

KEEP CITY TAPS FROM RUNNING DRY



INFRASTRUCTURE & ENGINEERING
Water and Sanitation



Updated February 2022

WHERE DOES NELSON MANDELA BAY GET ITS WATER FROM?

TWO MAIN SOURCES:

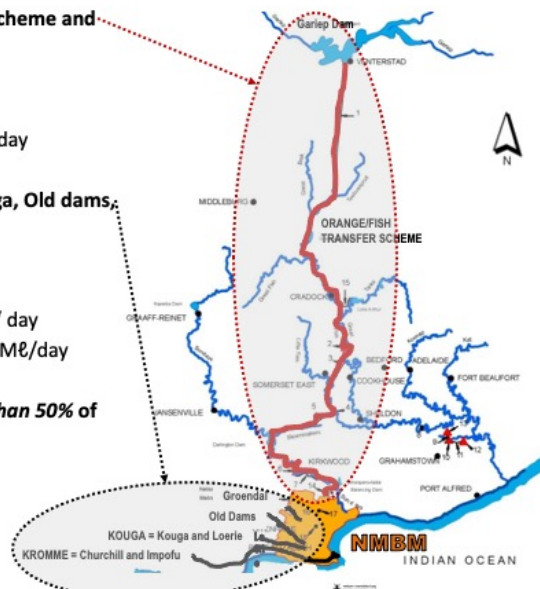
1. Gariep Dam via Orange/Fish Transfer scheme and Nooitgedagt

- Capacity = 5,340 million m³
- % storage Feb 2022 > 100%
- Unrestricted allocation = 210 Mℓ/day

2. Local dams and springs (Kromme, Kouga, Old dams, Groendal & springs)

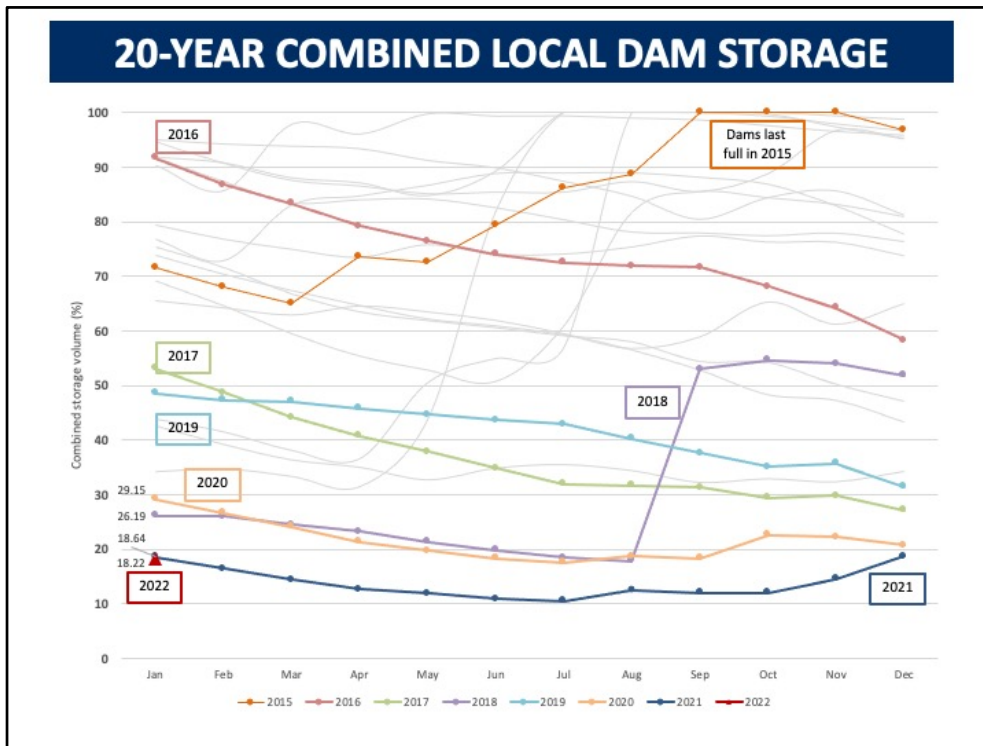
- Capacity = 286 million m³
- % storage Feb 2022 = **18%**
- Unrestricted allocation = 194 Mℓ / day
- Current, *restricted* allocation = 62 Mℓ/day

Unrestricted, local dams provide just less than 50% of water to NMB. Under current restrictions, local dams provide only 15%



Let's start with the water system. Cape Town was reliant *only* from rainfed dams within the Western Cape Water Supply System in the drought (2015-2019).

