontein SP39 & 31	Settlement Tank - Zevenfontein Tank SP39 & 31
RW_1318	Settlement Tank - Zevenfontein SP45	Settlement Tank - Zevenfontein Tank SP45
RW_0078	South Hills - Tower Inlet Rwb Ex Meyers	Moffat Park South Rand Road
RW_0079	South Hills - Tower Outlet	Moffat Park South Rand Road
RW_1197	Sweet Waters Settlement Tank No. 21	Sweet Waters settlement tank no. 21
RW_1192	Sweet Waters Settlement Tank No. 8	Sweet Waters settlement tank no. 8
RW_1191	Sweet Waters Settlement Tank No. A19	Sweet Waters settlement tank no. A19
RW_1193	Sweet Waters Settlement Tank No. A27	Sweet Waters settlement tank no. A27
RW_1215	Thulamntwana Settlement Tank No. ??	Thulamntwana settlement tank no. ??
RW_1214	Thulamntwana Settlement Tank No. 16	Thulamntwana settlement tank no. 16
RW_1213	Thulamntwana Settlement Tank No. 24	Thulamntwana settlement tank no. 24
RW_1202	Thulamntwana Settlement Tank No. 28	Thulamntwana settlement tank no. 28
RW_1216	Thulamntwana Settlement Tank No. 36	Thulamntwana settlement tank no. 36
RW_1200	Thulamntwana Settlement Tank No. A17	Thulamntwana settlement tank no. A17
RW_1500	Water tanker - informal settlements	NULL
RW_1501	Water tanker - informal settlements DZK677NW	DZK677NW
RW_1504	Water tanker - informal settlements KBF678GP	KBF678GP
RW_1503	Water tanker - informal settlements KRH139GP	KRH139GP
RW_1502	Water tanker - informal settlements KXW534GP	KXW534GP
RW_1507	Water Tanker - Informal Settlements NPN 67649	NPN 67649
RW_1506	Water tanker - informal Settlements NPN 93090	NPN 93090
RW_1505	Water tanker - informal settlements NPN18956	NPN18956
RW_0521	Waterval Tower Distr. Gordon Rdbergbron	Waterval Tower Distribution - Medicross, Gordon A
RW_0157	Waterval Tower Outlet	Vergesig Drive
RW_0525	Wilro Park Tower Inlet/outlet	Wilro Tower Inlet - Mimosa Street, Wilro Park
RW_0155	Witpoortjie / Princess - Tower Outlet	c/r Vermooten and South (old)
RW_0021	Yeoville - Reservoir 1, 2 Outlet	Durban Road, Yeoville
RW_0023	Yeoville - Reservoir 3 Outlet	Percy St Yeoville
RW_0020	Yeoville - Reservoir 3, Inlet Rwb Via City	Highland Road Yeoville
RW_0026	Yeoville - Reservoir Distrib.	Smit Street Workshop
RW_0024	Yeoville - Reservoir Distrib. Berea	Mitchell Park Johnston St Berea
RW_0027	Yeoville - Reservoir Distrib. Observat	Observatory Park Observatory Ave
RW_0028	Yeoville - Reservoir Distrib. Union	Union Observatory 18 Gill St
RW_1003	Zevenfontein Filling Point	Settlement Filling Point - Zevenfontein
RW_0375	Zondi Reservoir Distribution	ATA(Engen)Afr serv stat, Bendile rd, Zola North
RW_0371	Zondi Reservoir Inlet	Mphapheto Road
RW_0372	Zondi Reservoir Outlet	Mphapheto
RW_0373	Zondi Tower Inlet	Mphapheto Road
RW_0374	Zondi Tower Outlet	Mphapheto Road

