

GREEN P







Green Drop Progress Report: RISK PROFILES

INDEX



PAGE

Chapter 1: Introduction to Green Drop Progress Report 2012

♦ Chapter 2: National Wastewater Risk Overview of Municipal Plants

♦ Chapter 3: Private Wastewater Treatment Facilities

Chapters 4-12: Municipal Treatment Facilities

♦ Chapter 4: Eastern Cape

♦ Chapter 5: Free State

♦ Chapter 6: Gauteng

♦ Chapter 7: Kwa-Zulu Natal

♦ Chapter 8: Limpopo

♦ Chapter 9: Mpumalanga

♦ Chapter 10: North West

♦ Chapter 11: Northern Cape

♦ Chapter 12: Western Cape

ACRONYMS

CRR

ADWF Average Dry Weather Flow

COD Chemical Oxygen Demand

DPW Department of Public Works

DWS Department of Water and Sanitation

Cumulative Risk Rating

GA General Authorisation

GD Green Drop

GDC Green Drop Certification

GDS Green Drop System (<u>www.dws.gov.za/greendrop</u>)

NI No Information

NMR No Monitoring Required (For non-discharge treatment facilities)

O&M Operation and Maintenance

RPMS Regulatory Performance Measurement System

SLA Service Level Agreement

SS Suspended Solids

WRC Water Research Commission

WSA Water Services Authority
WSI Water Services Institution
WSP Water Services Provider

W₂RAP Wastewater Risk Abatement Plan

WWTP/W Wastewater Treatment Plant / Works

Provinces:

EC Eastern Cape Province

FS Free State Province

GP Gauteng Province

LP Limpopo Province

MP Mpumalanga Province
NW North West Province

NC Northern Cape Province
KZN Kwa-Zulu Natal Province
WC Western Cape Province

CHAPTER 1: INTRODUCTION TO THE GREEN DROP PROGRESS REPORT

Regulation is important to promote the provision of public water and waste services at an appropriate level of quality, at socially affordable prices and an acceptable level of risk. It clarifies the requirements and obligations placed on water service institutions, thereby protecting the environment and consumers from a potentially unsustainable and unsafe service.

Wastewater Regulation in South Africa

There are many ways to carry out regulation, and the model chosen in each situation depends on the stage of development of the sectors and the socio-cultural context. For South Africa, the regulatory approach is mainly collaborative, primarily using the power to influence. The power to sanction is also applied, but only used secondarily. This form of regulation is instrumental in supporting the development of the sectors and its stakeholders, and not just an instrument for supervision and control. Its strength is in its ability to influence and empower stakeholders in the sectors, and is enhanced by its overall and extensive geographical intervention across the nine provinces in South Africa.

South Africa adopted incentive-based regulation as a model to identify, reward and rectify non-compliance in the water sector. It is a mere 6 years since the Green Drop regulation programme was conceived within the Department of Water and Sanitation and launched by the Minister on 11 September 2008.

The South African regulation model adopts a strategic didactic, especially by showing weaknesses in the management of services, and efforts are not spared to support capacity building. An important aspect of this didactic posture is linked to the recommendations that can be made, either in general terms or following site inspections. These can focus on aspects which, whilst constituting or not any infringement, are open to improvement.

(Ref: The Regulation of Water and Waste Services, Baptista, 2014)

The action of the Department of Water and Sanitation, as Regulator, was not carried out in an arbitrary manner, or according to convenience, or determined by circumstances, but rather consistently and systematically based on a concept and audited scoring systems which has been developed and improved, namely the Green Drop Certification model.

The two-pronged regulation approach by the Water Sector Leader has been widely acknowledged. At its core is:

- ◆ The Green Drop Certification incentive-based regulation which seeks to identify and develop the core competencies required for the sector that if strengthened, will gradually and sustainably improve the level of wastewater management in South Africa; and
- Risk-based regulation which seeks to establish scientific baseline comprising of the critical risk areas within the wastewater services production and to use continuous risk measurement and reporting to ensure that corrective measures be taken to abate these high and critical risk areas.

The combination of incentive and risk-based regulation are recognised for its initial potential, and eventual successes to synergise the goodwill by municipalities and Government support programmes to give the focus, commitment and planning needed to achieve excellence in wastewater management. This form of 'Collaborative Regulation' continues to inform, empower and influence the water sector in a positive manner.

Regulation as a Game Changer

The Minister of Water and Sanitation in her 2014 Budget Speech, emphasised that "... each province or municipality has its own specific challenges; there were invariably a number of problems which could be classified as cross-cutting... the issue of ageing infrastructure and the maintenance thereof remains a huge challenge across the board; secondly, there is a lack of technical capacity to ensure that water is protected, conserved, managed and controlled sustainably and equitably, as well as the capacity to perform operations and maintenance activities. We are developing very specific Provincial Action Plans together with the Premiers to deal with interventions.

These are amongst the game changers we will implement...we will act swiftly and decisively as we deal with nothing else but service to the nation.

During this year, our spending focus will be on providing regional bulk infrastructure for water and wastewater treatment works which link water sources to local government infrastructure.

Going forward, we will accentuate our seamless model in infrastructure development to manage the water resource 'from source to tap and back to source' ..."

Purpose of the Green Drop Progress Report

In keeping with the Minister's commitment to provide the sector and its stakeholders with **ongoing**, **current**, **accurate**, **verified** and **relevant** information on the status of wastewater services in South Africa, this Green Drop Progress Report provides feedback and progress pertaining to:

- ✓ the status and historic trends of municipal wastewater treatment
- ✓ the status of public treatment facilities Department of Public Works
- ✓ the status of selected privately owned treatment facilities.











