INVEST CAPE TOWN

Long Term Vision for the Water Sector

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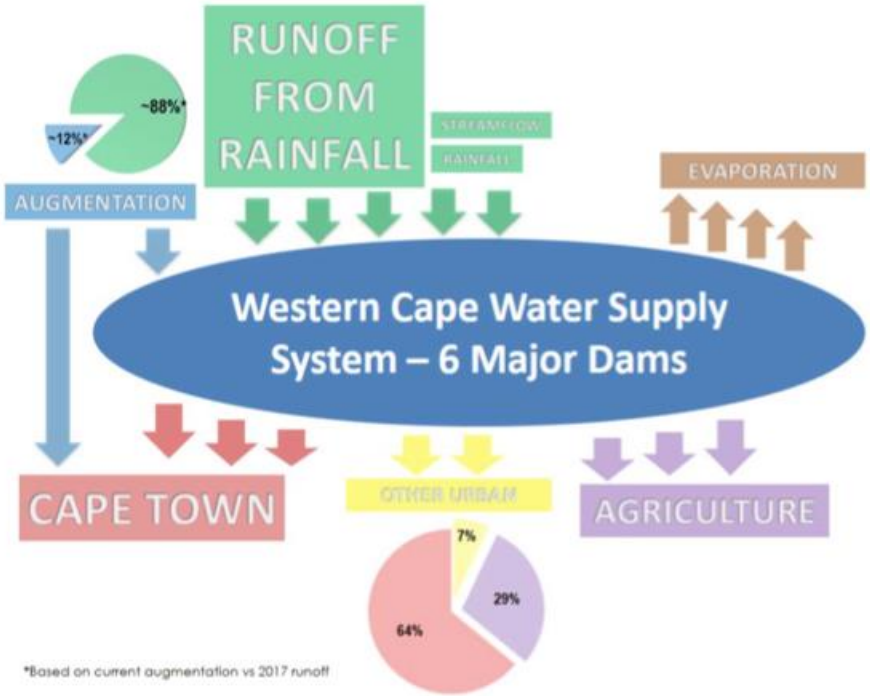
STAD KAAPSTAD

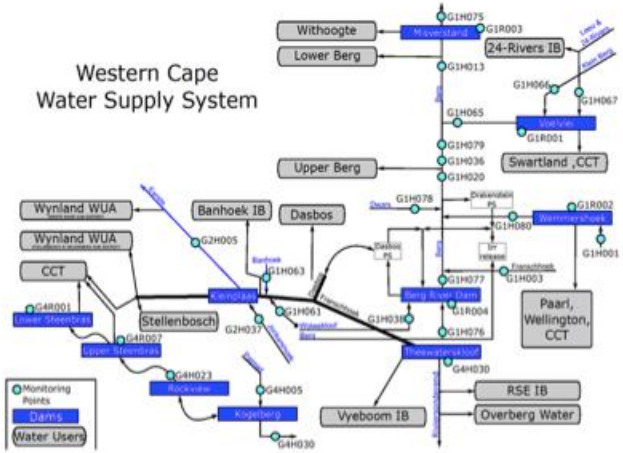
Cape Town's water is part of an integrated system



Cape Town gets its water from a system of dams that supply agriculture and other urban areas. The current system is heavily dependent on rainfall.