## APPENDIX 5 – Criteria for Choosing Sampling Points

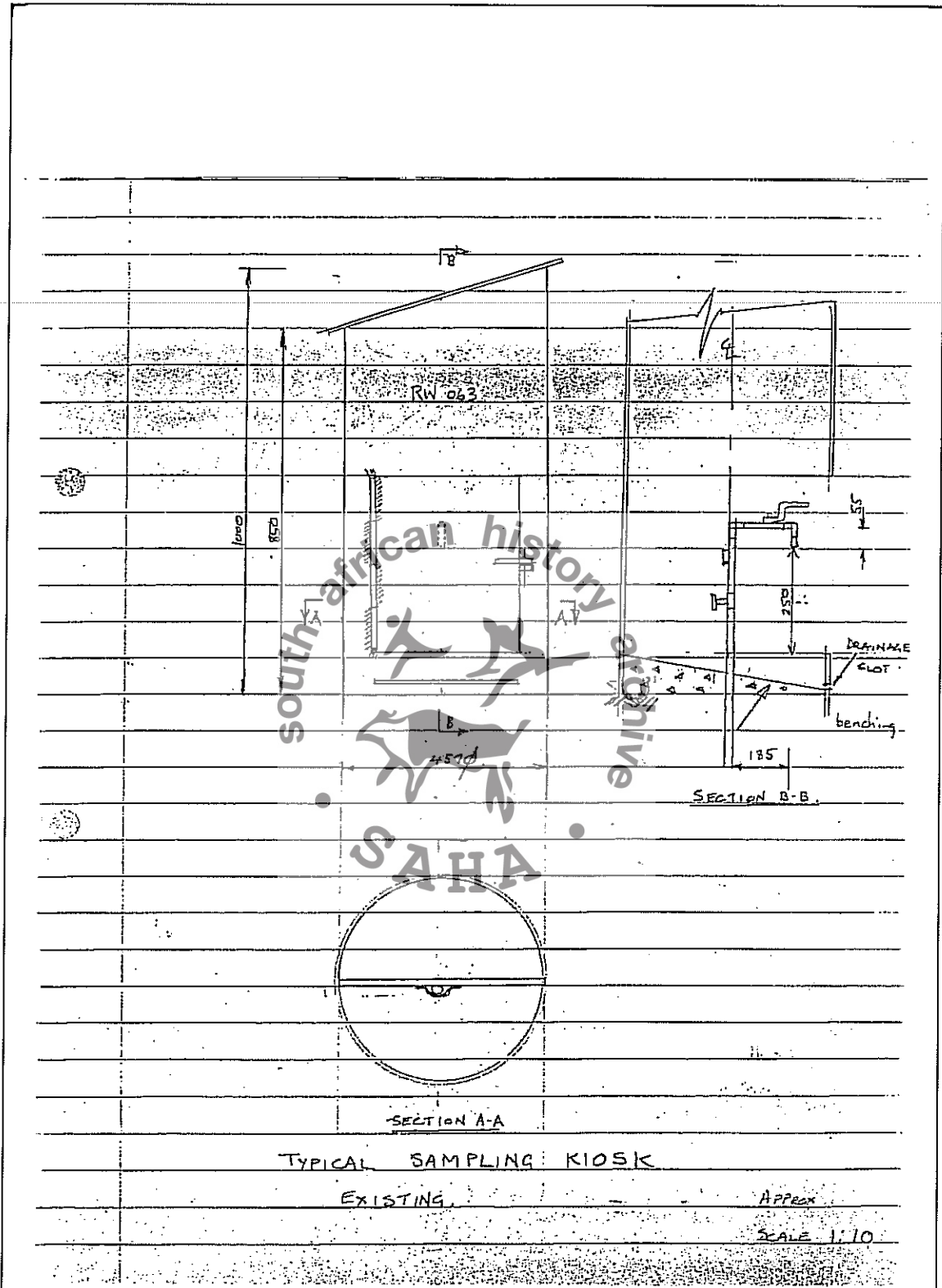
### **Criteria for choosing suitable sample points**

1. In order of preference
  - clinics (need times open)
  - libraries (need times open)
  - schools (if accessible during holidays)
  - police stations
  - car wash
  - Hotels
  - shopping centre
  - medical centre (times open)
  - garages (NB if tap is in a very safe position)
  - other
2. Should be under cover or inside for taking samples in the rain.
3. Could be a bathroom, restroom, kitchen or laundry tap. Where tap is too close to flammable material such as curtains, blinds etc or gas fittings it should be avoided.
4. Easy access ,close to vehicle.
5. Tap should ideally be a rugged garden type( less likely to damage) with a smooth flow for controlled sampling.
6. The sample point must be able to fill the sample bottles up to a Winchester which is 250 mm (height) x 240 mm (diameter)
7. If a digital camera is available then it should be used. If a sketch is required then it should be made.

