



NORTH WEST REGION

CONTENTS:

- **Introduction**
- **Services rendered in the North West Region**
- **Primary objective of the North West Region**
- **Operational overview: North West (Hartswater) Sub-region**
- **Operational overview: North West (Mahikeng) Sub-region**
- **Conclusion**

INTRODUCTION

The North West Region comprises two sub-regions, namely North West (Hartswater) with its regional office in Hartswater, and North West (Mahikeng) where the regional office is situated in Mahikeng. The Hartswater Sub-region serves the Ga-Segonyana Local Municipality (Northern Cape Province), Phokwane Local Municipality (Northern Cape Province) and Dr. Ruth Segomotsi Mompati District Municipality (North West Province), while the Mahikeng Sub-region serves the Ngaka Modiri Molema District Municipality (North West Province). Bulk water supply, and operations and maintenance services being rendered in these municipalities are defined in the Water Services Act (No. 108 of 1997) as Sections 29 and 30 activities. However, in certain areas the North West Region also provides retail services.

SERVICES RENDERED IN THE NORTH WEST REGION

The services that the Region offers municipalities are (but not limited to) the following:

Bulk Water Services

- Infrastructure for the supply of bulk potable water (water treatment plants and main pump lines); and
- Operation and maintenance of bulk water and sewage services.

Reticulation Water Services

- Operations and maintenance of reticulation systems;
- Installing pre-paid meters;
- Replacement of all conventional yard water meters with pre-paid yard meters; and
- Connection of pre-paid yard meters to retail customers.

Management and Other Support Services

- Technical audits;
- Optimisation and management of water supply systems;
- Training of personnel; and
- Project management.

Water Quality Monitoring

- Sampling and testing; and
- Water quality monitoring of sources, reservoirs and points of use.

Retail Services

- Meter installation and management;
- Billing and collection; and
- Bulk meter replacement and installation to minimise water losses.

PRIMARY OBJECTIVE OF THE NORTH WEST REGION

The primary objective of Sedibeng Water in the North West Region is to fulfil the requirements of the Water Services Act, for which reason the organisation signed several water service provider agreements with Water Services Authorities in the North West and Northern Cape Provinces. The North West Region (Hartswater Sub-region) has entered into such an agreement with the Dr. Ruth Segomotsi Mompati District Municipality for bulk water supply to the Mamusa Local Municipality and Lekwa-Teemane Local Municipality, as well as both bulk and retail water supply to the Kagisano Molopo Local Municipality and Greater Taung Local Municipality. All these bulk water supply contracts are still valid and will be revised in the 2019/2020

financial year. Likewise, the North West Region (Mahikeng Sub-region) has also concluded bulk and retail Service Level Agreements with the Ngaka Modiri Molema District Municipality to supply water to Mahikeng and surrounding peri-urban areas. The Service Level Agreements with the Ngaka Modiri Molema District Municipality and Mahikeng Local Municipality are valid until June 2020 and November 2010, respectively. Negotiations are underway to revise the bulk water supply contract with the Ditsobotla Local Municipality which will expire in August 2019. The Mahikeng Sub-region also entered into a tripartite agreement with the Department of Human Settlements, Water and Sanitation and the Water Utility Cooperation of Botswana to operate and maintain the TSWASA Scheme.

**OPERATIONAL OVERVIEW:
NORTH WEST (HARTSWATER) SUB-REGION**

CONTENTS:

- **Background**
- **Water sources**
- **Production volumes**
- **Water quality monitoring**
- **Bulk wastewater services**
- **Wastewater effluent quality**
- **Retail services**
- **Reticulation water services**
- **Maintenance and refurbishment**
- **Optimisation and management of water supply systems**
- **Management and other support services**



Mr. S.K. Sithole

Acting Regional Manager: North West (Hartswater)

BACKGROUND

The municipalities being served by Sedibeng Water in the North West (Hartswater) Sub-region include:

- Ga-Segonyana Local Municipality (Northern Cape Province);
- Phokwane Local Municipality (Northern Cape Province);
- Dr. Ruth Segomotsi Mompati District Municipality (North West Province);
 - Kagisano-Molopo Local Municipality;
 - Greater Taung Local Municipality;
 - Lekwa-Teemane Local Municipality;
 - Naledi Local Municipality; and
 - Mamusa Local Municipality.

WATER SOURCES

The primary source of potable water in the Sub-region is ground water resources, which constitute 45% of the total potable water supply. The villages in the area are scattered over a vast area of operation, and each village has its own boreholes. Supply and demand related to the water sources used by the Hartswater Sub-region to service the Dr. Ruth Segomotsi Mompati District Municipality are depicted in Table 1.

Table 1: Total Potable Water Production

Source	Water Treatment Plant	Design Capacity (Mℓ per day)	Current Demand (Mℓ per day produced)	Comments
Harts River	Kgomotso	1.8	1.5	-
Vaal Harts Canal	Pudimoe Module 1	6	5	Insufficient supply of raw water
Vaal Harts Canal	Pudimoe Module 2	7	6	Insufficient supply of raw water
Vaal Harts Canal	Pudimoe Module 3	7	3	Insufficient supply of raw water
Vaal Harts Canal	Bogosing	1.2	1.2	-
Taung Dam	Taung	11	48	Construction at the Taung plant is 98% complete and the due date for completion is January 2020
Wentzel Dam and Boreholes	Mamusa	4	3.5	-
Vaal Harts Canal and Harts River	Pampierstad	9.6	8.2	-

PRODUCTION VOLUMES

As can be seen in Table 2, total annual production volumes for the Dr. Ruth Segomotsi Mompati District Municipality, the Phokwane Local Municipality and the Ga-Segonyana Local Municipality, have decreased by 2.20% (from 22,598,411kℓ in the previous financial year to 22,111,398kℓ in the 2018/2019 financial year). Water production from the treatment works (see Table 3) decreased by

4.51% (from 14,880,566kℓ in the 2017/2018 financial year to 14,238,306kℓ in the year under review), while that of boreholes increased by 1.97% (from 7,717,845kℓ to 7,873,092kℓ in the review period (see Table 4). The decrease in production by plants was mainly due to the unavailability of raw water supply, while the increase in the production from boreholes was primarily as a result of the drilling of new and the rehabilitation of existing boreholes.

