

CITY OF TSHWANE



PROGRESS REPORT ON ROOIWAL WWTW

13 September 2023



PROBLEM STATEMENT



- Masterplan in 2004 identified that the Rooiwal WWTW must be expanded with:
 - 80MI/d by 2008 (Did not happen)
 - 50MI/d in 2024 (Current)
 - 50MI/d in 2034 (Future)
- Masterplan not funded and therefore not implemented
- Rooiwal WWTW does not have sufficient treatment capacity
- Non-compliance to the set limits and operating licence
- Pollution of natural water resources e.g Apies River that leads to poor raw water quality (source of drinking water to Hammanskraal)
- Insufficient capital budget allocation resulting in delays of upgrades
- Insufficient maintenance budget allocation resulting in maintenance backlog
- Theft and vandalism of infrastructure in and around the plant

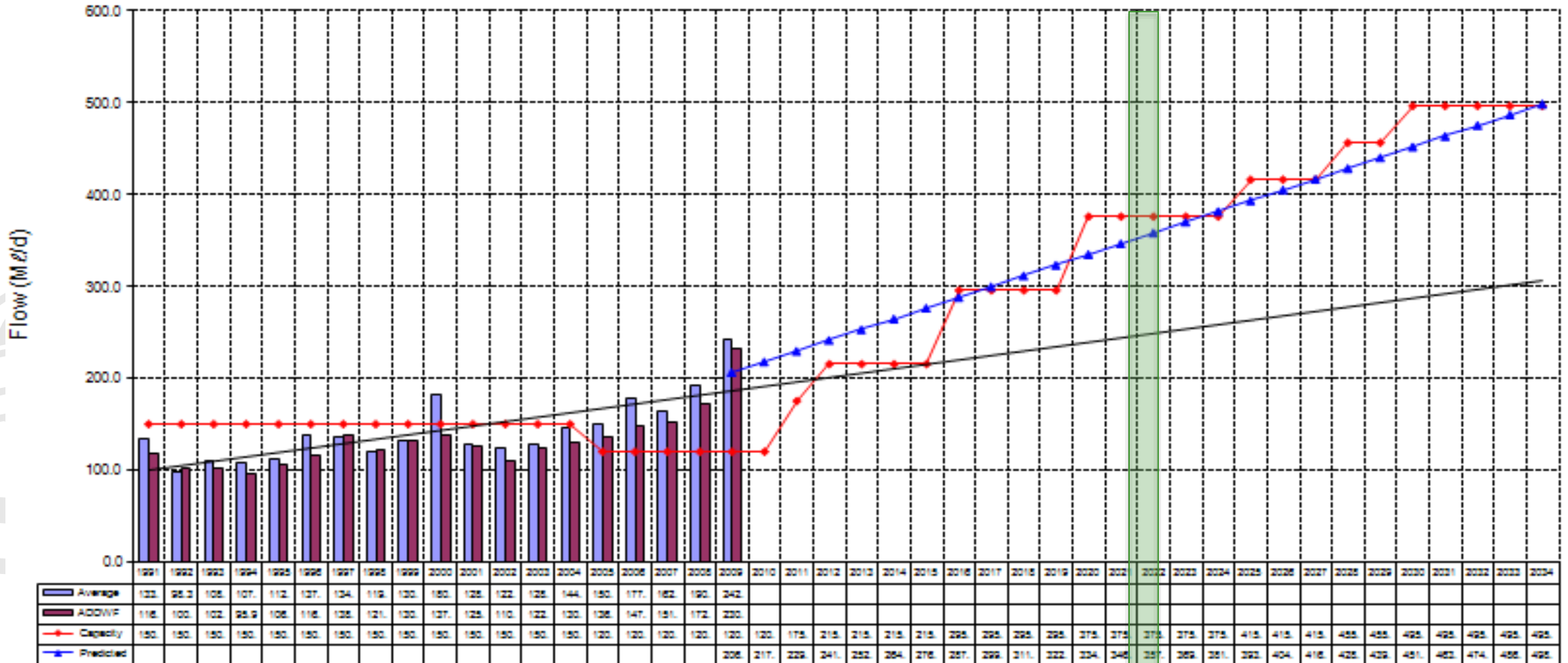
ROOIWAL WWTW DESIGN VS OPERATIONAL DATA



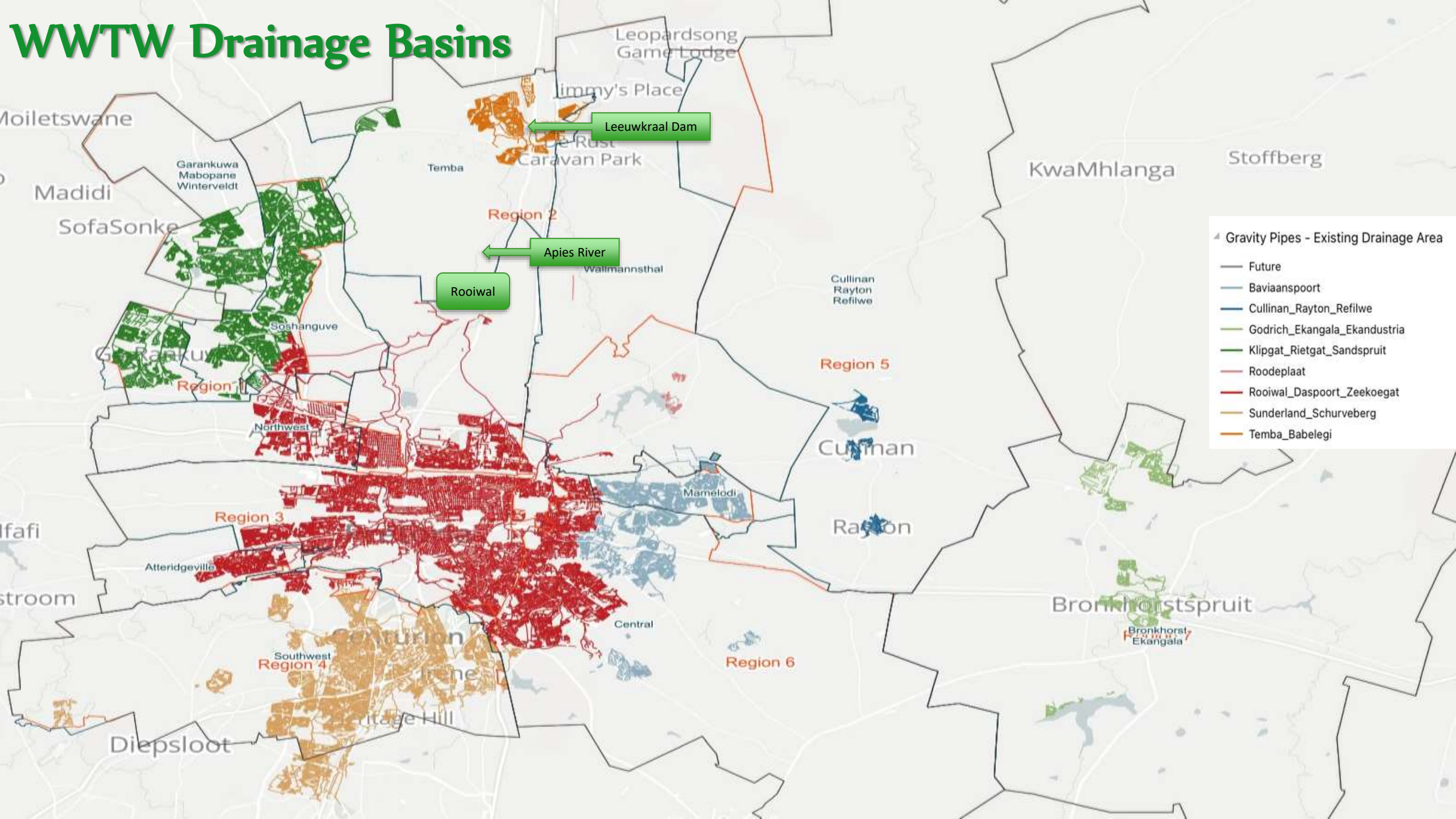
Parameter	Design	Actual	Percentage loading (%)
Flow (Ml/d)	110	154	140%
Load (kg/d)	84 000	143 000	170%
COD (mg/l)	700	1 100	157%
Upflow velocity (Settling capacity) (m/h)	1.2	3.8	316%

