

REPORT ON THE CURRENT WATER SUPPLY CRISIS IN BRONKHORSTSPRUIT AND SURROUNDING AREAS

Quintilla de Vries

1. Executive Summary

Bronkhorstspuit and surrounding areas are experiencing recurring water shortages and water quality concerns due to a combination of aging infrastructure, insufficient maintenance, mechanical pump breakdowns, electrical faults, raw water quality and reduced treatment capacity.

The most critical problems identified are:

1. Only one raw-water pump remains operational.
2. The remaining pump is very old and no longer performs at full capacity.
3. Only half of the treatment plant is operational because one filter section is awaiting filter sand.
4. The system has no effective redundancy.
5. High turbidity during rainfall events further reduces production.
6. Demand exceeds the amount of water that can currently be produced.

The Bronkhorstspuit Water Treatment Plant was designed to produce approximately **54 million litres per day with 3 operational raw-water pumps and the water treatment plant working at full capacity**, but current production is believed to be significantly below this capacity.

2. Current Problems

2.1 Aging Raw Water Pump

Problem

Only one raw-water pump is available and it is extremely old.

The pump:

- Does not operate at full capacity.
- Represents a single point of failure.
- Supplies the entire treatment plant.

Consequences

- Reduced raw-water flow.
- Inability to refill reservoirs.
- Extended outages.

- Increased likelihood of total system collapse if the pump fails.



Raw water pump station: Pump 1 – Aging pump, leaking water. Pump 2 – Disconnected. Pump 3 – No pump and pipes are removed. Picture taken 5 June 2026.



Water leaking from pump 1 at a rapid speed. Picture taken 5 June 2026.



Pump 1 Electric box condition open



Pump 2 Electric box condition open

2.2 Half the Treatment Plant is Out of Service

Problem

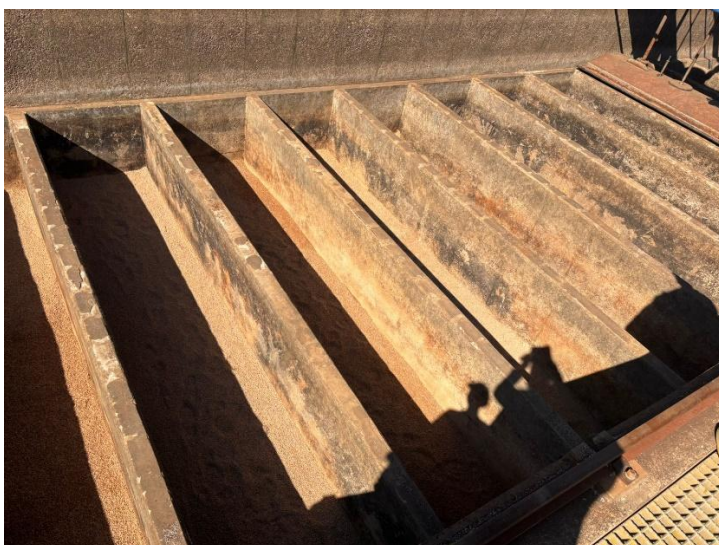
One treatment train cannot operate because filter sand is unavailable.

Consequences

- Approximately 50% loss of treatment capacity.
- More frequent filter backwashing.
- Slower reservoir recovery.
- Reduced water quality margins.



*Phase 2 Filtration system at Bronkhorstspuit Water Treatment Plant change out of sand in the filter:
Picture taken 15 May 2026.*



*Phase 2 Filtration system at Bronkhorstspuit Water Treatment Plant: Awaiting sand since 15 May
2026 – Picture taken 15 June 2026.*



Phase 1 Filtration system at Bronkhorstspuit Water Treatment Plant: Picture taken 15 June 2026.

2.3 Lack of Redundancy

Problem

Critical infrastructure should have backup equipment.

Currently:

- One pump failure affects the entire system.
- There is insufficient standby capacity.

Consequences

- Repeated crises.
 - Emergency repairs.
 - Dependence on aging assets.
-

2.4 High Turbidity

During heavy rains:

- Mud and suspended solids increase.
 - Filters clog faster.
 - Chemical consumption increases.
 - Plant output decreases.
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2.5 Growing Demand

The Bronkhorstspuit system serves:

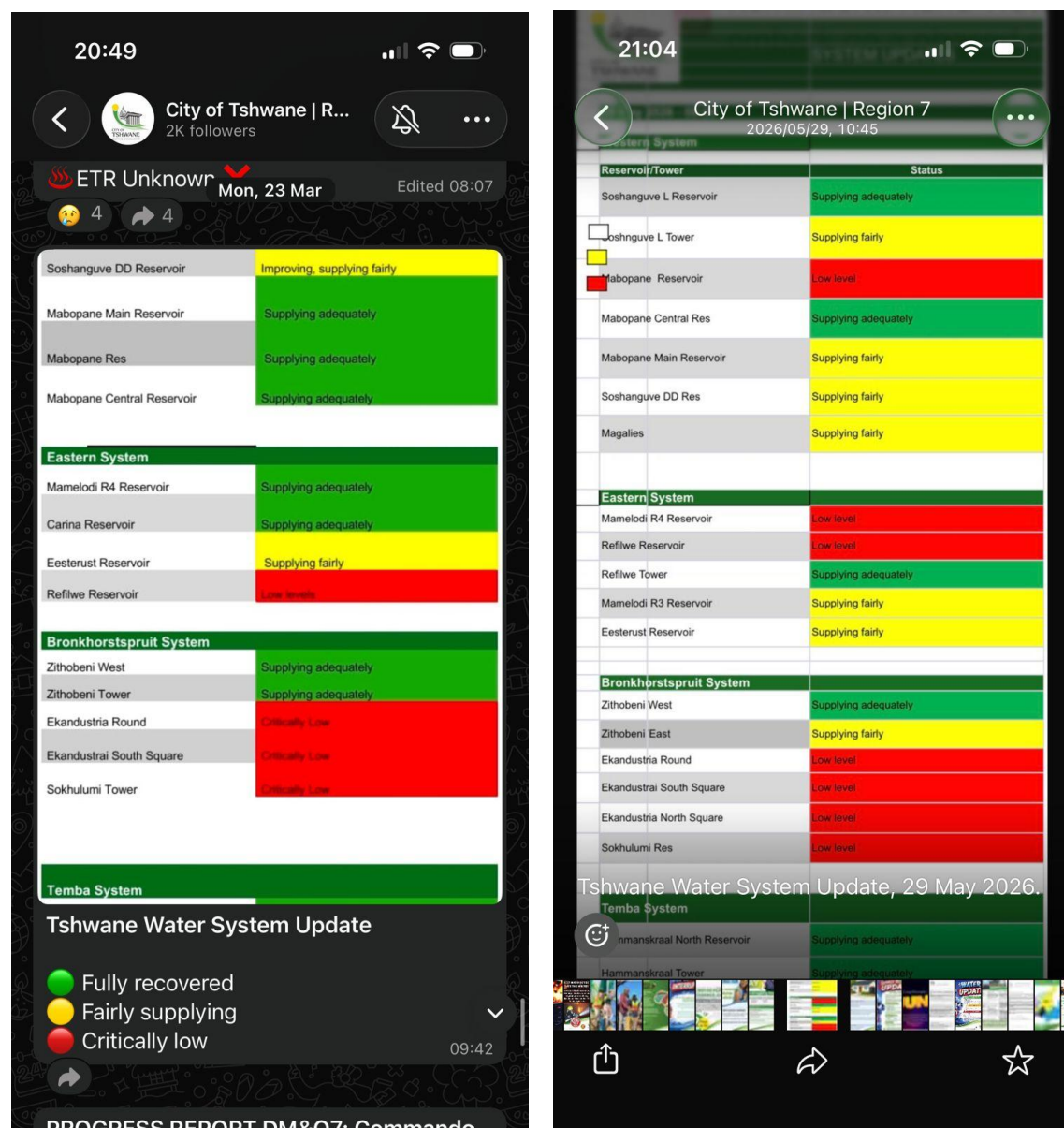
- Bronkhorstspuit – 62 034 residents (according to World Population Review 2026)
- Zithobeni – 22 434 residents (2011 census according to Citi Population, more likely 30 000 – 35 000)
- Ekandustria – 2 300 residents (2022, according to PMG)
- Sokhulumi – 1698 residents (according to City Facts)
- Ekangala 79 090 residents (according to World Population Review 2026)
- Rethabiseng 10 964 residents (2011 City Population, more likely 12 000)
- Surrounding communities

Demand continues to grow while production capacity declines. South African average water consumption per person per day is 237 litres. World average water consumption per person per day is 173 litres.

Residents 178 520 x water consumption in litres 173, equals 30 883 960 litres per day needed.

Bronkhorstspuit water production needs to produce 31 million to 43 million litres per day.

High-laying communities, such as Rethabiseng, Ekandustria and parts of Ekangala and Zithobeni; frequently experience periods of 0 kPa to 100 kPa pressure. When reservoirs or the Zithobeni Tower drop to low levels due to high consumption or pump failure, gravity cannot feed these elevated areas, resulting in low pressure or complete dry spells.



Bronkhorstspuit water production unable to supply adequate water to communities.

3. Root Cause

The water crisis is primarily an infrastructure reliability problem and not a shortage of raw water.

The most likely causes are:

1. Aging equipment.
2. Deferred maintenance.
3. Lack of spare parts.
4. Absence of standby pumping capacity.
5. Reduced filtration capacity.

