

The Story of **OWHIRO BAY QUARRY**

May 2004

The Story of Owhiro Bay Quarry

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Prepared for Wellington City Council

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Introduction

The Owhiro Bay quarry site is right at the entrance to the South Coast and provides access to Red Rocks and Te Kopahau Reserve. It is now set to become a new coastal recreation reserve for Wellington. This area of land once provided rock for many of Wellington's public roads and building sites, but the new use will better fit with the restorative aims of the South Coast Management Plan and provide a great resource for Wellingtonians and visitors.

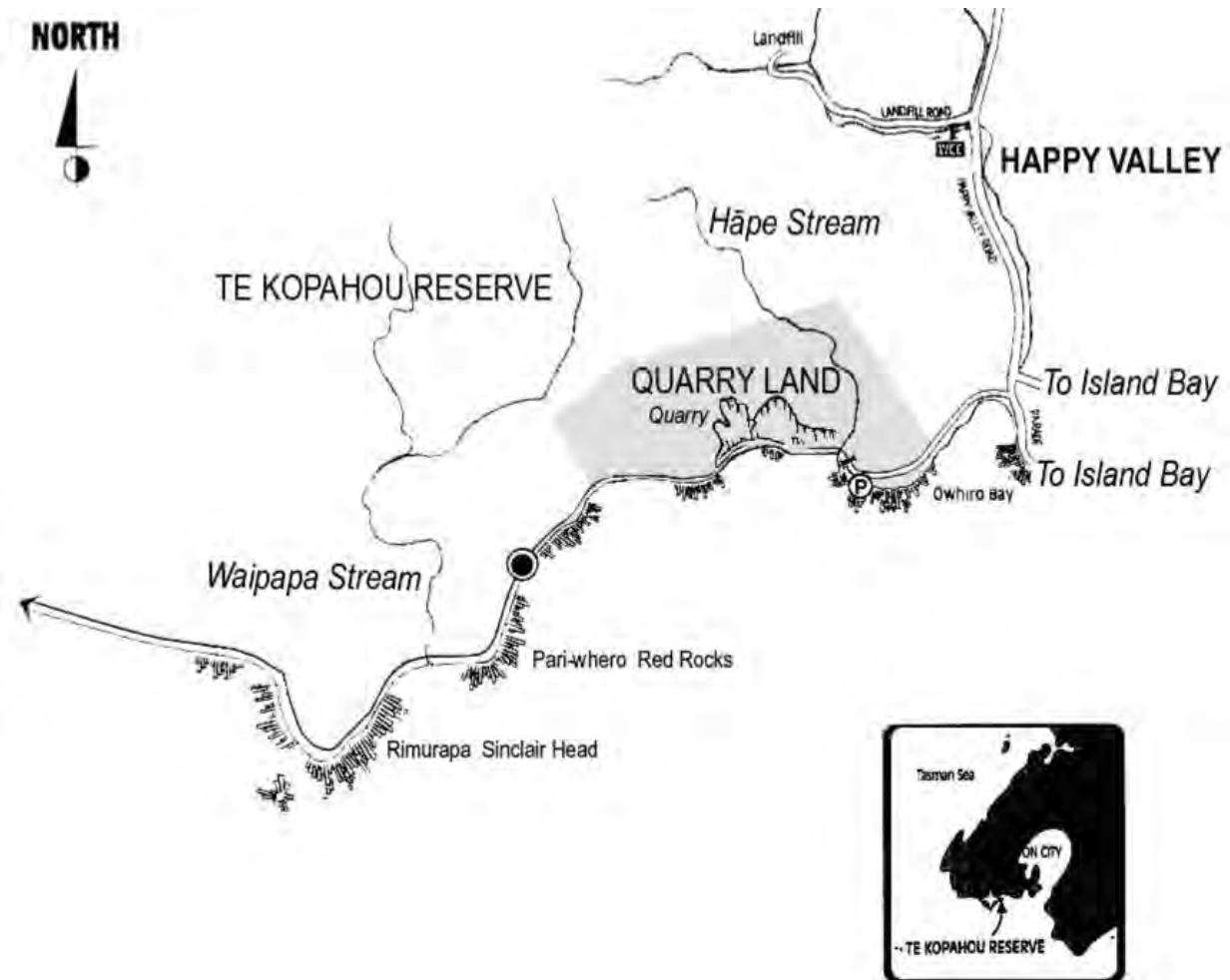
The site has seen many changes in use from Maori occupation, through early quarrying operations of shoveling gravel from the beach, to modern drilling and blasting, crushing and screening. The quarry in the late 1990's provided around 300,000 tonnes of aggregate for the greater Wellington market. It was a critical and much needed resource for a growing city.

It has however now been four years since the Owhiro Bay Quarry was purchased by the Wellington City Council, following its closure by Milburn New Zealand. So why did it close? Why did this critical resource get lost?

Clearly there were many sides to the story, and the issues were complex. Some of the many points of view are therefore reflected in the interviews with quarry people, environmentalists and others, which are included in this document.

The Mayor of Wellington at the time, Mark Blumsky, who was called on to open the Institute of Quarrying 1998 conference in Wellington, reflected in his speech another side to the issues surrounding quarries and the public perception of them. "The general public still does not have a good perception of quarries and what they do...and tend to lump quarrying in with strip-mining in terms of its environmental impact. [whereas in fact] quarries have to be environmentally friendly these days, or they're out."

The emphasis now is on quarries which operate within accepted environmental standards and which meet public expectations about the noise, by-products and visual impact of such activities.



Map showing Quarry land in relation to Te Kopahou Reserve.

Many uses of the South Coast area, over many years.



1 Site Description

Site description and geology

The parcel of land which once comprised Owhiro Bay Quarry is at the end of Owhiro Bay Parade, on the South Coast of Wellington. The land extends from the end of the road around to a point 2 km along the coast, and inland over the steep coastal escarpment.

The principal ridge leading inland from the coastal escarpment rises to the high point of the site which is 292 metres above sea level. The coastal escarpment is deeply incised by the two main catchments draining south to the sea along this section of the coastline.

Rock found at the quarry site is located in the base rock from the Triassic period. It is described as being of the balfour series with alternating dark grey argillite and greywacke sandstone, with areas of intrusions, in places intensely sheared and semi-schistose, commonly known as 'greywacke'.

Any greywacke deposit has a depth of weathered rock and this weathered rock is normally referred to as 'brown' and unweathered rock as 'blue'.¹ Greywacke rock is essentially hard sandstone whereas argillite is siltstone.

On closure of the quarry it is estimated around 50 years worth of aggregate resource remains unquarried.

Climate and weather patterns

Wellington's South Coast is famous - or notorious - for its climate, which can be wild and unforgiving at times. While the prevailing winds are northwest, the coast regularly receives a battering from the sea during and after southerly storms. These seas were responsible for the shipwrecks and the occasional loss of life around the coast.