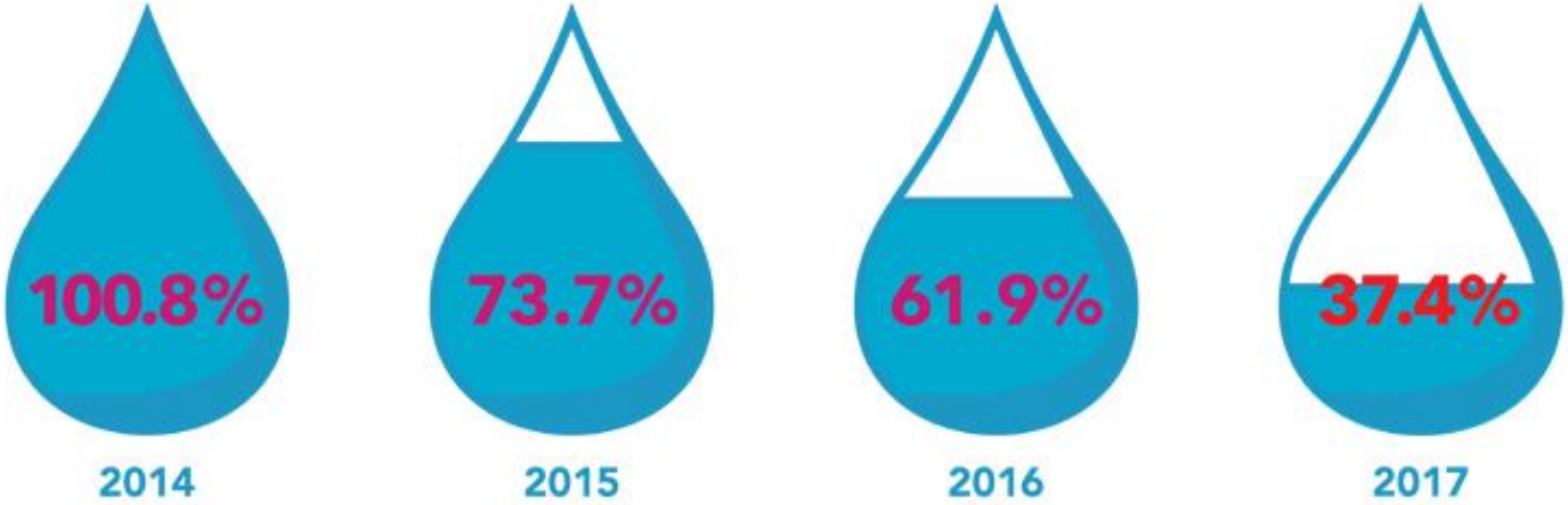
This complex system is managed by the national Department of Water and Sanitation.

About a third of the water in this system is used by agriculture and 7% by other urban areas (smaller towns).



ANNUAL MAJOR DAM LEVELS

All figures are for 25 September for each year



THINK WATER
THINK LESS THAN 87ℓ A DAY

PHASES OF THE DISASTER PLAN

We are currently in Phase 1 with Level 6b in effect from 1 February 2018. Day Zero is set for 2019, unless water use drastically reduces across the City

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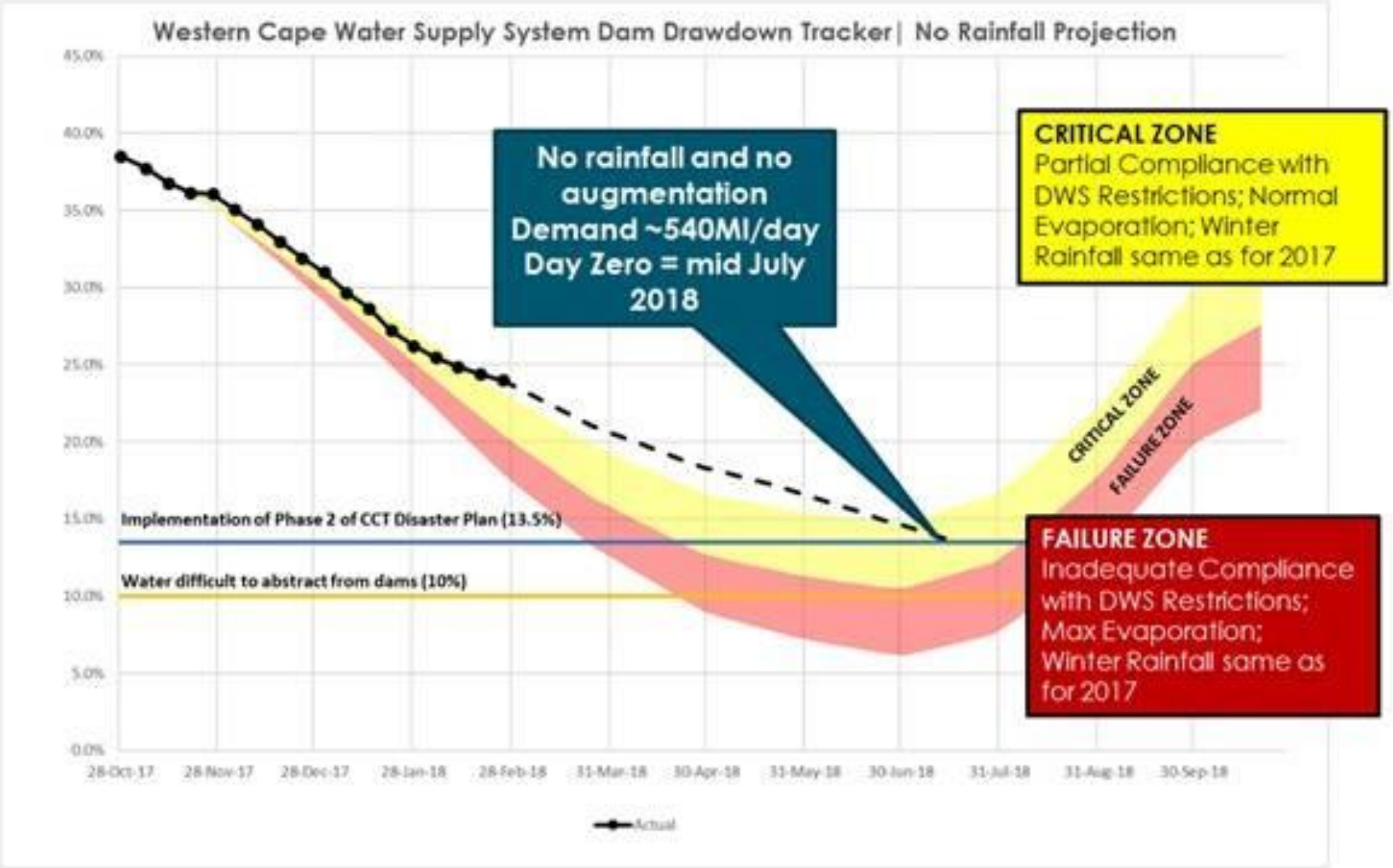
Graph 1: No Rainfall | No Interventions | Average Demand ~540Ml/day



