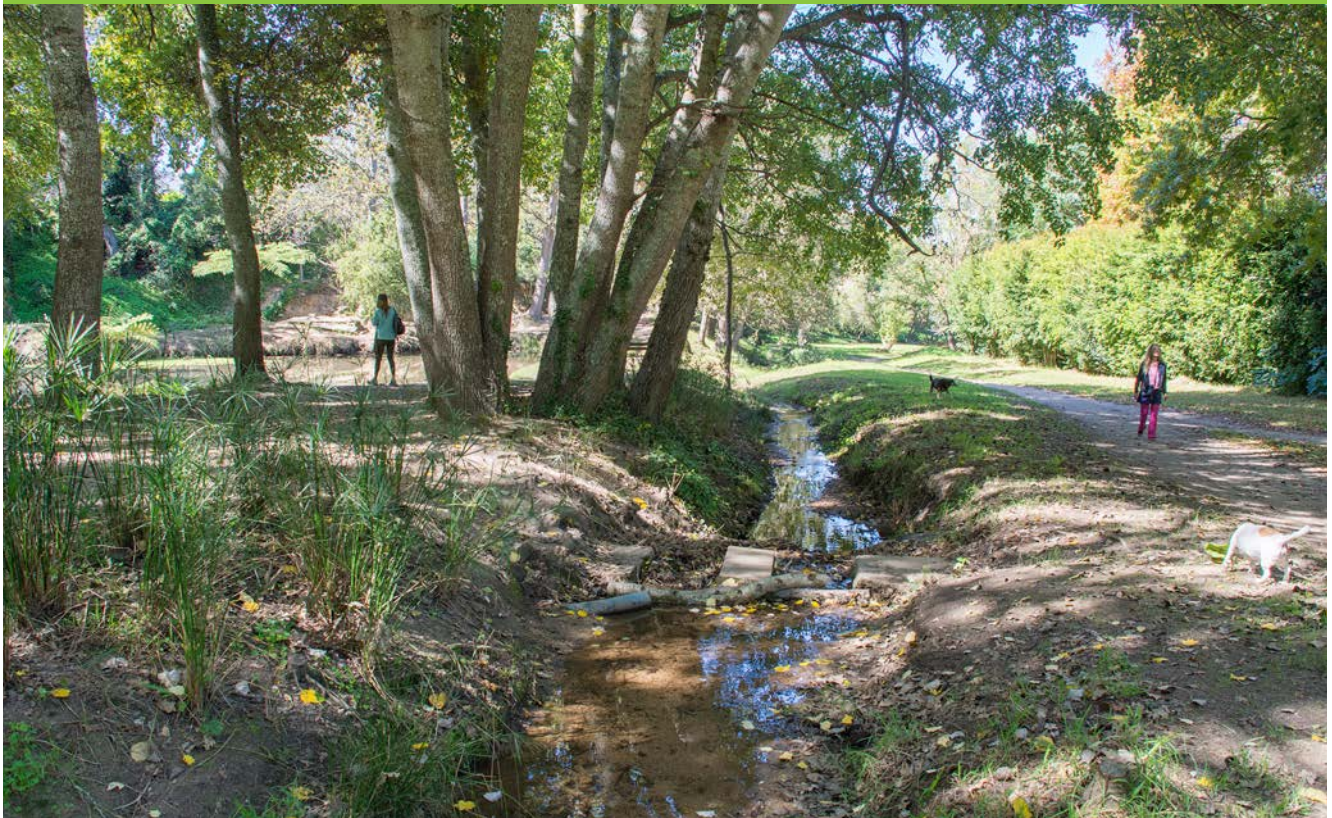


URBAN WATER MANAGEMENT

Restoring the ecological health of Cape Town's waterways – one vlei at a time

The City of Cape Town is taking great strides to improve waterway health and amenity value. Sue Matthews reports.