NMB has two main sources of water: about half from local sources, some local springs, a number of local dams to the west of the metro, and the other half from the Gariep dam via the Orange/Fish/Sunday scheme. This is a good start to diversification of supply as the risk of drought is distributed between two distant catchment areas. The Gariep dam is overflowing and not currently at risk of water restrictions. We have received for the full allocation of 210 MI/day from Nooitgedagt.



The local dams are however not anywhere close to overflowing.

The local Eastern Cape dam system comprises the Kromme scheme (Churchill and Impofu dams), the Kouga system (Kouga and Loerie dams) and Groendal dam. The graph shows the combined storage of these dams over 20 years – the most recent years shown in color, prior to that in grey.

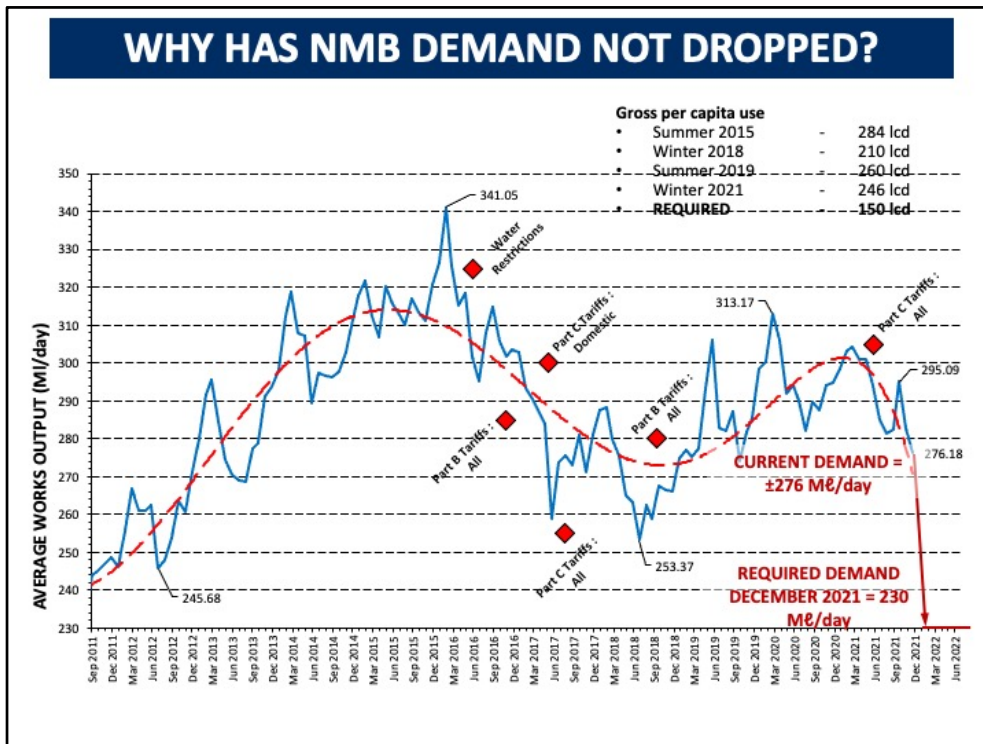
Dam levels were last at 100% of storage capacity in 2015. Barring a rapid increase to above 50% in 2018, dam levels have gradually decreased, and is now at their lowest storage ever at this point in the year. Recent rainfall has lifted dam levels to 18.22% at the start of February, just less than last year at this time.

