



# Building resilience through investment in water saving interventions

## A case study of the V&A Waterfront



### Purpose

Climate change has impacted the City of Cape Town (CCT) in a number of ways and has exacerbated the occurrence and severity of extreme weather events such as drought, storms, flooding, and heatwaves. Businesses are sensitive to drought and are vulnerable to water related risks, particularly when their key operations are water intensive. However, investing in green technologies and solutions has the potential to make businesses more sustainable and resilient in the face of these acute shocks and chronic stresses.

This case study highlights the successful progressive application of innovative green technologies and solutions by large shopping centres, commercial districts and tourism destination such as the **Victoria & Alfred Waterfront (V&A)** in building water resilience over a ten-year period.

This case study is written for:

- Cities and regions seeking to harness innovative green technologies to build water resilience
- Cities and regions focused on building economic resilience through innovation, and enterprise and investment development.
- Technology/service providers and entrepreneurs looking to capitalise on climate-induced business opportunities, and
- Funders, businesses and other stakeholders seeking to replicate similar programmes in order to enhance water resilience.

### What is resilience?

In human terms, resilience refers to “the ability of an individual to recover from setbacks, adapt well to change and to keep going even when facing difficult circumstances”.

A resilient Cape Town is a compassionate, connected, and capable city, where Capetonians collaborate across households, communities and institutions, to build collective responses to the current and future social, environmental and economic challenges.

## Key insights

- To enhance water resilience, commercial districts, shopping centres and malls should work collaboratively with their shareholders, employees, tenants and progressive customers.
- A systematic approach to implementing water saving interventions should be followed, starting with the easiest, least expensive initiatives, as outlined in **Figure 1**.
- Simple, low-cost interventions such as awareness raising, water monitoring and metering, and implementing water efficiency interventions can reduce water consumption by 30% in a commercial district, shopping centre or mall.
- The 123-hectare V&A waterfront property, was able to reduce its water consumption by 891 066 kℓ/yr (2.47 kℓ/m<sup>2</sup> or 65%) through progressive water saving investments of ~R7 million over 10 years.
- This resulted in cost savings of ~R40 million<sup>1</sup> on water consumption and sanitation costs.
- Lessors can include clauses on lease contracts that make it compulsory for tenants to incorporate green principles in their design, installations and operations.

## Background

The recent drought in Cape Town (2015-2018) led to job losses and a decline in the tourism and agriculture industries. The total economic loss was estimated at approximately R6 billion with over 30 000 jobs losses in the agricultural sector during the 2017/18 season<sup>2</sup>. The drought highlighted the vulnerability of businesses to water related risks, and fast-tracked the adoption of innovative solutions,

technologies, processes and techniques to manage water use as Cape Town embarks on the resilience journey. GreenCape as part of the **Economic Security Workstream** which consisted of the Western Cape Government, the CCT, Wesgro, and other key stakeholders that worked closely with businesses during the drought to improve their economic resilience and that of the Western Cape economy.

A Water Resilience Journey was mapped out and it proposed a number of interventions that can be implemented in each step of the journey (**Figure 1**). The V&A Waterfront is one example of many businesses that enhanced resilience through water use behavioural changes, implementation of water efficiency interventions, and the installation of alternative water sources.

## Business overview

The V&A Waterfront is a 123 hectare mixed use destination for ~ 24 million visitors from all over the world. It is a growing commercial district with the largest use being commercial offices which make up 25% of all gross, lettable areas, while the ocean economy takes up 19% of the land use. The public areas comprise 20% retail, 18% hotels, 5% eateries, 4% arts and culture and 1% education or conference facilities.

The property has nearly 800 tenants and occupies approximately 0.2% of the developed land in the province. The property consumed about 1 370 084 kℓ (3.57 kℓ/m<sup>2</sup>) of water in 2010 and has managed to reduce its consumption over the last 10 years to 479 018 kℓ (1.10 kℓ/m<sup>2</sup>). This was achieved through the progressive implementation of water saving initiatives (**Figure 1**).