The **2014 Green Drop Progress Report** presents the current risk profile and a 6-year trend analysis of wastewater treatment plants on three levels:

- 1. **System specific** risk data and information pertaining to the performance of each wastewater treatment system per WSI (municipal, public, private WSIs);
- 2. **Region specific** risk figures and information to highlight the strengths, weaknesses and progress for the collective of WSIs within the province or region;
- 3. **National overview** that collate and elevate the detailed findings on system level to that of a provincial overview, which can then be compared and inculcated as a national view of wastewater treatment performance. Comparative analyses amongst the provincial performances are useful indicators and benchmarks for the various role players.





Background:

Incentive-based Regulation in South Africa

(Green Drop Certification)

The incentive-based concept is defined by three REGULATION programmes:

- Blue Drop Certification Programme for Drinking Water Quality Management;
- ♦ Green Drop Certification Programme for Wastewater Quality Management; and
- No Drop Certification Programme for Water Use Efficiency and Water Loss Management.

The Green Drop process measures and compares the results of the performance of Water Service Authorities and their Providers, and subsequently rewards (or penalises) the municipality upon evidence of their excellence (or failures) according to the minimum standards or requirements that have been defined. Awareness of this performance is obtained by pressure through the customers, the media, political classes and NGOs. The strategy revolves around the identification of mediocre performing municipalities who consequently correct the identified shortcomings, as well as the introduction of competitiveness amongst the municipalities, and using benchmarking in a market where competition is difficult to implement.

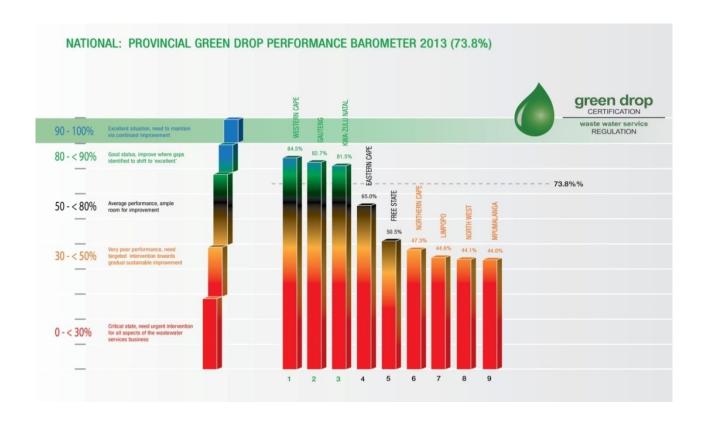
The Green Drop strategy gradually expanded to also include privately owned and other public wastewater facilities. As a result of the benchmarking opportunities associated with Green Drop Certification, many privately owned facilities recognise the value proposition and positive exposure that comes from participation with the Green Drop programme. The Department included a select few privately owned plants, as well as treatment facilities owned and operated by the Department of Public Works (e.g. schools, correctional services, hospitals) and the Department of Environment (Kruger National Parks, SanParks) as part of its audit process.

Results 2013:

The last publication, the "Green Drop Report 2013", reported on municipal, public and private wastewater systems' performance in three separate Reports. The results are summarised as follows:

MUNICIPAL WASTEWATER SYSTEMS:

- 152 municipalities provide wastewater services via a network of 824 collector and treatment systems
- 24 systems retained Green Drop status from 2011 to 2013
- 79,6% of the 824 systems are of micro, small and medium size (<10 Ml/day), whilst the remainder of 20,4% is large and macro-sized systems
- The total design capacity of treatment plants in South Africa is 6509,7 MI/day and the actual flow received at the plants is 5128,8 MI/day, leaving a spare capacity of 1 380,9 MI/day
- 33 systems were awarded Green Drop status in 2009
- 40 systems were awarded Green Drop status in 2011
- 60 systems were awarded Green Drop status in 2013.

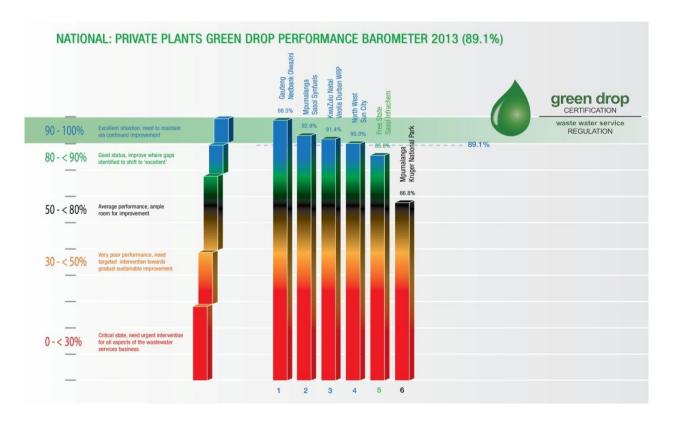


PRIVATELY OWNED WASTEWATER SYSTEMS:

- 5 institutions participated in the Green Drop assessment, comprising a total treatment capacity of 106.7 Ml/day
- 4 of the 5 systems (80%) have achieved Green Drop Certification which places these plants in 'excellence' space (>90%)
- 20% of systems were found to be in the 'good performance' category
- 2 of the 5 systems retained Green Drop status from 2011 to 2013.

