

# South Dunedin and stormwater

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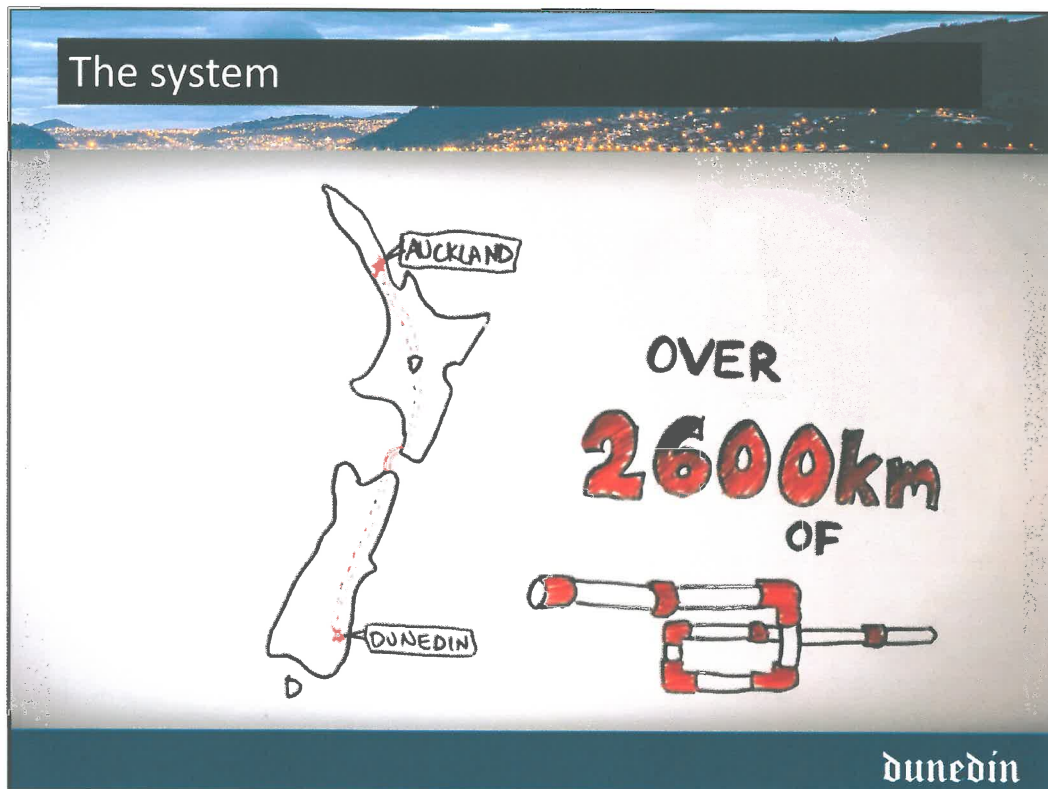


## What I hope to cover today...

- Background: how the system works
- Details of the storm event
- What happened in the system
- What we have done since
- How we have on-going discussions