The climate and weather patterns have a strong influence on the vegetation that grows along the coast. The windswept vegetation provides a strong landscape feature and a palette of colours for the South Coast. The area.....experiences an annual rainfall of 1000-1200 mm and is exposed to gales an average of 43 days per annum ². Windiness and relatively high sunshine hours combine to create a high evaporation rate compared with other north island sites. Prevailing northwest winds funnel through Cook Strait. ³

¹ Owhiro Bay Quarry Management Plan , Harrison Grierson (1999)

² Based on Wellington Airport observations (1980-86)

³ South Coast Management Plan, Wellington City Council, (2002)

Original vegetation

The Wellington Peninsular was once entirely forested. Although steep and exposed faces that bore the brunt of Cook Strait's gales were scrub-covered, the extent of dense forest cover was much greater than most Wellingtonians appreciate.⁴

In considering the future of this area and a restoration process, it is important to bear in mind what it once was. Whatever restoration is undertaken obviously cannot replace the forest cover, but can go some way towards re-creating an area enjoyed by many for its pristine beauty, wild seas, and a surprisingly wide range of plant species.

Existing vegetation

The coastal edge of Wellington supports many plant species adapted to the Cook Strait conditions. This includes local varieties and species which are more commonly found in mountain environments, such as inaka [*Aciphylla squarrosa*]. The site includes both coastal cliff and coastal foreshore vegetation.

A number of species have become locally extinct. There has also been a decline in ecological 'quality' through farming, quarrying, fire, off-road vehicles and spread of pest animals, feral stock, pest and weed species.⁵ Gabites describes the introduced goat community as 'a botanical catastrophe.'⁶ Feral goats still pose some problems, but the goat population is now being controlled.

A 1992 Wellington Botanical Society field trip listed 159 indigenous species in the Te Kopahau and Spooky Gully catchments (not including the foreshore). Nearly a quarter of the plants in these catchments are considered by Druce to be uncommon in Wellington. A high proportion of these species are threatened.⁷

Plants of regional and national significance

Owhiro Bay and the old quarry site are included in the Regionally Significant areas identified in Wellington Regional Council's policy statement, under the heading 'Landscape and Seascapes of Regional Importance.' It is identified as *Coastal escarpment and small beaches from Paekakariki to Owhiro Bay and Sinclair Head*.⁸

Gabites identified four areas on the peninsular as having high biological values. She notes that Spooky Gully (Hape Stream) includes both nationally and regionally significant plant and weevil species. The entire coastal zone is identified as nationally significant as it contains nationally threatened plant species and weevil colonies.⁹

⁴ Healing the South Coast, Gabites, I. (1994)

⁵ Wellington South Coast Management Plan, (2002), Wellington City Council

⁶ Healing the South Coast, Gabites, I. (1994)

⁷ Ibid.

⁸ Wellington Regional Policy Statement, Wellington Regional Council.

⁹ Healing the South Coast, Gabites, I. (1994)

Protection and enhancement

Despite the damage that has been, and continues to be, inflicted on the fragile ecosystems of the coast, Gabites offers a positive view of protection and enhancement of the area:

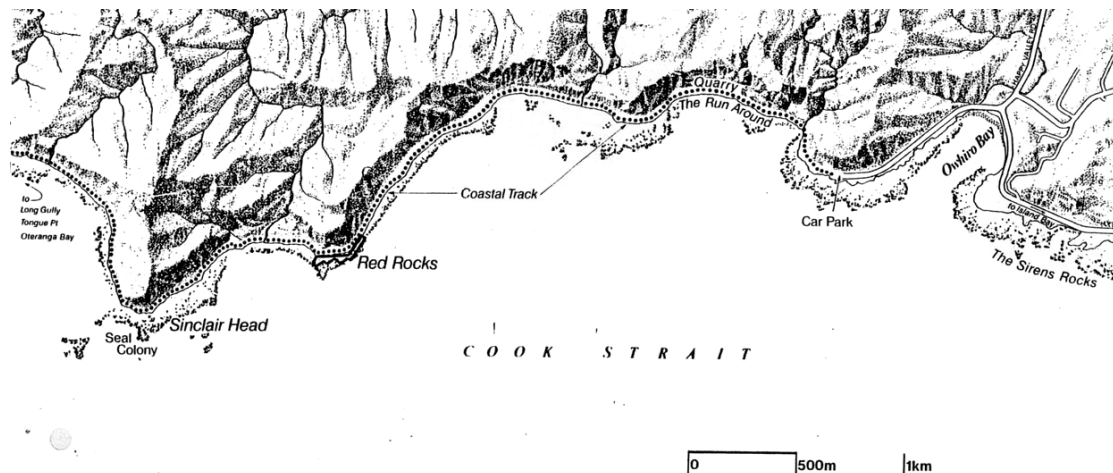
The remnant plant communities, however, do offer the nuclei for regeneration of diverse coastal vegetation which could in turn see a corresponding increase in the breeding habits for the coast's wildlife.¹⁰

Land description

The land descriptions for the areas which make up the ex-quarry land are:

Lot 1 DP 26786
Pt Lot 1 DP 26908
Lot 1 DP 61218

As the land is now owned by Wellington City Council, and comes within the South Coast Management Plan, it will be vested as reserve.



¹⁰

Ibid.

Owners of Owhiro Bay Quarry

Date	Owners
Approx. 1908	Prior to actual ownership, Tonks and Andrews started removing shingle and sand for use in construction sites around Wellington. Stables and a smoko shed (now baches) were constructed about this time in Mestanes Bay.
1942	Warren and Ken Lamberg purchased the quarry.
early 1970's	Mick Kerry became co-owner with the Lambergs.
1982	Quarry purchased by Milburn NZ Ltd (cement manufacturers) Milburn NZ later bought out by Holcim (A Swiss company)
2000	Quarry purchased by Wellington City Council Quarry restoration project commenced.



Aerial view of quarry area.

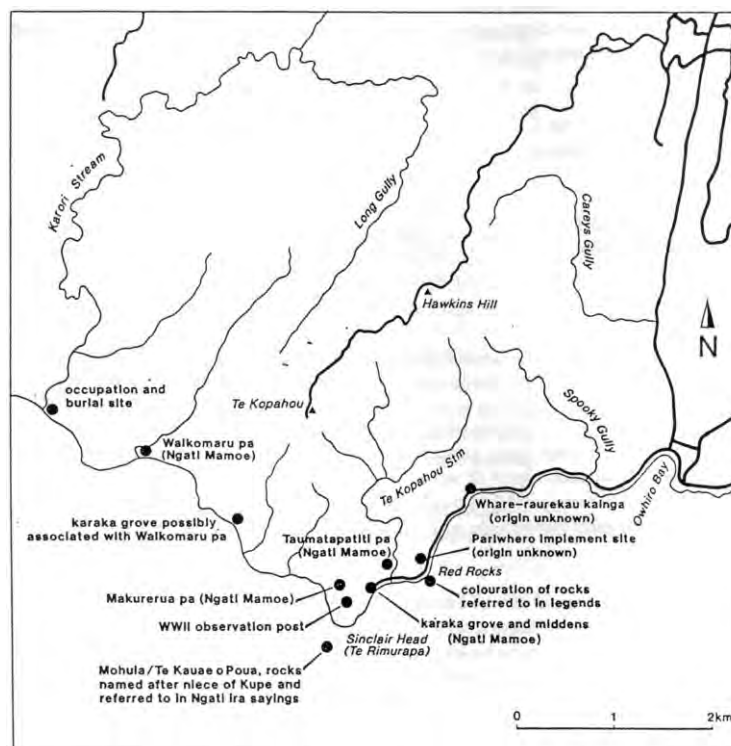
2 Cultural, Spiritual and Heritage Significance

Sites of cultural and spiritual significance

Sites within the South Coast area are believed to record up to 1000 years of settlement. Owhiro Bay was a well-developed settlement site when European settlers arrived, and there are documented signs of other Maori settlements along the coast, and on Rimurapa Headland. (Sinclair Head). Iwi associated with the area have included Ngati Mamoe, Te Atiawa, Ngai Tara, Ngati Toa, Ngati Ira and Rangitane.