DWS RESTRICTIONS ON DAMS

Curtailement of Water Sources							
Component			Licenced Volumes		Restrictions		
Sub-system	Category	Consumer	Mm3/a	Mℓ/day	Curt.%	Mm3/a	Mℓ/day
2021/22							
Kouga	Irrig.	Gamtoos IB	60.3	165.2	85%	9.0	24.8
	Loss	Canal	6.9	18.9	20%	5.5	15.1
	Urban	Hankey	0.5	1.4	65%	0.2	0.5
	Urban	Patensie	0.4	1.1	65%	0.1	0.4
Loerie	Urban	NMBM	23.0	63.0	85%	3.5	9.5
Kromme: Churchill+ Impofu	Urban	NMBM	38.1	104.3	70%	11.4	31.3
	Irrig.	Kromme	2.0	5.5	70%	0.6	1.6
	Env.	Release	2.0	5.5	100%	0.0	0.0
Groendal	Urban	NMBM	4.4	12.1	50%	2.2	6.0
	Irrig.	Release	2.4	6.6	70%	0.7	2.0
Uitenhage Springs	Urban	NMBM	2.2	5.9	0%	2.2	5.9
Old Dams	Urban	NMBM	3.3	9.0	0%	3.3	9.0
Sundays	Urban	NMBM	58.3	159.7	0%	58.3	159.7
Total for Existing Algoa System	All	All	203.8	558.2	52%	97.1	265.8
	Urban	NMBM only	129.3	354.1	37%	80.9	221.5

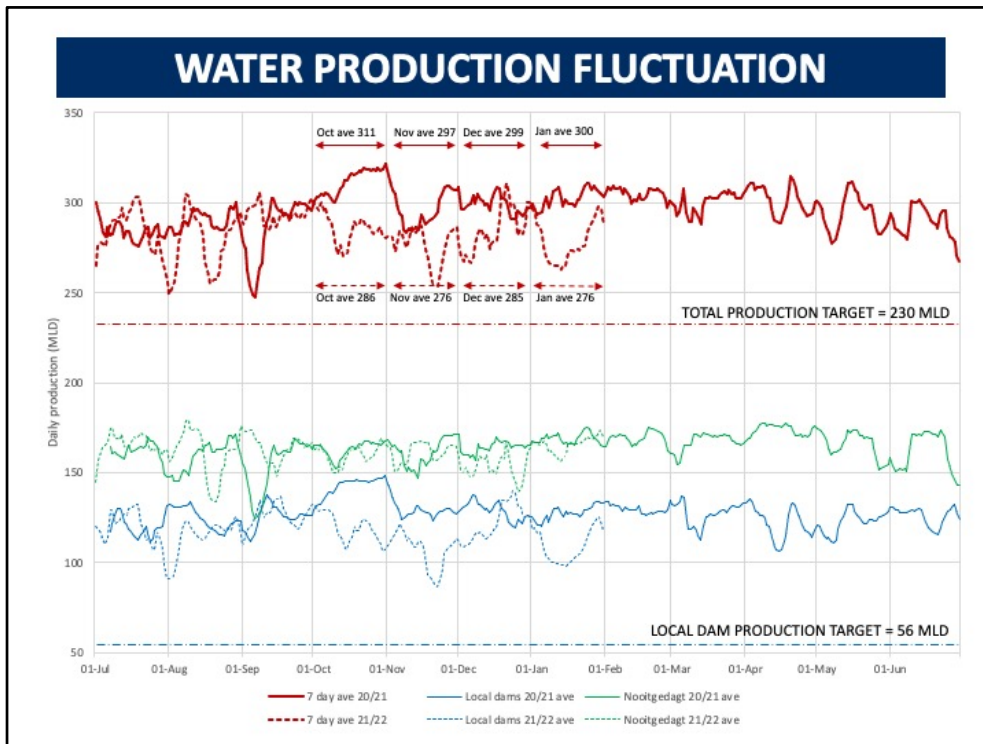
The National Department of Water & Sanitation is responsible for regulating bulk water supply, and in times of drought, imposes restrictions on the draw-off from dams. Restrictions are imposed to save the dams from running dry as this leads to system shutdown. So when you're reliant on rainfed dams, and that alone, you cannot but comply to restrictions. Furthermore the National Water Act compels us to comply.

This table shows the DWS's latest proposed restrictions on the easter cape dams, and they will be gazetted shortly. We as NMBM have no choice but to comply, which means drastically reducing our abstraction volume from Kromme and Loerie.