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What I hope to cover today

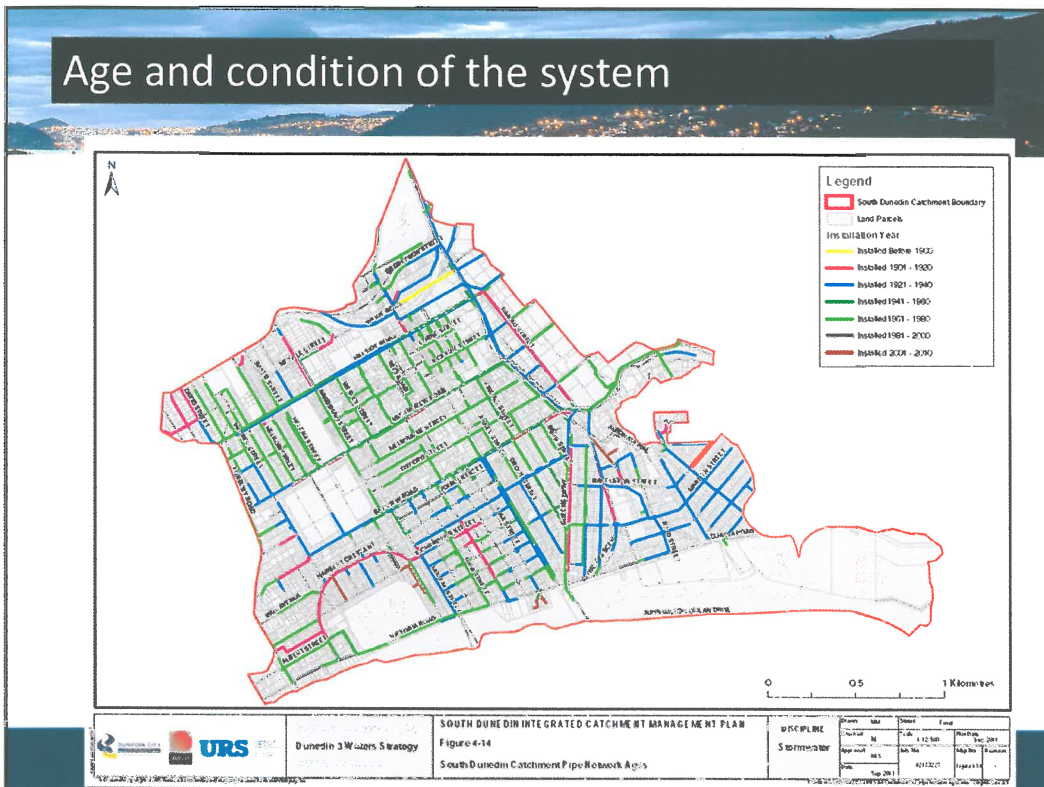


South D 'catchment' is 570 hectares, so fairly big

3 systems underground – fresh (drinking), waste (sewage, sink etc) and storm (roof, roads runoff) – 65km of storm pipes in South Dunedin, 2600 km on total pipes across all Dunedin

Sewage goes into sewer, through Musselburgh Pumping Station, then Tahuna for treatment and to long outfall 1km to open sea (note, sewage from Kaikorai comes in pipe through Caversham tunnel and goes into same pumping station)

Stormwater from Sth D catchment gets pumped through Portobello Rd pumping station, discharged untreated into harbour  
(with variations at edges – e.g. Hill suburbs through Forbury Road aquaduct – gravity outfall at second beach for example – also Tainui low levels has its own STORM pumps to Portobello Rd)



Oldest pipes: turn of last century

2% less than 10 years old

55% pre-1960

Big upgrade in 1960 including putting in the current Portobello Rd Pumping Station

In terms of the state of system – well, if we were building it today, we wouldn't build this! That is probably true of every system that is a mix of incremental growth generally designed and installed by professional engineers with good practice and professional standards of the time.

In understanding our systems: we do both hydraulic modelling of water flows in the system, but we also CCTV condition assessment to assess structural condition, and we monitor failures to understand and prioritise risk – water asset management is a DCC strength, and in fact Auditor General's office stood in parliament and said DCC's water asset management is best practice, a model for councils.



## Capacity of the system

- Storage capacity: soil and system
- Pumping capacity = 6.3 m<sup>3</sup>/second
- If water coming IN exceeds pumping capacity?

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When it rains, water that falls on hard surfaces such as pavements and roofs runs off and into the stormwater system. That is what the system is designed for. Portobello Rd Pumping Station can move 6.3m<sup>3</sup> per second of stormwater. That is one Olympic swimming pool every 6.5 minutes. The pipes can also store more than 8 swimming pools of water before water can't get away fast enough and it ponds.

Rain that falls on natural areas such as grass is supposed to soak into the soil. Eventually the soil can't take any more and water ponds on the surface. How quickly this happens depends on how much space the total space that is available in the soil and how fast water is absorbed.

In a long duration event with high rainfall such as June 3, there was more rain than the system could cope with and also the soil became saturated resulting in more flooding. The problem with every stormwater system in the country – if water keeps coming in at a rate faster than we can pump it out to the harbour ponding occurs, which in more extreme situations becomes flooding. Where, when and how much varies with each and every storm. But this doesn't mean that there will be flooding of houses in every large storm. Three or four weekends ago, we had a belter of a storm – 40mm in 24 hours. The system coped well, as it almost always does

And the improvements we have made and are planning to make will make sure it performs even better in future.

This situation is NO different to what it was prior to 3 June – the risk is still the same.