Table 2: Total Potable Water Production

Source	2017/2018 Volume (kℓ)	2018/2019 Volume (kℓ)
Plants	14,880,566	14,238,306
Boreholes	7,717,845	7,873,092
Total Production	22 598 411	22,111,398

Table 3: Monthly Potable Water Production by Plants in Kilolitres (July 2018 – June 2019)

Month	Pampierstad	Bogosing	Kgomotso	Pudimoe	Mamusa	Bloemhof	Christiana
JULY	185,220	27,845	36,160	386,994	26,410	352,040	179,380
AUG	200,240	25,572	35,630	445,330	81,440	311,390	191,760
SEPT	222,560	23,973	38,900	388,927	83,650	273,390	181,490
OCT	218,820	26,302	39,260	324,116	85,990	261,650	177,240
NOV	232,270	30,047	42,250	379,307	85,850	373,150	218,280

Table 3: Monthly Potable Water Production by Plants in Kilotres (July 2018 – June 2019) (Continued)

DEC	167,720	28,355	35,010	359,382	85,750	253,170	139,090
JAN	258,300	30,023	46,270	412,019	85,920	415,990	214,760
FEB	233,130	32,317	40,220	325,726	85,990	341,030	197,560
MAR	180,720	33,902	39,590	258,796	85,910	278,060	173,620
APR	210,970	33,584	38,310	306,746	85,910	287,340	186,000
MAY	209,210	29,284	33,950	401,132	87,540	325,750	137,140
JUNE	188,310	23,099	38,600	302,258	82,110	228,730	154,070
Total	2,507,470	344,303	464,150	4,290,833	965,470	3,701,690	1,964,390
Total Production							14,238,306

Table 4: Monthly Borehole Production Trends in Kilotres (July 2018 – June 2019)

Month	Ga-Segonyana	Greater Taung	Kagisano-Molopo
JULY	384,365	112,892	174,344
AUG	292,331	125,058	204,817
SEPT	338,632	111,397	169,169
OCT	275,140	113,994	178,726
NOV	313,031	149,235	296,077
DEC	280,850	145,476	477,289
JAN	310,293	121,251	208,393
FEB	311,866	101,846	131,339
MAR	231,163	94,206	168,637
APR	319,025	110,461	329,949
MAY	379,109	110,479	240,145
JUNE	287,707	86,338	188,072
Total	3,723,512	1,382,633	2,766,947
Total Production			7,873,092

Monthly potable water production per municipality is shown in Table 5.

Table 5: Monthly Potable Water Production per Municipality in Kilotres (July 2018 – June 2019)

Month	Phokwane	Ga-Segonyana	Dr. Ruth S. Mompoti
JULY	185,220	384,365	1,296,065
AUG	200,240	292,331	1,420,997
SEPT	222,560	338,632	1,270,896
OCT	218,820	275,140	1,207,278
NOV	232,270	313,031	1,574,196
DEC	167,720	280,850	1,523,522
JAN	258,300	310,293	1,534,616
FEB	233,130	311,866	1,256,028

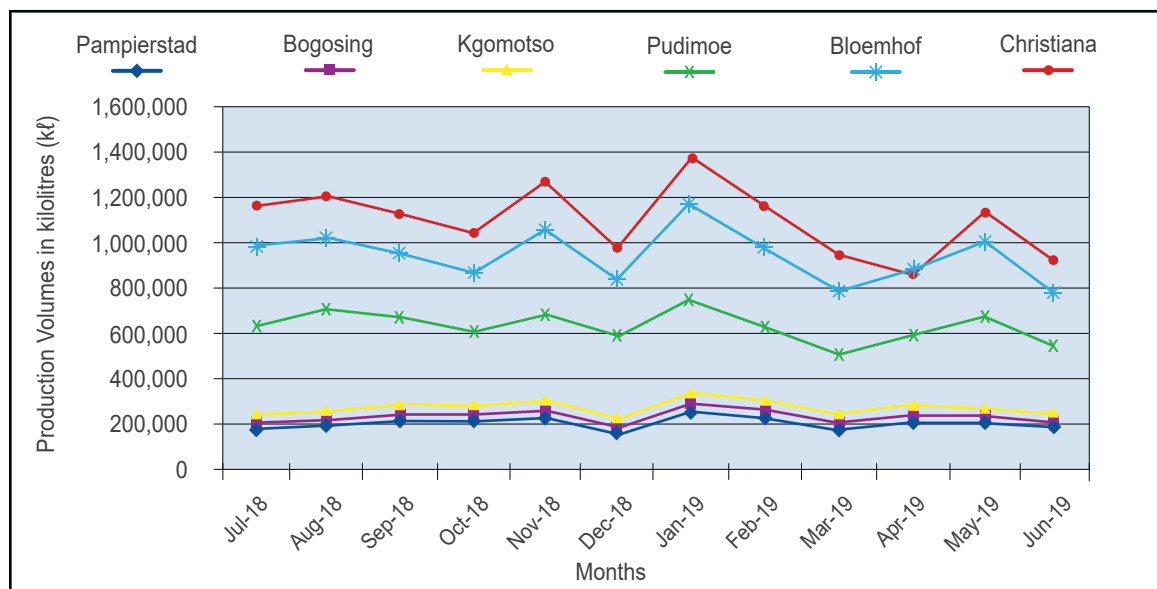
Table 5: Monthly Potable Water Production per Municipality in Kilotres (July 2018 – June 2019)
(Continued)

MAR	180,720	231,163	1,132,721
APR	210,,970	319,025	1,192,300
MAY	209210	379,109	1,365,420
JUNE	188,310	287,707	1,106,377
Total	2,507,470	3,723,512	15,880,416
Total Production			22,111,398

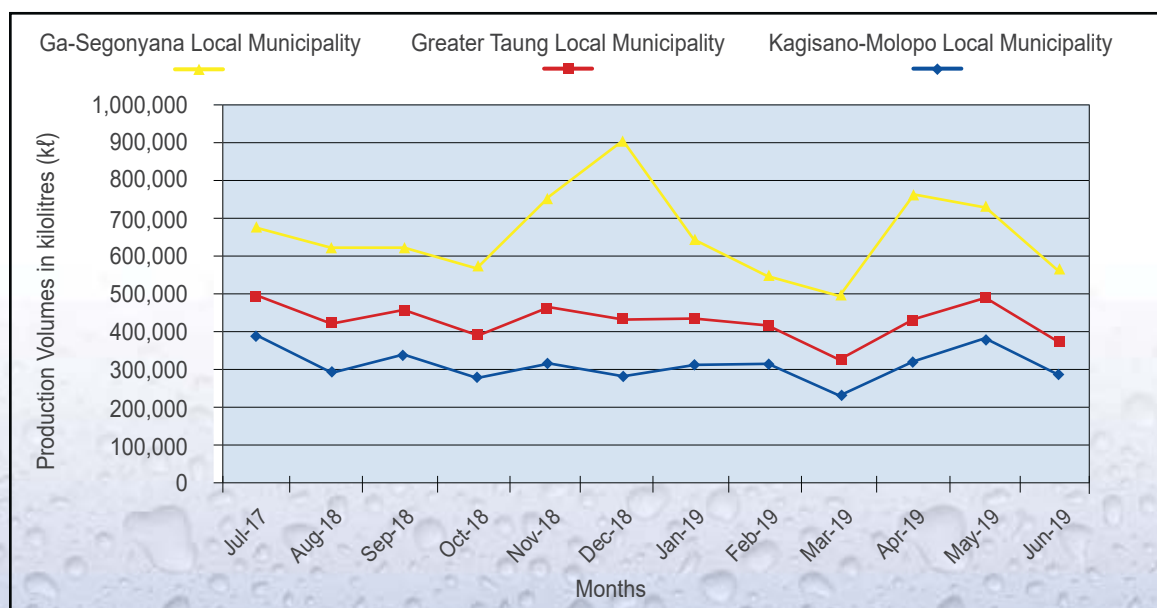
Graphs 1-3 indicate water demand and production trends in the Sub-region, highlighting the periods of high demand and consumption. There were great fluctuations in production volumes from the Pudimoe

Water Treatment Works due to the fact that the Vaalharts Water Users Association is in the process of upgrading and refurbishing the supply canal.