In Mestones bay there is an ancient kainga (settlement) site of unknown origin [see map]. Over the years sites of cultural significance, including waahi tapu along the coast, have been severely degraded. Some important historical sites, including the Red Rocks headland and the kainga mentioned, have been modified.

Te Rimurapa headland was Maori Reserve (from 1899) and a settlement site. Titles were issued ten years after declaration as a reserve. The area was gazetted as a Recreation Reserve in 1989, following a land swap between the quarry and the Wellington City Council.¹¹



Sites of cultural and spiritual significance [from Healing the South Coast]

¹¹ References: South Coast Management Plan, W.C.C.
Wellington City District Plan 'Issues for Tangata Whenua'
Maori Sites of Te Whanganui a Tara
(www.wcl.govt.nz/maori/wellington/ngawaahirimupara.html)

Tangata whenua

Under the principles of the Treaty of Waitangi, Wellington City Council has committed to a special relationship with tangata whenua. This is outlined in the memorandum of understanding between the Council and Te Runanga O Toa Rangatira Inc. (Ngati Toa), and between the Council and the Wellington Tenth Trust.

The principles outlined in these memoranda are incorporated in the Management Plan for the area and are intended to provide opportunities for discussion and to develop partnerships.

Early quarrying at the 'Runaround'

This section is based on an interview with Gary Tonks, a resident of Kilbirnie, conducted in 2004.

The Runaround was the locals' name for the rough 'road' which ran past the current quarry site towards Red Rocks. Around 1908, Enoch Tonks Jnr (Ted, 1870 – 1944) started the family business as Tonks and Andrews.

Quarrying of the Red Rocks area started informally. Stanley Tonks drove his horse-drawn dray around the coast, and proceeded to shovel shingle from the beach into the dray. The dray was usually pulled by three draught horses. As the Tonks family also owned large stables in Kilbirnie, running about 80 horses, there was no problem providing transport for the metal aggregate. Some of the horses were grazed on the land beyond the runaround.

Once loaded, the metal was taken up Happy Valley Road and into the City 'and to the job where it would be off-loaded by hand. This would possibly take four hours from the works to the job.' [Tonks, G. (1962)]¹²

This rather low-key shoveling and carting of metal from the beach was the start of the quarrying business, which later became modernised with the advent of machinery, including a rock crushing plant.

¹² A Collection of Family Records, 1962 – 1842. Tonks, G. (1962) held at Turnbull Library.



A Tonks and Andrews man drives his dray through the surf at Owhiro Bay.



Employees of Tonks and Andrews collecting shingle from Owhiro Bay.

One of the Tonks brothers started a brickworks in Kilbirnie, but as it became apparent that brick houses were less than suitable in New Zealand's earthquake-prone cities, the Tonks moved into the quarrying business, with a partner. Andrews appears to have been a silent partner, and no known records exist of his involvement in the business.

According to family history, Stanley Tonks was a physically fit man, who liked to shovel the metal until the dray was full (about 1 ½ yards of metal); then strip and dive into the sea for a quick dip, before making the long trip into the City with the load!

The metal aggregate, along with sand obtained from Miramar, was provided for various construction sites around the city. These included the metal for the Parliament Buildings, the Hāitaitai Car Tunnel, the seawall for the Miramar cutting, and for the original Government Buildings.

The Tonks family feature prominently in Wellington's early history. They were clearly inveterate business-people and natural entrepreneurs, who at various times owned and ran a Kilbirnie brick-making business, a large stables/delivery service [Coutts Street, Kilbirnie]; the quarrying business; a smithy and a bakery. They also owned several large ships including the barque, the 'Malay' and 'The Wellington'. (Ironically enough, the 'Wellington' was later wrecked in Owhiro Bay).¹³

Ted Tonks sold the quarry business to the family's rivals, the Lambergs, in 1942.



Early settlers moving stock around the coastline. Dominant rock feature is Fly rock.

¹³

New Zealand Shipwrecks 1795-1970, (1972) Ingram, C.W.N.



Stock grazing the hillside.

Drama at ‘the Runaround’

The Runaround was so-named because of the narrow strip of beach which had to be crossed at one point, between sea and rocky cliffs, and the threat often posed by huge waves rushing up the beach. More than one unlucky person met their fate at the Runaround, and the death of one man [and his three horses] is dramatically recorded in this newspaper article from the 1930s.

Caught by Wave – Body Swept Seaward Tragedy at ‘Run Around’

Trapped and swept out to sea by a huge wave with the horses and dray he was driving, My Harry Perrett, a married man, aged 68, met his death yesterday afternoon at the ‘Run Around’ west of Owhiro Bay. A young boy who was with him narrowly escaped the same fate...

...Mr. Perrett had been carting shingle and metal from the spot for some time with a three-horse dray. Shortly after 2.30 pm yesterday he loaded the dray and was about to drive out. The tide was then coming in rapidly, full tide being due in that locality about 4.25 pm. Suddenly a huge sea swept up the beach towards the cliff under which stood the loaded dray. Despite its weight, the dray was thrown over, and with its driver and the three horses, was carried out to sea. The boy, being a resident of the locality, and knowing the power of such waves, managed to reach the safety on a rock.

...The locality is very popular with trampers and weekend visitors, but with the combination of steep cliff, narrow beach and at times exceptionally heavy surf has always to be treated with caution.

from The Evening Post, Sat., August 28, 1938.

Mestanes Bay baches¹⁴

In Mestanes Bay, at the western end of the quarry parcel of land, are four baches, listed in 2002 as historic areas by the Historic Places Trust. The Trust noted that these baches, one of which has been there since around 1900, have ‘retained their originality’. They are seen to have both historical and cultural significance.

The five baches in the bay are part of Lot 1 DP 26786 54.3290 and occupy an area of land between the legal road and the base of the hill to the rear. Mestanes Bay originally had eight baches; only these five now remain.

¹⁴

Adapted from Historic Places Assessment, Historic Places Trust, (no date)

1 King Bach – 1928

This bach was taken by the Army during WW II and used as a supply depot for a fortified observation post on the cliff above Sinclair Head. Provisions and armaments were trucked to the bach at what was then the road end, packed on foot, or taken by horse and dray the kilometers to Beadle's bach (now Perkins bach), where they were stored and hoisted to the fort above.

2 Boshier Bach – 1933

3 Grey's Bach – 1960.

Owner Terry Gray. Formerly known as King's bach.

4 Stevenson bach (rear) c 1910, owned by Chris Stevenson. Formerly known as the Frontin-Rollett bach.

Stevenson bach (front) c 1910 – formerly known as the Stables bach.

The front bach emerged from what was the stables for the original Tonks and Andrews quarry operations. Tonks and Andrews grazed some of their cart horses on the hills. The rear bach is said to have been built by Tonks and Andrews as a lunch room and shelter for staff.