Economically, the V&A contributed about 1.6% to the provincial economy in the 2017/8 financial year and sustained about 23 000 direct jobs.

A 13.5% increase in real contribution to direct gross domestic product (GDP) was also realised despite the peak of the drought at the time. This surpassed the 1.5% and 0.5% growth realised by the province and country, respectively. The increase in economic activity was driven particularly by the developments at the new Silo and Canal districts.

The V&A sees its role on the African continent as a platform for collaboration, that supports entrepreneurship and innovation, a leader on sustainability, and a driver of inclusive socio-economic development.

The V&A and its stakeholders are committed to best sustainable practices in their operations in order to achieve an equitable balance between economic, environmental and social sustainability. There are 13 Green Star rated buildings at the V&A, which make it the greenest property on the African continent.



<sup>1</sup> Based on commercial water and sanitation tariffs at 10% reduction, level 3 tariffs and no restriction tariff for 2020.

<sup>2</sup> Informing the Western Cape agricultural sector on the 2015 - 2017 drought, A Drought Fact Sheet. Western Cape Department of Agriculture, November 2017

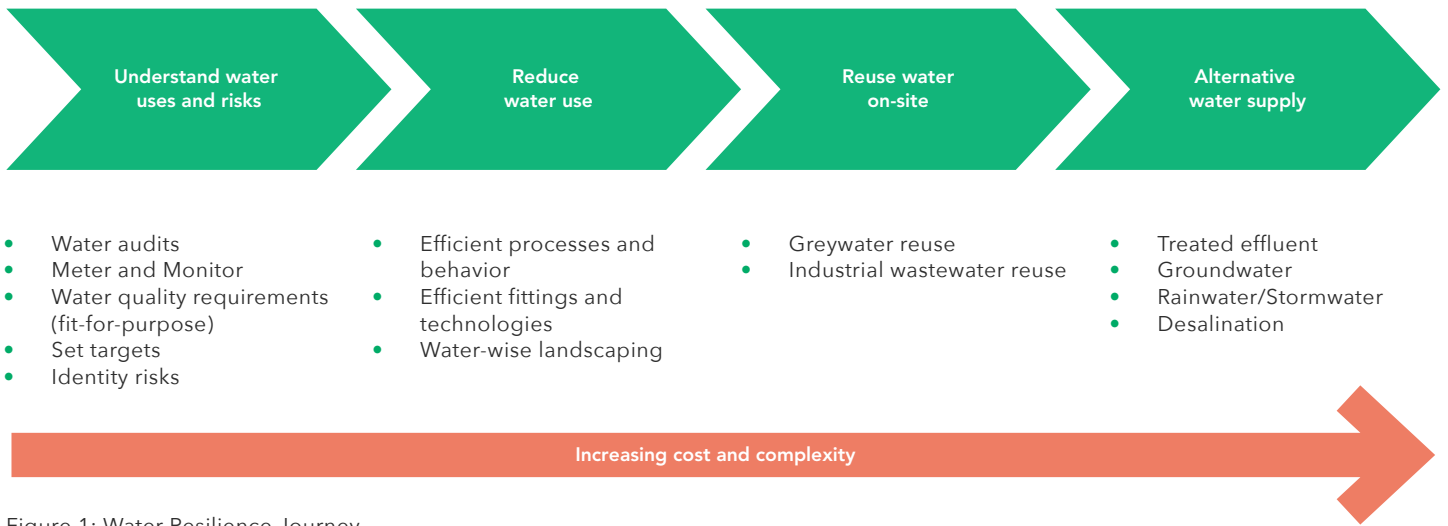


Figure 1: Water Resilience Journey

## Solution and impact

In 2008, the V&A shareholders committed to improving resource efficiency of the entire operation in order to make it environmentally sustainable and to save costs. The V&A has since invested R45 million into water and energy efficiency

and waste recycling across the 123-hectare property since 2008. A number of greening initiatives were also introduced across the precinct. To date, the V&A has reduced its water consumption by almost 65% (using 2010 as a baseline) despite expanding its

development and increased water demand. This was progressively achieved in phases, beginning with the less complex and less costly interventions between 2010 and 2016, followed by more complex and costly initiatives from 2017 onwards.