Sue Matthews



The year 2021 was an *annus horribilis* for Cape Town's three large waterbodies – Zandvlei, Zeekoevlei and Rietvlei – with all being closed to recreation for many months due to high levels of faecal contamination. The problems were variously attributed to upstream sewage spills caused by pump station failures and sewer line blockages, stormwater ingress into sewage systems during heavy rains, the theft of one manhole cover and the damage of another, and the malfunction of a screw pump at the inlet of the Cape Flats Wastewater Works (WWTW) near Zeekoevlei.

The closure of the vleis and the multitude of contributory factors focused public and political attention on sanitation issues and

the environmental impact of sewage pollution. On his first day in office on 19 November 2021, Cape Town's Mayor, Geordin Hill-Lewis, visited some low-income, high-density areas that had been particularly affected by sewage spills, and asked officials to provide short-term solutions. He also commented on the need to clean up the city's waterways, which include rivers, vleis and estuaries as well as the earthen channels, concrete canals and retention ponds of the stormwater system.

Just 10 days later the City of Cape Town (CoCT) announced that its Water and Sanitation Department had produced a Sewer Spill Reduction Plan, targeting a 50% reduction in spills by 2030, and by April 2022 the more comprehensive Mayoral

Priority Programme for Sanitation and Inland Water Quality was underway. Admittedly, many of the components were already embedded in other plans and programmes developed by the CoCT in response to the commitments made in its Water Strategy, finalised in February 2020, to improve access to safe water and sanitation and to transition to a water-sensitive city by 2040.

Nevertheless, the Mayor has put his money where his mouth is, as it were. The CoCT Budget of 2022/23 got the ball rolling, but the draft Budget for 2023/24 – tabled for comment at the end of March – ramps up spending on water and sanitation significantly. In his ‘Building hope’ Budget Speech, the Mayor reported that R11 million had been earmarked for more rapid-response sewer spill teams, R16 million for sewer pump station response teams, and R31 million for extra cleaning of drains and flooding prevention. But it is the infrastructure budget that will undoubtedly have the greatest impact, with expenditure set to increase sharply in the medium term to mid-2026.

“Of all the ways to spend a city’s revenue, investment in water and sanitation infrastructure is arguably the most crucial,” said the Mayor. “Our water and sanitation capital budget for this current financial year is R2,3 billion. By 2025 it will be R7,8 billion. That means water and sanitation’s budget in 2025 will be bigger than our entire capital budget this year. This scale of investment will allow us to do the kind of critical infrastructure work that no other city in the country is doing.”

He added that this will include a 330% increase in sewer pump station upgrades over the next three years, an R8,6 billion capital expenditure on WWTW upgrades, and another R1,4 billion for bulk sewer upgrades to the Milnerton, Cape Flats, Gordon’s Bay and Phillipi sewer mains.

Ageing sewer pipes also need to be replaced, of course, to prevent leakages. In the decade up to mid-2022, the CoCT replaced just over 235 km of sewer pipes, with the annual target set at between 25 km and 28 km per year according to the approved budget. A year ago, the target was increased from 26 km to 50 km, but for the 2024/25 financial year this will double again to 100 km, budgeted at R300 million. The target for proactive jet-cleaning of sewer pipes has likewise been bumped up from 100 km to 200 km annually. By removing blockages caused by sand, roots, litter and illegally dumped foreign objects, jet-cleaning helps prevent sewage spills during winter, when stormwater ingress typically increases sewer flows significantly. If overflows occur, they not only cause a health hazard and added misery to residents already affected by flooding, but all too often they discharge directly into rivers and stormwater canals, severely affecting water quality downstream.