Coastal character

The unique character of these baches has been retained, largely because they have not been upgraded to any great extent. The community of baches at Mestanes Bay, together with those at Red Rocks, form part of the unique character of the coast and provide an interesting insight into one of the earliest and best preserved examples of bach history. The significance of the bach to a range of New Zealanders is summed up in this quote from Paul Thompson:

*The humble nature of the (Wellington) region's baches suggest that the owners, when building and buying, made a deliberate decision to accept simplicity, to have a place, free of pretensions, which they could escape to.*¹⁵





Stories from the quarry face

Cliff Denham, ex quarry worker (about 1947 – 1952), and resident of Owhiro Bay. [*Cliff's father helped to build the early retaining wall now visible at Hape Stream during the Depression.*]

Can you tell me what your job at the quarry was?

Most of the time I had to cart the rock from the quarry, and bring it round to the crusher. I had to keep the bins filled up and make sure the crusher was being fed. Warren Lamberg, he was one of the Lamberg brothers, he helped me. The other brother, Ken, was in the office, he did all the orders and that. Their uncle Ernie assisted them, he was an engineer, fine chap.

So who blasted the rock for you to cart?

We had to do that too, Warren and myself. We had some really terrifying experiences round there actually. One shot we put in the rock face, we set it off and it blew all right but nothing happened. About ten minutes went by and we could hear this noise..a crackling sound, it was the actual rock breaking up. And then the whole hillside come down, we were just lucky we were on the hillside, away from it all. It actually took a long bar out of Warren's hands, a wooden bar we used to poke the rock with. The whole hill come down – we were very lucky.

Ken used to do all the boring of the holes and I used to assist him when he was blasting. I'd tap it in very carefully [the gelignite] and plug it and set the detonator and fuse.

After the blasting, the rock would all slide down the quarry face into a big bin, and from that bin we loaded the truck – we had an old Dennis ex-fire engine – and we used that to cart the rock around to the crusher plant, and then it would be crushed up and screened, and be ready for delivery.

*Isn't that pretty dangerous work for one person to be doing on their own?
[because Warren often wasn't there]*

Yes! But in those days we got away with murder didn't we?

The last of the horse and drays were there when I started. He had one horse and a dray and he used to cart the sand from further round the coast. They had to have sand for the builder's mix you see. He was one of the old Tonks and Andrews crew.

You left after about 5 years after a rogue rock fall, can you tell me about that?

This often happened. One rock came down off the hill and it was probably traveling about 60 miles an hour, and it hit the windscreen bar on the truck and it shattered, but I heard it go past my ear, it was only inches away but that was enough for me. It give me a fright! I gave my notice in after that, and went down the waterfront to work.

Grant Sunley

(stepson of owner, Mick Kerry, and Quarry manager 1974 - 1984)

What sort of operation would the quarry have been when Mick bought into it?

It wasn't a large operation at all in those days, because Lamberg ran it based on the fact that he had a carriage company. Lambergs had delivery trucks, and the [running of the] quarry was based on supplying builder's mix and shingle, and that was it.

In terms of the scale of the operation, did it change much over that time?

Mick Kerry gradually built it up by putting in better machinery, and [made it] a bit more of a sophisticated operation. He installed updated crushing and screening plants.

How did you end up in the business?

Mick Kerry were drainage contractors and a few of us worked in that area [of the business], then the drainage work petered out so we transferred up to the quarry. Then I sat my quarry manager's ticket, for a B-grade quarry, and was there for ten years.

What did you like about working there?

It was interesting – you're dealing with all sort of different facets of the process of converting rock into so many different products that are used in a lot more places than people realise. You're driving machinery which you like doing...but you're also dealing with the public, you're dealing with civil engineers and construction people...and you can see what you've done at the end of the day!

What about dramas and excitements, anything to report?

Apart from all the paua poachers and people dumping stolen cars around there and setting fire to them? One year 56 cars were dumped round there. A man got drowned round there once, just outside the quarry office...In the 70's, a chap used to live down the road a bit, it was a really rough day, and lots of times when the sea was rough the crayfish pots would be washed up on the rocks, and people would collect them and take them back to the fishermen in Island Bay. This chap came along this day and he was standing on the rocks trying to hook a pot out and a big wave washed him off, right in front of us, we all saw it happen. We called the police real fast and we tried to throw a rope to him...but he just disappeared so quick...I can't remember his name.

There used to quite a few landslides round there, but we'd keep the road open. We had what was known as a washing license, from the Marine Department, and the overburden would be pushed out into the sea, and the sea would wash it, the silt would get washed away by the Cook Strait rip.

Because the wave action there is so strong, you didn't get any bad sediments building up.

Who would the main clients of the quarry have been?

All sorts of people, from home-owners through to Fletcher Construction. We used to supply a lot of roading metal, a lot of stuff for the Harbour Board, and Wellington Municipal Electricity Department, that sort of thing. Contractors use the quarry that's handy to where they're working [for builder's mix, through to drainage metals].

The bigger companies mainly used materials for filling excavation sites – drainage products. A lot of people don't realise you can't have a roadway, you can't have a wharf, you can't have an airport, you can't even have a house, without a quarry!

So, when was the business sold to Milburn?

In 1982. I stayed there for two years after that, under the terms of the sale, then I went to work for the NZ Breweries.

You know the City Council bought the quarry in 2000 and it's being turned into a recreation reserve, what do you think about that?

Well, I can understand why because the conservationists were always going off the deep end. One of the things about round there was that there was a never-ending supply of good quality rock, handy to the city. You've got to think in terms of transport costs, and the further a quarry is away from a city, the higher the cost. It's a high quality hard rock which is ideal for roading. In one way, it could be a loss to the city, in another way maybe it won't.

I must admit I've gone over on the ferry and you look over there and see this great big scar on the cliff face, but is it really bad?

What other stories from those days come to mind?

We used to have a chap coming round there quite regularly, with his couple of half gallon jars, and fill them up with the spring water that was coming out of the hill, half way up the cliff face, because he reckoned it was the best water that he's ever drunk with his whisky!

Paul Warren (ex-Owhiro Bay Quarry Manager, currently Quarry Manager of Plimmerton and Kiwi Point Quarries)

'it was an amazing place to work....a really good crew of people...'

Paul Warren grew up in Owhiro Bay, just along the road from the quarry, and for a small boy the quarry and surrounds were a natural place to play 'after hours'. After leaving school and working on one or two other jobs, Paul went back to the quarry, 'walked in and asked for a job, and they had one.' He worked there for 3 years in the 1970s, and again from 1986 until its closure in March 2000.

During the seventies, OBQ produced concrete sand, aggregates and specialist roading products. Paul comments that little has changed in terms of quarrying methods over the past 20 – 30 years, but that the technique for setting off explosives has been improved, 'so you get much better fragmentation.' Most quarries now use excavators, as well as bulldozers and trucks. Paul described the quarrying process used at quarries like OBQ:

The quarrying process

Starting from the top of the rock face, firstly any plants or grasses and clay are stripped from the surface, until the 'blue rock' (previously unexposed rock) is exposed. In Wellington, the blue rock is almost always 'hard' rock, so it requires drilling and blasting to remove. At OBQ this rock is greywacke.