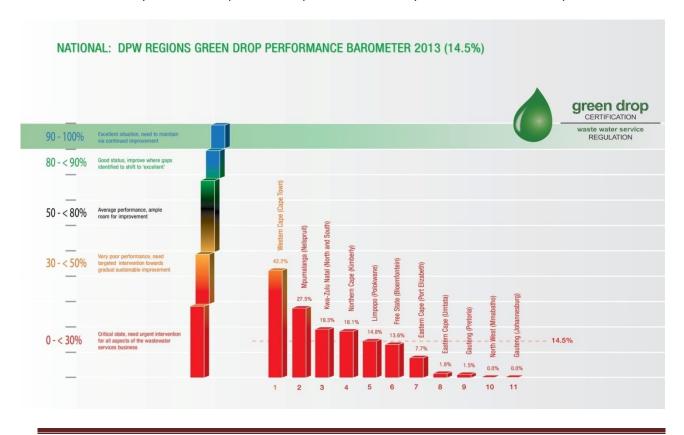
DEPARTMENT OF ENVIRONMENT (KRUGER NATIONAL PARK) SERVICES' WASTEWATER SYSTEMS:

- 13 systems were assessed, all of which comprised of ponds and reed bed treatment systems
- 11 systems (84.6%) received Green Drop Certification scores which placed the systems in the 'average state' space, whilst 2 systems (15.4%) were found to be in 'poor state'
- No systems were in the 'critical state' space, hence 0 Purple Drops were issued.



DEPARTMENT OF PUBLIC WORKS WASTEWATER SYSTEMS:

- 121 systems were assessed
- No systems have achieved Green Drop Certification which places zero of the facilities in 'excellence' space (>90%)
- No systems were found to reside in 'excellent and good state' space
- 4.1% of systems in the 'average state' space
- 104 facilities were given Purple Drop status (<30% performance).
- 9.9% of systems in the 'poor state' space, and 86% of systems in 'critical state' space.



Risk-based Regulation in South Africa

The Green Drop criteria have been designed to assess the entire business of the municipal wastewater services. Wastewater treatment still remains the key risk component within this production chain, and as such present a critical barrier in preventing pollution of water resources. Wastewater risk abatement planning and implementation is part of this set of Green Drop criteria and is using the Cumulative Risk Ratios (CRR) to track progress on a year-to-year basis. This allows the Regulator to have insight into the treatment component of the municipal, private and public wastewater treatment business.

Risk-based regulation allows the municipality to identify and prioritise the critical risk areas within its wastewater treatment process and to take corrective measures to abate these. Risk analysis is used by the Regulator to identify, quantify and manage the corresponding risks according to their potential impact on the water resource and to ensure a prioritised and targeted regulation of municipalities whose facilities fall in high and critical risk parameters. Such 'risk' is defined and calculated as follows:

Cumulative Risk Rating (CRR) = $(A \times B) + C + D$

where:

- A = Design Capacity of plant which also represent the hydraulic loading onto the receiving water body
- B = Operational flow exceeding- on- and below capacity
- C = Number of non-compliance trends in terms of effluent quality as discharged to the receiving water body
- D = Compliance or non-compliance i.t.o. technical skills

Where each risk element carries a different weight in proportion to the severity of the risk element:

A: Desig	WF		
	> 400	7	
ting	201 to 400	6	
y Rai	101 to 200	5	
oacit	20 to 50 20 to 50 20 to 50 20 to 50		
n Cap	21 to 50	3	
esig	20 to 5		
۵	<5	1	

B: Capac	WF			
	> 151 %	5		
ance	101 - 150 %	4		
ceed	20 - 10 %			
ty Ex Ratii				
pacit	0 - 10 %	1		
ප	< 0 %	0		

C	Weighting Factor (WF) for the Technical Skills	WF
	Superintendent + Process Controllers + Maintenance Team	1
હ	Superintendent + Maintenance Team but no Process Controllers	
Rating	Process Controllers + Maintenance Team but no Superintendent	2
kills	Process Controllers + Superintendent but no Maintenance Team	
Technical Skills	Superintendent but no Maintenance Team & no Process Controllers	
chni	Process Controllers but no Maintenance Team & no Superintendent	3
Te	Maintenance Team but no Superintendent & no Process Controllers	
	No Superintendent + No Process Controllers + No Maintenance Team	4

D No of Non-Compliant Parameter Failures	WF
	8
	7
ting	6
e Ra	5
ailur	4
ent F	3
Effluent Failure Rating	2
_	1
	0

A CRR value is calculated for each municipal wastewater treatment facility in South Africa, as provided in this Green Drop Progress Report. From 2012, private and public plants have also been included in this profile.

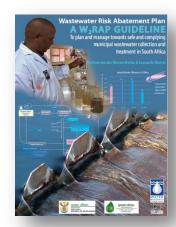
A CRR% deviation is used throughout the Report to indicate that variance of a CRR value before it reaches its maximum CRR value. The higher the CRR% deviation value, the closer the CRR risk is to the maximum value it can obtain. Example 1: a 95% CRR% deviation value means the plant has only 5% space remaining before the system will reach its maximum critical state (100%). Example 2: a 25% CRR% deviation value means the plant holds a low and manageable risk position and is not close to the limits that define a critical state (90-100%).

CRR% deviation is calculated as CRR value / CRRmax X100 = CRR% deviation (as%)

Wastewater Risk Abatement Planning (W₂RAP)

Wastewater treatment is the first barrier in a multi-barrier system of ensuring public and environmental health. In the same way that the Water Safety Plan identifies, plans and manages the risks in the drinking water treatment and supply systems, does the W₂RAP identifies, plans and manages risks in the wastewater collection and treatment system.