Rooiwal WWTW is organically and hydraulically overloaded

Rooiwal WWTW Master Planning



WWTW Drainage Basins



- Gravity Pipes - Existing Drainage Area
- Future
- Baviaanspoort
- Cullinan_Rayton_Refilwe
- Godrich_Ekangala_Ekandustria
- Klippgat_Rietgat_Sandspruit
- Roodeplaat
- Rooiwal_Daspoort_Zeekoegat
- Sunderland_Schurveberg
- Temba_Babelegi

Previous commitments made by the City



Intervention	Impact	Start/End Date	Status
Refurbishment of the Sludge Belt Presses	Reduces sludge volume	Sept 2019	Done
Refurbishment of the Return Activated Sludge Screw Pumps	Prevents failures in the Secondary Settling Tanks	October 2019	Done
Dredging of Maturation Ponds	Creates buffering capacity during plant failures; creates tertiary treatment capacity before final disposal into the river	Sept 2018 - March 2020	Done
Implementation of the Maintenance Plan	Continuous plant operation with minimal interruptions	On-going	Done
Phase 1 of upgrading of Rooiwal WWTW	Additional 10 ML/d treatment capacity and improvement of the overall function of the plant	Oct 2019 – Oct 2022	Partially implemented
Implementation of Rooiwal WWTW Phase 2 Project	Additional 80 ML/d treatment capacity and sludge handling	N/A	Requires funding (R2.5 bn)

Previous commitments made by the City



Intervention	Impact	Start/End Date	Status
Cleaning of Reservoirs	Improve the water quality to the distribution water networks	26 – 28 Aug 2019	Done
Flushing & disinfection of the water networks	Improve water quality in the distribution network	23 Sept – 4 Oct 2019	Done
Supply water through the Sosha DD pipeline	Supply more areas with pipes water	Ongoing from Dec 2018	Done
Water supply from Magalies Water	Supply more areas with pipes water	Ongoing from Sept 2018	Done
Deployment of Water Tankers	Provide the community with potable water	Ongoing from 1 Oct 2018	Done (on-going)
Implementation of the Maintenance Plan	Continuous plant operation with minimal interruptions	On-going throughout FY	Done (on-going)
Completion of Temba Plant Upgrade Project	Create additional 60 ML/d capacity	End Oct 2019	Done (Completed)

Short Term Interventions - Repair of critical equipment at Rooiwal WWTW



Intervention	Impact	Status
Reinstatement of the temporary decommissioned reactor	Reduction in hydraulic overload on the five operating reactors	Completed
Unblocking and recommissioning of 4 Primary Sedimentation Tanks (PST) from Rooiwal East	Removal of sand and settleable organics that reduce organic load to the reactors	Completed
Installation of three rough screens	Removal of large objects and protection of existing mechanical screens	Completed
Unblocking and recommissioning of 3 Primary Sedimentation Tanks (PST) from Rooiwal North	Removal of sand and settleable organics that reduce organic load to the reactors	Completed
Quarterly Blower Maintenance	Continuous supply of air for BNR operation	Quarterly

Short Term Intervention (Completed Maintenance in the 2022/23 FY)



Intervention	Impact	Progress
Service Inlet Screen No 3	Continuous removal of screenings	Completed
Service various conveyer belts (inlet screens and sludge conveying)	Continuous conveying of screenings and sludge	Completed
Calibrate flow meters	This will enable accurate flow measuring to split known volumes to East/North WWTWs	Completed
Repair grit classifier	Removal of grit to protect equipment and settling downstream	Completed
Service 2 x grit pumps (No 1 and No 2)	Continuous removal of grit to protect equipment and settling downstream	Completed
Repair bin trailers	Continuous removal of screenings	Completed
Unblocking and recommissioning of Primary Sedimentation Tanks (PST)	Removal of sand and settleable organics that reduce organic load to the reactors	Completed

Short Term Intervention

(Completed Maintenance in the 2022/23 FY)



Intervention	Impact	Progress
Service PST desludge pumps	Continuous removal of sludge from PST	Completed
Service PST Rotating bridge (No 2 and No 3)	Continuous removal of sludge from PST	Completed
Service sludge dam aerator	Continuous effective sludge stabilisation	Completed
Service chlorination system	Continuous effective and safe disinfection using liquid chlorine	Completed
Repair electric panels of dissolved air flotation unit and Secondary Sedimentation Tanks	Reactive maintenance performed for continuous operation	Completed
Blowers	Reactive maintenance performed due to tripped blowers	Completed
Unblocking and recommissioning of 4 Primary Sedimentation Tanks (PST) from Rooiwal East	Removal of sand and settleable organics that reduce organic load to the reactors	Completed