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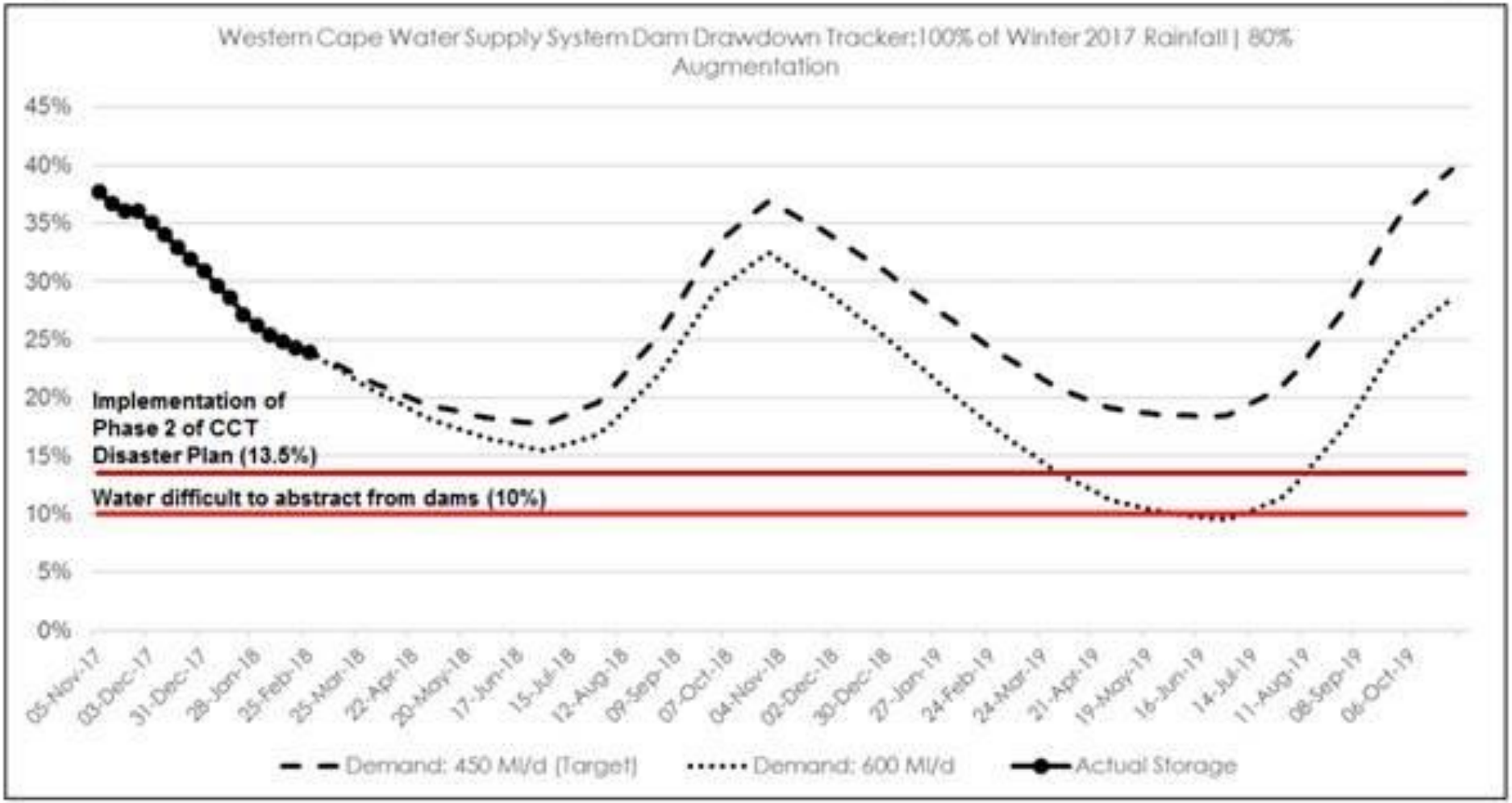
Graph 2: 100% Winter 2017 Rainfall | 80% Augmentation| Max Evaporation