### **Reminder of Actions**

1. Know what reservoir zone you are trying to get a distribution sample for .
2. Look in Map book to see what suitable sites are available(criteria to use is: to be in zone far enough from reservoir /tower but not too close to the edge of the zone to go over into the next zone).
3. Once potential site identified introduce yourself with the help of the letter.
4. If manager agrees and the sample point is suitable against criteria above then fill in the Agreement in duplicate or use carbon (prefer that we keep the better copy) , or ask to photostat.
5. Make an accurate note on exactly where tap is .
6. Make an accurate note of the address i.e. cross reference the streets.

APPENDIX 6 - Sketch of a Sampling Point

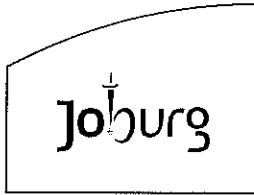


APPENDIX 7 - Typical Sampling Point





## APPENDIX 8 – Request Use of Sampling Point



City of Johannesburg  
Johannesburg Water (Pty) Ltd

Johannesburg Water  
Cydna Laboratories  
No. 75 4<sup>th</sup> Street  
Houghton  
2198

Johannesburg Water  
Cydna Laboratories  
PO Box 61542  
Marshalltown  
2107

Tel +27(0)11 728-7373  
Fax +27(0)11 728-5444

DATE : \_\_\_\_\_

TO WHOM IT MAY CONCERN

### POTABLE WATER QUALITY MONITORING PROGRAMME

Johannesburg Water Pty (Ltd) has been formed by the City of Johannesburg to undertake the provision of water and sanitation services to the residents and businesses in the Greater Johannesburg area.

In terms of the Service Delivery Agreement the company is required to ensure that the services rendered to consumers are of the highest quality.

In order to achieve this objective in respect of potable water, Johannesburg Water has a Drinking Water Quality Programme to monitor the quality of water supplied to our customers in the Greater Johannesburg area. We would like to monitor water at the actual point of supply. In order to do this we need to take routine samples at suitable locations such as clinics, libraries and schools etc.

It will be greatly appreciated if you would give your support to this programme by authorizing a Sampler to take regular samples from your premises. The Sampler will be required to carry his letter of authority and company identification at all times.

The Sampler, who will take regular samples from a suitable tap, will follow a standard procedure, which should not take more than a few minutes to perform. The Sampler will open the designated tap for three minutes, and he will flame the tap to ensure that any microbes on the outside of the tap are killed and that a representative sample is taken. Several sample bottles will be filled and taken to our laboratory for analysis.

Should you agree to participate in this programme you are kindly asked to complete the attached Agreement. Your participation in this exercise will enable us to ensure that the water quality throughout the City of Johannesburg is of the highest standard.

Yours sincerely,

Scientific Services Manager  
Johannesburg Water (Pty) Ltd



#### Directors:

Mr Gerald Dumas (Managing Director) • Mr Manu Padayachee (Executive) • Ms Jocelyn Armstrong (Acting Chairperson) • Mr Nell Macleod • Mr Armstrong Ngcobo • Dr Nomonde Mabuya • Ms Mandisa Xonle • Mr Nandha Govender • Ms Natalie Skeepers • Mr Gandhi Badela • Mr Patrick Dlamini • Mr Graham Luden (Company Secretary)

JOHANNESBURG WATER (PTY) LTD REG. NO. 2000/029271/07

APPENDIX 9 - Agreement to Use a Sampling Point

AGREEMENT TO ALLOW JOHANNESBURG WATER TO SAMPLE  
POTABLE WATER

I \_\_\_\_\_ in my  
capacity as \_\_\_\_\_ of  
\_\_\_\_\_ (clinic, library ,school etc) hereby agree to  
allow a Sampler of Johannesburg Water to take regular samples of drinking water from a tap  
located \_\_\_\_\_ (state position) on the premises located at  
the following physical address \_\_\_\_\_