This is NMBs water demand graph shown from 2011 to current. Demand has decreased when required by restrictions in the past. Seasonal peaks are not as pronounced as in for example Cape Town, but usually peaks in the first quarter of the year and dips in the third quarter.

We need to reduce NMBs demand down to 230 MLD immediately to comply with restrictions. If it does not rain, and dams run dry during 2022, we will be able to better distribute the available water around the metro, with 210 MLD from Nooitgedagt, and the balance from our own sources such as Springs, groundwater and dams.



Daily demand fluctuates widely as a function of balancing reservoirs, planned and unplanned maintenance and domestic water use. A 7 day rolling average is a better indicator of trend than daily or weekly demand. In January, we reduced consumption down to an average of 276 MI/day, which is a good improvement compared to 300 MI/day a year ago, but we are still nearly 50 MI/day above where we need to be.

Especially with warmer weather, we must resist the temptation to use water for anything but essential use and keep driving down our collective water demand. No watering of gardens, filling of pools, washing of cars allowed – unless non-potable water is used.

WHY HAS NMB DEMAND NOT DROPPED?

CAPE TOWN
DAY ZERO
SIMULATION



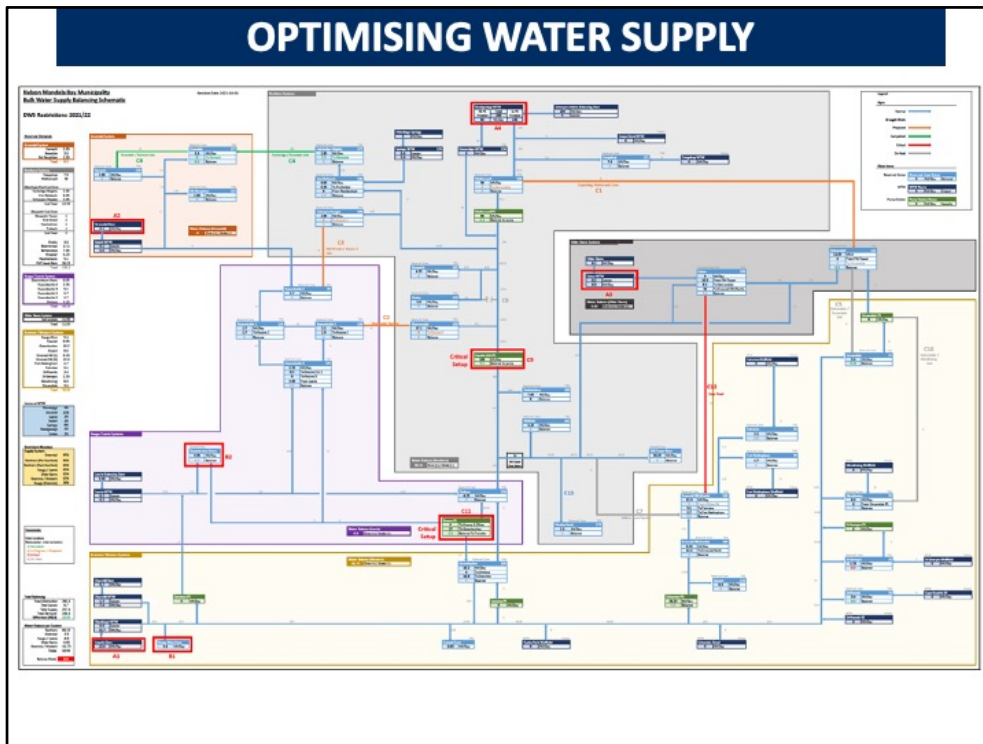
LARGE PARTS OF NELSON
MANDELA BAY,
SEPTEMBER LONG
WEEKEND

We conclude that demand has not dropped largely due to public behavior. No doubt there are some water warriors the Bay, but not enough. Each and every one of us must take this seriously. Recent water outages affected large parts of the city, but more than half of all households will run dry if the dams run dry. Collecting water from water tankers could be the norm, potentially for months. This will permanently damage the economy, not to mention our livelihoods and lifestyles.

