Come and walk over Matahorua Gorge with us!

New SH2 route through Matahorua Gorge soon to open

First Government stimulus transport project in Hawke’s Bay

When the Matahorua project is completed, motorists can expect to cut approximately 12 minutes off their daily journey with the new road bridge making the trip safer for motorists, tourists and freight.

“Replacing the windy, narrow route through Matahorua Gorge with two new bridges will give safer journeys for the residents, tourists and freight haulers who use State Highway 2. Receiving the additional funding has enabled us to deliver a safer, shorter road to the community 12 months early. This is in line with the support and co-operation of the local community throughout construction and for this we thank them immensely,” NZTA’s Central Regional Director Jenny Chetwynd.

First and foremost I would like to extend my sincere thanks to the project team from NZTA and Downer who have delivered this project to the community in just six months.

Throughout the construction process, the team have worked closely with many organisations and community members, and the co-operation and tremendous support they’ve received has been instrumental to our success.

Ongoing updates and presentations have kept community groups such as Rotary informed and schoolchildren from the local Tutira School have learnt about bridge building through the Futureintech programme. (Read more about this on the back page of this supplement.)

Closures of the state highway, sometimes at short notice, have been made possible thanks to the co-operation and support from Hastings District Council. My thanks also to the staff at Hawke’s Bay Regional Council for their promptness in approving all the necessary consents and approvals. The collaborative approach adopted by both of these organisations has enabled us to keep the project on track to open it for the community this month.

The Matahorua project passes through four major properties and at all times we’ve endeavoured to work closely with the owners to maintain access and minimise disruption. In return, we thank them for their co-operation and great support of the project.

Lastly, our thanks to the freight industry who will undoubtedly derive great benefit from the project. The NZTA has a positive and collaborative working relationship with the New Zealand Road Transport Association (NZRTA) nationally and wishes to thank the local branch for their continued efforts to work with the team in minimising inconvenience to drivers during closures of State Highway 2. Their advice on road closures has been invaluable.

Together the NZTA and its contractor Downer are proud to deliver safer, more reliable journeys along SH2 through the Matahorua Gorge to the communities of Napier, Wairoa and beyond.

Design and construction

As main contractor, Downer is proud to have constructed the SH2 Matahorua Gorge Realignment project in conjunction with its designers and subcontractors.

New Zealand Government

Hawke’s Bay residents will reap the benefits of the Government’s economic stimulus package when the NZ Transport Agency opens the SH2 Matahorua Gorge Realignment in March.

The existing section of State Highway 2 between Napier and Waioeka requires motorists to negotiate three narrow gorges – Devil’s Elbow, so known because of its sharp bend at the bottom of the gorge, followed by Matahorua and lastly the Mohaka Gorge before arriving at Waioeka. Located 52 km from Napier and 66 km from Waioaka, an estimated 4,000 vehicles travel the Matahorua Gorge every day.

Construction of the state highway realignment with its impressive road and rail bridges, began in October 2009 after a cash injection from the Government’s Jobs and Growth stimulus package in February that same year brought forward the start date.

The $30 million project has employed local staff and sourced plant and materials locally in Napier for most of the project.

Find out more about the project’s contribution to the local economy inside.

Find out more inside about how the Matahorua project has been constructed and come along to the open day on Sunday 13 February to see first hand this impressive engineering feat.

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Keeping it local

The Matahorua project began construction ahead of schedule after a cash injection through the Government’s February 2009 Jobs and Economic Stimulus package. The goal of this funding is to bring forward construction time savings, safety improvements and creation of local jobs.

Throughout its sixteen months of construction the Matahorua project has done just that – and much more. Up to 60 construction staff work on site at any one time and most of these people live in Napier. A further 45 staff off site are employed by the associated pre-cast yards, suppliers and designers.

Contractor, Downer, has undertaken the construction of earthworks, roadways and drainage from its Napier branch office. Auxiliary equipment and plant has been hired from Hawke’s Bay companies and the aggregate and material used to construct the road itself is all sourced within the Hawke’s Bay region.

The bridges have been constructed by sub-contractor Concrete Structures Limited, who manufactured all of the pre-cast concrete for the gorge bridge and the road-over-rail bridge at their factory in Dhurol Road, Hastings.

The 400 tonnes of steel that forms the Gorge Bridge was fabricated by Hawker-based Eastbridge.

Design and engineering expertise has come from Wellington firm Holmes Consulting Limited, who designed the bridges, and MWH of Auckland, who designed the road alignment and ancillary works such as stormwater management. NZTA were assisted by Beca Infrastructure with the preliminary design, tendering and project supervision and Opus Consultants, URS and Traffic Design Group assisted with design reviews and safety audits.

Together, it is estimated that the project will have injected around $40m into the local economy by the time it is completed in February.

Giant USA crane tackles NZ bridge

When the time came to lift the huge steel beams of the Matahorua Bridge, a gigantic American crane, one of the biggest ever in New Zealand, was up to the task for sub-contractor Concrete Structures.