ALTERNATIVE WATER SUPPLY



- The eastern part of Hammanskraal is supplied from the Magalies Water (Klipdrift WTP) supply system through the Babelegi Reservoir.
 - The current supplied volume is 10MI/d as per agreement with Magalies Water.
 - The areas supplied include, Marokolong, Babelegi Industries, Ramotse and the Moretele area.
- The western part of Hammanskraal is supplied from the Rand Water (Soshanguve DD pipeline) supply system.
 - The DD pipeline can only supply Refentse, New Eersterust and Extensions
- The central parts of Hammanskraal (Sekampaneng, Suurman, Manyeleti, Unit D and Oustad) are being serviced by water tankers for potable use.
- The water tankers source water from Magalies Water (Babelegi reservoir) and Rand Water (Soshanguve DD pipeline).

ALTERNATIVE WATER SUPPLY AREAS



Water Quality Sampling and Testing During the Cholera Outbreak



- Routine water quality sampling and testing was conducted on the Temba WTP supply system – SANS 241 compliance
- Sampling points included the final water produced from the Temba WTP and the distribution.
- Water samples were also taken from water tankers
- Analyses included:
 - Physical and aesthetic determinants (colour, turbidity, etc.)
 - Chemical determinants (nitrate, ammonia, etc.)
 - Microbiological determinants (E.coli, Faecal coliforms, HPC, etc.)
 - Other determinants (o-P, Alk, Si, etc.)
- All water samples tested for cholera by various institutions such as CSIR, WaterLab, ERWAT, Aquatico came back negative

Short Term Intervention: Rooiwal WWTW Phase 1 Upgrade Project



Description	Company Name
Consultant	Royal Haskoning DHV (Pty) Ltd
Implementing Agent	Ekurhuleni Water Care Company (ERWAT)
Contractor	CMS, NJR and Blackhead JV
Safety Agent	Basumi Safety Consultants
Project Milestones	Contractor
Commencement date	09 March 2020
Initial completion date	24 May 2021
Revised Completion date	02 August 2022
Contract period	24 months
Contract Termination Date	30 July 2022
Contract Amount	R253 399 726.97
Expenditure at contract termination	R147 820 006.10
Percentage construction complete at termination	68%

Short Term Intervention: Rooiwal Phase 1 Upgrade Project (Activities carried out prior termination)



Activity	Original Start Date	Planned Completion date	% Progress
Portion A: primary settling tank	10 March 2020	14 January 2022	88%
Sludge pipeline to eastern digesters	09 February 2022	01 April 2022	2%
Portion A - dewatering building refurbishment	13 May 2020	23 November 2021	71%
Portion C - digester refurbishment	19 May 2020	29 November 2021	68%
Portion D - North works, degritters and screenings handling	13 May 2020	12 April 2021	52%
Portion E - North works, fine bubble aeration	16 July 2020	17 June 2022	37%

CoT-DWS COLLABORATION: FOUNDING AGREEMENT PRINCIPLE

On May 2023, the Minister of Water and Sanitation (Mr. Senzo Mchunu) and the Executive Mayor of CoT (Cllr Cilliers Brink) agreed that:

1. DWS and the City will partner together to jointly manage a project to fix the infrastructure problems in Hammanskraal
2. Tshwane will contribute a portion of its USDG allocations, and reprioritize from allocated funding to cover for any shortfalls
3. National Treasury will be requested to supplement these allocations to enable the project to be fully implemented
4. A competent independent implementing agent will be appointed to manage implementation – the DBSA
5. DWS and the City will form a joint steering committee to oversee the project
6. The project will be implemented in stages, with an emphasis on work to stop or reduce the pollution from Rooiwal in the early stages
7. DWS and CoT technical officials to engage in more detailed technical preparation work



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JOINT PROGRESS REPORT ON THE WATER AND SANITATION INFRASTRUCTURE INTERVENTION PARTNERSHIP FOR HAMMANSKRAAL

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City of Tshwane Metro

13 September 2023



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INSTITUTIONAL PARTNERSHIP



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IGNITING EXCELLENCE

DBSA
DEVELOPMENT BANK OF SOUTHERN AFRICA


Magalies Water

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PART A

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PLANNED PROJECT DELIVERABLES



ROOIWAL WWTW



The Rooiwal WWTW consists of three works, the first of which was built in 1950 and the last in 1983, equipped to treat a total flow of 245.3 Mℓ/d:

- Rooiwal West: 40.8 Mℓ/d biological trickling filter facility
- Rooiwal East: 54.5 Mℓ/d biological trickling filter facility
- Rooiwal North: 150 Mℓ/d biological capacity.