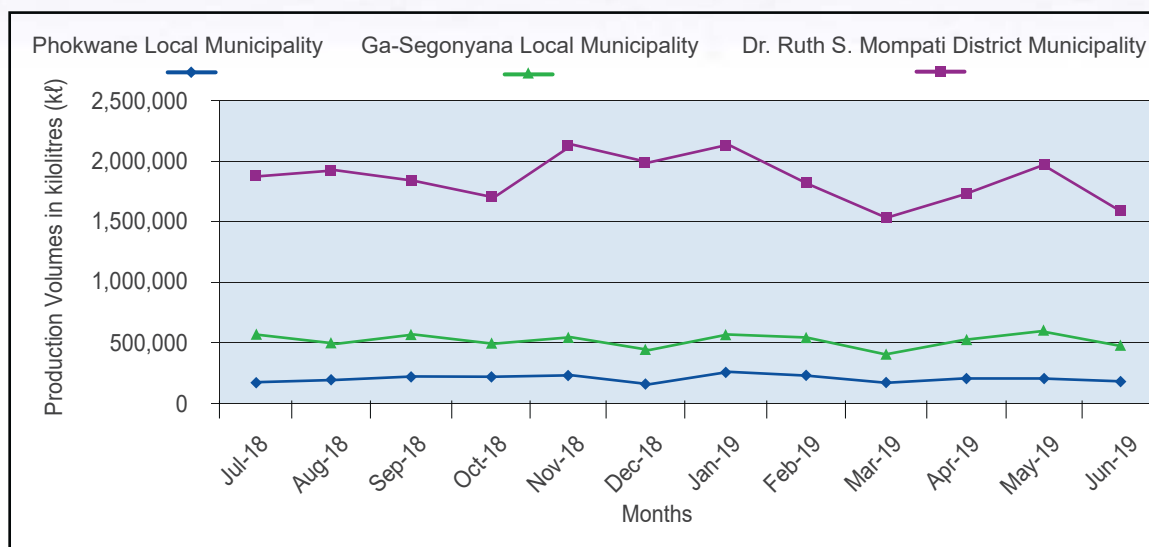
Graph 2: Monthly Borehole Production Trends



Graph 2: Monthly Borehole Production Trends



Graph 3: Monthly Production Trends per Municipality



WATER QUALITY MONITORING

Water Treatment Works

The Sub-region has developed and implemented a comprehensive Water Quality Monitoring Programme, which involves sampling and testing above minimum requirements. As monitoring process deviations may negatively impact on final water quality, operators have been trained to carry out regular on-site sampling and testing procedures at the plants. The quality testing and recording

procedures have also been extended to the Mamusa Local Municipality in the review period.

On a weekly basis, samples from the water treatment plants are sent to Sedibeng Water’s accredited laboratory at Balkfontein for detailed analysis as per SANS 241:2015 standards. Table 6 summarises water quality statistics for the 2018/2019 financial year, which complied with SANS 241:2015 bacteriological requirements for drinking water, and with most of the microbiological requirements for final water.

Table 6: Treated Potable Water Quality Results

Treated Water	Bogosing Supply System	Kgomotso Supply System	Pampierstad Supply System	Pudimoe-Taung Supply System	Majeakgoro Supply System	Majeakgoro Supply System
% Compliance						
Microbiological (Health)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Chemical (Health)	99.6%	100.0%	100.0%	99.9%	100.0%	99.9%
Physical, Organoleptic (Non-health)	90.0%	98.5%	99.2%	99.8%	99.6%	99.6%
Operational	89.5%	91.6%	95.5%	96.0%	99.6%	99.5%

No microbiological health failures were encountered for the water supply systems within the Water Service Authority, i.e. the Dr. Ruth Segomotsi Mompoti District Municipality.

Boreholes

A water quality monitoring programme for the Ganyesa area was developed and implemented. Two samplers were appointed and trained to apply

sampling techniques. Most of the boreholes are vandalised and fencing is absent. A business plan for the refurbishment of the boreholes has been compiled and submitted to the Dr. Ruth Segomotsi Mompati District Municipality and the Department of Water and Sanitation. Due to funding challenges being experienced, the refurbishment of boreholes still needs to be done. However, some refurbishment

has already been done by the Infrastructure Support Agent (MISA). Borehole water samples from the Ga-Segonyana Local Municipality are sent on a weekly basis to the laboratories at Balkfontein and Vaal Gamagara for bacteriological and chemical analysis. Table 7 summarises the water quality test results of boreholes in the Sub-region for the 2018/2019 financial year.

Table 6: Borehole Water Quality Results

Borehole Water	Taung East Borehole WMA	Taung West Borehole WMA	Ga-Segonyana North WMA	Ga-Segonyana West WMA
	% Compliance			
Microbiological (Health)	97.0%	90.5%	98.9%	97.5%
Chemical (Health)	99.9%	99.7%	99.5%	99.9%
Physical, Organoleptic (Non-health)	99.1%	99.3%	99.9%	99.9%
Operational	96.0%	97.1%	97.0%	96.1%

BULK WASTEWATER SERVICES

Sedibeng Water in the Sub-region renders operations and maintenance services to the Pampierstad Wastewater Treatment Works on behalf of the Phokwane Local Municipality, and to the Christiana, Bloemhof and Mamusa Wastewater Treatment Works, on behalf of the Dr. Ruth Segomotsi Mompati District Municipality. These wastewater treatment works treat household effluent from the townships of Pampierstad, Christiana, Bloemhof and Schweizer Reneke. The Pampierstad Wastewater Treatment Works is currently under-utilised, operating at below 60% of its design capacity. There is a substantial increase in population in the area, while informal housing structures and RDP houses are not yet connected to the sewer system due to a lack of formal infrastructure. Sekhile is serviced with both water and sanitation reticulation, but the sewer system is non-operational. The Phokwane Local Municipality is responsible for the sewer reticulation system. However, the Christiana and Bloemhof Wastewater Treatment Works are encumbered, and projects to upgrade and refurbish these plants have been approved for the 2018/2019 financial year. These upgrade and refurbishment projects are still in their construction phases and should be completed in the new financial year. Both these plants are licensed and authorised to discharge effluent into the nearby Harts River and Vaal River, respectively.

Currently, 60% of the effluent is discharged into these rivers, while the rest is recycled back into the plants. It can be confirmed that the effluent discharged into these sources meets SANAS standards. The old Bloemhof Wastewater Treatment Works has been refurbished, and the new wastewater treatment plant is currently in the process of being refurbished. In Schweizer Reneke, effluent is also discharged into the Harts River. This plant is in the process of being refurbished and therefore, not optimally in operation. Much work still needs to be done before the plant will be fully operational and in compliance with SANAS requirements.