### Understanding water uses and risks

In order to improve water efficiency, one must understand water use through measurement and monitoring water consumption. A sustainability committee with a representative from each department was tasked with raising awareness in their departments and implementing sustainable practices together with tenants and customers. The V&A implemented various monitoring, metering and billing systems at the individual tenant level.

These include smart metering systems, leak detection systems, and a metric indicator dashboard that shows real time tenant consumption data. A 'green lease' that contains performance clauses on reporting and consumption was also adopted in 2015 in order to attract 'green tenants' that are committed to efficient water use.

The property has different irrigation zones, each fitted with a water meter, isolation valves and a leak detection system.

The reticulation system has an automatic shut off system that can turn off flow if potential leaks are detected. There is a dedicated utilities team that is responsible for trend analysis and communicating their findings to respective departments in order to effect conservation efforts. This makes it is easy for the V&A to repair leaks within a turnaround time of 24 hours and reduce water losses.

### Water efficiency interventions

In 2008, the V&A embarked on awareness raising programmes and campaigns using infographics installed across the entire property in order to positively impact water use behaviour change among its tenants and customers.

This has been further enhanced by training and ongoing communications for tenants and was immediately followed by the installation of water efficiency interventions, such as water-efficient toilets and urinals, water sensor taps, and drip irrigation.

Water sensor taps were first installed in all bathrooms in 2008.

Then aerating water-restrictors were fitted to each tap and sensor timings were adjusted to a minimum during the drought. Some taps were shut and hand sanitisers were made available. Bathrooms across the property were fitted with plumbing accessories that reduced the water flow to hand basins from 6 l/min to 1.25 l/min. Pressure reducing valves were also installed in the water lines and these resulted in fewer burst pipes and leakages as well as a reduction in water consumption. The V&A now has a combination of waterless toilets and urinals as well as those fitted with an air propelled system.

The technology creates a vortex when flushed and therefore only uses about ~1ℓ of water per flush.

The green leases have seen tenants saving 25% - 60% in water consumption. The lease requires all new developments and tenant installations to incorporate green principles in their design and installation phase. The property eliminated irrigation in winter and introduced drip irrigation. Water-wise indigenous plants were also planted in place of alien water intensive plants. This collectively led to over 30% overall reduction in water consumption across the property.

## Onsite reuse

Grey-water systems for toilet flushing were installed in the Victoria Wharf, Granger Bay Court and Food Market shopping

centre. The systems also make use of the air conditioning cooling tower bleed off water.

A bulk water recycling plant is also being introduced for irrigation purposes.

## Alternative water use

In addition to onsite reuse, the V&A also makes use of rainwater, borehole water and seawater. All carwashes use harvested rainwater and recycled water, while borehole water is used for irrigation purposes and for hard surface cleaning. Filtered sea water is used for scrubbing very dusty areas, such as the parking lots.

These are used in conjunction with high-pressure washer systems in order to minimise water consumption.

Sea water cooling was introduced for all the air conditioning plants at the end of 2017.

A district cooling plant produces chilled water at a central plant from seawater that is distributed to cool the buildings. This eliminated the use of potable water and saves about 9 000 kℓ/month of water per building. There are plans to install a permanent desalination plant.

## Lessons learned and opportunities

This case study illustrates that:

- Businesses must be forward thinking and must invest in sustainable practises beforehand not as a response to a shock.
- Enhancing water resilience is a collaborative efforts and all players must be involved. In this case tenants, customers, and shareholders.
- Enhancing water resilience requires a systematic approach and less costly and complex initiatives must be implemented first.
- Investment in green technologies and initiatives enables efficient water use and cost savings. Alternative water has a good business case when used for non-potable purposes.
- In addition, investment in green technologies to build water resilience unlocks opportunities for technology providers and entrepreneurs.
- Lessors can attract 'green tenants' by incorporating green principles in the lease agreements.



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