WE HAVE TO BUILD TRUST



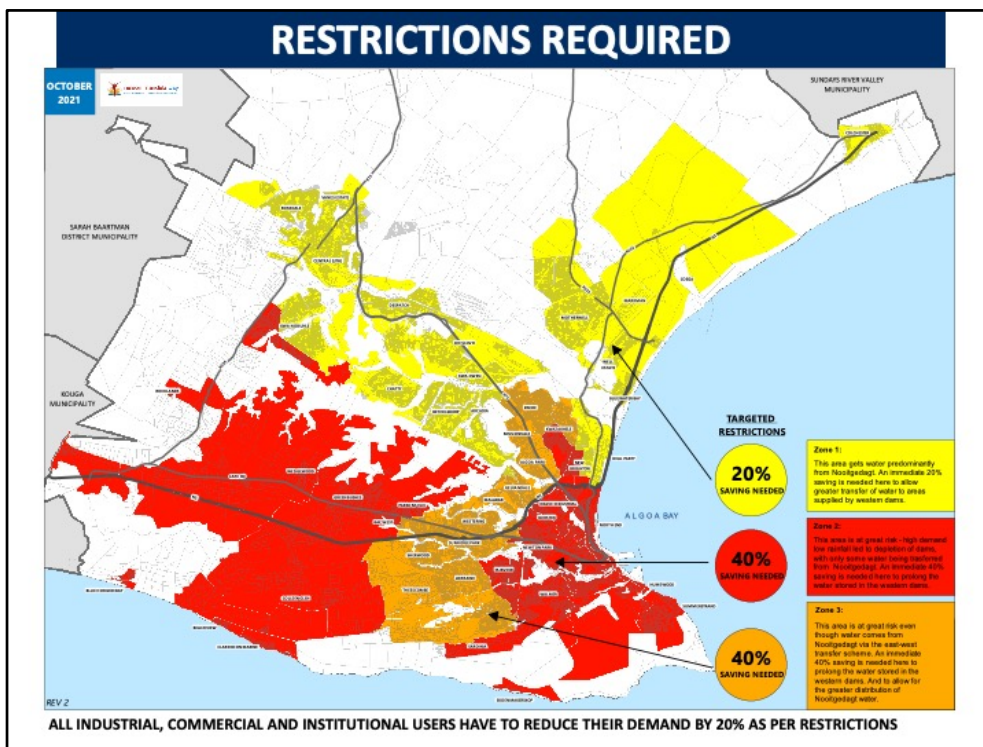
**If *all of us* reduce our consumption, AND
the NMBM implements projects to improve distribution
in the city, and works hard to reduce water loss, THEN
We can avoid dry taps even if it doesn't rain**



So what can we do? To avert disaster, we have developed an updated system optimisation plan that will mean we will be able to distribute water as far as practically possible across the metro so that everyone has access to water to meet their basic needs, even if the local dam catchments get no further rainfall. There are risks, this will be testing our infrastructure, and pipe-bursts will still result in water outages.

While *no* rainfall is unlikely, we have no control of how much, where or when rain will fall, but we *do* have control over other parts of our water cycle. One such area of control is in how water is distributed: There is a complex network of reticulation mains fed from various supply sources and distributed by means of pump stations.

We have been re-assessing the situation whenever conditions change, e.g. after every rainfall event or change in demand.



If you recall the different supply sources, with Nooitgedacht from the Gariep dam. But even if your water comes from Nooitgedacht, with the harsh restrictions on the dams, we have to distribute as much water as we can to the zones shown in red. If you live in Zone 1, the yellow area, you need to reduce by 20% immediately. If you live in Zone 2, shaded red you need to reduce consumption by 40% immediately. We highlight Zone 3, which was previously shown as low risk but relies on the east-west transfer pumping system and needs to reduce consumption by 40% as well. Due to high demand, this area used water from the dams on top of that from Nooitgedacht. This zone includes Sherwood, Sunridge Park Lorraine, Malabar, Westering and Theescombe etc.

The local dams supplying Zones 2 and 3 can provide ±190 MLD unrestricted. Under current restrictions, this is limited to ±60 MLD, leaving a shortfall of 130 MLD. Even with the transfer of 80 MLD from Nooitgedacht, it leaves a shortfall of ±50 MLD. We are trying to manage this shortfall daily, by balancing reservoirs and fluctuating flows into various areas. This creates volatility in the system, which inevitably results in further maintenance. These problems would largely be eliminated if the load is reduced on the demand side, but to date our pleas to consumers to reduce consumption have not had sufficient success.