The development of the South African W₂RAP Guideline for Municipalities draws from the principles and concepts of other risk management procedures, such as the Water Safety Plan and Hazard Analysis and Critical Control Points. The Guideline was published by the Water Research Commission and Department of Water and Sanitation in 2011. The development and implementation of municipal W₂RAPs have enjoyed significant



attention within both the municipal and private services sector, in an effort to identify, prioritise and abate the higher risk elements within the institutions and with the (limited) resources in hand. Additional mileage has been accrued by the more pioneering municipalities, who have used their W₂RAPs to access additional funds for project implementation.

The Department of Water and Sanitation has, and will continue to increase its focus on the use of risk abatement to influence business decisions, determine priorities and (re)allocate resources, in order to achieve compliance and best practice.

Corrective Action Plans

The Green Drop Report 2013 identified all WSIs with systems that obtained <30% score/s and required that a Corrective Action Plan be submitted within 30 days of the publication of the Report to inform the Regulator how the WSI plan to improve the compliance and performance of the system. A number of alternate descriptions have been given to this Action Plan, amongst which the most common are Green Drop Improvement Plans, Acceleration Plans, Turnaround Plans, etc. The Minister's call for 'Provincial Action Plans' (Budget Speech 2014) is complied with using the results and plans coming forth from the Green Drop processes.

Municipal Water Quality WORKplan

The "Municipal Water Quality WORKplan 2010-2015" has been developed to guide Water Services Institutions towards meeting national targets for wastewater quality, and to entice progressive and incremental improvement in wastewater management (= Green Drop performance). The WORKplan seeks to;

i) hold up a benchmark on what world best-practice identifies as core values that enable improved organization performance; and

ii) Sets out a WORKplan for the South African water sector, whereby municipal management and national regulation authorities can focus effort and work towards improved and sustainable water and wastewater management.

The WORKplan will be updated in 2015 to reflect the plans and expectations of the Regulator for the next ten years (2015 – 2025) . It builds on the existing Green Drop Certification programme, as well as the risk-based approach as outlined in the $W_2\text{RAP}$, to formulate the calendar and targets for regulation in the sector as they impact on local government over the next five years. In short, the WORKplan spells out the foreseeable future of wastewater quality in the country, and the key areas that will drive change and the milestones that will determine if progress is on par with planning.

For the wastewater sector, this implies relentless adherence to input variables, rigorous and brave tracking of output variables and a determination to improve performance year on year.

Green Drop HANDbook

The Department of Water and Sanitation takes cognisance of the need to advance its regulatory approach based on the fundamentals of conventional regulation to ensure that credibility is not compromised. The Green Drop Certification programme is based upon the core fundamentals of regulatory responsibilities and cannot be regarded as a Municipal Support Programme. However, the programme is informative and educational by design, and thereby carries significant inherent capacity building characteristics. It is therefore a beneficial trait that the programme is directly linked to government support initiatives.

In order to provide more clarity with regard to the Green Drop Certification programme, a *Green Drop HANDbook* was developed to aid WSIs in preparing for assessments and for site inspections, but also to improve their wastewater business by focussing on the essential elements of the business. The HANDbook provides technical detail that matches the specific requirements of the Green Drop Certification process, as well as information on how an assessment is conducted. It also ensures the uniform understanding and application of Green Drop requirements. Two revisions of the Green Drop HANDbook were issued to date, dated 2010 and 2014 (draft).

Green Drop Scoring and Risk Ratio Determination

The two main outputs from the Green Drop assessment are the:

- Green Drop score for each municipal system assessed; and
- The Cumulative Risk Rating for each municipal wastewater treatment works calculated

The Minister has committed to providing the sector and its stakeholders with **ongoing**, **current**, **accurate**, **verified** and **relevant** information on the status of wastewater services in South Africa. It is however a practical reality that a national assessment programme of this scale and magnitude, required significant resources, which need to be rationalised within the available resource base of the participating and regulating entities.

Hence, the following sequence of events is practiced:

- Green Drop Certification takes place every 2nd year
- Blue Drop Certification takes place every alternate year to Green Drop assessment
- No Drop Certification was introduced and initiated as part of the Blue Drop audits in 2014
- The Green Drop 'gap' year is used to track and report progress in the wastewater sector via the assessment of the cumulative risk status of treatment systems.

Each Green Drop cycle present a slight up-scaling and tightening of the different performance criteria, thereby ensuring that positive pressure is constantly applied to compel continuous improvement. Weighting also changes continuously to ensure that weight is applied on areas that hold highest risk to public health and the environment. For example, the highest weight is allocated to final effluent quality.



The Green Drop Progress Report 2014

The Green Drop RISK PROFILE Progress Report for 2014 is the product of a 'gap' year, whereby progress is reported in terms of the improvement or decline in the risk position of the particular wastewater treatment facility, as compared to the previous year's risk profile. The tool to collect, assess and report the risk profile is called the Green Drop Progress Assessment Tool (PAT) and all municipalities, Public Works, selected private works and Department of Environment / Kruger National works, have participated in the PAT assessments 2014.

How to Read the PAT (Progress Assessment Tool)

The following is an *example* of a typical PAT result. Results are provided in colour coded format – each colour has a specific meaning and performance reference.