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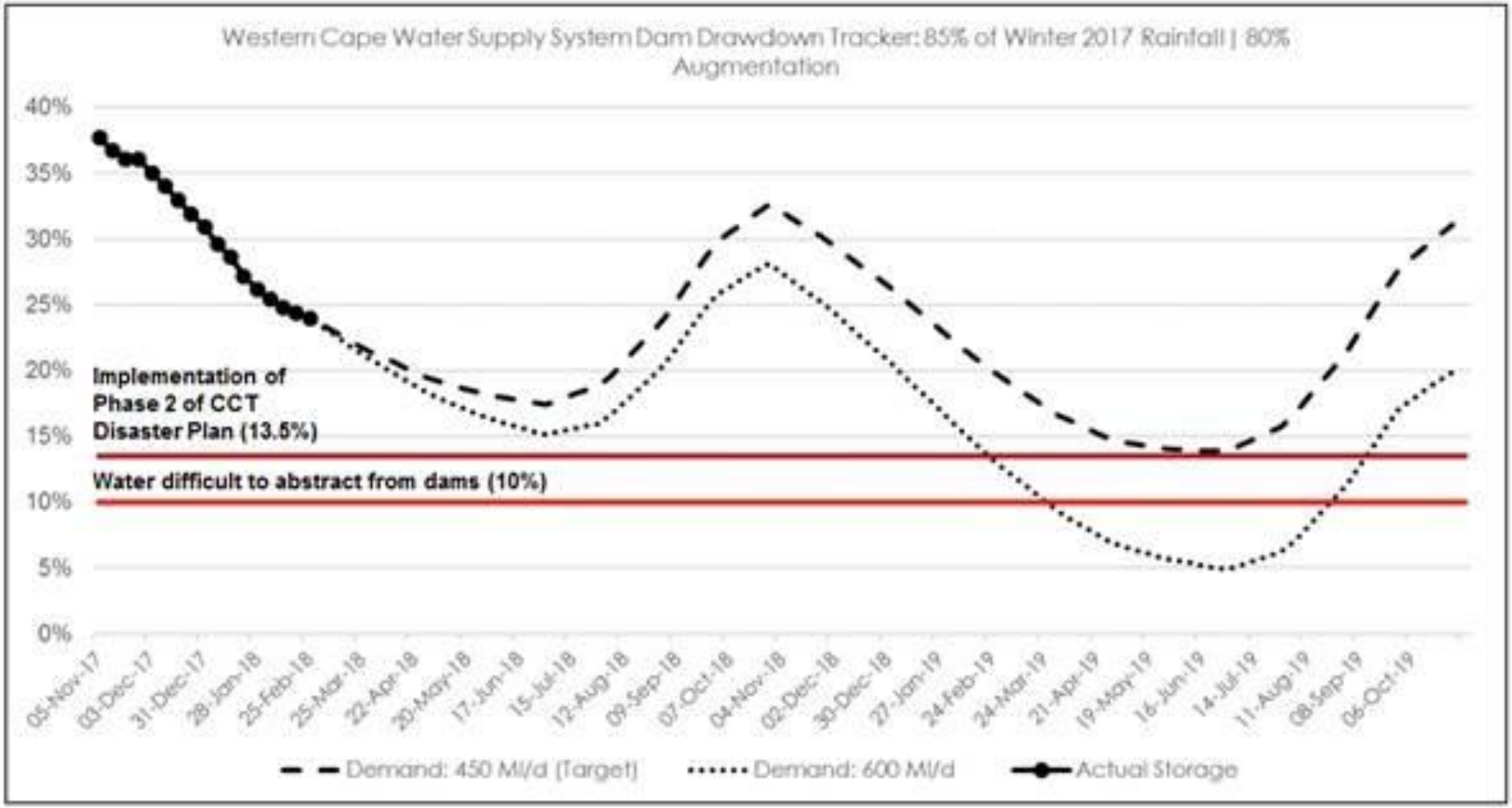
Graph 3: 85% Winter 2017 Rainfall | 80% Augmentation | Max Evaporation