4. Cheapest Immediate Solutions (0–3 Months)

Priority 1: Restore Filter Sand

Cost – Low

Benefit – Very High

Restoring the missing filter media would immediately bring the second half of the treatment plant back into operation.

Impact

Potentially doubles treatment capacity.

Priority 2: Refurbish Existing Raw Water Pumps

Cost – Low to Moderate

Benefit – Very High

Replace:

- Bearings
- Mechanical seals
- Shaft sleeves
- Impeller
- Motor components

Impact

Can restore much of the pump's original performance at a fraction of the cost of a new pump.

TAX INVOICE		 ELECTROMECHANICAL & AUTOMATION	
NUMBER:	INV0000120		
REFERENCE:	4501190892		
DATE:	13/05/2022		
DUE DATE:	31/05/2022		
SALES REP:			
OVERALL DISCOUNT %:	0.00%		
PAGE:	1/2		

FROM WATER AND WASTEWATER TECHNOLOGY SOUTHERN AFRICA (PTY) LTD		TO CITY OF TSHWANE	
VAT NO: 4480282207		CUSTOMER VAT NO: 4000142267	
POSTAL ADDRESS: Postnet Suite 368 Private Bag x1 Melrose Arch Gauteng 2076	PHYSICAL ADDRESS: N4 Gateway Industrial Park Water House, 97 Molewa Avenue Willows Park Manor X05 South Africa	POSTAL ADDRESS: 174 Eskia Mphahlele Drive Bronkhorstspuit Water Treatment Works Pretoria 0002 Tender No. USD WIS 28-2017/18	PHYSICAL ADDRESS: 174 Eskia Mphahlele Drive Bronkhorstspuit Water Treatment Works Pretoria, 0002 CSD No. MAAA0490696 Vendor No. 101781

Description	Quantity	Excl. Price	Disc %	VAT %	Excl. Total	Incl. Total
ELECTROMECHANICAL REPAIRS AND MAINTENANCE		R0.00	0.00%	15.00%	R0.00	R0.00
001 - Summary of Work Done	1.00	R453,204.75	0.00%	15.00%	R453,204.75	R521,185.46
Supply and install pump no.2		R0.00	0.00%	15.00%	R0.00	R0.00
Complete overhaul of pump no.4		R0.00	0.00%	15.00%	R0.00	R0.00
Supply and install 2 soft starters		R0.00	0.00%	15.00%	R0.00	R0.00
Complete rewiring of 2 control panels		R0.00	0.00%	15.00%	R0.00	R0.00
Rewind 65kw motor no. 4		R0.00	0.00%	15.00%	R0.00	R0.00
Replacement of faulty fittings		R0.00	0.00%	15.00%	R0.00	R0.00
Installation of outside security lights		R0.00	0.00%	15.00%	R0.00	R0.00
Inspection, testing and repair of earthing system		R0.00	0.00%	15.00%	R0.00	R0.00
LABOUR / TRAVELLING		R0.00	0.00%	15.00%	R0.00	R0.00

Payment Ref: Customer Company Name	Total Discount:	R0.00
Banking Details:	Total Exclusive:	R560,285.59
Bank Name: Standard Bank	Total VAT:	R84,042.84
Account Name: Water & Wastewater Technology Southern Africa (Pty) Ltd.	Sub Total:	R644,328.43
Account Number: 012-788-341	Total Rounding:	R0.01
Branch Name: Menlyn		
Branch Code: 012345		

Grand Total:	R644,328.44
	BALANCE DUE
	R644,328.44

Pump 2 was refurbished in May 2022, but was wired incorrectly on the 3-phase and broke 2026, according to sources.

Priority 3: Keep Critical Spares on Site

Cost – Low

Benefit – High

Maintain stock of:

- Bearings
- Seals
- Impellers
- Electrical contactors
- Motors

Impact

Greatly reduces repair times.

5. Cheapest Short-Term Solutions (3–18 Months)

Install a Second Raw Water Pump

Cost – Moderate

Benefit – Very High

Operate:

- One duty pump.
- One standby pump.

Impact

Prevents total loss of supply when one pump fails.

Establish Preventative Maintenance

Cost – Low

Benefit – Very High

Implement:

- Monthly inspections.
- Vibration analysis.
- Bearing replacement schedules.
- Motor testing.

Impact

Can extend pump life by decades.

Improve Intake Screening

Cost – Low

Benefit – Moderate

Prevent:

- Debris
- Weeds
- Sand accumulation

from damaging pumps.