Following blasting, a bulldozer pushes the rock to the edge of the bench, where it is loaded onto dump trucks for crushing and grading.

Only solid 'clean' rock is used in the crusher – anything else just becomes dust. Pieces from 500 ml and smaller are loaded into the crusher.

There are 3 steps:

1. Primary crusher
2. Secondary crusher
3. Shaping machine

During this process, the slithery (smooth) stone is made into a 'cubical chip' which is suitable for concrete. After that, it's screened into different sizes and washed. It's then ready for transportation to the various purchasers.

All aggregates and sands are made from solid rock (i.e. at OBQ, greywacke). Argillite, which is also found at the OBQ site, turns into dust and is washed out during the crushing process.

"I think it's a hell of a shame that the quarry is closed, because it was such a valuable resource" . As a quarryman, Paul is only too aware of the limited resources available for making concrete products – which are, of course, still in high demand all over Wellington. Other quarries now work harder, and borrow from each other, to meet the demands. Paul sees a situation in future where Wellington may be trucking in aggregate from outside the district.

3 Uses: Recreation, Leisure and Access

Recreation and leisure

This section of the South Coast provides access to a number of recreational activities, some of which are based around the beach and sea, while others are based further inland. Boating, surf casting, picnicking, fishing and diving are all activities undertaken on the coast. The coastal environment also provides a pleasant location for other recreational pursuits such as walking, mountain-bike riding, running, off-road driving, playing and 'just being there'.

Two surveys were undertaken by the City Council during one summer and winter. Based on the numbers using it at these times, an estimated number of users over a year is at least 15,000 people – this figure has probably increased since. Of these visitors, almost all entered the area via the quarry entrance (87%) and more than 50% spent between one and four hours in the area. Both active and passive forms of recreation were included in the activities mentioned by respondents.¹⁶

Access

Vehicle access to the South Coast has been the single most controversial issue for Wellington City Council to deal with. With recreational pursuits ranging from off-road driving, through fishing and diving to family walks and picnics, there was clearly going to be conflict at times over how much, and what type of access to the coast was allowed. Botanists and conservationists were concerned about the impact of vehicles on delicate coastal eco-systems.¹⁷ Others feel deprived of the 'right' to drive around the coast that was previously available for all comers.

Consultation with the public identified three issues relating to the existence of the coast road:

- would the Council maintain a coast road?
- would having a coastal road increase damage to coastal eco-systems?
- user behaviour [e.g. lack of respect for plant life and the environment]

Balancing public expectations about access against a commitment to preserve and restore the eco-systems around the coast will continue to be a challenge for Wellington City Council. The issue triggers strong emotions from a range of interested parties and user groups with differing agendas.

¹⁶ Wellington City Council South Coast Recreation Survey Results Summer 1997, Winter 1996.

¹⁷ Scientific Study of Vehicle Impacts on Wellington's South Coast Harrison Grierson, (1998)

Current policy

From Hape stream westward is 'unformed road' which is subject to constant tidal erosion. It is suitable for off-road vehicles and a level of 'driving competence' that suits the conditions. The road will be maintained by the Council as a coastal track and allow 'a reasonable level of access for recreational pursuits and to access baches.'¹⁸ The road will also be used by Search and Rescue personnel in emergencies.

The road is open six days a week to 4WD vehicles, but closed between 9.00 am. and 5.00 pm. on Sundays. This allows people to experience the coast in peace, without the impact of vehicle noise and disruption.

By making the access route a 'track' rather than a road, the number of users has decreased from around 200 a day to around 50. This of course has a positive impact on the coastal flora, allowing better opportunities for regeneration.



¹⁸ Wellington South Coast Management Plan W,C,C, (2002)

4 Wellington City Council and Owhiro Bay Quarry

Wellington City Council's relationship with the quarry and its owners took many forms over the years of the quarry's operation. In 1962 a public outcry over the quarrying of the Red Rocks seams led to the quarry shifting its operations away from the foreshore, but quarrying of red rock seams in the headland continued until the late 1970s.¹⁹

In the late 1970s, Owhiro Bay Quarry began negotiations over a 70 hectare land swap with Wellington City Council, but the legal aspects of the land swap were not finalised until 1990. Environmental groups were concerned about the land Council swapped (Hape Stream, or Spooky Gully) as this land had a high ecological value and contained locally and nationally rare plants.

The quarry also ran some of its operation (plant) on legal road, a fact which emerged when Council challenged the quarry owners about its consents and legal obligations.

The issues wrangled over were many and complex. However, this section only gives an overview of what occurred, rather than providing details.

Changed perceptions

The issues which arose over Owhiro Bay Quarry to a certain extent reflected changing public attitudes to the natural environment. The quarry was right at the entrance to a natural resource – the South Coast – that many Wellingtonians cherished, and was perceived by some as a weeping wound on the hillside. Located near the entrance to Wellington harbour, it offers the first view of Wellington for visitors arriving by sea or air.

Many of the people most attracted to the area were environmentalists and those pursuing active outdoor recreation. Botanists had been aware of the delicate eco-systems and rare plants in the area for some time. Others were concerned about the safety aspects of the operation, with young children playing in the area and families walking past. Some residents of the area were affected by noise, dust and trucks constantly moving between the quarry and the city; and some became active in the campaign to close the quarry.

By the end of the 1990s, the quarrying operation had grown from a fairly low-key set-up, into a large scale operation owned by overseas interests. Another factor was that public attitudes to activities which had an impact on the environment, had changed considerably. This was also reflected in law: quarries now have to operate within strict parameters in terms of the immediate impacts of their activities (such as noise and dust) and in terms of how they dispose of waste products.

¹⁹ [Healing the South Coast](#) Gabites, I.

Silt also became an issue:, left in piles around the quarry area, it mixed with



water and made an unappealing sludge.

Owhiro Bay Quarry prior to closure.



Members of the public walking past the quarry crushing plant.



Quarry crushing plant



Quarry silt ponds



On purchase, the site contained five large waste areas where water had been mixed with over-burden, and gravel was stockpiled along the coast in many places.



The area had long been used as a dumping ground for stolen or unwanted cars

Mounting Pressure

Over the next two decades, environmental groups were increasingly active, and vociferous about the ecological damage inflicted by the quarry operation. Arguments about access were also widely aired in the media. In the Land use Management Guidelines (1995) Wellington City Council committed itself to: 'cease all quarrying operations on the South Coast, by re-location if necessary' and, in the meantime, to 'minimise the environmental impact of the quarry operation.'

The Paper War

The issue of the quarry's operation became a hot topic and was frequently reported in the papers. Carl Gifford mentions a 'war of the papers' where arguments about the quarry were carried out via letters to the editor. The Southern Environmental Association and other groups were active over several years prior to the quarry closure, ensuring that the issues remained in the public's eye.

Some of the media headings over the long dispute and resolution process:

Lobbyist digs in for long fight
Protester Fights for public access
Council frustrates quarry owners
Seal of disapproval
Scarring of the city's heritage
Quarry faces cease-work
SEA queries quarry safety standards
Driver sees red over quarry road plans

Clearly there were many sides to the story, and the issues were complex. Some of the many points of view are reflected in the interviews with quarry people, environmentalists and Wellington City Council staff. Staff and politicians of Wellington City Council felt their way gingerly through these issues over the 1990s; media headings reflect that tempers frayed and feelings ran high about the issues, on both sides.