AUGMENTATION

The City of Cape Town has been working towards a diversified supply for some time, but due to the expense of options other than surface water, the projects have progressed to pilot stage, rather than production. The full augmentation plan runs until June 2022.

- Short-term, temporary desalination (16 MLD)
- Groundwater abstraction (peak at 150 MLD)
- Springs
- Water re-use
- Water transfers
- Permanent desalination

WORLD BANK COMMENDATION

*"The **project management of Cape Town's new water supply is impressive**. This was **confirmed in November by World Bank consultants** who spent time with the City to look at their plan.*

*They agreed that **the plan was excellent and one of the most detailed they had ever seen**. The project management team has put in place a range of measures to speed up procurement time lines that are in line with private sector procurement, seldom seen within government."*

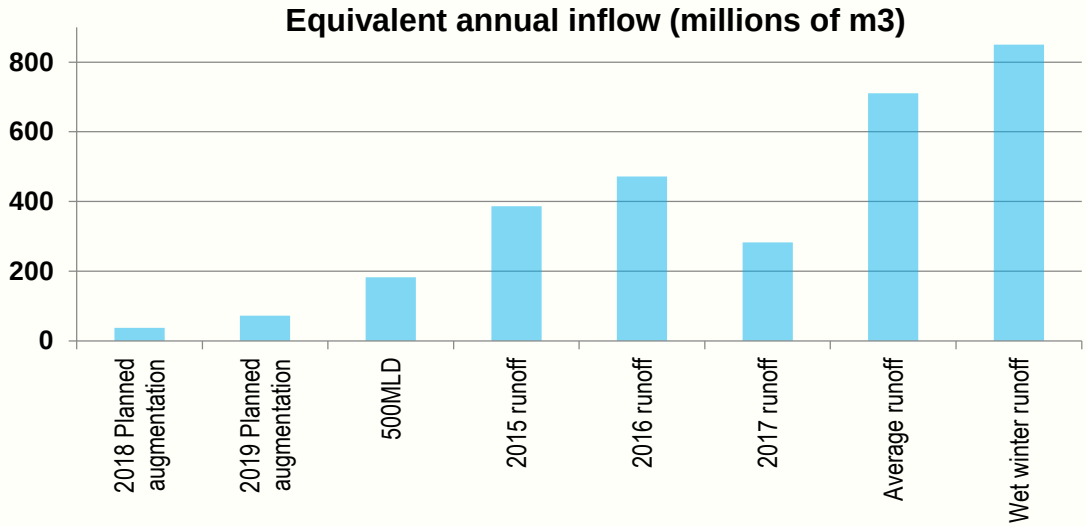
Gina Ziervogel, associate professor in the Department of Environmental and Geographical Science and Research Chair at the African Climate and Development Initiative, University of Cape Town.