WASTEWATER EFFLUENT QUALITY

The final effluent from the Pampierstad Wastewater Plant complied with the General Standard for effluent. The presence of free chlorine was maintained within the limits, before discharging the final effluent into the Harts River. A fully equipped and on-site quality monitoring laboratory ensures compliance in this regard. Samples are sent on a weekly basis to the accredited main laboratory at Balkfontein for detailed analysis. The final effluent from the Christiana Wastewater Treatment Plant complied with the required standard.

RETAIL SERVICES

The Sub-region renders full retail services, including the installation of pre-paid water meters, maintenance and management of old meters, as well as billing and revenue collection. Sedibeng Water decided to replace all conventional water meters with pre-paid meters. This process is pending as the Phokwane Local Municipality has not yet approved the replacement of the conventional meters with pre-paid meters. The Sub-region is likewise in the process of installing pre-paid meters in the Ganyesa area, replacing all conventional water meters.

RETICULATION WATER SERVICES

In addition to bulk water services, the Sub-region also renders operations and maintenance services to reticulation systems, making this a full-scale service ranging from source to tap. A refurbishment programme to replace the asbestos pipes in Pampierstad within the Phokwane Local Municipality was completed as far as the allocated budget allowed. This refurbishment of the reticulation system has increased the water demand in Pampierstad and a proposal regarding the upgrade of the water treatment works and raw water supply system was presented to the municipality. There is an increasingly high demand for yard connections. Yard connections are limited to areas where water sources are available and the areas are reticulated.

The Pudimoe Water Treatment Works Module 3 has been commissioned during May 2018 and is supplying the Naledi Local Municipality with potable water. The Taung plant will be supplying potable water to Greater Taung and its surrounding areas. However, progress related to the completion of this plant has been delayed and the facility will only be commissioned during the 2019/2020 financial year. A new project supplying water from the Taung Water Treatment Works to the villages on the Eastern Plato has been approved. Certain aspects of the project are under construction and should be completed by the end of the 2019/2020 financial year.

The Sub-region also services the drought-stricken Ganyesa area. A ground water study

was conducted and has identified the areas where potentially high-yield boreholes can be drilled. Plans and system designs to provide the operational area of the Dr. Ruth Segomotsi Mompati District Municipality with a more sustainable water supply have been completed. Consultants concluded an Implementation Readiness Study and the tender documents have been prepared to construct a bulk water supply system for the most needing areas by the beginning of the new financial year. However, this project has been placed on hold due to financial constraints.

MAINTENANCE AND REFURBISHMENT

A wide range of maintenance activities, in part (component replacement) and in full (general overhaul) was performed according to a Maintenance Plan with regards to the following assets:

- Process equipment at the water and wastewater treatment plants;
- Borehole equipment;
- Pump stations;
- Storage facilities, such as concrete reservoirs, steel tanks and plastic tanks;
- Reticulation equipment;
- Buildings; and
- Vehicles.

There was a notable increase in maintenance expenditure by the Sub-region in the year under review. Aging equipment and frequent breakdowns demanded the refurbishment and replacement of equipment and machinery. Water supply shortages and disruptions in raw water supply have necessitated the acquisition of new mobile pumps to supply raw water to the treatment plants, especially in Pampierstad where the increased demand exceeded the capacity of the pumps to supply sufficient raw water. Dry periods caused by canal maintenance and upgrading, also contributed to more extensive mobile pumping. The radial flow pumps at the Pudimoe Water Treatment Works have reached the end of their operational lifespan and are in the process of being replaced and refurbished.

OPTIMISATION AND MANAGEMENT OF WATER SUPPLY SYSTEMS

The Hartswater Sub-region is currently operating and maintaining the water supply line from Pudimoe to Vryburg on behalf of the Dr. Ruth Segomotsi Mompati District Municipality. The Sub-region is likewise responsible for the operation and maintenance of the Christiana and Bloemhof Water and Wastewater Treatment Plants on a cost-recovery basis on behalf of this district municipality. While temporarily managing these systems, Sedibeng Water assists the Water Services Authority in the optimisation of the water treatment processes to

bring the water quality to acceptable standards and to ensure the correct dosing of chemicals.

MANAGEMENT AND OTHER SUPPORT SERVICES

In addition to standard services that are rendered in the fulfilment of Water Services Provider Agreements in the Sub-region, Sedibeng Water also renders management and other support services on request from the Water Services Authorities within its area of operations.

OPERATIONAL OVERVIEW: NORTH WEST (MAHIKENG) SUB-REGION

CONTENTS:

- Introduction
- Primary objective
- Water sources
- Water treatment works
- Production volumes
- Bulk potable water sales
- Potable water quality
- Management and other support services
- Operations and maintenance services
- Retail services
- TSWASA Water Scheme
- Interventions

Mr. A. Mnyaka
Acting Regional Manager: North West (Mahikeng)



INTRODUCTION

The North West (Mahikeng) Sub-region serves the Ngaka Modiri Molema District Municipality, which includes the following local municipalities:

- Ramotshere Moiloa Local Municipality;
- Ratlou Local Municipality;
- Tswaing Local Municipality;
- Ditsobotla Local Municipality; and
- Mahikeng Local Municipality.

Sedibeng Water's area of operations was extended to cover the areas of Ngaka Modiri Molema District Municipality. The Minister of Water and Sanitation issued Gazette Number 38100, disestablishing Botshelo Water Board with effect from 1 October 2014, thereby extending the operations of Sedibeng Water with the areas serviced by former Botshelo

Water including all the rural areas of Ngaka Modiri Molema District Municipality.

This Ministerial Directive have an impact on water provisioning for the whole district municipality.

PRIMARY OBJECTIVE

The Ministerial Directive mandated Sedibeng Water to service Ngaka Modiri Molema District Municipality on bulk water supply, operations and maintenance (rural supply) of boreholes and handpumps, and the retail business. The water services offered by Sedibeng Water (Water Service Provider) to the Ngaka Modiri Molema District Municipality (Water Service Authority) thus cover both primary and secondary activities in terms of the Water Services Act (Act No. 108 of 1997).

The 2018/19 financial year has been characterised by additional responsibilities bestowed upon Sedibeng Water in the district municipality concerned. Sedibeng Water is expanding its offerings as an Implementing Agent to also implement projects on behalf of the Department of Water and Sanitation and the North West Local Government and Human

Settlements Department. Responsibilities in this regard relate to the restoration of boreholes, installation of storage tanks and reticulation network, water treatment plants, wastewater treatment plants and wastewater pumping stations. Table 1 indicates services rendered by Sedibeng Water to the Ngaka Modiri Molema District Municipality.