The main or northern plant WWTW is designed to treat 150 MI/d at a COD loading of 750mg/l but is having to treat sewage with a COD loading in excess of 1000 mg/l. As a result, the plant is currently re-rated at 110MI/d

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IMMEDIATE INTERVENTION FOR WATER SUPPLY (3-6 Months)

The table provides the immediate deliverable actions for supply of portable and reduction of continuous contamination of Apies River by Rooiwal WWTW

No.	Description of Activity	Output	Start Date	End Date
1.	CoT to continue with mobile water tankering services for communities around Hammanskraal, from designated water filling points, as well as testing.	To continue the current alternative provision of clean water to residents	On Going	
2.	The use of wastewater technology driven solutions at Rooiwal WWTW to treat sewerage and increase quality of discharged effluent into Apies River.	Reduce E-coli levels of treated sewerage water	01 Aug 2023	30 March 2024
3.	Provision of an alternative water source by Magalies Water Board for Hammanskraal through the emergency construction of a 30-40MI/day package-plant at Klipdrift WTW. The Package Plant will be implemented in a phased approach on Units of 10MI/day at a time. The units will be in place starting from October 2023 at Klipdrift WTW	To improve water provision through piped system to all residents	July 2023	March 2024

Note: The various project phases will run in parallel from current and for the next 8 months.

Funding for 30-40MI/day and Technological intervention on WWTW treatment to be finalized by 05 June 2023 by MWB

PROJET MILESTONES

Project details for the repair, refurbishments and upgrades of Rooiwal WWTW (Phase 1- 3)

No.	Description of Activity	Output	Start Date	End Date
1.	PHASE 1: - Acceleration of the completion of current project at Rooiwal WWTW which is sitting at 68%.	To improve quality of effluent discharged into the Apies River	01 Sep 2023	31 Nov 2024
2.	PHASE 2: - Expansion of Rooiwal WWTW by an additional 80ML/day to accommodate more influent as well as de-silting and de-sludging of the Leeuwkraal Dam	To improve water quality that is pumped into the Temba Water Treatment Works, which supplies areas of Hammanskraal.	Jul 2024	Jun 2026
3.	PHASE 3: - Expansion of Rooiwal WWTW by a further additional capacity of 50ML/day - Upgrade and Refurbishment of Temba Water Treatment Works	To improve capacity of the Rooiwal WWTW to meet current and future demands and improve effluent quality	Oct 2024	Dec 2025

(Note: The various Project phases will run parallel between 2023/24FY and 25/26FY)