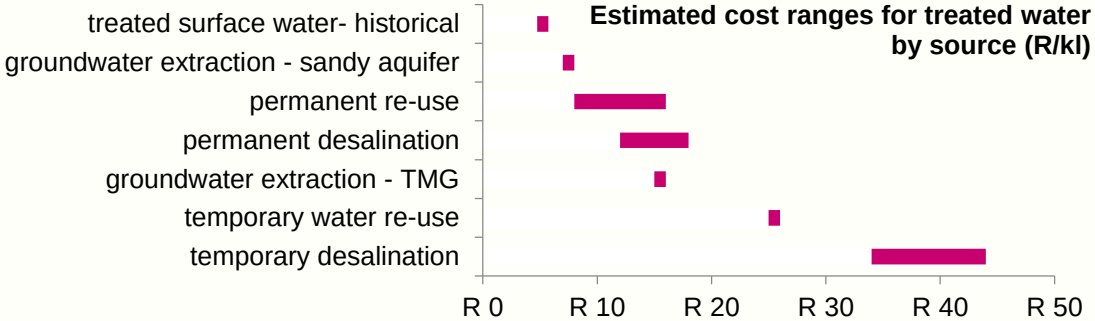
Advice from International Review (November 2017)

1. **Assuming it will not rain again is not realistic**
2. **Prioritise ground water**
3. **Do not pursue temporary desalination and reuse**
4. **Re-use is cheaper than desalination and may be quicker to execute**
5. **Plan and execute permanent desalination at a optimum scale**
6. **A turnkey approach** for reuse and desalination with a water purchase agreement **will yield the lowest cost per unit of water**
7. **Do not delay decisions** on permanent reuse and desalination.

TYPE	LOCATION	MLD	FIRST WATER	FULL PRODUCTION
Short-term, temporary desalination	*Strandfontein*	*7*	*March 2018*	*May 2018*
	Monwabisi	*7*	*March 2018*	*May 2018*
	V&A Waterfront	*12*	*March 2018*	*May 2018*
Groundwater abstraction	*Cape Flats aquifer*	*80*	*May 2018*	*June 2018*
	Atlantis aquifer	*20*	*May 2018*	*October 2018*
	TMG aquifer	*40*	*February 2018*	*June 2019*
Springs	*Newlands Albion spring*	*3*	*In operation*	
	Oranjezicht	*1*	*In operation*	
Water re-use	*Zandvliet*	*10-50*	*June 2018*	*December 2021*
	Cape Flats	*10-75*	*June 2018*	*December 2021*
	Macassar	*20*	*June 2019*	
	Potsdam	*10*	*June 2019*	
	Ahtlone	*75*	*December 2021*	
Permanent desalination	*Koeberg*		*(pilot underway)*	