Assessment Areas	wwtw
Technology	Activated sludge-BNR Anaerobic sludge digestion
Design Capacity (MI/d)	200
Operational % i.t.o. Design Capacity	111%
i) Microbiological Compliance	75.5%
ii) Chemical Compliance	95.4%
iii) Physical Compliance	99.5%
Process Control Skills Compliance with R2834	Partial
Annual Average Effluent Quality Compliance	96.2%
Wastewater Risk Rating (%CRR/CRRmax)	62.3% (↓)
Highest Risk Area	Flow exceed design capacity, effluent quality (disinfection)
Risk Abatement Process	Draft W₂RAP

Capital & Refurbishment expenditure in 2010/2011	R 21 million		
Description of Projects' Expenditure	Refurbishment of digesters, sludge dredging from maturation ponds		
Wastewater Risk Abatement planning	A CRR-based W₂RAP has been prepared by the WSA which identified the key risk pertaining to plant capacity, effluent quality and technical skill within the municipality. The plan prioritises the high risk hazards and lists mitigation measures, funds, responsibility and timeframes against the risk area to ensure abatement of risks.		

Funds and actions undertaken by the WSI to mitigate the identified risks

More information on the status of the W₂RAP and the approach taken to risk management

The PAT Assessment and Scoring Criteria

PAT assessments are conducted as self-assessments by the responsible WSI. The process consisted of the circulation of (pre-populated) PATs with explanatory FACTSHEETS to the WSIs, via the DWS provincial operations offices. PAT scorecards are returned to DWS by the WSIs with supportive evidence. Confirmation assessments were conducted to verify the information provided by WSIs in the PATs, and to collect any outstanding information that impact on the CRR values.

The process is overseen by a team of Inspectors, who are qualified competent persons in water management. Each PAT scorecard is moderated by an independent Moderator to ensure quality control and correctness of interpretation.

Important notice: The PAT Progress assessment period was done on compliance data and actions during July 2012 to June 2013 audit cycle, which represents the year immediately following the Green Drop 2013 assessment period.

PAT Progress Assessment Period: 1 July 2012 – 30 June 2013

The following table provides the content of the Green Drop Progress Assessment Tool:

#	Green Drop Criteria	Description of Criteria	Additional information to assist completion
		Class of Works	Choose the applicable Class Works from the options provided in the dropdown list
1	Confirmed Plant Classification	Type/s of effluent treatment technology	3 columns are provided, each have a dropdown list to choose the applicable technology for effluent treatment. If a combination of technologies are applied, then make such options under the next columns
		Type/s of sludge treatment technology	3 columns are provided, each have a dropdown list to choose the applicable technology for effluent treatment. If a combination of technologies are applied, then make such options under the next columns
	Davis Court	As captured on GDS	Provide the hydraulic design capacity, as reflected on the GDS. If 'No Information' is available or the unit is unknown to the municipality – zero compliance is assumed
2	Design Capacity (MI/d)	Confirmed capacity	Provide the actual and confirmed hydraulic design capacity, which might be different or the same as the GDS value. If' No Information' is available or the unit is unknown to the municipality, zero compliance is assumed
		Frequency of inflow measurement	State in one word the frequency of inflow measurement to the plant – this could be: monthly, weekly, daily, hourly, 15 minutes, etc.
3	Operational Capacity (MI/d)	Measured daily inflow (MI/d)	Provide a value only, which states the daily inflow recorded to the plant. This value is best represented by the average flow to the plant over the period 1 July 2010 – 30 June 2011. If 'No Information' is available or the unit is unknown to the municipality, zero compliance is assumed

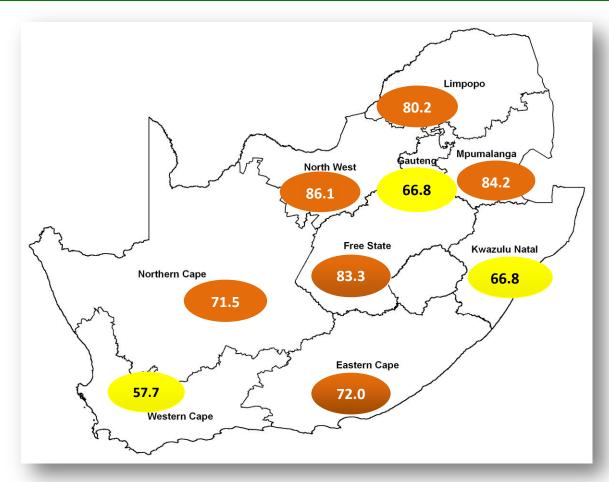
		Operational Capacity (%)	This cell is blocked and will automatically calculate the % capacity utilised as follows: (measured flow / confirmed capacity)*100
Process Control Skills Compliance with R2834		Supervisor + Process Controllers + Maintenance (1) Supervisor + Maintenance & No Process Control (2) Process Control + Maintenance & No Supervisor (2) Process Control + Supervisor & No Maintenance (2) Supervisor & No Maintenance & No PC's (3) Process Controllers & No Maintenance & No Supervisor (3) Maintenance & No PC's & No Supervisor (3)	Using Regulation 2834 as guideline, choose the appropriate staff combinations applicable to your the staff set-up at the specific plant, the choose the number in bracket next to the chosen option and insert in yellow cell. Example: If the plant have a Supervisor, Process Controller and Maintenance crew that complies in full with Regulation 2934, then insert '1'.
		No Supervisor & No Maintenance & No PCs (4) Number of determinands that do not comply 90% of the time with	No need to complete, this will be verified by the Green Drop Assessor
		Authorization Limits	
		Annual Compliance record (%)	
5	Wastewater Quality	E. coli / Faecal coliform	Calculate the % compliance for E coli OR Faecal coliform over the period 1 July 2010 – 30 June 2011. Refer to Annex A for guidance on this calculation if in doubt. If: • DWS authorisation do not require monitoring of this determinant, insert NMR • No information, insert NI
	Compliance	Ammonia as Nitrogen	Same as above, but for specific to NH ₃ -N
		Chemical Oxygen Demand	Same as above, but for specific to COD
		Nitrate/Nitrite as Nitrogen	Same as above, but for specific to NO _{2/3}
		Ortho-Phosphate as Phosphorus	Same as above, but for specific to PO ₄
		рН	Same as above, but for specific to pH
		Electrical Conductivity	Same as above, but for specific to EC
		Suspended Solids	Same as above, but for specific to SS
		Is there a W ₂ RAP in place (Yes /	'Yes' if a W ₂ RAP (wastewater risk abatement plan) process have
6	W₂RAP	No) Format (Rough = R /Draft = D/Finalised = F)	commenced and evidence of resources can be provided. If not, 'No' R=planning and rough outline done D=draft document is in place as evidence F=final document is in place in conforming to the WRC "W ₂ RAP Guideline" for municipalities (TT489/11)
		W ₂ RAP comments	Details of the type or W ₂ RAP that is under development or completed, with some details to attest to the findings and implementation.
		Capital & refurbishment projects - expenditure (Rand in million over 2010/11 financial year)	Capital Expenditure (in Rand) that has been expended over the past FY in terms of upgrading, refurbishment or replacement (capital only) against this specific system. (values in Rmillion)
7	Capital Projects	Brief description of the nature of projects	Details of the project under the 'Description box" that might include: project name, funding source, period, main activities undertaken (e.g. upgrade with 3 M/d capacity), refurbish settling tanks, construct chlorine building, etc)
8	Green Drop Action Plan	Brief description of Corrective Action Plan adopted based upon 2011 Green Drop Report	Details of the type of Corrective Action Plan in place whereby the gaps and corrective measures are outlined against the Green Drop Report June 2011. Some examples would include: Green Drop Improvement Plan, Corrective Action Plan, W ₂ RAP chapter, Work Plan, etc
		Name action targets achieved	Gaps identified which have been RECTIFIED since June 2011 – give specific details in evidence of rectification
Cum	nulative Risk Rating	(CRR)	This block indicate the system's CRR value