Southern Environmental Association (SEA)

The SEA, at the time a relatively small group of locals and environmentalists, gained the support of several other organisations including Forest and Bird, the Wellington Conservation Board, Action for the Environment, Wellington Botanical Society, and the Federation of Wellington Progressive Associations. The SEA is acknowledged by all as being instrumental in getting the quarry closed down. The outcome was achieved through painstaking attention to detail and a good deal of hard lobbying over a sustained period. Robert Logan, Roy Furniss, Carl Gifford and others, formed the core of an active group over a period of a campaign of more than five years.

This flier encourages people to support relocation of the quarry and was put together and distributed by SEA members.



WCC DRAFT "ACCESS" OBJECTIVE: *"To modify access arrangements ... in a manner that ... enhances the ... convenience of quarry operations."* (WCC discussion draft, 29/06/94, p. 14, emphasis added)

COMMENT: Public access decisions should not be made for the convenience of the quarry.



WCC DRAFT "QUARRY MANAGEMENT" OBJECTIVE: *"To enable continued operation of the Owhiro Bay Quarry"* (WCC discussion draft, 29/06/94, p. 24)

COMMENT: Council has failed to look seriously at negotiating the relocation of the quarry away from its present unsuitable site.



WCC DRAFT "QUARRY MANAGEMENT" OBJECTIVE: *"To enable continued [quarry] operation while minimising ... its environmental impact"* (WCC discussion draft, 29/06/94, p. 24)

COMMENT: Continued quarrying at this unique ecologically important site is not compatible with even a minimal commitment to environmental protection.



WCC DRAFT "QUARRY MANAGEMENT" EXPLANATION: *"Quarry operations suffer from vandalism"* (WCC discussion draft, 29/06/94, p. 25)

COMMENT: Shouldn't we also be concerned about *environmental* vandalism?

SUPPORT A WIN-WIN SOLUTION: **RELOCATE THE QUARRY**

Purchase: the final outcome

During the 1990's, with pressure mounting from environment groups and other sectors, the Council demanded that the quarry comply with its consent obligations. Eventually the issues went before the Environment Court. Although the Council entered into negotiations with Milburn about purchase, the high cost (\$3.5 million) was probably one factor which discouraged purchase in the early stages.

For a number of reasons, not the least of which was the price tag, Council members were not in unanimous agreement about the purchase and it was not finally agreed to by Council until November 1999. Owhiro Bay Quarry was bought from Milburn on November 23rd, 1999 and ceased operations on the 29th February, 2000.

Interview: Carl Gifford

(active member, Southern Environmental Association, during the years up to purchase and closure of the quarry)

The SEA started up probably in 1992, but we were going hard on it [this issue] for about five years until the quarry closed. There were quite a few people involved, myself, Robert Logan, Roy Furniss and a few other people. It was mainly Island Bay people involved. It started off saving the ridge line to Island Bay from being built out with houses. That one was one of the big ones at the beginning...that was a real winner for the SEA.

When I jumped on board was about the same time that Council was setting up a sub-committee to deal with the South Coast and all the issues round there. My main cause for joining was Owhiro Bay Quarry. I lived here all my life and where I grew up, we sort of overlooked the quarry. It wasn't a huge operation in those days, just a local quarry getting a bit of gravel from the hills and the beaches and supplying the local industry. As I grew up I did my apprenticeship as a mechanic in the local garage, and fixed all the vehicles from the quarry, so really got to know the people that worked in the quarry fairly well. So when I started my campaign I went down there and saw the manager who I knew and said, Look I know you're not going to agree with me but I think the quarry's the main problem on the south coast and we're going to fight to have it taken away. I had to put my cards on the table and they weren't happy. And of course over the years after that, probably me more than anyone was Judas because I turned on them and wanted to close the quarry.

Old Roy (Furniss, who died in 2000) down the road, he'd already been campaigning for sort of two or three years before that, he was known by the people at the quarry as 'the old nutter down the road' – he took photos of them going up the road with their tailgates spilling gravel and stuff like that. So when the Council set up this task force..they got [representatives of] anyone who had an interest in the south coast, about 18 people and a couple of Councilors and the quarry manager. I was pretty green back in those days and wasn't really a good public speaker at all, I went along as a representative of the community. I just stood up and said "the main

devastation on the South Coast is from the quarry and that's what we should be closing..." Everybody was quite shocked really! Everybody thought the access was the main issue. Most of the bach owners and the four wheel drivers were dead against the quarry closing because for them, the quarry was the main reason why the gate was always open. Having access was what mattered, not the quarry looking like a ****hole.

I think the quarry got out of control. They had problems getting rid of their silt. When they made their gravels it would cause a lot of really muddy silt. They started stockpiling it around the coast and it would make huge big mud ponds..they were absolutely disgusting. Then they were making mounds of gravel and pulling parts of the hills down they didn't need to pull down. It was basically mis-managed. So as we got into these meetings with Council things hotted up a bit and they brought along a representative from the quarry and that was Ray Vivian, [the general manager of aggregates].

As time went on – we were talking about years not months – it was a battle against the councilors. When I went to these meetings at the beginning I wasn't a public speaker – when I'd stand up, I'd almost get dyslexic looking at my notes and be going all red in front of this great big round table of people who all spoke well and knew how to do the public speaking bit...I was just totally embarrassed. But it toughens you up you know, after awhile you get confidence, and I was also quite angry. I was angry that the Council could let this go and they couldn't see the wood for the trees as far as I was concerned, here was this quarry destroying our south coast and they weren't making any profit out of the company – it was an overseas company – would they be allowed to do that in Switzerland ? no way. [Milburn was by now Swiss owned]. We had all these righteous reasons and we were going hard.

Roy Furniss was a driving force. He was an old fella, a little bit eccentric, he used to make jewelry and stuff, he was in the minerals club so he used to get beautiful stones and put them on necklaces. There was a bit of humour in the old fellow but he could also drive you a bit barmy. He'd come along to the meetings and go on and on and on...we got used to him, we'd let him have his say. He'd always be there [at Council meetings].

We were basically a team of people driven to close the quarry no matter what. After four years they were really sick of us because we were doing all sorts of things, we were lobbying up to get people to write letters to the editor every week and there was this big 'battle of the newspaper'. A lot of it was directed at me [as Judas] by people who were writing letters back. Saying 'what about this Carl Gifford character..he's got all his junk in the stream..'

At the end of the day Robert Logan was the main person. I was dedicated and I did certain things that came in on a good angle...I got [Council staff members] up to my place and showed them the quarry trucks speeding to the quarry.

We went through year after year, Council meetings, and they would be voting on it and it would always be that there would be one person that didn't turn up to the meeting and it would be nine votes to eight; we were always certain we were going to win. And when it didn't go through we'd be distraught. People

who were real strong supporters of us would say “Never mind it’ll happen one day”. But we weren’t taking no for an answer. My reply to that was “yeah and its going to happen real soon, they are not going to get away with this.” It was only ten years ago..I had a young family and a struggling business and I was off at Robert Logan’s till 2 or 3 in the morning and we were preparing all of these letter drops – you know, so much time went into it. I would have made thousands if I’d been putting that time into my business!