Augmentation - considerations



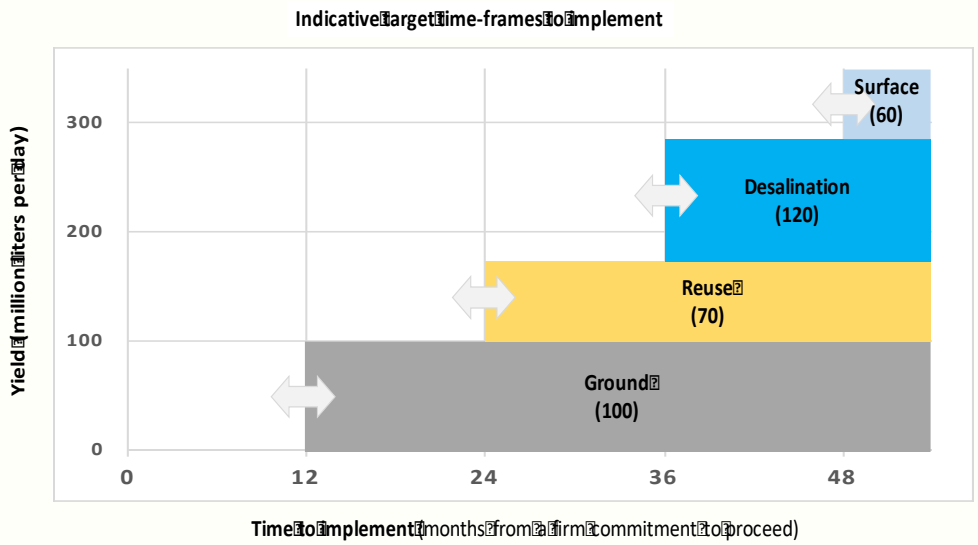


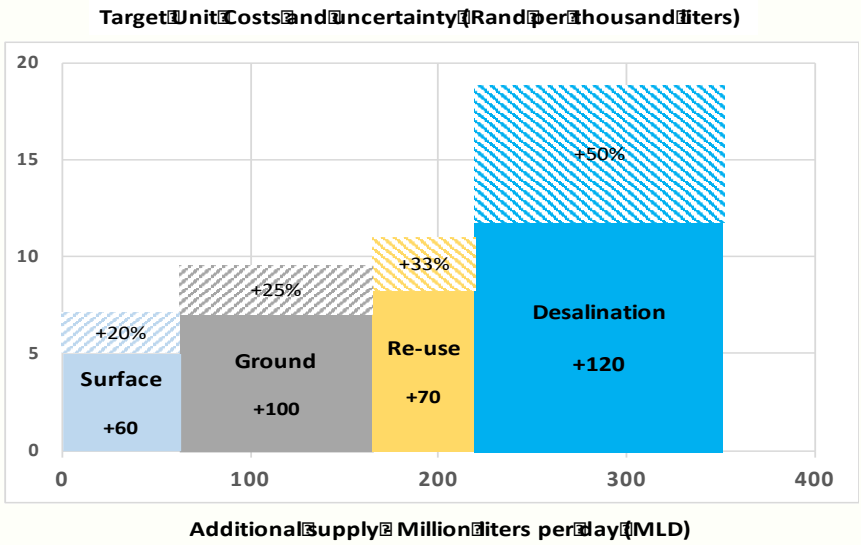
Augmentation schemes are a far more expensive source of water than runoff from rainfall. The volume of runoff cannot be easily augmented in short time periods and is dependent on rainfall patterns. Under poor rainfall conditions like 2017 we would require augmentation of ~770 MLD to match the volume of runoff. Despite all augmentation efforts, the supply scheme is vulnerable to poor rainfall.

As can be seen the cost per kl of water from other sources vary considerably. The cost of bulk water, waste water and reticulation is common so the costs can be compared to the cost of runoff which is ~**R5.20/kl** vs temporary desalination at >R40/kl.

Yield, cost, timing informs priorities

Augmentation far more costly than demand management – but there are limits





- **Surface water** is least costly, but not resilient to drought;
- **Groundwater** is more drought resilient, and quick to provide additional water into the system;
- Permanent **Desalination** is very costly and cannot be implemented quickly **BUT** it is the only unlimited new source of water into the system not reliant on rainfall;
- **Re-used water** is less costly than desalination, and is necessary to maximize value from the diversified supply mix which is considerably more expensive than single source surface water.

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MID TO LONG TERM AUGMENTATION PLANS