CRR _{maximum}	Based on the above information and data, this block will indicate the maximum CRR that the system potentially could reach
WW Risk Rating (% CRR/CRR _{max})	This cell will reflect the CRR/CRR _{max} % value, using the input from the above 2 values
Microbiological Compliance (%)	This cell will depict the % compliance based on the data provided by the municipality against the E coli or Faecal coliform parameter
Chemical Compliance (%)	This cell will depict the % compliance based on the data provided by the municipality against the COD, NH ₃ , NO _{3/2} , O-PO ₄ parameters
Physical Compliance (%)	This cell will depict the % compliance based on the data provided by the municipality against the SS, pH and EC parameters
Average Compliance (%)	The cell will display the average compliance of the discharge effluent quality

The final proof of greatness lies in being able to endure criticism without resentment.

Elbert Hubbar

CHAPTER 2: NATIONAL OVERVIEW OF MUNICIPAL PLANTS



Introduction

Wastewater services delivery is performed by a vast number of Water Services Authorities and their Providers in South Africa. The Green Drop Certification programme of 2013 verified the status of wastewater service delivery by the 152 municipalities that provide services via an infrastructure network comprising of wastewater collector and treatment systems.

The PAT assessment of 2014 had been used to update the status of wastewater treatment in South Africa and the following data has been confirmed for municipal treatment plant and public owned plants respectively. A total of 152 municipalities and 824 plants were assessed, with the works receiving a total of 5 000 MI wastewater per day or 1 825 000 MI/year.

	MICRO SIZE <0.5 M€/day	SMALL SIZE 0.5-2 M€/day	MEDIUM SIZE 2-10 M&/day	LARGE SIZE 10-25 M€/day	MACRO SIZE >25 M&/day	Undeter mined	Total Mℓ/day
No of municipal WWTPs	168	269	232	65	62	28 (43)	824
Total Design Capacity (MI/day)	37.55	256.88	1019.73	939.90	4178.30	28 (43)	6432.36
Total Daily Inflows (MI/day)	9.39	85.43	485.65	496.05	3923.06	450 (243)	4999.58

National Risk Analysis

One of the key performance areas within the national Green Drop Certification programme is the presence and implementation of risk abatement management by a Water Services Institution. The Department has commenced with risk-based regulation in 2008, thereby establishing a baseline risk profile for each municipal plant in South Africa. The following table shows the trend in risk movement on a national basis over a 6 year period:

CUMULATIVE RISK COMPARATIVE ANALYSIS							
Performance Category	2008	2009	2011	2012	2013	2014	Risk Trend [2013-2014]
Highest CRR	25	29	32	28	30	29	\
Average CRR	13.5	13.3	13.6	12.3	12.2	13.4	↑
Lowest CRR	5	4	3	2	4	3	T
Average Design Rating (A)	2.5	1.4	1.4	1.4	1.4	1.4	→
Average Capacity Exceedance Rating (B)	3.3	3.7	4.1	3.8	3.6	4.1	↑
Average Effluent Failure Rating (C)	3.2	5.7	5.7	4.7	4.9	5.1	↑
Average Technical Skills Rating (D)	1.7	2.4	2.6	2.5	2.5	2.9	↑
AVERAGE % DEVIATION FROM maximum-CRR	67	66.8	69.2	66	65.4	71.7	↑

 \uparrow = digress, \downarrow =improvement, \rightarrow = no change

The above data indicate that the overall risk profile of wastewater treatment plants remained reasonably constant over the period 2008 to 2013. However, digress in the performance of municipal treatment facilities is evident for 2014, based on the unvarying upwards risk trend arrows (increased risk). The highest risk plant and position of 30 (2013) has reduced to a CRR value of 29 but still giving an increased national average of 13.4 as opposed to 12.2 in 2013. The cumulative effect can be seen in the increased and digressed CRR/CRR_{max}% deviation from of 65.4% (in 2013) to 71.7% (in 2014). A positive reflection is to be found in the reduction of both the maximum CRR (30 to 29) and minimum CRR (4 to 3) of all plants.