Remember that it doesn't help to use more water at work or the gym and less at home – we need you to reduce your overall usage, wherever you are. Everyone in NMB will









suffer if part of the city runs out of water. We need everyone to do their bit.




Using 40% less water will require some effort, but you can do it by being aware of your usage and thinking every time you open a tap. Use the online calculator to work out your daily usage.

Cape Town reduced demand by 55% during their drought. And they eliminated the summer peak completely, even though they are also a summer holiday destination.

CHECK YOUR USE

READ YOUR WATER BILL	
NUMBER OF PEOPLE IN HOUSEHOLD	MONTHLY WATER BILL VOLUME
 1	1.5
 2	3.0
 3	4.5
 4	6.0
 5	7.5
 6	9.0
 8	12.0
 10	15.0
(household size)	(kilolitres per household)

For example, for a household of 4:



Nelson Mandela Bay Municipality		TAX INVOICE	
PORT ELIZABETH UTENHAGE DESPATCH		COMPUTER GENERATED COPY TAX INVOICE	
WAT 100 488289723	TEL 1 041-306-1111	FAX 041-306-1104	DEPOSIT 150.00
PO Box 834 6000	Prof/Fin/Reserve/Net/Net		
STATEMENT DATE	ACCOUNT NUMBER	EASY PAY NUMBER	AMOUNT
DATE	DETAILS		
MONTHLY FORWARD			
08/03	THANK YOU FOR YOUR PAYMENT		
18/03	BY [REDACTED]		
READING TO 25/03/23 BY [REDACTED]			
NEXT METER READING IS SCHEDULED FOR 08/04/23			
METER	READING	CHG.	
[REDACTED]	7100	6.0	
WATER			34.02
MUNICIPALITY CHARGE			11.29
VAT @ 15%			21.88
			167.33

You should also use your monthly water bill to make sure that you reduce your consumption by the required amount.

The average household in NMB has just under 4 people – your water bill should be no more than 6,000 liters per month. If you have a different number of people in your household, you can calculate what your bill should be by multiplying the number of people by 1,500 litres per month.

WHAT HAS NMBM BEEN DOING WHEN IT COMES TO MANAGING DEMAND?

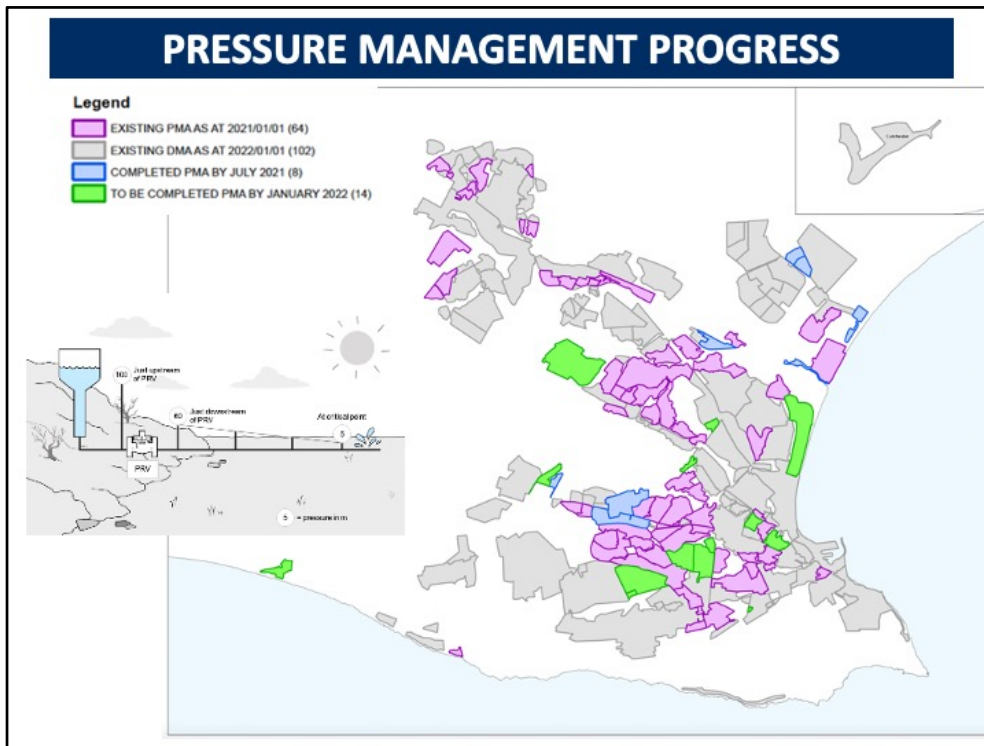
- Imposing restrictions
- Fixing leaks (focus on large gains)
- Schools leak fixing program
- Reducing pressure
- Replacing old/faulty meters
- Restricting flow to high consumers
- Increasing use of non-potable water
- Clearing alien vegetation
- Installing meters on straight connections
- Reducing on bulk lines and reservoir connections
- Extensive communications campaigns