## Capacity of the system

Table 7-1: South Dunedin Catchment Model Results – Current Land Use

Hydraulic Performance Measure	ARI	Current Land Use
Percentage of manholes predicted to overflow	1 in 2 <sup>1</sup> yr	18.3
	1 in 5 yr	30.1
	1 in 10 yr	43.5
Number of land parcels with flood depth potentially $\geq$ 300 mm	1 in 2 <sup>1</sup> yr	0
	1 in 5 yr	1
	1 in 10 yr	8
	1 in 50 yr	31
	1 in 100 yr	40
Estimated flood extent (% of catchment area with flood depth $\geq$ 50 mm) <sup>2</sup>	1 in 2 <sup>1</sup> yr	0.4
	1 in 5 yr	1.4
	1 in 10 yr	3.5
	1 in 50 yr	6.4
	1 in 100 yr	7.8

This gives you an indication of the number of private sections where we might get ponding or flooding, in different 'annual return interval' rainfalls... 300mm is deep enough to flood a house on some sections, if you built in the low corner.

So for example, line one – every 2 years on average we expect to have manhole overflows and so stormwater ponding on the road  
 BUT (first line second set) none flooding in houses (or sections over 300mm)





## What happened in June?

- Portobello Rd pumping station screen
  - system to be replaced July/August
- Mud tanks (1500 in South Dunedin's zone)
  - All South D cleaned prior to winter, new system for monitoring dates of emptying of each

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Portobello Pumping station screen got blocked. Current screen is the same as the original 1960's design. It stops debris from damaging pumps.

Modifications 3-4 years ago: men were having to climb down into a 'well' onto a platform, and lean down and pull debris off screen with a rake. Health and Safety risk was too great.

Now they access the screen from the surface - much safer but they have to reach further and couldn't dislodge debris due to weight.

Screen blocked led to lower water flow through, so pumps slowed automatically, compounding the problem.

There is no doubt that added to flood depth – modelling suggests 195mm. About 8 inches. We are of course very sorry for that – Council staff are part of this community too, and our jobs are to keep the city dry, clean, attractive – we work every day so things like this don't happen...

NOW: new screen in July/Aug. On an angle do debris forces by the water flow to the top. Also allows more water through. Alarms if it blocks, and different system to remove it. And we now ensure it gets additional clean every time we get a heavy rain warning and then throughout the event (which we got, although it didn't predict THAT heavy) and cleaned throughout every event.

Mud tanks: throughout city, not being cleaned properly or regularly. March 2016 - Every tank cleaned throughout South Dunedin and rest of Dunedin is on a plan over next few months.

This didn't generally add to the depth across June 3 flood. You saw in Sandringham St a manhole where whole pipe pushed up through the road – water in the system was flowing and with real force – but that Portobello Rd screen issue was the 'bottleneck' – even if the mud tanks were empty, the pumping was still the bottle neck. The mud tanks could, though, have made localised differences, where water flowed around a blocked mud tank and went down a drive instead for example.

But the mudtanks would be the limiting factor in storms of different intensity/duration – so we have changed how we monitor cleaning compliance so that they don't cause a problem in future. And we are looking to give you a way to check online when 'yours' was last cleaned...

Where to from here?

Future issues we need to be paying attention to:

- Groundwater
- Climate change

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I know there are some that don't want us to talk about these things, but we have to. PCE produced a report – many places in NZ and the world are built in great locations – flat, low-lying land near the sea. South Dunedin is one. Many houses less than 50cm above sea level.

Is climate change real? I don't want to debate that here. I am not a climate scientist and neither are ANY of my staff. But the Government has said they accept the international panel on climate change and both they and we should plan accordingly.

SO if it is NOT real – than be assured we are replacing the screen and we're looking to ways so you can easily check the mud tanks near your house, so the system will work optimally.

But if it is then two things matter


1. I talked of the soil having 'storage capacity' – rising GROUNDWATER which comes from higher sea levels, means less ground storage. We can optimise pumping stormwater with the screen changes and gradual upgrades, but we can't pump away the sea - so we need to explore options.
2. Increasing storm events. Every 1 degree rise in earth temperature means 7% more water in the air – so more intense rainfall.

So we need to start planning for this – but it isn't happening tomorrow. We are talking very slowly, mostly in timeframes that are decades. And we are your council – we commit to giving you information when we have it, and having discussions with you, the locals who pay for this work, about the options and whether things are changing and how fast.

We are not planning to do anything TO YOU. There is no plan for certain predetermined options – we are only just starting to gather data to see if we have change happening, and we will start to think about options both short term and longer.

Here is Gavin, to tell you about the monitoring – we get much of our technical expertise and input from the ORC...





## How we'd like your involvement

- Regular updates: FYI and direct to you
- Local meetings
- Local office
- Community Development team will come out
- Involvement in planning options, and decisions on them

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Questions?

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