Table 1: Services rendered within NMMDM

Client	Services Rendered			
	Bulk	O&M	Retail	Implementing Agent
Ngaka Modiri Molema District Municipality	✓	✓	✓	✓
Ditsobotla Local Municipality	✓			
Mahikeng Local Municipality	✓			

POTABLE WATER SOURCES

In the area of the Ngaka Modiri Molema District Municipality, Sedibeng Water depends on the following water resources for the provision of potable water:

Grootfontein and Molopo Eye

There are two abstraction points from Dolomitic ground water compartments located approximately 20km to the east of Mahikeng, namely the previously high-yielding Grootfontein borehole fields and the Molopo Eye. The abstraction quantity allocated from these dolomitic ground water compartments previously amounted to 35Mℓ/day. This quantity has since reduced to approximately 23Mℓ/day.

The water abstracted from these two sources is of good quality. However, the yield from the Molopo Eye abstraction point has been inconsistent over the reporting period, ranging from 600m³ to 830m³ per hour. A number of investigations undertaken during the 2017/2018 financial year delivered inconclusive findings on the reasons for this decline. Further investigations are underway to explore various ways to augment the existing raw water supply from these sources.

Setumo Dam

The Setumo Dam was constructed in 1996 to augment the bulk water supply to Mmabatho, Mahikeng and the surrounding peri-urban villages. It is situated to the west of Mahikeng and supplies raw water to the Mmabatho Water Treatment Works. The design capacity of the dam is 18 million m³ per annum. The abstraction quantity allocated from this source amounts to 20Mℓ/day. However, the raw water quality has deteriorated and the abstraction volumes have decreased to about 16Mℓ/day. An upgrade project is currently underway at the Mmabatho Water Treatment Works to increase its capacity from 20Mℓ/day to 30Mℓ/day.

Sehujwane Dam

The Sehujwane Dam is situated approximately 102km north-east of Mahikeng and is used for supplying raw water to the Motswedi Water Treatment Works in the Ramotshere Moiloa Local Municipality. The abstraction quantity allocated from this resource is 2Mℓ/day.

Dinokana Eye

The Dinokana Eye is situated 100km north-east of Mahikeng in the Dinokana Village. The raw water is abstracted from the Dinokana Eye and pumped into

five (5) 600m³ storage reservoirs, and the disinfected potable water gravitates to supply the Dinokana village and other small surrounding villages. The quality of raw water abstracted from Dinokana, is good. It only requires disinfection before it can be supplied to consumers. The abstraction quantity allocated to this resource is 2Mℓ/day.

Itsoseng Well Field

The Itsoseng well field is situated 32km south-east of Mahikeng. Here, Sedibeng Water is licensed to abstract 4.6Mℓ/day. Water is pumped from 16 boreholes to a ground reservoir, then to an elevated reservoir, and thereafter, it gravitates to the Itsoseng Township. The water quality is very good and meets the set standards for potable water. The quantity of water that is supplied by the existing boreholes is not adequate to meet the demand of the consumers in the area. A previous study found that approximately 8Mℓ/day is required to augment the water supply to the Itsoseng area.

WATER TREATMENT WORKS

Water production by plants is undertaken through Bulk Water Contracts with the Ngaka Modiri Molema District Municipality, as well as the Mahikeng and Ditsobotla Local Municipalities.

Mahikeng Water Treatment Works

The Mahikeng Water Treatment Works is situated 5km to the east of Mahikeng and has a total allocation of 30Mℓ/day, which constitutes 7.5Mℓ/day from the Grootfontein well fields and 22.5Mℓ/day from the Molopo Eye. The plant supplies peri-urban and urban areas around Mahikeng and Mmabatho. Although the Mahikeng Water Treatment Works has an allocation of only 30Mℓ/day, it has a design capacity of 45Mℓ/day.

The level of water production is highly dependent on the yield from the Molopo Eye and Grootfontein boreholes. During the 2018/2019 financial year, the average production volume of the Mahikeng Treatment Works was 22.0Mℓ/day, compared to 24.1 Mℓ/day in the previous financial year resulting in a decrease of 9.5%. This reduction is due to

decreases in raw water supply from both the Molopo Eye and Grootfontein well fields.

Mmabatho Water Treatment Works

Average production during the 2018/2019 financial year was 14.59Mℓ/day, which has decreased from an average of 15.77Mℓ/day during the previous financial year. This decrease is largely due to deteriorating raw water quality from the recycled sewage and dropping levels of the Setumo Dam. This plant has an allocation of 20Mℓ/day, although it was designed to be upgradable through phases up to a maximum capacity of 60Mℓ/day.

The average level of the Signal Hill Reservoirs has dropped to levels between 40% and 65%, as compared to the previous financial year due to reduced production volumes. Currently, there are no major water supply interruptions to the customers as compared to previous years. However, ESKOM power failures continue to pose a threat to the reliability of supply.

Motswedi Water Treatment Works

The Motswedi Water Treatment Works is situated in Lehurutshe, close to Zeerust. It has a treatment design capacity of 2Mℓ/day and only supplies peri-urban areas in Motswedi, Borakalalo, Gopane and Reagile. During the year under review, an average of 1.74Mℓ/day was estimated to have been produced from the Motswedi Water Treatment Works. This average production volume is the same as that of the previous financial year. Issues with regards to turbidity still prevail at the Motswedi Water Treatment Works. However, minor modifications were done to the water treatment process, including changes in water treatment chemicals to reduce instances of unacceptable turbidity levels.

Dinokana Water Scheme

The Dinokana Water Scheme is located at the Dinokana village, which is 30km to the north-west of Zeerust. This water source originates from a natural spring known as the Dinokana Eye, as well as seven boreholes, which produce good quality water. Production volumes depend mainly on the water table and the natural yield of the spring.

During the year under review, an average of 3.76Mℓ/day was estimated to have been produced from the Dinokana Eye, while 2Mℓ/day was yielded by the seven boreholes.

Itsoseng Water Scheme

The Itsoseng Water Scheme is situated 20km to the west of Lichtenburg in the Ditsobotla Local Municipality’s area of jurisdiction. Water for this scheme emanates from 16 boreholes situated at the Itsoseng village. Of these 16 boreholes, seven supply the old reservoir, while the remaining nine feed the new reservoir. The overall total of the current yield amounts to 3.21Mℓ/day, which has increased from 3.0 Mℓ/day in the previous financial

year. This increase can be attributed to resuscitating of two boreholes that were vandalised.

BULK POTABLE WATER PRODUCTION

Potable Water Supplied by Water Treatment Works

During the 2018/19 financial year, plants in the Sub-region (Ngaka Modiri Molema District Municipality) produced a total of 16 588 600kℓ of potable water. Table 2 indicates that the Mahikeng Water Treatment Works produces the most potable water as compared to the rest of the schemes, while the second highest production volume of potable water comes from the Mmabatho Water Treatment Works.