Here I was a stonemason, who builds rock walls – so I need quarries – and it was not even half a mile away from me, like having a cake shop in my back yard really. But in the end, the material was sub-standard, they weren’t making money, they were absolutely polluting our coastline. We felt really frustrated when certain councilors weren’t coming our way and we’d be lobbying the councilors big time, going round to their houses and knocking on their doors. We went along to the Tenth Trust and said “Look this is where Kupe’s daughters bled their blood onto the rocks [according to legend] before he set off in his canoe” ...They were quite rapt too, that we were trying to save this coastline. We brought in support from Forest and Bird and all these different places.

In the end there were only really a couple of councilors that were against it. It became a letter to the editor war and it was amazing for a whole year how many letters were in [the papers] about this quarry. I’ll tell you what, most of the people didn’t give a hoot, they wanted the quarry to stay – it was handy – even the people who lived in Owhiro Bay Parade, most of them were for the quarry!

[in terms of how it’s looking now..] We’re happy with the beach, but there’s still a lot of work to be done on the hills. Then you could turn it into some tourism thing, it could be recognised as a quarry that once was, and this is what you can do with people power – turn it into something quite special.

Interview: Brian Bouzaid

Business Unit Manager for Wellington City Council, Project Manager, Owhiro Bay Quarry Restoration Project and an ex employee of Owhiro Bay Quarry.

Tell me what your vision for the restoration project is?

The idea of making the quarry area the Gateway to the South Coast is the idea of 'giving something back, having taken something away'. How do we re-shape this and make this something really special for the environment and the people of Wellington, or visitors? Because of the huge significance the area has had and the geological significance.

It also links in with the South Coast Management Plan(SCMP) and the Outer Green Belt plan. It's not like an Annual Plan project which are often only annual things, this project has a life for the next 5 – 10 years and money will be budgeted for it accordingly.

Buying the quarry and closing it was the easy option and would have met with Council's obligations as per the SCMP but this seemed like a great opportunity to do something else. *[Brian came from a quarrying background and had started his working life at the quarry; he saw this as an opportunity to put something back into that environment, where he had worked and been part of removing and crushing rocks.]*

The idea was seen as important by key people within Council so it was not difficult to promote it and ensure that funds were allocated for it. We need quarries but we need good (environmentally sound) quarries. I wanted to do it over five years so that nature would do some work for us too. Nature has done a lot for us as well; there is so much a digger can do, then nature can take over. Because of the wind there, self seeding naturally occurs. And because of the sea there, the sea actually starts to re-shape the landscape; it takes away man-made features and establishes its own level. That's been really successful there.

Hape Stream was Stage 4 but because [during a big southerly storm] the concrete blocks fell into the sea, we brought it forward to Stage 2 and did that part straight away but it worked out well, and drove home [to the public] that we weren't going to support an access road around the coast, but a coastal track. It reduces the impact of vehicles from about 200 per day to around 50 [4WD vehicles]. It allows plant species to take hold.

(the following pages record the damage to the road and the restoration of the Hape Stream area)



Hape stream area prior to rehabilitation work.



Wellington City Councilors receiving a briefing on Hape stream prior to work starting.



Concrete block seawall under threat as southerly breakers roll in.



Sea wall collapsing into the sea during a southerly storm.



Earthworks on Hape stream area get underway.



Hape Stream mouth work nearing completion. Digger placing riprap along exposed concrete road. Exposed rock wall in foreground.



Wellington City Council staff check out the newly exposed sea wall.



Dumper moving along old coastal road area shows the extent of fill above the old rock wall.



Earthworks continue



A member of the public enjoys the new beach area. The extent of filling is indicated by the piping on the beach.



Brian Bouzaid checks out the new stream mouth area



Hape stream following re-shaping.

What have the major issues been, from the Council's point of view, in getting the project to this stage?

Access was a huge issue. Council held meeting with 4WD clubs and others, but in order to complete the Hape stream restoration, the road had to be closed for a month in 2000. I had to advise all users that the road was closed to the general public. But there would be a track that 4WD vehicles could use.

It is interesting, however, that when you consult, you can't consult with everyone, people don't read the newspaper but they may be an affected party. People damaged the machines and broke locks because they wanted to get through. We had to do the work, because the safety issue was the first thing, but it was the end result [that mattered]. No-one could understand that to stop access for 30 days was actually going to be really good in the long term. Now a lot of the people that use the coast have told me it's really good now; but they were the people who were negative at the beginning!

Now that that's been done, it's attracted positive comment from bach owners, users [of the area] and 4WD drivers, because the man-made features have been removed and it's now obvious that it is a track and not a road. Council is committed to maintaining a track, but not a road.

The old rock wall that has been exposed at Hape Stream is visible in the old photos where horse and cart are being used to remove rock, so it has obviously been there for some time.

Stages 1 – 4 have been completed. Stage 5 is in process. Planting is on-going; the carpark area is the last piece of the project to be completed.

What would you like to see happening there over the next, say 5 – 10 years?

Ideally I would like to see the area from the car park becoming a coastal reserve; the carpark defines that area. [To see that] the planting continues, and that people remember to use and not abuse it. And that everyone gets something out of it.

5 Putting Owhiro Bay Quarry in context: Wellington's South Coast

The South Coast Management plan

The restoration of the quarry site fits very well within the overall objectives of the South Coast Management Plan, which are:

Primary Objective:

To protect and enhance the coastal character of Wellington's South Coast

Secondary Objectives:

- *To enhance and, where possible, restore the natural values of the coast, while providing for the recreational and leisure desires of visitors/users*
- *To reduce conflict between the many users and values of the area.*
- *To respect, acknowledge and protect the history, heritage and diverse character that the South Coast holds for iwi and Wellington's communities.*
- *To meet the needs of coastal visitors/users and the City, while ensuring any infrastructure or facilities are developed in sympathy with the coastal environment.*
- *To manage the coast as a public asset with the assistance of the community in conjunction with our Treaty partners (in accordance with the memoranda of understanding held with the Council).*

Te Kopahau Scientific Reserve and Recreation Reserve

The scientific reserve, administered by the Department of Conservation, was gazetted as reserve in 1977 to protect the seal haul out on the foreshore and off-lying rocks.

The recreation reserve was gazetted in 1974 by Council. Two historic pa are situated on the headland, and the observation post remains are still evident on the ridge-top.²⁰

²⁰ Healing the South Coast, Gabites, 1.

Red Rocks Scientific Reserve

In 1972, 0.52 hectare of foreshore was declared a scientific reserve. It is administered by the Department of Conservation. The reserve is within Te Kopahau Reserve. Red Rocks (Pari-whereo) was formed 200 million years ago during submarine volcanic eruptions



6 The Restoration Project

The two major objectives of the restoration project were:

- 1 To enhance the coastal character of the Owhiro Bay Quarry on Wellington's South Coast
- 2 To restore the natural values to the Coast while allowing people to enjoy recreational and leisure activities

It must be acknowledged that this plan will not 'restore' the original landforms and habitats. This is not practicable given the extensive modification to landforms, habitats and ecological processes that have occurred on the site over the last 90 plus years of quarrying.

[*Owiro Bay Quarry Management Plan, June, 2000*]

Consultation

The consultation process was undertaken not only to ensure that the restoration was successful, but also to ensure a sense of ownership of the area by those who use it.