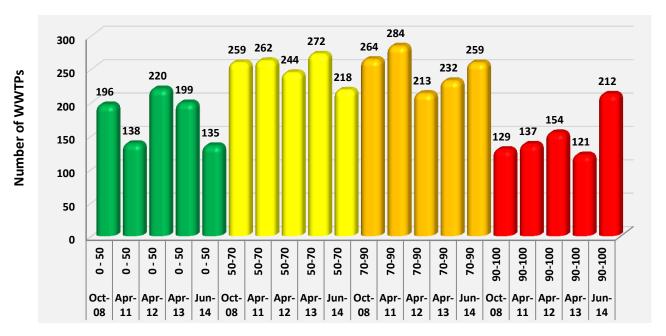
This risk profile is made up by the various risk indicators (A,B,C,D) that contribute to the total CRR value. The data shows that the treatment plant on an average (national scale) has digressed in terms of operational flows to the facilities, effluent quality and technical skill. Results indicated that, despite significant regulatory pressure, processes or evidence are still lacking in terms of flow and/or effluent monitoring, compliance monitoring, effluent quality failures, and technical skills requirements.

The overall national picture leans towards a negative impression, and is detracting attention from the high-end performing municipal systems. It is impressed upon the municipalities with digressing risk profiles to evaluate the underlying causes for depreciating risk positions and to address the specific risk elements. These municipal treatment plants are clearly identified in the various Chapters under "Regulatory Impression" and marked with CRR for each individual plant. CRR values marked in red and orange means that those treatment plants are in high and critical risk positions. Unless those plants are not turning around performance, the above table will not show a positive risk profile for the country, and the health of the receiving environment will remain under threat.

The movement of risk in the following barchart shows that the majority of plants are in high risk (259) positions, followed by 218 plants in medium risk and 212 plants in critical risk positions. The reduction in the number of plants in low risk domain, which decreased from 199 to 135, is raising concern. Some of the formerly 'low risk' plants have since moved into higher risk positions, which is undesirable. This can be seen by the increase in high risk plants from 232 to 259, and critical risk plants from 121 plants to 212 plants.

The overall picture projects negatively and suggests that the municipal industry as a whole has not managed to contain and then turnaround the risk. The Regulator regards this trend with concern and the plants that have digressed into higher risk positions are placed under regulatory surveillance.

National Risk Profile: CRR as % of CRRmax



RISK PERCENTAGE

9/ Deviation -	90 – 100% Critical risk WWTPs	
% Deviation =	70 - <90% High Risk WWTPs	
CRR/CRR(max) TRFND	50-<70% Medium risk WWTPs	
IKEND	<50% Low Risk WWTPs	

Comparative Analysis of Provincial Performance

Provincial risk profiles are the summation of the respective municipal performances. Each Province has different dynamics with municipal participants that progressed or digressed on different levels. The status of each province is summarised as follows, which also provides for valuable comparative analysis and benchmarking.

PROVINCE	RISK COMPARISON PROFILE AREA						
Province (abbreviated)	2013 CRR and % deviation from CRR _{max}	2014 CRR and % deviation from CRR _{max}	Number of Plants in Critical Risk Positions	Number of Plants in High Risk Positions	Number of Municipalities with W₂RAPs in place*		
W-Cape	53%	58%	5	46	23		

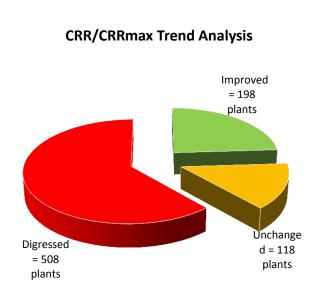
KZN	55%	67%	13	55	15
Gauteng	59%	67%	5	22	10
E-Cape	67%	73%	33	41	9
Mpumalanga	76%	84%	40	20	6
N-West	73%	86%	23	7	3
F-State	77%	83%	44	29	8
Limpopo	75%	80%	24	19	8
N-Cape	78%	72%	25	20	9

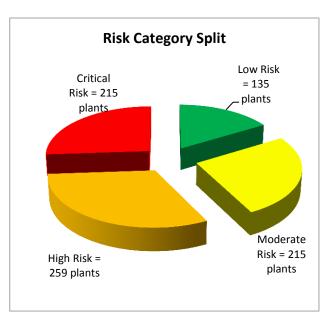
^{*} Considering from Draft (unapproved by Council) onwards and no W₂RAPs in planning stage or with framework established only

Conclusion

The overall progress on a nation-wide scale can be summarised as follows:

- 198 plants shows progress by taking up lower risk (CRR% deviation) positions these municipalities are congratulated and commended for their responsible and active mitigation of risk;
- ii. **118 plants maintained** their status and are commended for maintaining their status these municipalities are encouraged to plan towards deliberate mitigation of their risk;
- iii. **508 plants digressed** by taking up increased risk ratios these municipalities are cautioned and advised to plan and implement interventions and risk mitigation measures;
- iv. The majority of plants are in high risk (259 plants) and medium risk (218 plants), with 212 plants in critical risk and 135 plants in low risk space.