PART B

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PROGRESS MADE BY JOINT STEERING COMMITTEE



INTRODUCTION

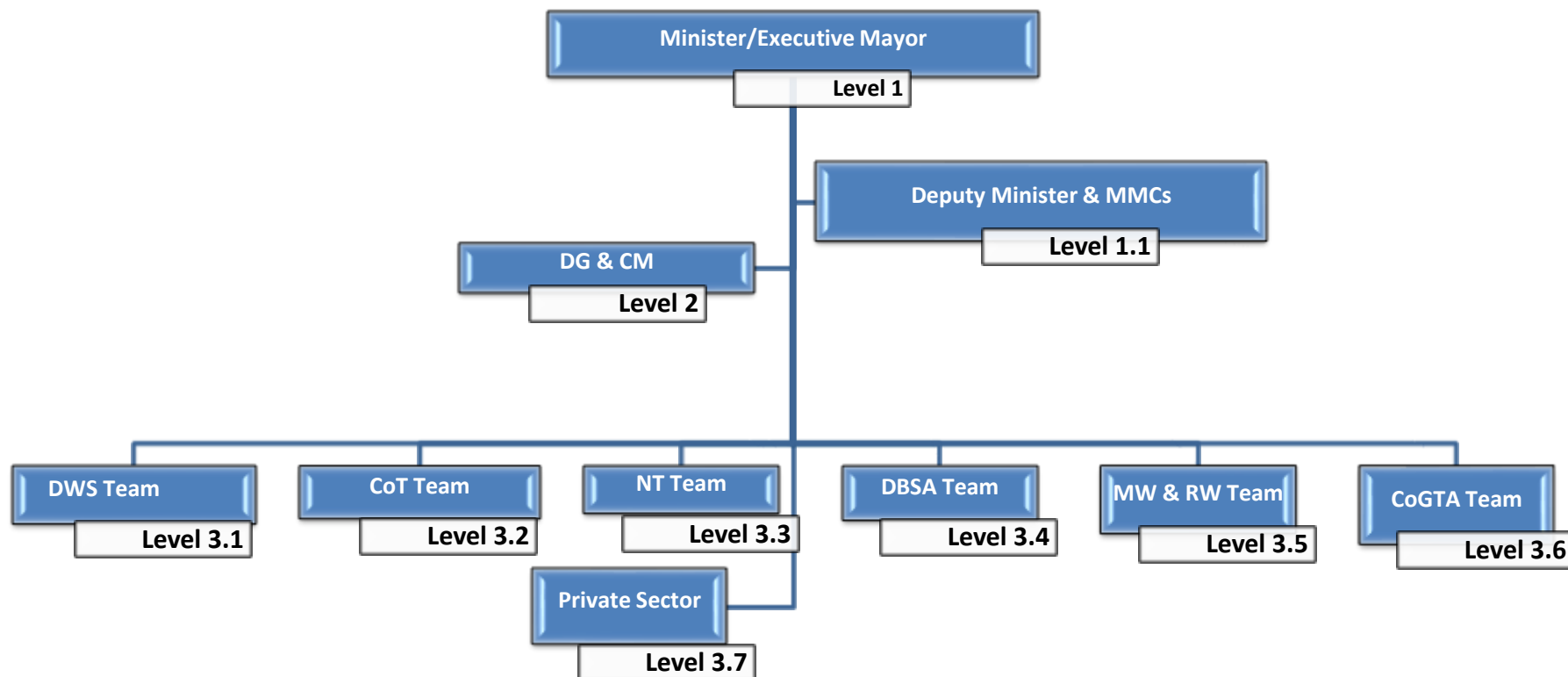
- ❑ The following is the intervention partnership meeting between the Minister of Water and Sanitation (Mr Senzo Mchunu) and the Executive Mayor of CoT (Cllr Cilliers Brink) on the 26 May 2023 and the subsequent joint-media briefing on the 01 June 2023, the following directives were issued to the Director General (DWS) and City Manager (CoT) that the following be established;
 - Technical Joint Steering Committee to oversee the implementation of the Hammanskraal intervention support project.
 - A Sub-finance committee to model the project funding for various phases of the intervention support.

- ❑ To date, the two-sub committees have been jointly integrated to form a Joint Steering Committee (JSC).

JOINT STEERING COMMITTEE

- The Joint Steering Committee was established and is represented by: DWS, CoT, Magalies Water Board, DBSA, COGTA and Rand Water Board and is chaired by the DDG: WSSM (DWS).
- Terms of reference (TOR) were developed and circulated for approval by the JSC
- The Steering committee has bi-weekly meetings, with the last one held on 31 August 2023
- Members of the committee are nominated from each institution
- JSC draws up an Action Log with timeframes to be updated at each meeting based on progress realized.

PROJECT STRUCTURE



- **Level 1:** The Minister and Executive Mayor chairs the intervention and partnership.
- **Level 1.1** Political support by DMs and MMs for project oversight.
- **Level 2:** DG and CM oversees the joint technical steering committee.
- **Level 3:** Comprises of all institutions involved in the project development, implementation and monitoring.