The 55m crane was manufactured in the United States and shipped to Auckland, where four heavy haulage mems and 15 trailers transported it to Rotoviar for commissioning and testing before finally arriving at the Matahorua site.

A 500 horsepower turbo-diesel engine powers the 450 tonne crane and the nine hydraulic pumps that allow it to lift up to 450 tonnes. Its massive boom reaches across 180 metres – almost twice the length of a rugby field.

Using the huge crane means heavier and fewer loads are needed to erect the bridge, minimising the disruption and closures to motorists on the road below.

Aerial photo taken in June 2010 showing the Wairoa side of the gorge and the 450 tonne crane.

Safer journeys across the Matahorua Gorge

Various bridge designs were investigated by the NZTA project team when a crossing of the Matahorua Gorge was first considered.

There were seven different possible designs and it was for this reason that they tendered the project as a design and construct contract to enable different contractors and designers to choose an option that best suited their skills and equipment.

Holmes Consulting, a Wellington firm engaged by sub-contractor Concrete Structures, chose a design similar to one of those options. The final design meets all of NZTA’s requirements to withstand hurricane-winds and a one in 250-year earthquake.

Matahorua Bridge looks remarkably like a typical arch bridge (similar to Sydney Harbour Bridge) but is actually a frame bridge. The 450-tonne bridge deck is supported by pairs of shores on an incline into the wadihne walls of the gorge. Three spans from the deck measuring 407, 535 and 497 give a total length of 75m.

Choosing a bridge design that eliminated a central pier saved both time and money. Importantly, it also enabled construction to take place in a manner that avoided disturbing the Gorge face and the ecologically sensitive stream below. Each inclined pier weighs in at a massive 65 tonnes and sits on 16.5m-long piles meticulously hand-dug into the sandstone using compressed air tools to minimise the effect on the gorge face. This same hand-dug technique was used in 1928 to construct the adjacent rail bridge which withstood Napier’s 1931 earthquake.

Specialist welders took 27,000 hours to fabricate the structural steel of the bridge that weighs 420 tonnes and is held together by 4,800 bolts.

Looking after the natural environment has been a priority throughout the project. At all times they’ve endeavoured to limit the noise on surrounding houses by undertaking noisy work during the day.

Dwisting environmental protection has been built into the project in other ways too. For example, stormwater run-off from the new road will be cleaned before it is discharged into the stream and silo ponds have been used to capture and settle dirt during construction. Motorists will notice new plantings near the bridge and after the old road through the gorge is removed the area will be regrassed.

Some impressive numbers have been recorded in the 16 months it has taken to complete the Matahoura project. Here are a few:

• 137 metre long steel road bridge across the gorge
• Constructed of 500 tonnes of steel and a 1000 tonne pre-cast concrete deck
• 75 metre long rail bridge
• The bridge lies 28 metres above the Matahora Stream – as high as the top of the arch on the Auckland Harbour Bridge
• 21,000 cubic metres of aggregate
• 150,000 cubic metres of soil moved
• 82,000 cubic metres of fill placed
• 450 tonnes – the weight able to be lifted by the giant crane used to erect the steel bridge

SH50A extension to finish this year

Hawke’s Bay can expect more roading improvements in 2011 with the impending completion of NZTA’s SH50A Hawke’s Bay Expressway Southern Extension.

Construction of the 3.2km expressway extension started at the same time as Matahorua in October 2009 and is progressing smoothly with an opening predicted for March 2011.

The $12m project will provide a safer and more direct route south of the gorge, and opening predicted for March 2011.

Motorists will notice new plantings near the bridge and after the old road through the gorge is removed the area will be regrassed.

It takes a great team to build something special.

From investigation and specimen design to consenting and project management, Beca is proud to have provided a creative, dedicated team to work with NZTA on the Matahorua Gorge Realignment.

On big projects or small, from planning to design and commissioning, Beca is committed to helping transform New Zealand.

Beca. Creative people striving together to transform our world.
Project opens Waipukurau up to many new opportunities

Situated at the roll of the Waipukurau River, the town of Waipukurau is the gateway to the Te Urewera National Park. Its 8,500 residents, half of whom live in the town itself, are surrounded by spectacular scenery.

State Highway 2 through the Matahorua Gorge is the vital lifeline for Waipukurau’s residents and a key route for the freight industry, particularly logging. Around 60,000 hectares of pine forests lie within the district and the growing number of logging trucks have little room between wing mirrors when they meet on the slow, winding gorge road.

Once described as a ‘highway from hell’, it has always been a challenge when they meet on the slow, winding gorge road. During winter heavy rainfall and slippery conditions lead to slips and accidents that either close the road completely or make it necessary to operate under a one-way system. NZTA investigated a cost effective, long term solution for several years and eventually decided on straightening the road and building a new bridge to take motorists across - rather than through the gorge - was the best way to go.

Waipukurau residents and truckies will now have a safer trip along a straighter state highway that stays open year round. Local school children will no longer be late for school due to delays in the gorge. Most importantly, the one-way reliable route will give Waipukurau the opportunity to promote itself to tourists, while freight won’t have to struggle to negotiate the dangerous road to get to the town.