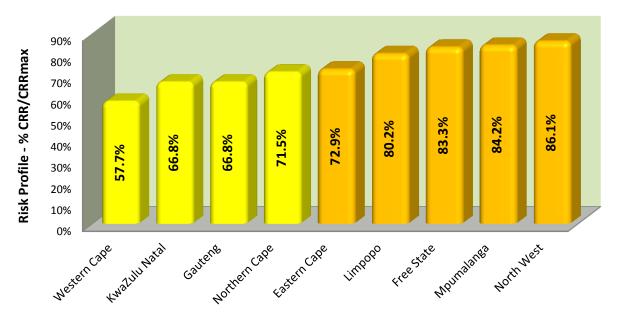


It is important to understand that municipalities that are positioned in **low risk domain**, that have successfully abated their risks, will have a positive and uplifting impact on the cumulative risk profile of their province, whilst **high risk municipalities** will down-grade the collective CRR score of the province and thereby counteract or outweigh the positive contributions.

It is therefore important that Provincial Action Plans, whether support directed, or other, identify the lower performers (municipalities with high and critical risk plants) and direct corrective action and risk mitigation measures accordingly. Various opportunities co-exist for municipalities, business and agriculture to cooperate and improve wastewater services. It is in the collective interest of municipal 'neighbours' within a province/ region to work together, share resources, experience and best practice to stimulate further progress via progressive risk abatement. Successful partnerships will result in a positive replacement of high risk with lower risk treatment facilities on a national scale — thereby presenting a safer and healthier environment and reliable service to all. The Green Drop scorecard 'rewards' such partnerships through incentive scoring for 'cross pollination' (collaboration).

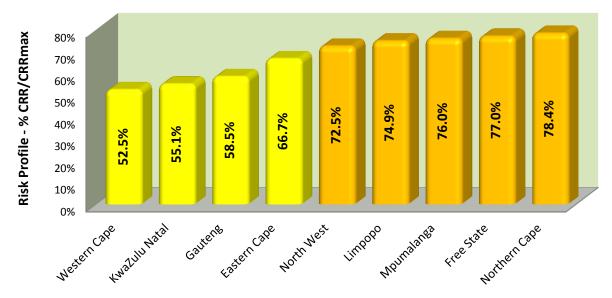
The 2014CRR/CRRmax% deviation is made up by the risk profiles of the various provinces as follows (comparative figure for 2013 provided below the 2014 results):

NATIONAL PERFORMANCE LOG 2014



Performance Position in South Africa

NATIONAL PERFORMANCE LOG 2013



Performance Position in South Africa

The CRR risk information provides valuable information that can be used to inform actions, decisions, strategies and policies on various levels.

SOUTH AFRICAN WSA PROGRESS INDICATOR:

198√

508*

Green Drop Progress Acknowledgement 2014

The following municipalities are commended for their outstanding achievement in terms of risk abatement and overall risk management practices. Well done and continue to aspire to advance this good practice to even higher peripheries in the coming year of full Green Drop Certification Audits.

Eastern Cape:

Best overall risk positions achieved: Buffalo City; Nelson Mandela

• Best progress in risk abatement: Camdeboo

Free State:

Best overall risk positions achieved: Tokologo
 Best progress in risk abatement: Tokologo

Gauteng:

Best overall risk positions achieved: City of Johannesburg; Johannesburg Water

• Best progress in risk abatement: Merafong

Kwa-Zulu Natal:

Best overall risk positions achieved: eThekwini; Umhlathuze; Umgungundlovu

• Best progress in risk abatement: Umhlathuze

Limpopo:

Best overall risk positions achieved: Polokwane
 Best progress in risk abatement: Vhembe

Mpumalanga:

Best overall risk positions achieved: Mbombela

Best progress in risk abatement: Albert Luthuli; Nkomazi; Steve Tshwete

Northern Cape:

• Best overall risk positions achieved: Tsantsabane; Hantam; Emthanjeni

• Best progress in risk abatement: Tsantsabane; Hantam; Kamiesberg; Kheis; Joe

Morolong; Siyathemba; Siyancuma; Ubuntu; Khai Ma;

Nama Khoi

North West:

• Best overall risk positions achieved: Tlokwe; Rustenburg

• Best progress in risk abatement: Tlokwe; Rustenburg; Moses Kotane

Western Cape:

• Best overall risk positions achieved: Beaufort West; Bitou; Witzenberg; Overstrand

Best progress in risk abatement:
 Beaufort West; Bitou; Hessequa; Bergriver; Drakenstein

The following private institutions and Department of Environment Kruger National Park plants are commended for participating and for outstanding achievement in terms of effluent compliance, risk abatement and wastewater management:

Sun City (North West):

PAT CRR status of 22.7% (improved from 31.8% in 2013)

Nedbank Olwazini (Gauteng):

• PAT CRR status of 29.4% (remains same as in 2013)

Sasol Synfuels (Mpumalanga):

• PAT CRR status of 40.9% (remains same as in 2013)

SasolburgInfrachem (Free State):

PAT CRR status of 37% (improved from 44.4% in 2013)

Kruger National Park (Mpumalanga):

Best overall risk positions achieved: Malelane; Shingwedzi; Satara; Orpen; Lower Sabie; WPS
 Best progress in risk abatement: Satara and Lower Sabie (medium to low risk space).

"If you are going to achieve excellence in big things, you develop the habit in little matters.

Excellence is not an exception, it is a prevailing attitude."

Colin Powell