

# Asset MANAGEMENT

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## Seawall project saves weather-worn St Clair

An exercise in coastal management and the restoration of a much-loved local attraction... Dunedin's \$6 million St Clair seawall redevelopment scheme became a balancing act between the need for conservation and the need for public amenities.

When the Dunedin City Council engaged Duffill Watts & King and Duffill Watts & Davis to carry out an investigation into its ailing St Clair seawall, it made an appropriate choice.

On the team the council selected was consultant Maurice Davis – a civil engineer, a naval architect, a boatie who regularly uses the ocean off St Clair beach - and as someone who lives at St Clair he can look directly at the seawall itself.

Of course he isn't alone in that. Many people in Dunedin had been looking at the rather "worn" wall for some time, prompting the city council to undertake a major review of the seawall and the popular esplanade area above it.

Council's Architecture and Urban Design team launched a programme that included extensive consultation with both residents and users of the St Clair beach amenities.

A series of public meetings and investigations into likely solutions eventually led to council drawing up tender documents and leading a design team into the initial working drawings and plans for the wall itself, and for the esplanade redevelopment.

It was a project dear to the heart of the whole Dunedin area. The stability of the sand dunes stretching from St Clair to Lawyers Head had been of concern to the Dunedin community

since the 1860s.

"Smiths Wall" was constructed in the surf zone at St Clair as protection back in 1866 and since then a number of walls have been constructed in the Esplanade area.

After the sea breached the wall near the Esplanade several

St Clair Beach in 1898. Dunedin has battled the power of the sea for decades. (Picture Dunedin City Council)



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times in the late 1880s, the present seawall was constructed as far as Forbury Road in 1912-13 and the remainder was built in 1933-38.

By the 1980s the seawall was showing signs of deterioration and during major storms loss of fill was occurring behind the seawall to such an extent that the footpath and roadway were visibly slumping.

To the Dunedin community, it was not desirable for an area highly valued as a public amenity and leisure facility.

Dunedin City Council describes St Clair beach as a world class surfing beach, a meeting and leisure activity place for children, parents and teenagers - a place for exercise and walking, and a place for just watching the sea.



More than a century later... St Clair's new look (Dunedin City Council)

### Risk of Failure

Maurice Davis says the team looked "reasonably deeply" into the risk and the life prognosis of the wall back in 2001 and came up with the conclusion the wall wasn't going to last much longer.

"More particularly, there was a high risk of getting a failure in a severe storm which could have let the land go behind and result in the loss of what is some valuable real estate," he says. "The repair bill could have been horrendous."

He says the risk from the sea in stormy weather was not confined to highly unusual, extreme weather conditions.

"You can get abnormal weather conditions that would do it. If you get a very high tide, low barometer, and a strong storm surge, the damage could very well occur," he says.

Because of the nature of the existing wall, the popularity of the St Clair area and the need to keep the wall functional, it was decided to build the new wall with the old one in place.

"There were suggestions we should have taken the opportunity to move the

whole lot further out and provide a bit more space," Mr Davis says, but the design team was convinced it was not a good idea.

"We do a fair bit of work in coastal dynamics and coastal engineering and we believe that would have been a disaster to move the hard face further out to sea.

"We have a naturally occurring soft shoreline between two hard headlands, and it was the creation of the hard esplanade wall - which was put there as a public amenity - that caused the problem.

### No good turn

"The best natural protection you could have along there would be the sand dunes - but they were effectively removed when a lot of the sand was taken away to fill up low-lying areas around St Kilda and to reclaim other parts around the city in the late 19th century.

"Our forebears did not do us a really good turn by destroying the sand dunes. We would have exacerbated the current problem if we had tried to make more

land area by moving the new wall seawards," Mr Davis says.

The planning team was facing a typical New Zealand coastline where the combined effects of waves and currents travelling up the coast from the south means there is a constant movement of sand. At the same time there are the forces of ocean swell, local coastal currents and local wave patterns that influence the amount of sand deposited on or stripped off the beach. Frequently over the years, the sand has depleted to an extent that the amenity value of the area has been badly affected.

The Otago Harbour was once a drowned valley, open to the sea at both ends. The Aramoana flats did not exist nor did the land which is now Tainui, St Kilda and St Clair. What is now Otago Peninsula was an island. The opening to the sea at the south end of the harbour was closed by the deposition of sand carried by waves and to a lesser degree by wind.

The design team looked at several



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options to try to offset the effects of the seawall and several other man-made structures along St Clair beach.

"We originally proposed putting a small breakwater groyne off the seawall to help retain the sand. But surfers didn't like that at all, and so that idea was thrown out.

"In the western corner we now have a much more substantial rock-faced seawall which is going to provide much more erosion protection.

"Then along the face of the hot salt pool we have put some large rocks to replace badly deteriorating concrete walls. So we are knocking the sting out of the waves with big boulders which are rock-bolted onto the natural rock," Mr Davis says.

"At the eastern end of the wall there has historically been an erosion problem. That's not unusual, there's always going to be a problem at the end of a hard seawall. So we've opted to make a more gentle transition between the hard concrete wall and the naturally occurring sand dunes by using geotechnical bags - so-called sausages - which we hope will alleviate some of that problem."

Maurice Davis says there will probably be a need for some on-going maintenance on the beach.

"We have a problem with the structure of the dunes. The natural dune protection has been compromised by sports fields being situated very close by, that sort of thing. We just don't have the broad band of protection that had been there. It's the old problem of human interference with nature - but that's the price we pay for having amenities."

However, Mr Davis says there is no doubt the council's seawall project is improving amenities and providing better access to the beach.

"Pedestrian access is much improved too, and when it's finished it's going to be very attractive and very useful."

The \$6 million upgrade is due to be finished before summer. ■



A concept view of the redevelopment from the beach (Dunedin City Council)



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## ***Beach-front battles*** ***Protecting our coastline***