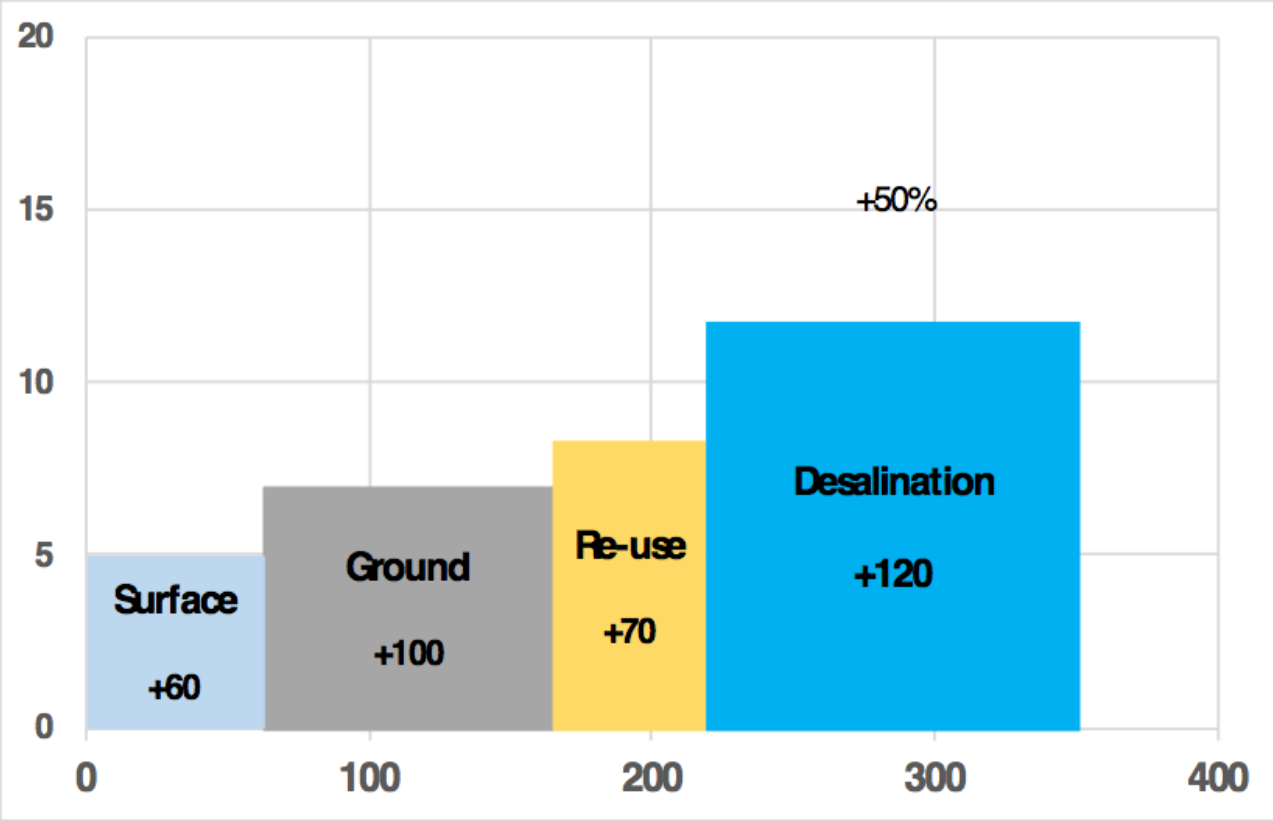
Water demand in Cape Town will continue to grow as a result of population and economic growth. Providing water from diverse sources in the region of 350 MLD will increase the city's resilience to periods of drought at the same time as provide for future growth. The greater resilience provided from these diverse sources, with the ability to extract more from aquifers during droughts and to re-charge with other water sources during wet periods, is significant. The impact of climate variability will be continuously assessed and the planned augmentation volume may be increased in future years, in consultation with DWS.

Detailed design work is proceeding on a 70 MLD wastewater reuse plant to be sited at Faure Treatment Works, taking water from Zandvliet (50 MLD) and Macassar (20 MLD). Concept designs have been developed for water reuse from Cape Flats (75 MLD) and Athlone (75 MLD)

Work is proceeding on options for recharge of the Cape Flats aquifer.

The optimum site for a 120-150 MLD permanent desalination plant is being explored and a pilot plant at Koeberg (20 MLD) is being constructed which will inform the design for a larger desalination plant at that site in the future.

PROJECTED RATIO OF NEW BUILD



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LONG TERM PROJECTS UNDER CONSIDERATION

Source	Target yield MLD	Notes
Ground	100	More could be abstracted from ground water sources in dry years.
Re-use	70	One large re-use reclamation plant (economies of scale)
Desalination	120	Optimal scale for desalination is 120-150 MLD
Surface water	60	Lower Berg River Voelvlei Augmentation scheme
Total (diverse sources)	**350**	

Summary

1. Continue **demand management** to reduce dam drawdown (in line with NDWS restriction);
2. Manage and monitor **dam behaviour;**
3. Fast-track **augmentation**:
   - **Decisions** under consideration by the City on **optimal augmentation** types, volumes, methods;
   - **Groundwater** projects (Atlantis, Cape Flats and TMG Aquifers) have been prioritised;
   - **Aquifer recharge** projects from treated wastewater under development;
   - **Long-term Permanent Re-use** project under development;
   - **Long-term Permanent Desalination** under evaluation in terms of siting, optimum yield & procurement method;
4. Manage **financial impacts with appropriate tariffs**: future revenues are still somewhat uncertain but the impact ***will*** be substantial as a result of reduced sales combined with increased costs;
5. Improve **coordination** and leadership within and between spheres of government;
6. Engage **stakeholders** into active citizenry and progress **communications** with consistent messaging across government.

THANK YOU

TOGETHER WE CAN AVOID DAY ZERO

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