As in Cape Town, NMBM has worked on a number of initiatives to drive down demand.

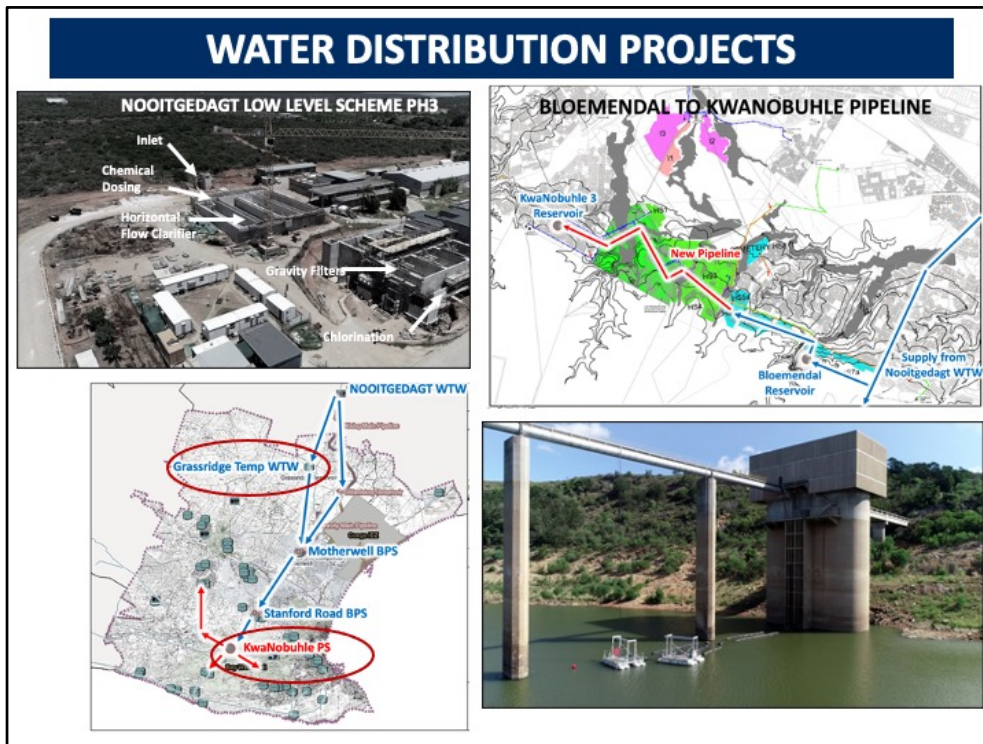
The impact on reduced demand should accelerate now that contracts have been put in place, stocks of meters, valves etc. have been increased and some of the required budget has been transferred to support water demand management initiatives.

We are working towards balancing reservoir levels so that high-lying suburbs do not run dry whenever demand exceeds supply and are boosted by reduced pressure to low-lying areas. Reservoirs affected include Glendinning, Heatherbank and Lovemore Heights. Even if pressure is reduced, households will have water as long as no-one abuses water, especially during peak hours.



The map shows the areas where pressure management has already been implemented, and where we are aiming to move to by the end of the year. We have now reduced the pressure from 1.5 to 1.0 bar at critical points.