This brings us back to the vleis, but the budget addresses a lot more than sewage pollution – it accommodates a range of interventions aimed at restoring the vleis’ ecological health. At Zandvlei, the estuary mouth at Muizenberg beach is bulldozed open and closed periodically, with the sometimes competing objectives of preventing flooding and erosion of waterfront properties, keeping water levels deep enough for canoeing and dinghy-sailing, maintaining salinity levels within an optimal range for estuarine plants and animals, facilitating the estuary’s

role as a nursery area for marine fish migrants, and flushing out excess nutrients. A study has been underway to explore rehabilitation options for the concrete outlet canal and a rubble weir at the estuary mouth, and to update the mouth management plan accordingly. The construction work, at a cost of more than R6,7 million, is scheduled in the Medium-Term Revenue & Expenditure Framework for budget year 2025/26.

The water level at Zeekoevlei, where recreational activities include waterskiing, rowing, dinghy sailing and kitesurfing, is manipulated via a weir with sluice gates. An annual ‘drawdown’ is conducted in autumn, when the sluice gates are opened and much of the water drains out. The lower water levels allow for reed control, litter removal and other maintenance activities, while early winter rains flush the system. After about two months, the sluice gates are closed again and the vlei soon refills. During 2022, a remediation plan for Zeekoevlei was developed, and it has been decided that the weir should be lowered to allow greater flushing. A fish ladder will be installed at the same time, and the entire project has been budgeted at R49,2 million, with the construction work set to take place in 2025/26.

At Rietvlei, the Bayside Canal will be upgraded over the next three years at a budgeted cost of R68 million. This is the main stormwater canal draining Table View and Parklands, and rapid development in those areas means that the canal’s capacity needs to be increased to reduce flooding, which can affect sewer lines and pump stations. The project includes the construction of treatment ponds to improve the quality of stormwater before it enters the vlei, as well as measures to trap sediment and litter. A mechanical weed harvester will also be bought in the coming



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Public engagement sessions allowed local communities to give input on draft concept designs for the Liveable Urban Waterways Programme.



This image from 2019 shows broken 'nightsoil' bags and other waste at a stormwater outlet that discharges into Milnerton Lagoon. The City of Cape Town's Water and Sanitation Directorate installed a larger litter trap in March 2022, and in November created a sandbag barrier to dam up the polluted stormwater, which is then pumped into the sewer line and conveyed to Potsdam WWTW. Litter traps are being installed in stormwater channels upstream, and a low-flow diversion of stormwater into the sewage system is being investigated.

financial year at a cost of R17 million to control pondweed in the vlei's boat-launching areas, where it creates a nuisance. Specialist consultants appointed to advise the CoCT on possible remediation options for Rietvlei have recommended that sustainable harvesting of pondweed and certain other aquatic plants will help remove nutrients, particularly phosphorus, from the system. They advised against dredging the vlei at this point, given the expense and the ecological disturbance it typically causes, because sediment build-up is largely contained within the two deep basins that were excavated in the 1970s to provide sandfill for Table Bay Harbour extensions.

The other vleis, as well as Milnerton Lagoon, will likely be dredged in the next few years, providing environmental authorisation is granted. The dredging will not only remove accumulated sediments and organic material – together with their pollutants and nutrients – but also allow greater tidal exchange in the case of Zandvlei and Milnerton Lagoon.

Like Rietvlei, which is essentially the estuarine floodplain, the lagoon is part of the Diep River estuary, but much of its freshwater input is in the form of final effluent from the Potsdam WWTW and stormwater from adjacent suburbs. The lagoon has long been plagued by water quality issues, with faecal pollution emanating from an informal settlement and from backyard dwellers disposing of 'nightsoil' in stormwater canals, pump station failures often attributed to loadshedding and misuse of the sewage system, and sometimes sub-standard sewage treatment. The CoCT has implemented a range of interventions

in response, including remedial measures at Potsdam WWTW, pending the start of its R5 billion upgrade. Two contracts for the construction work are set to be signed in May 2023, and will see the works' capacity increased from 47 MI/d to 100 MI/d, as well as the installation of advanced membrane treatment technology to ensure the final effluent is of a high standard. Any improvements can't come soon enough for members of the Milnerton Canoe Club and residents of the Woodbridge Island security estate on the lagoon's shore, as they have borne the brunt of foul odours and health risks from contact with the polluted water for many years now.