INSTITUTIONAL AGREEMENTS

- CoT and DBSA entered into a Memorandum of Understanding (MOU) on infrastructure funding and capital project implementation mechanisms on 24 July 2023.
- The signing of the MOU was the preceding action before appointment of DBSA' Infrastructure Delivery Division (IDD) could be finalized through a Section 110 appointment.
- The report for the appointment of the DBSA as implementing agent was tabled at the BAC committee on 31 August 2023.
- A Service Level Agreement (SLA) is being finalized between CoT and DBSA as the Implementing Agent (IA) & (IDD)
- DBSA will subsequently commence with procurement for appointment of a PSP for scope finalization, designs and exact cost estimates
- The funding model will include both Rooiwal WWTW as well as Temba WTP

IMMEDIATE ACTIVITY MILESTONES

(Implementation within 3 – 6 Months)



ROOIWAAL WASTEWATER TREATMENT WORK: (PHASE 1)

Acceleration of the completion of current project at Rooiwal WWTW which is sitting at 68%. The aim is to reduce sewer spillage into the river course and improve effluent quality discharge into the Apies River.

ID	ACTIVITY	START DATE	END DATE	COMMENTS
RW-01	Drafting, circulation and finalization of MOU between DBSA and CoT to effect appointment of DBSA as IA.	25 May 2023	01 June 2023	Done
RW-02	Coordination of Phase 1 funding requirement between CoT and DBSA before application (NT providing strategic financial oversight)	10 June 2023	25 June 2023	Done
RW-03	Adoption of MOU by CoT EXCO and submission to Mayco for approval and appointment of DBSA Infrastructure Development Division (IDD) as IA	25 June 2023	30 June 2023	Done
RW-04	Submission of Funding Application by CoT to DBSA	15 July 2023	30 July 2023	Done
RW-05	Technical & Engineering Design Review of Phase 1 and development of construction activity programme by the IA	15 July 2023	30 July 2023	Pending
RW-06	PSP Procurement and commencement of Phase 1	01 Aug 2023	10 Oct 2024	Pending
RW-07	Bid Specification	11 Oct 2023	11 Feb 2023	TBC
RW-08	Contractor Procurement and commencement of Phase 1	12 Feb 2024	22 April 2024	TBC
RW-09	Execution of Construction for Phase 1 Construction of Rooiwal WWTW	23 April 2024	TBC	TBC

- There is budget availability of R150mil approved by CoT Council which the JSC has agreed that it will be used immediately after appointment of IA and procurement processes as well as appointment of contractor(s) for completion of phase 1.
- DBSA Funding to CoT is anticipated for consideration and approval in late July /August 2023 and will therefore not hinder current implementation processes.

THE PACKAGE PLANT @ KLIPDRIFT WTW

Provision of an alternative water source by Magalies Water Board for Hammanskraal through the emergency construction of a 30-40MI/day package-plant at Klipdrift WTW. The Package Plant will be implemented in a phased approach by Units of 10MI/day at a time.

ID	ACTIIVITY	START DATE	END DATE	COMMENTS
PP-01	Preliminary Scoping Report for the Construction of Package Plant by Magalies Water through existing panel PSPs	25 May 2023	01 June 2023	Done
PP-02	Alignment and Technical Configuration of Package Plant and CoT supply system	15 June 2023	27 June 2023	Done
PP-03	Amendment of agreement between Magalies Water and CoT for the additional system input volume (Additional Water Supply)	25 June 2023	27 June 2023	In progress
PP-04	Funding Engagement Application to DBSA by Magalies for front-end loading	15 June 2023	30 Sep 2023	In progress
PP-05	Part Funding of an estimated R250mil of Magalies Water by DWS to start implementation of the Package Plant	25 June 2023	30 July 2023	Pending
PP-06	Detailed Designs, Procurement Processes for 1 st Unit of the Package Plant	01 Aug 2023	01 Sep 2023	TBC
PP-07	1 st Unit and Construction Phase of the Package Plant	01 Oct 2023	01 March 2024	TBC

- The activity schedule may be revised by the JSC subject to initial funding provision date by DWS to Magalies Water and subsequent additional funding loan by DBSA to Magalies Water.
- DWS will issue funding confirmation letter to Magalies on or before 30 July 2023 after completing its internal processes as per NT provisions.