Table 2: Bulk Water Production on Average

Mahikeng WTW [Mℓ]	Mmabatho WTW [Mℓ]	Itsoseng WTW [Mℓ]	Motswedi WTW [Mℓ]	Dinokana WTW [Mℓ]	Total [Mℓ]
8,031	5,328	1,173	634	1,371	16,589

Potable Water Supplied from Boreholes

Water production by means of boreholes resides under an Operations and Maintenance Contract with the Ngaka Modiri Molema District Municipality. In most of its rural schemes, Sedibeng Water uses specialised meters to account for pumping time and energy used, as well as to avoid over-abstraction from boreholes, which could exceed the recharge rate. During the 2018/19 financial year, Sedibeng Water utilised boreholes to supply a total of 2 917Mℓ of potable water to the areas of the Ngaka

Modiri Molema District Municipality. The production from the boreholes presents a decrease of 27% when compared to the previous financial year. The decrease can be attributed to ding up of boreholes due to dropping of water table for the groundwater.

Combined Potable Water Production

The combined potable water production by plants in the Sub-region (Ngaka Modiri Molema District Municipality) is depicted in Table 3.

Table 8: Potable Water Production

Source	2016/2017 Volume (kℓ)	2017/2018 Volume (kℓ)	2018/2019 Volume (kℓ)
Plants	17,706	16,488	16,589
Boreholes	4,150	3,717	2,917
Total Production	21,856	20,205	19,507

The total production volumes for both plants and boreholes have decreased by 3.46% from the previous financial year to the 2018/2019 financial

year, mainly due to a number of boreholes drying up and some providing a reduced yield during long periods of lesser rainfall.

BULK POTABLE WATER SALES

The bulk of the potable water produced in the Sub-region is sold to the Mahikeng Local Municipality, the

Ngaka Modiri Molema District Municipality (western side) and to Ditsobotla Local Municipality. The Sub-region's bulk potable water sales for the 2018/2019 financial year, are indicated in Table 4.

Table 4: Bulk Water Sales in the Ngaka Modiri Molema District Municipality

Financial Year	2017 / 2018	2018 / 2019
Volume (Mℓ)	14,648	12,426

The reduction in bulk water sales in the Ngaka Modiri Molema District Municipality's operational area resulted from a decrease in raw water supply from both the Mahikeng Water Treatment Plant and Itsoseng Plant. Contributing to this decrease, is the reduction in the number of boreholes in operation, a decrease in the yield of current boreholes, and the reduction of raw water yield from the Molopo Eye and Grootfontein well fields. Also, due to a decline in water quality in the Setumo Dam, the abstraction from the dam was reduced in order to allow for the effective treatment of the water to acceptable standards. The Department of Water and Sanitation has been requested to intervene and is currently undertaking assessments at the Grootfontein Compartment to address this issue.

ensure the correct dosing of chemicals. This is done through sampling and analysing water samples at the sources, reservoirs and carefully selected points of use, while communicating the results to the municipalities affected for actions to be taken.

The Sub-region has developed and implemented a comprehensive Water Quality Monitoring Programme, which involves sampling and testing above minimum requirements. As monitoring process deviations may negatively impact on final water quality, operators have been trained to carry out regular on-site sampling and testing procedures at the plants.

POTABLE WATER QUALITY

The Sub-region assists the Water Services Authority in the optimisation of the water treatment processes to bring water quality to acceptable standards, and to

Water Treatment Works

Samples are sent on a weekly basis to Sedibeng Water's accredited laboratory at Balkfontein for detailed analysis as per SANS 241:2015 standards. Water quality results from the water treatment plants are indicated in Table 5.

Table 5: Treated Potable Water Quality in the Ngaka Modiri Molema District Municipality (based on SANS 241: 2015)

Determinand	Unit	Specification	Mahikeng Plant	Mmabatho Plant	Itsoseng Plant	Dinokana Plant	Motswedi Plant
			% Compliance				
Microbiology Safety Requirements							
<i>E. coli</i>	MPN/100 ml	Not detected	100%	100%	100%	100%	100%
Physical and Organoleptic Requirements							
pH	pH	≥ 5 to ≤ 9.5	100%	100%	100%	100%	100%
Turbidity	NTU	< 1	98%	96%	100%	84%	64%
Operational Water Quality Alert Levels							
Total Coliforms	MPN/100 ml	≤ 10	100%	100%	100%	100%	100%
Average Free Chlorine	mg/l	≤ 5	100%	100%	100%	100%	100%

Most of the water quality parameters in the Ngaka Modiri Molema District Municipality complied with the SANS 241:2015 standard. During the financial year under review, some slight challenges were encountered regarding turbidity, especially at the Dinokana and Motswedi Plants. Turbidity compliance at the Motswedi Plant decreased to 64%, as compared to 65.6% in the previous financial year. This is due to the lower quality of raw water from the Sehujwane Dam. The turbidity of water from the dam ranges from 200-250 NTU during dry seasons, and up to 5000 NTU during rainy seasons. As a result, the turbidity of final treated water does exceed 1NTU more frequently during rainy seasons (nonetheless, ever more than 5NTU). Turbidity compliance at the Dinokana Plant also shifted from 92.5% in the 2017/2018 financial year, to 84% in the year under review.

Interventions were undertaken, which included changes in the chemical dosing used, the installation of rain gauges to monitor rainfall and slight modifications to the configuration of the plant.

Boreholes

Boreholes are normally located in remote areas, which expose them to vandalism and theft of fences and diesel. The quality of borehole water is unstable, with major problems being the high concentration of nitrates and bacteriological contamination as a result of livestock activities around such ground water sources.

The following measures were put into place to remedy the situation:

- In case of bacteriological contamination, localised dosing of chlorine takes place;
- The roofs of steel tanks are sealed to eliminate contamination; and
- Awareness campaigns are conducted to encourage communities to take ownership of water infrastructure and keep their livestock away from boreholes.

Borehole water samples from the Mahikeng, Ratlou, Ditsobotla, Ramotshere Moiloa and Tswaing

Local Municipalities are sent to the laboratories at Balkfontein for bacteriological and chemical analysis.

OPERATIONS AND MAINTENANCE SERVICES

In terms of its Service Level Agreement with the Ngaka Modiri Molema District Municipality, Sedibeng Water is responsible for the maintenance, protection and preservation of the water supply infrastructure. This function includes proactive and reactive maintenance activities conducted according to planned schedules, as well as on an ad-hoc basis.

Operation and maintenance services relating to bulk water infrastructure include, but are not limited to:

- Pump operation and maintenance for raw water abstraction;
- Operation and maintenance of the sites and facilities of the water treatment works;
- Operation and maintenance of booster pump stations;
- Operation and maintenance of bulk reticulation; and
- Valves, and the cleaning and maintenance of reservoirs.