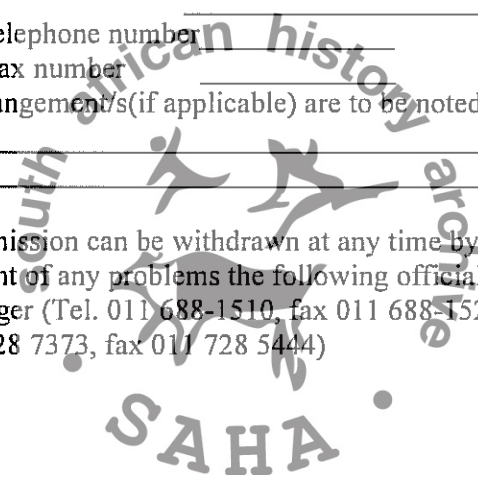
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Postal Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone number \_\_\_\_\_  
Fax number \_\_\_\_\_

The following special arrangement/s(if applicable) are to be noted: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I understand that this permission can be withdrawn at any time by me should it cause any  
inconvenience. In the event of any problems the following official may be contacted by phone  
:Scientific Services Manager (Tel. 011 688-1510, fax 011 688-1524) or Laboratory Manager,  
Microbiology (Tel. 011 728 7373, fax 011 728 5444)

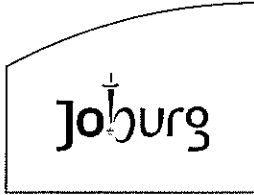


Signed by \_\_\_\_\_  
Date \_\_\_\_\_

Johannesburg Water Representative \_\_\_\_\_

J W Sample Point Number \_\_\_\_\_

APPENDIX 10 – ID Document



City of Johannesburg  
Johannesburg Water (Pty) Ltd

Johannesburg Water  
Cydna Laboratories  
No. 75 4<sup>th</sup> Street  
Houghton  
2198

Johannesburg Water  
Cydna Laboratories  
PO Box 61542  
Marshalltown  
2107

Tel +27(0)11 728-7373  
Fax +27(0)11 728-5444

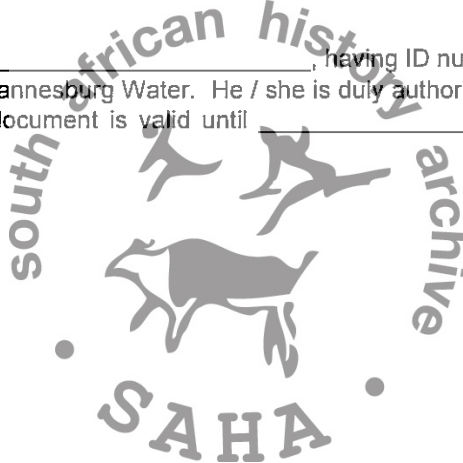
[www.johannesburgwater.co.za](http://www.johannesburgwater.co.za)

DATE : \_\_\_\_\_

TO WHOM IT MAY CONCERN

*JOHANNESBURG WATER IDENTIFICATION DOCUMENT*

This serves to confirm that \_\_\_\_\_, having ID number \_\_\_\_\_  
Is currently employed by Johannesburg Water. He / she is duly authorized by Johannesburg Water to  
take water samples. This document is valid until \_\_\_\_\_ after which it will be  
renewed.



Mrs. R. Phillips  
LABORATORY MANAGER : MICROBIOLOGY

Telephone No. 728-7373 Ext 213

Arc Ref :