6. Cheapest Medium-Term Solutions (1–5 Years)

Refurbish Remaining Pump Infrastructure

Cost – Moderate

Benefit – High

Upgrade:

- Motors
 - Starters
 - MCC panels
 - Control systems
-

Increase Reservoir Storage

Cost – Moderate to High

Benefit – High

More storage means:

- Better pressure stability.
 - More resilience during breakdowns.
 - Longer supply during outages.
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Leak Detection Programme

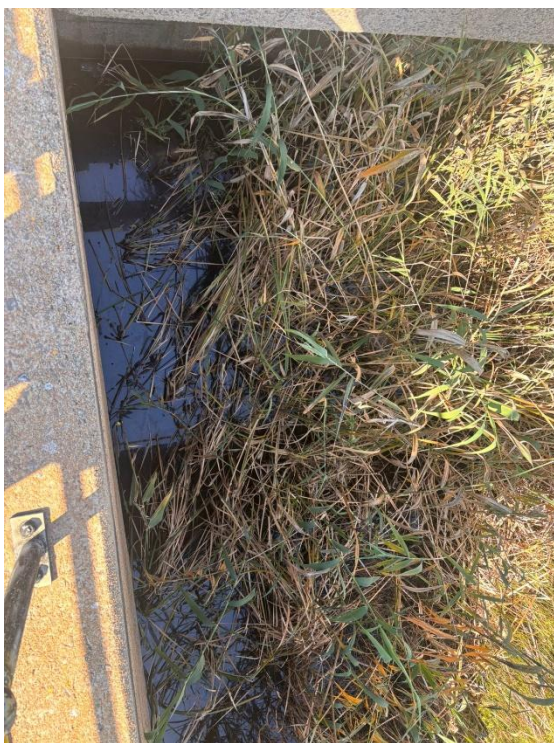
The City of Tshwane reports overall water losses of approximately 33%.

Cost – Low

Benefit – Very High

Reducing losses is often cheaper than producing more water. Bronkhorstspuit and the surrounding areas are currently facing significant challenges due to the deterioration and frequent failure of the

underground water pipeline infrastructure. The existing pipelines are highly susceptible to bursts and are no longer capable of operating reliably under the required system pressure. Restoring the water distribution system to full operational capacity will inevitably increase pressure within the network, resulting in a higher risk of pipeline failures. Consequently, the affected pipeline networks require urgent replacement to ensure the sustainable, reliable, and efficient delivery of water services to the community.



Water leaks at Bronkhorstspuit Water Treatment Plant. Electrical cable running through the water. Picture taken 15 June 2026.

7. Long-Term Solutions (5–15 Years)

Replace the Raw Water Pump Station

Cost – High

Benefit – Very High

Install:

- Two duty pumps.
- One standby pump.

This configuration allows maintenance without disrupting supply.

Upgrade the Entire Treatment Plant

The plant was originally designed for a capacity of 54 ML/day.

Modernisation should include:

- Filters.
 - Electrical systems.
 - Instrumentation.
 - SCADA control.
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Additional Supply from Rand Water

According to the City of Tshwane Water Services Development Plan, no further yield is available for increasing the Bronkhorstspuit system from local resources, and future augmentation would require additional supply from Rand Water.

Cost – Very High

Benefit – Very High

Provides long-term security.

8. Recommended Priority List

Priority	Solution	Cost	Benefit
1	Replace filter sand	Low	Extremely High
2	Refurbish existing raw-water pump	Low	Extremely High
3	Keep spare parts available	Low	High
4	Install second raw-water pump	Moderate	Extremely High
5	Preventative maintenance programme	Low	High
6	Leak reduction programme	Low	Very High
7	Upgrade electrical systems	Moderate	High
8	Additional storage reservoirs	Moderate	High
9	New raw-water pump station	High	Very High
10	Additional Rand Water supply	Very High	Long-term security

Conclusion

The fastest and cheapest way to improve water supply reliability in Bronkhorstspuit is:

1. **Restore the missing filter sand.**
2. **Refurbish the aging raw-water pump.**
3. **Install at least one additional raw-water pump.**
4. **Maintain critical spare parts on site.**
5. **Implement preventative maintenance.**

These interventions are far cheaper than building a new treatment plant and would likely provide the greatest improvement in water availability for residents, businesses, schools and healthcare facilities.

Sources

Source: SABC News - Breaking news, special reports, world, business, sport coverage of all South African current events. Africa's news leader. <https://share.google/qip1kMLsIYGV3hxzs>

Source: World Population Review <https://share.google/IEqxZaMdJQrRIPz9o>

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<https://share.google/qYjDjrj6UjQ3jQlpe>

South African Government **National Water Month** <https://share.google/vEcu4GpriYPCjMWCJ>

Tshwane Developmental Plan <https://share.google/lbz2iJPg5TJVgoedR>

CITY OF TSHWANE BRONKHORSTSPRUIT WATER TREATMENT WORKS WSBU 17 2025/26 TENDER
DRAWINGS - PART 1 BRONKHORSTSPRUIT WATER TREATMENT WORKS