Operation and maintenance services associated with ground water abstraction, include:

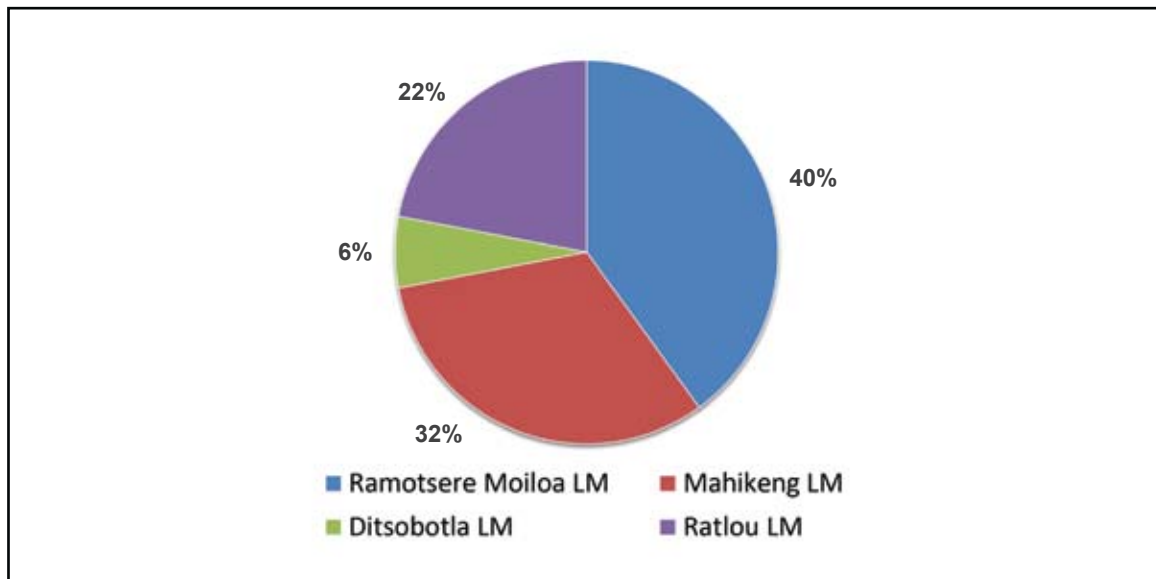
- Repairs and maintenance of borehole pipes and pumps;
- Installations and the reading of borehole meters;
- Pipeline repair or replacement; and
- Valve maintenance.

The Mahikeng regional office performs operation and maintenance services in 67 villages in the Ngaka Modiri Molema District Municipality. During the review period, maintenance teams have been strengthened further to respond effectively to additional infrastructure-related challenges. This has assisted in improving service delivery and successful interventions in both existing and additional operational areas.

In the 2018/2019 financial year, 3 186 pipeline, plant and borehole maintenance activities were conducted

within the Ngaka Modiri Molema District Municipality. These maintenance activities per local municipality are depicted in Graph 1.

Graph 3: Maintenance Activities per Local Municipality



Trends in Graph 3 indicate that the most extensive maintenance time was spent in villages of the Ramotshere Moiloa Local Municipality, followed by the Mahikeng and Ratlou Local Municipalities. No maintenance activities took place in the Tswaing Local Municipality as the area is still operated and maintained by the Water Services Authority, Ngaka Modiri Molema District Municipality.

RETAIL SERVICES

The Sub-region renders retail services in some of the areas of the North West Region. In the Ngaka Modiri Molema District Municipality, retail services provided are minimal and done in Welbedacht (Lehurutshe) under the Ramotshere Moiloa Local Municipality, and in peri-urban areas of the Mahikeng Local Municipality, including Signal Hill, Military, Moshawane, Top Village and Setumo Park. Readings of conventional water are being done on a monthly basis and account statements sent to customers. The Sub-region implements a cost-recovery strategy, which was developed in line with the credit control policies of the Water Services Authorities.

TSWASA WATER SCHEME

The TSWASA Water Scheme was built in the late 1980s, following an agreement between the then Republic of Bophuthatswana, the Water Utilities Corporation of the Republic of Botswana and the former Department of Water Affairs in the Republic of South Africa. The total cost of the scheme in 1989 was estimated at R38 million. Sedibeng Water operates and maintains the TSWASA Water Scheme on behalf of the Department of Water and Sanitation. This scheme provides for an allocation of 7.3 million m³ of water per annum to Botswana to augment water supply to Gaborone. Furthermore, it also provides a small allocation for irrigation purposes in Botswana along the Marico River, which forms the border between the two countries. In South Africa, the scheme supplies about 10.6 million m³ of water per annum to irrigation farmers along the Lower Groot Marico River, and about 5 million m³ of water per annum for primary use in the Madikwe Game Reserve and the village of Molatedi. The scheme consists of the following infrastructure:

- The Molatedi Dam located on the Groot Marico River;

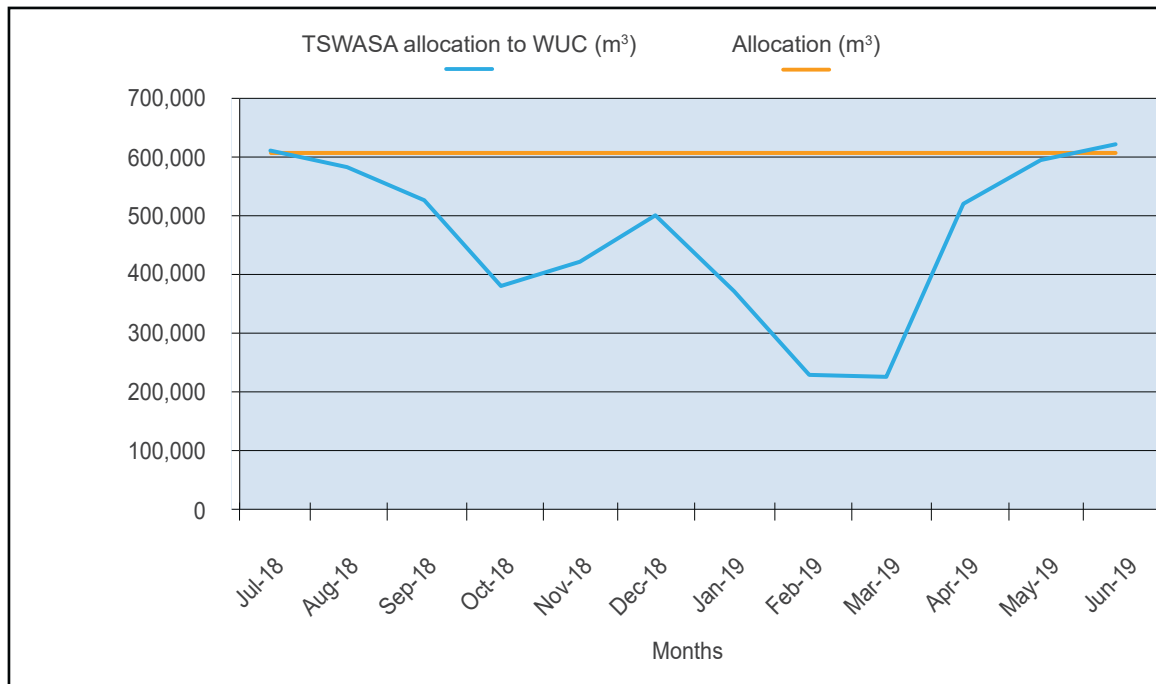
- A balancing reservoir;
- A pump station at Mooiplaats (26km downstream of the Molatedi Dam);
- A 22km feeder pipeline to the balancing reservoir; and
- A 32km gravity pipeline to the Gaborone Dam in Botswana.