Masters/JW



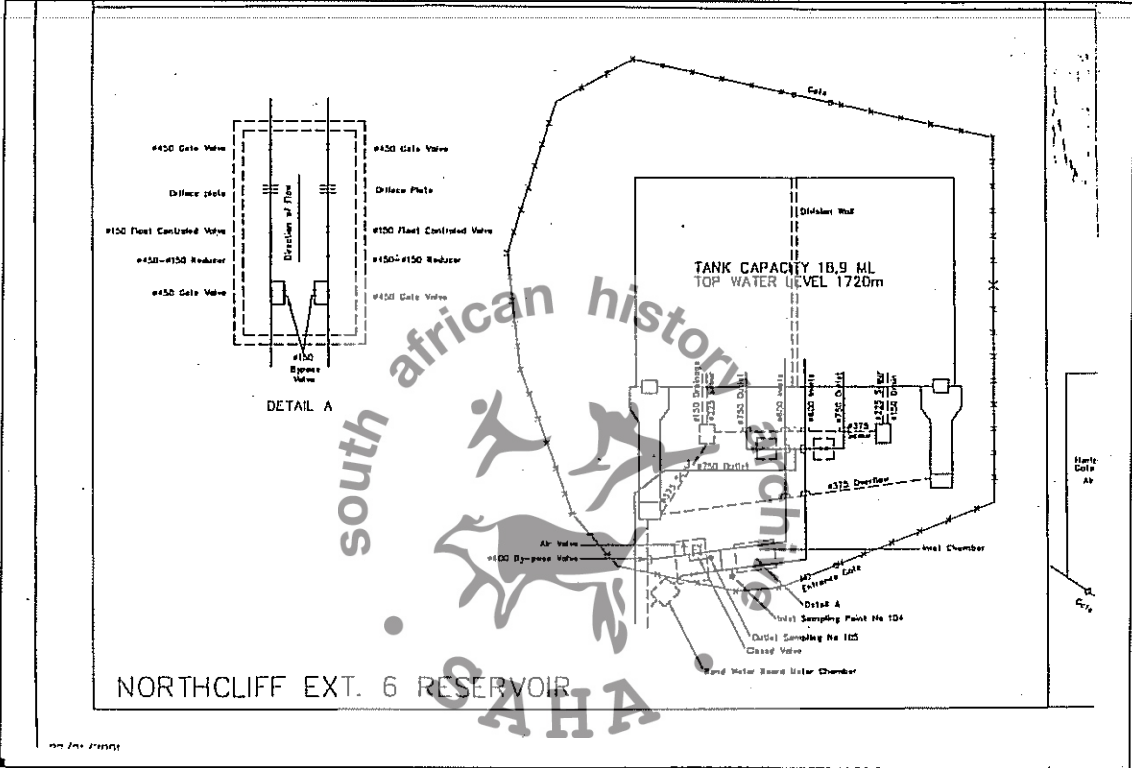
Johannesburg Water

Directors:

Mr Gerald Dumas (Managing Director) • Mr Manu Padayachee (Executive) • Ms Jocelyn Armstrong  
(Acting Chairperson) • Mr Neil Macleod • Mr Armstrong Ngcobo • Dr Nomonde Mabuya • Ms Mandisa  
Xonle • Mr Nandha Govender • Ms Natalie Skeepers • Mr Gandhi Badela • Mr Patrick Dlamini •  
Mr Graham Luden (Company Secretary)

JOHANNESBURG WATER (PTY) LTD REG. NO. 2000/029271/07

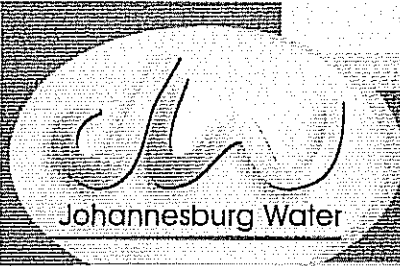
APPENDIX 11 – Sketch of a Site



APPENDIX 12 – Contact Types

<u>CODE</u>	<u>DESCRIPTION</u>	<u>PRIORITY</u>	<u>RESPONSIBLE LABORATORY</u>	<u>RESPONSE TIMES (HRS / DAYS)</u>
C200	Discoloured or Cloudy Water(e.g. rust)	3	Water	6 hours
C210	Stained Washing	3	Water	6 hours
C220	Bits in Water	3	Chemistry	6 hours
C230	Taste	3	Chemistry	6 hours
C240	Odour	3	Chemistry	6 hours
C250	Colour of Water	3	Water	6 hours
C260	Animals in Water	2	Microbiology	6 hours
C270	Illness Complaint	2	Microbiology	6 hours
C280	White Water (Aerated)	3	Water	6 hours
C290	Water Quality Other	3	Microbiology	6 hours





## Operations

### Water monitoring in Johannesburg Water

Johannesburg Water (Pty) Ltd, the water and sanitation service provider for the City of Johannesburg has intensified its water monitoring in the Greater Johannesburg area. The following types of water are sampled and analysed in the Company's three laboratories at Cydn and the Northern and Goudkoppes Wastewater Treatment Works:

- Potable (drinking) water
- Wastewater and treated wastewater
- Industrial effluents
- Surface water
- Groundwater

#### Potable Water

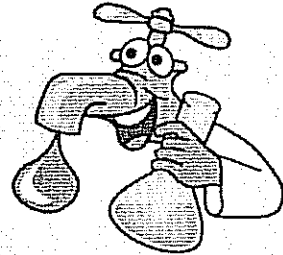
Every month throughout the whole of the Johannesburg Metropolis around 500 samples are taken and analysed to ensure compliance with the SABS 241 Standard. Between 42 and 46 determinants are checked and over 4000 analyses carried out each month. These include aesthetic, mineral, chemical and microbiological parameters. The results show excellent compliance with the highest category (Class 1) in this Standard, which confirms that the drinking water in Johannesburg is one of the best in the World.

This monitoring represents an increase in coverage since Johannesburg Water took over when only 150 samples per month were tested. In addition the number of parameters tested has increased.

Typical analysis of water supplied in the Johannesburg area per mg/l.

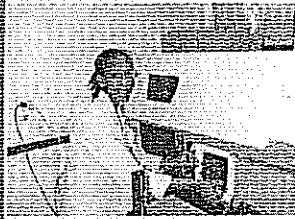
Calcium	22
Magnesium	8
Sodium	15
Potassium	3
Chloride	15
Sulphate	19
Nitrate	0.2
Fluoride	0.2
Total alkalinity	69
Total dissolved solids	160
pH (pH units)	7.6

Complies fully with SABS 241 Edition 5, 2001, South African Standard Specification For Class 1 Drinking Water.



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 (011) 688-1500

www.johannesburgwater.co.za



Water testing at JW's Cydna laboratories

**Industrial effluents**

There are approximately 150 industries in the City that discharge large quantities of problematic effluents to the Company's sewers. All industrial effluents from these factories are regularly monitored to ensure they do not contain dangerous or toxic chemicals (i.e. comply with the City's Bylaws) and to obtain data to enable the charging of tariffs for the pollutants discharging to sewer.

**Surface water**

Although surface waters in Johannesburg are not used as a source of drinking water, all the streams and rivers in the City are sampled on a regular basis by the City's regional Environmental Health staff and monitored by the City's Water Quality Management Department and Johannesburg Water. This is done to determine the impact of the treated effluents from the Company's wastewater treatment works and to detect pollution due to surface runoff, sewer overflows and illegal discharges. All these samples are analysed by the Company's Cydna Laboratory. About 150 samples are analysed each month. In addition Johannesburg Water monitors by remote sensing a number of key places in its sewer network to detect sewer overflows and pump-station failures.

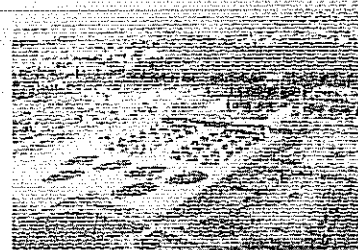
**Groundwater**

In order to determine the impact of the wastewater treatment works on underground waters 66 boreholes are monitored on a regular basis. A sample of each borehole is analysed monthly for 37 parameters. This is a completely new initiative as ground-water was not monitored in the past.

**Wastewater and treated wastewater**

Johannesburg Water owns seven and directly manages six wastewater treatment works treating all the domestic sewage and industrial effluents discharged to its sewers. These works which treat 850 million litres everyday must comply with Standards laid down by the State Department of Water Affairs and Forestry (DWAF). The Works are intensively monitored on a daily basis to check the quality of the incoming wastewater, process performance and efficiency and the quality of final effluents and by-products. Over 3500 samples are tested each month. In addition, certain key parameters are monitored on a continuous basis using on-line analyzers.

As part of the permit requirements the upstream and downstream quality of the streams into which treated effluents are discharged is regularly monitored. Bio-monitoring is also carried out to determine the impact of treated effluents on the habitat of these streams.



Ollantsoyi wastewater treatment works

This intensive monitoring has assisted in these Works improving overall compliance with DWAF standards from 85 to 95% and has assisted in reducing the usage of power and chemicals.