MEDIUM TO LONG-TERM ACTIVITY MILESTONES

(Implementation within 12 Months)



ROOIWAL WASTEWATER TREATMENT WORKS: (PHASE 2 & PHASE 3)

PHASE 2: Upgrading of Rooiwal WWTW to a further additional 50ML/day to accommodate more effluent and de-silting of sludge at Leeuwkraal dam

PHASE 3: Upgrading of Rooiwal WWTW by an additional capacity of 80ML/day (Phase 2)

ID	ACTIVITY	START DATE	END DATE	COMMENTS
RW2-01	Scoping Report and Engineering Design of Rooiwal's integrated Phase 2/3	30 Nov 2023	30 June 2024	Pending
RW2-02	Preliminary Designs of Phase 2/3 and development of Procurement Strategy	31 Jan 2024	30 June 2024	Pending
RW2-03	Feasibility Studies, Cost Benefit Analysis and preliminary funding alignment for Phase 2/3 (National Treasury to Champion the process)	30 Sep 2023	30 June 2024	Pending
RW2-05	Detailed Technical and Engineering Design Review of Phase 2/3 and development of construction activity programme by the IA	30 July 2024	31 Aug 2024	Pending
RW2-06	Contractor Procurement and commencement of Phase 2/3	30 Aug 2024	30 Sep 2024	Pending
RW3-07	Completion and commission of Phase 2&3 Construction of Rooiwal WWTW	01 Oct 2024	31 June 2026	Pending

- The JSC is technically considering the combination of both Phase 2 and Phase 3 into one phase for ease of implementation and cost-efficiency purposes
- The funding by NT and other sources will be considered for this phase (2/3).
- Phase 2/3 will be aligned to the dredging of Leeukraal dam to reduce the sludge sedimentation which have a direct impact on quality of abstracted water to Temba WTW
- The scope for Rooiwal WWTW also aligns to the use of technology to improve effluent quality into the Apies River as well as sludge dredging of Leeukraal Dam

UPGRADE & REFURBISHMENT OF TEMBA WATER TREATMENT WORKS

The implementation works for the upgrade and refurbishment of Temba Water Treatment Works is aimed at improving the treatment process and quality of final drinking water. Design, refurbishment and upgrade of Temba WTW to meet current and future demand and improve potable drinking water quality

ID	ACTIIVITY	START DATE	END DATE	COMMENTS
TW-01	Scoping Report and Engineering Design of Temba WTW	30 Nov 2023	30 June 2024	Pending
TW2-02	Preliminary Designs of Phase 2/3 and development of Procurement Strategy	31 Jan 2024	30 June 2024	Pending
TW2-03	Feasibility Studies, Cost Benefit Analysis and preliminary funding alignment for Temba WTW with other scoping activities e.g. dredging of Leeuwkraal Dam (National Treasury to Champion the process)	30 Sep 2023	30 June 2024	Pending
TW2-05	Detailed Technical and Engineering Design for upgrades and refurbishment of Temba WTW	30 July 2024	31 Aug 2024	Pending
TW2-06	Contractor Procurement and commencement of upgrades and refurbishment works	30 Aug 2024	30 Sep 2024	Pending
TW3-07	Completion and commission of upgrades and refurbishments at Temba WTW	01 Oct 2024	31 June 2026	Pending

- The JSC technically will work on the alignment and phasing-off of the Temba WTW upgrades in-line with the dredging/de-silting of sludge at Leeukraal Dam and component upgrades of Rooiwaal WWTW.
- The scope for Temba WTW also aligns to the use of technology at Rooiwaal WWTW to improve effluent quality into the Apies River

CONCLUDING REMARKS

- In short, what is of priority now is **R350 million** to fund the enhanced Phase1 CAPEX programme, a **R90 million annual operating budget**, and an accelerated procurement process that avoids the procurement problems of the past. **(on-going)**
- CoT and DBSA have finalized the MoU in order to formally appoint the IA **(15 July 2023)**.
- Finalization of funding model between DBSA and Magalies Water on the package plant is ongoing **(30 July 2023)**
- Raw water availability for the additional 40MI/day, a Water Use License is required from DWS to confirm water allocation **(30 July 2023)**
- Discussions between CoT and Rand Water on future scope will be addressed by the JSC, clarity yet on what RWs role will be on the projects **(on-going)**
- The Danish Bank has also approached CoT for possible funding. The Danish have shown willingness to support the project on both the Technical and Financial aspects on Phases 2&3 through a concession.
- CoT are also engaging Infrastructure Fund for blended finance on the projects. The parties will further engage after BFI closure on **14 July 2023**
- CoT to share other plans in place to fix the entire water and sanitation infrastructure, including water expansion projects within the municipality **(On-going)**
- JSC has started discussing a whole catchment approach intervention for CoT and models through which an integrated funding can be sought. **(on-going beyond Phase 2 and 3)**



THANK YOU

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