It's not only large waterbodies that have recreational value, though, and the CoCT recognises this in its Water Strategy. Specifically, the commitment to become a water-sensitive city mentions making optimal use of urban waterways for recreational opportunities. A Liveable Urban Waterways (LUW) Programme has been developed to rehabilitate waterways using water-sensitive design approaches and nature-based solutions for multiple social and environmental benefits, with the pilot phase focusing on the Sand River catchment's tributaries, which ultimately flow into Zandvlei. A series of public engagements were held in the latter half of 2022, firstly to introduce the programme and pilot projects, then to allow interested and affected parties to participate in co-design workshops, and finally to present the concept designs.

At the initial meeting in July, LUW Programme Lead Andrew McDonald explained that projects would be limited to small

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Shop assistants from the Blue Route Mall use this grassy area alongside a drainage channel during their lunch breaks, but it will be upgraded with paths and picnic tables. A low-flow wetland with rip-rap sections will be created in the channel, and the embankment will be reshaped and revegetated.

nodes along five river reaches within the catchment, but the intention was to learn from them and then hopefully scale up to other catchments within the city. As he pointed out, the Sand catchment has a number of greenbelts that are well-used by communities, allowing people to connect with each other and the waterways.

Those greenbelts, located in leafy parts of Constantia, Tokai and Kirstenhof, already have a mix of formal gravel pathways, well-trodden tracks and dirt access roads. It's unlikely that long-time users – or the many more people who only 'discovered' the greenbelts during the work-from-home period of the COVID pandemic – would welcome too many changes, other than fixing broken bridges and remedying paths that get muddy in winter. The concept designs presented at the final engagement sessions in November reveal that project work there would primarily be in the watercourses themselves, involving reshaping of riverbanks, planting indigenous riparian species, rehabilitating wetland areas, constructing gabion- or natural stone weirs, and installing stormwater swales and sediment traps.

The other projects do some of that and more, because they're at sites offering potential for improvement in terms of creating attractive public places for the enjoyment of communities. Along the Keyser River, for example, there are two sites – one behind the Blue Route Mall and the other in an industrial area – and the concept designs include recreational nodes where shop assistants and factory workers can relax during lunch breaks. The upper Westlake River flows between a low-cost housing suburb and Pollsmoor Prison, and here the concept is to improve the walkway and pedestrian bridge granting access around an extensive reedbed to the nearby shopping centre, to provide a picnic site, lawn, playpark, biodiversity garden, outdoor classroom and sports facility, and to rehabilitate the river and wetland. At the confluence of the Sand and Langevlei canals, a wetland will be created for the treatment of stormwater before it enters Zandvlei, and litter grids and sediment traps installed, but the surrounding area will also be landscaped to increase its amenity value and encourage local residents to make use of this green open space.

In December, McDonald issued a progress update in which he noted that a multidisciplinary team of consultants had undertaken various specialist studies and produced a number of reports to provide the fundamental body of knowledge for the concept designs, which were also informed by the outcomes of the co-design workshops. He explained that the CoCT team would need to complete a number of internal processes to get the concept designs approved and budgets released.

"This will be followed by detailed design and, importantly, applications to the National and Provincial government for water use, environmental and heritage authorisation. Running in parallel to this we will procure the necessary contractors who will join our team during the construction and landscaping phase of the projects," he wrote.

"Once we have obtained authorisations and appointed the contractors, we will commence with the on-the-ground work – if all goes to schedule, we hope this will be in late 2024."



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Sedimentation in the lower reaches of Zandvlei inhibits tidal exchange when the mouth is opened. The City of Cape Town has budgeted R265 million over the next three years for the dredging of vleis.



GoogleEarth

Houses have their backs to the waterway at the confluence of the Sand and Langevlei Canals, but the intention is to transform this neglected open space into an area that surrounding residents would want to visit. Sections of canal will be broken open and a wetland created to treat stormwater before it enters Zandvlei.