Community Groups

A number of meetings were held with the Southern Environmental Association, who had been instrumental in getting the quarry closed. Discussion ensued about what could be achieved and high expectations were held, but a balance between 'what was desirable' and what was possible, was reached.

Consultation with Maori

Due to the sites of high cultural significance which are within the Red Rocks/Owhiro Bay area, consultation with iwi representatives was an essential part of the quarry restoration project.

The process highlighted two major areas of concern:

- Hape Stream and Red Rocks areas required rehabilitation to restore ecological balance
- Improving the unacceptable visual impact of the quarry benches



After the consultation process with iwi, a tapu lifting was carried out on the quarry site. Wellington Tenth's Trust, City Council and community representatives during the ceremony at the entrance to Hape Stream.

The restoration project: an overview

Prior to any work being undertaken, the site had been quarried for over a hundred years and on closure comprised:

- a number of old quarry workings now sheared and faulted with pockets of weak rock with soil, and overburden above
- an estimated 100,000 cubic metres of overburden (topsoil and other material removed prior to quarrying) that needed to be stabilised and relocated on site
- a number of baches without titles
- several earth bunds made from overburden and waste water sludge
- a large area of reclaimed coastal reserve including a dam and pipe works in the Hape Stream

Most of the site was devoid of vegetation as a result of early settlers, farming, animal pests, quarrying and the harshness of southerly storms.

Effective restoration required a method that could restore large areas cost-effectively and stabilise the quarry slopes to prevent water erosion and run-off. Re-shaping occurred first of all, before hydro-seeding technology was used to start re-vegetating the exposed slopes.



Waste quarry product stockpiled on western boundary of the quarry.



Coastal road. This area required special attention to ensure that following re-shaping, wave and tidal action did not result in silt being washed into the sea.



Using surplus riprap (rocks) from the quarry, a sea wall was constructed along the bunded area as a protective shoulder. Western boundary area sea wall is shown.



Brian Bouzaid and Don Phillips Senior ('Big Don') from Wellington City Council discuss the re-shaping process.



Western boundary area following re-shaping





Looking back along the coast road at areas following re-shaping.



Re-shaped quarry batters

The re-vegetation project

Since 2000, Wellington City Council staff have been involved in an extensive re-vegetation process of areas around the quarry. This is one part of the overall Owhiro Bay Quarry Management Plan.

Outline of the process

Initially site restoration included major re-contouring of the site into a series of rolling batters, or slopes. Major plantings of coastal natives took place, but it became apparent that the size of the site, and the need to re-vegetate large areas of overburden, would require a different approach.

Rural Supply Technologies were commissioned in late 2001 to develop a rehabilitation plan for the site using hydro-seeding technology. This Palmerston North-based company had experience in mine site restoration.

The project had three phases:

- Stabilising the site using quick-growing exotic species
- Trial hydro-seeding techniques using native coastal species
- Replacing the exotics by hydro-seeding natives on the stabilised slopes

The most important aspect of the process was to establish the bacteria and fungi that are present in the natural soils, on the new batters, thus creating a plant-friendly environment.

Initial trials

At the start of the project, the plan was to establish a micro-typography, to provide some holds for larger species such as flax and hebes. This meant artificially creating small indentations and pits, more similar to the original natural environment, in the planting surface. However the site of the initial trial proved unsuitable, as the surface was sludge capped with shale, and could not be dug into.

The first trial area for hydro-seeding was not as successful as hoped, partly because of this, and also because it was only 5 metres from the sea. It is a challenging environment even for the naturally-occurring vegetation, and much more so for this new ecosystem, which is virtually being started from scratch. The coast is open to both northerlies and southerlies, and all plant life takes a regular beating from salt-laden winds.

The second trial was undertaken on two spots in an area 60 metres from the sea and was more successful, though larger species will still take some time to propagate here. The hydro-seeding mix included seeds from local plants including flax (*Phormium cookianum*), tauhinu (*Cassinia leptophylla*) and grasses such as *Poa cita*.

Hebe and *Cassinia leptophylla* seedlings have now self-seeded on these two trial areas which bodes well for the rest of the project. From the car park, the trial areas are easily identifiable from the furze of green over the surface of the grey shale.

Ideally the hydro-seeding process will 'kick start' a successional natural re-vegetation process by offering the necessary ground cover and layers of organic material which give larger species the opportunity to take hold. This aspect has proved more challenging for Council staff involved in the project. Jonathan Bussell [Manager, Berhampore Nursery, Wellington City Council] hopes to be able to use lichens and moss in the next hydro-seeding mixture. The combination of organic material in the hydro-seeding mix, plus seaweed that is blown or deposited, eventually provides a layer of organic matter which can trap windblown seeds, and start a natural process of re-vegetation.

Council have planted the Hape Stream area with 3,600 plants in 2003, and intend to plant another 2,400 in 2004. Silicone gel placed in planting holes and a wet summer [Wellington had its wettest February on record in 2004] have helped the new plants to establish well.



Hydro-seeding work begins



Old quarry batters following hydro-seeding.



Quarry batters unable to be re-shaped are left to create scree slopes, then spray with native seeds mix.



Hydro-seeded areas, two years on



As the re-shaping process continued, small areas that were used as waste dump sites are quickly completed and prepared for planting.



Community Involvement

In the early stages the local community got involved in major plantings of coastal natives on Arbour days. The Southern Environmental Association has also been raising seeds for planting off-site, for later planting at the quarry.



A student from Owhiro Bay School enjoys Arbour Day planting.



Another area of planting complete: a job well done!



Mayor Prendergast, Owhiro Bay school children and staff take part in planting.



Areas clearly marked to ensure that planting is not disturbed.



Planted areas taking hold.



Planted area in background. The toe of the batter (slope) was shaped to try and prevent vehicle damage.



Sea view of another completed area.



The coastal gate is relocated to allow more parking for visitors to the coast.



With the removal of the old quarry fence and gate the area started to reflect the vision of a gateway to the south coast.



Stockpiles of gravel following closure of the quarry. Much of this product was trucked to the Council's Kiwi Point quarry for sale.



After removal of stockpiles and concrete, the area starts to take shape.

Progress report

All stages of the project are now complete except for Stage 5, which is in progress at time of writing.

Future plans

Seeds from ancient established karaka groves [possibly planted by residents of the ancient Kainga nearby] will be taken and propagated, providing new plants from the old stock.

The site is challenging in many ways, not least because of its unforgiving climate. Another issue for the project is the damage inflicted by some four-wheel drive vehicle owners and motorbike riders, who are not always respectful of struggling plant life. Nonetheless, it is a satisfying project for Council staff, to have the opportunity to see the gradual return of this area to something like its natural beauty.



Fly Rock area during quarry operations



Fly rock area restored.

7 Future of the Quarry site

For now, the site of the old quarry is undergoing a gradual but relentless change, aided by Council workers and members of the community. The area is now an appropriate entrance to the South Coast and makes the entrance to Wellington harbour (visible from sea and air) more attractive. With further work, care and attention, and abetted by nature, it will eventually become a coastal reserve in keeping with the natural beauty of the south coast area.



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References for photos on pg.13

1..... G – 46383 – ½
2..... G – 46384 – ½

S C Smith Collection

Alexander Turnbull Library, Wellington

Cover Photo: S.C. Smith, Alexander Turnbull Library.

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