During the 2018/2019 financial year, the TSWASA Scheme supplied a total volume of 4 849 139m³ to the Water Utilities Corporation (Botswana) and released a total volume of 10 914 043m³ to South African farmers (Derdepoort Irrigation Board). Both these volumes of water supplied are less than the

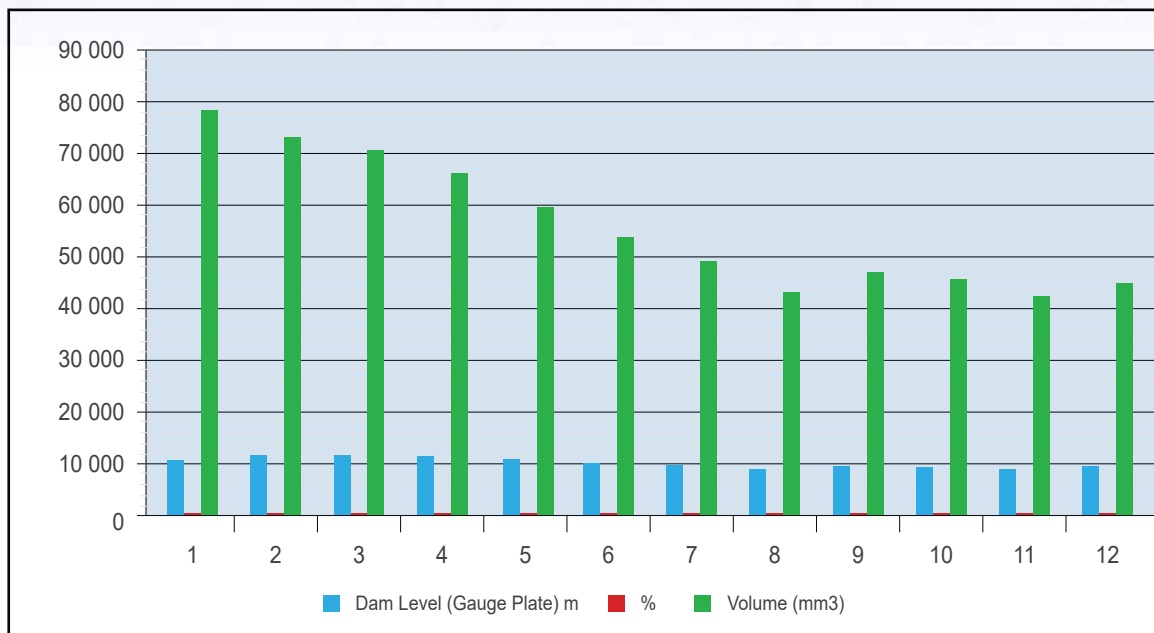
allocation of 7.3 million m³ of water per annum (average 608 333 m³ per month) to Botswana and 10.6 million m³ of water per annum to irrigation farmers. However, supply has substantially increased from the previous financial year due to higher levels of water in the Molatedi Dam and improved rainfall in the first quarter of the financial year.

Monthly water supply trends to the Utilities Corporation of Botswana from the TSWASA Transfer Scheme and trends in the level of the Molatedi Dam are illustrated in Graphs 2 and 3, respectively.

Graph 2: Monthly Water Supply Trends to the Water Utilities Corporation of Botswana from the TSWASA Water Transfer Scheme (in cubic metres)



Graph 3: Molatedi Dam Level Trends



INTERVENTIONS

The Sub-region performed a number of emergency maintenance related interventions within the Ngaka Modiri Molema District Municipality, specifically in an area that falls within the Tswaing Local Municipality, which was not part of the jurisdiction of the former Botshelo Water Board. The previous operational areas of the former Botshelo Water have been incorporated into Sedibeng Water’s footprint in the North West Province. A number of boreholes were refurbished and drilled within this municipal area, while the unblocking of sewer lines also took place. All of these interventions had been performed in accordance with directives issued by the Minister of Water and Sanitation to Sedibeng Water in order to ensure that water and sanitation services are properly functioning within Ngaka Modiri Molema District Municipality.

MANAGEMENT AND OTHER SUPPORT SERVICES

In addition to standard services that are rendered in fulfilment of Water Services Provider Agreements in the Sub-region, management and other support services were also provided on request by the Water Services Authorities.

Diesel supply

As part of its operations and maintenance function, the Sub-region is responsible for supplying diesel in order to pump water to various communities. In the Ngaka Modiri Molema District Municipality, the Sub-region supplies diesel to pump water from 104 boreholes to villages located within the Ratlou and Ramotshere Moiloa Local Municipalities. Most of these boreholes are entirely diesel-driven, but there are some boreholes where diesel generators are only used as back-up during ESKOM power failures. Volumes of diesel supplied in the 2018/2019 financial year are shown in table 6.

Table 6: Diesel Volumes Supplied to Boreholes in Ngaka Modiri Molema District Municipality

Mahikeng LM (ℓ)	Ramotshere Moiloa LM (ℓ)	Ratlou LM (ℓ)
10,166	142,908	151,159

Water Tankering

Water tankering is a short-term intervention undertaken in various areas to assist communities with access to potable water. Water tankering services are being provided due to infrastructure breakdowns, special events, emergencies, etc.

During borehole maintenance activities, tankering services were also organised to ensure water supply to affected areas. Due to a continuous reduction in the water table caused by drought, such services were likewise used to augment existing water supplies. However, the total volume of tankered water supplied has significantly decreased

as Sedibeng Water is gradually phasing out water tankering in line with a directive from the Minister of Water and Sanitation.

In the Ngaka Modiri Molema District Municipality, volumes of water through water tankering were supplied to villages located within the Mahikeng, Ramotshere Moiloa and Ditsobotla Local Municipalities. During the 2018/2019 financial year, the highest volumes of tankered water (see Table 7) were supplied to the Ditsobotla Local Municipality, followed by the Mahikeng Local Municipality. It is expected that water tankering will decrease as more water supply projects are being successfully completed.

Table 7: Water Tankering Volumes in the Ngaka Modiri Molema District Municipality (in litres)

Mahikeng LM (ℓ)	Ramotshere Moiloa LM (ℓ)	Ditsobotla LM (ℓ)
3,830,000*	2,775,500**	5,051,300***

* A tanker was hired to supply mainly the Bophelong Hospital within the Mahikeng Local Municipality when low reservoir levels were the case at the Mahikeng Water Treatment Works due to reduced supply from the Molopo Eye and Grootfontein boreholes.

** A tanker owned by Sedibeng Water was used in the Ramotshere Moiloa Local Municipality to supply certain areas with water when boreholes did not provide sufficient yield; when pipe bursts occurred and during weekends when large funerals took place.

*** A tanker was hired to supply the Bakerville community within the Ditsobotla Local Municipality while a project to upgrade the water infrastructure in the area was in progress. The project has been completed in April 2019.

CONCLUSION

Despite numerous challenges related to the acquisition and takeover of municipal infrastructure and operations to provide water services in several areas, Sedibeng Water in the North West

Region excelled during the 2018/2019 financial year in supporting municipalities and supplying potable water that meet quality standards to local communities.