

ROCKTEC INNOVATION AWARD 2014



Oreti Beach Aggregate Plant

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Southern Aggregates

Oreti Beach Plant

Southern Aggregates recently commissioned a new aggregate screening and washing plant. The plant is located at their Oreti Beach Site, approximately 6km from Invercargill.

The plant supplies a full range of aggregates and sands to the local market with some aggregates being carted as far away as Auckland for exposed concrete.

Southern Aggregates purchased the Oreti Beach operation from Southern Transport in 2006. At that stage the site was serviced by two mobile plants – a Keith Niederer 3 Deck Plant and a Richard Baird 3+2 Decks Plant. The combined throughput of these two units was about 75tph.

Given the harsh environment (500m from the Southern Ocean) and the limited throughput, the decision was made to replace the two ageing mobiles with a new custom built screening and washing plant.

The new plant has a maximum designed throughput of 150tph. Due to the make-up of the feed material, this throughput equates to approximately 75 to 80tph of sand and 70 tonnes of aggregates. To achieve this tonnage, the plant utilises a 900, variable speed belt feeder drawing from a 50t feedbin. The feed is conveyed 28 metres to the first of two Fulton Hogan 4m x 1.5m three deck screens. The first deck cuts the feed into +22.0mm rejects, aggregate and 4.00mm sand. The second screen splits the aggregates into 3 grades and picks up any carry over sand. All the sand is chuted to a Finlay 252E Hydrasander where it is classified and dewatered. The finished sand product is conveyed via a 25m radial stacker to a 2000t load out stockpile. One pump supplies the screens and Hydrasander with 2800 to 3200lpm from existing ground water. Plant Foreman, Ross McPherson is more than happy with the new plant. “Being able to fine tune the plant to suit the different feed material is bloody magic” said Ross.

Benefits

Tonnes per day due to the ability to have larger stockpiles of aggregates and sand under the conveyors with loading out sand and aggregates directly to our customers.

Oreti Beach Plant

Sand and Aggregate Plant Upgrade Project

Option 1:	TICI	\$1,440,000
Option 2:	TICI/SAL	\$1,050,000
Option 3:	FHE/SAL/Trans Diesel	\$ 680,100 (Preferred Option)

Background

The two sand and aggregate plants at our Oreti Beach site were at the limit of their capacity in their old form. They were operating in excess of 1600 hours per year each just to keep up with the existing demand. Due to their age and environment, they also became unreliable. The two existing plants were at a maximum throughput of 53tph. 25tph of this is sand. This high proportion of sand was limiting the ability to produce the required quantity of aggregate and quality of sand.

Option 3 involved the installation of a new sand recovery system including a Finlay 252 Hydrasander, a 25m radial stacking conveyor, two new 3 deck screens, two new conveyors and several refurbished conveyors, and walkways and associated site works.

These new components work in conjunction with the existing 50t tonne feeder from one of the now redundant plants. We were also able to re-use some of the existing product conveyors although they required some modification.

The inclusion of a more efficient de-watering system has allowed us to load out the sand directly from the plant for sale to clients. This has reduced loader work by approx 150 tonnes per day.

Having the ability to better wash and grade our sand products has negated the need for the dragline to wash the feed material at the pit. The dragline was struggling to keep up with demand but this is only because the material was handled two or three times to wash it prior to stockpiling. Occasionally we have used an excavator to extract the feed material but we have been unable to run the material through either plant because the sand produced ended up too dirty.

The Proposed Layout for Option 3

The first screen is used to split off the oversize, the aggregate and 90% and 100% of the sand. The second screen splits the aggregate sizes and recovers any sand that gets past the first screen.

All the product conveyors have at least 220 tonne stockpiling capacity. This has allowed us to load out the aggregate products from the plant for sale to clients. This

has further reduced loader work by approx 200 tonnes per day. The old plant configuration only permitted approx 15 tonne stockpiling capacity.

Programme

The plant was built over a 12 month period using in-house and local trade's people.

Build Costs

Through some very studious purchasing and using quality materials the first time, we have managed to build a \$1,500,000 plant for little under \$800,000. Most of the structural steel for the main screen support frames cost approximately \$380/t from a local auctioneer, rather than \$2250/t retail. It did require some clean up but the savings were significant.

Two years prior to the rebuild, the company purchased 53m of conveyor frame and supports for \$12,000. Once again, this purchase saved a significant amount of money. The 25m radial stacking conveyor cost \$27,000. The feed bin retaining wall consists of 11 discarded bridge beams from the recently refurbished Tiwai Bridge. The cost of this structure is only a fraction of the cost of a purpose built retaining wall.

Benefits

Reduction of material handling. Approx 1800 tonnes per day to 1200 tonnes per day. This has made one 25 tonne loader the best option to run the site rather than two 16 tonne loaders.

Reduction in labour and plant hours required to meet demand. The site was costing over \$2.00/tonne labour to produce the products. This was considerably more than the company's other operations. In the past the staff would work six days per week and then do maintenance on Sunday!

Reduction in effort by our extraction subcontractor now that we have the ability to wash the products properly at the plant. This has also increased the scope for alternative methods of extraction.

Improved quality and consistency of the sand product that we supply to Allied Concrete, Firth and other customers.

We have gained the ability to supply other clients and future-proof the plant capacity for the foreseeable future. This has been proven with the recent purchase of Southland Sand and Gravel Assets.

This has increased our client base and sand and aggregate sales. We are also using the Hydrasander to wash the wine/beer residue off the recycled crushed glass

that is then sold to Allied Concrete and a producer of polished concrete, cobble stones and bench tops.

Summary

The measures outlined above were the most cost effective method of getting both the quality and quantity of products back up to where they should be in the short term and improving the reliability and capacity in the long term.

The ability to look outside the square can have very real financial benefits. One should always table “left field” ideas and should at least consider alternatives as the solution to the problem.

In the end the project came in \$100,000 above our budget at \$780,000 however we are very happy with our new plant.





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