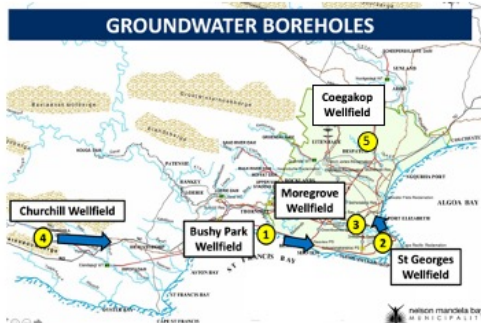
There are difficulties in the older areas such as the CBD – more complex and takes longer to analyze, isolate and actively manage.



We are busy implementing projects to improve distribution in the city, and to reduce water loss including

1. The Kwanobuhle pumpstation at Chelsea reservoir will enable wider distribution of water from Nooitgedagt when it can be commissioned in May 2022;
2. Bloemendal pipeline to Kwanobuhle has been completed and the system connections are being optimised;
3. Booster pump upgrading at Motherwell and Stanford Road;
4. To stretch the water remaining in the dams:
 - We added a barge at Impofu Dam Barge to extract more water which would otherwise have been dead storage;
 - We commissioned Grassridge Temporary Treatment Works to treat raw water until Nooitgedagt Phase 3 water treatment works becomes operational

NEW SUPPLY PROJECTS



Diversification of supply sources:

- Groundwater (Existing projects under development 55 MLD)
- Re-use (Coega SEZ industrial water project)
- Desalination (future source of reliable water supply)

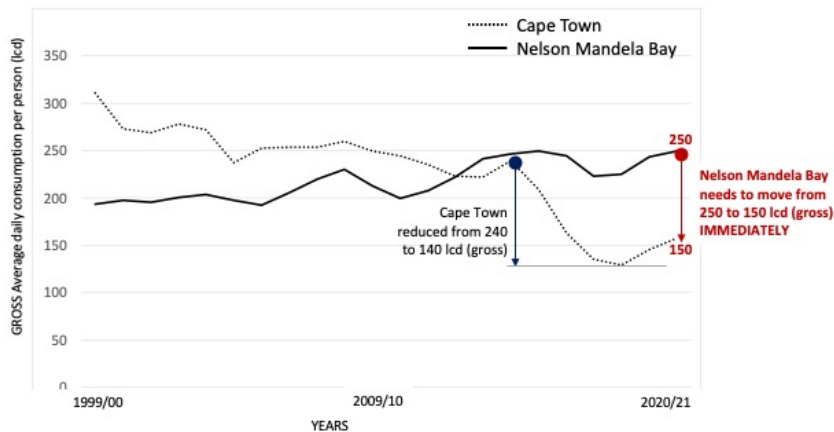
Lessons from Cape Town

1. Our Emergency Water Supply projects include Tanks, Boreholes and increased supply of return effluent for non-potable use. Eventually, an emergency additional supply of up to 55 MLD will be from groundwater projects, developed at 5 locations around NMBM
2. In ideal conditions, Groundwater is abundantly available, of good quality, close to either reticulation or storage capacity of sufficient volume.
3. The Cape Town experience proved groundwater to generally be very expensive – either due to poor quality and high treatment requirements in the urban setting, or else due to stringent environmental requirements in remote areas around the city dams
4. The world is looking at direct potable re-use as a future source of water – when water is more expensive, it makes perfect sense to re-use it. Non-potable re-use needs to be increased
5. Desalination provides drought-proof water, but it is expensive and takes a long time to develop to make sure the planned for volume and quality is achieved. Temporary small-scale desalination is particularly expensive, and it is good that that route has not been followed.
6. All of these augmentation options form part of the Algoa reconciliation strategy which focuses on long-term water security.

THE WAY FORWARD

We are not aiming for permanent scarcity. We want to get to the point of WISE use, where we pay cost-reflective tariffs.

And in parallel, NMBM commits to continue and accelerate all programs to reduce loss & provide connectivity.



We reduced the gross consumption in Cape Town from 240 to 140 litres per capita per day. Gross consumption is the total city demand divided by the number of people, thus includes commercial and industrial use, as well as all households, and leaks.

In NMB, we require the per capita consumption to reduce from 250 to 150, immediately.

THANK YOU



 **nelson mandela bay**
MUNICIPALITY