Long-serving Mayor Les Probert says, “The Waipukurau District Council has enjoyed working with the NZ Transport Agency throughout the project. Completing the new Matahorua bridges are an integral part of our economic development plan to provide easier access across Waipukurau. More reliable and better access gives us the opportunity to build our business economy and introduce everyone to the fantastic natural beauty of northern Hawke’s Bay.”

Innovation is Matahorua’s hallmark

Some $4 million of taxpayer’s money has been saved on the Matahorua project thanks to the innovation and ingenuity of NZTA and its team of contractors.

Once project funding was confirmed in February 2009, NZTA fast tracked the tendering process so construction could start as soon as possible. Just six months later contracts were awarded in August 2009 with construction starting in October 2009.

The cost savings have been made using what’s known in the construction industry as a design and construct tendering process. As the biggest road project in the Hawke’s Bay, Matahorua represented a significant opportunity for the region’s contracting firms.

Design and construct tenders involve a construction firm joining with a designer to develop a design that best utilizes their skills and equipment. The process enables different designers and contractors to work together while still meeting the criteria of the NZ Transport Agency. The Matahorua project posed some unique problems that challenged the tenderers, largely due to the difficult topography that had previously kept construction costs prohibitively high.

The winning team is led by Downer, with partners Concrete Structures and Eastbridge and designers Holmes Consulting and MWH.

Checking up online

Projects located in remote areas can sometimes be difficult to monitor, as is the case where most of the project’s staff live in Napier or further afield. To overcome this it was decided to use remote construction monitoring cameras to record the day to day progress of the project. This was the first NZTA project to use such monitoring devices.

Three on-site cameras capture high resolution images that are immediately beamed back to the Earthcam web centre via satellite. The images can then be viewed remotely on any computer with internet access by both the project team and the public. New images are captured every fifteen minutes and uploaded to the project website at www.nzta.govt.nz/matahorua.

Priority Project Well Done

“The Matahorua Gorge Realignment has been high on the priorities list for the Hawke’s Bay Regional Transport Committee, and it’s good to see that NZTA and its contractors have achieved this on time and within budget. The committee has persisted with the challenge of securing this essential Hawke’s Bay project against competing roading needs across New Zealand.

Removing this major bottleneck on the Napier Wairoa route will give travellers fewer road closures and accident risks, and better travel times. Everyone involved in this project deserves congratulations for an important job well done.”

- Alan Dick, Regional Councillor and Chairman, Hawke’s Bay Regional Transport Committee

Oppus is proud to have supported NZTA with the original investigation and planning, roading, and geotechnical design review and laboratory testing for all site works and construction.

For all Roading, Civil, Structural and Geotechnical Engineering, Surveying, Laboratory Testing, Planning, Environmental, Facilities Management, Heritage, Landscape Architecture and Architectural work, contact:

Napier Office (06) 833 5100 e-mail: dean.taylor@opus.co.nz
Wairport Office (06) 588 6340 Visit our Website: www.opus.co.nz

Basecourse density testing on site
the construction of buildings, bridges, dams, reservoirs, stock underpasses and other civil structures.

Concrete Structures (NZ) Limited has been proud to be associated with Contractors Downer EDI Works on this Major Project with the New Zealand Transport Agency by supplying and installing the New Gorge Bridge and the New Road over Rail Bridge.

THE ROAD TO WAIROA JUST GOT BETTER - WHY NOT MAKE THE TRIP?

Come and walk over Matahorua Gorge on Sunday 13 February

Before the NZ Transport Agency officially opens the new bridge in late February, the public are warmly invited to walk or cycle the new SH2 Matahorua Gorge Bridge on Sunday 13 February between 10am and 3pm.

Event details

When: Sunday 13 February 2011
Time: 10am to 3pm
Location: site - there will be several sign-posted access points from Napier
Carparking: limited carparking will be available on-site
Transport: event buses will be travelling to the site from Hawke’s Bay-Napier-Havelock
Return: Hawks-Hastings-Havelock North
Please pre-book your seat ($10 return) by calling Keith Lewis at WW Buses on 06 838 6049.

The realignment project has constructed 3.1 km of new and straighter state highway to replace the existing tight, winding route through the gorge. Two new bridges, one for rail, provide a path across the gorge to improve safety and reliability for residents, tourists and the freight industry.

Rotary and Tutira School will have food and drinks available for purchase on the day. Toilets will be located throughout the site. A gold coin donation would be appreciated, with all proceeds going to Rotary and Tutira School.

Each of the realignment initiatives in the Hawke’s Bay and Wairoa.

Students at Tutira School are among around your primary school children in Hawke’s Bay who have learnt about bridges in 2010 / 11. While New Zealand has almost 4,000 bridges, students have learnt about the importance of students understanding the advantages the new bridge will bring to their town.

"We have students and staff travelling through the gorge every day to reach school. As our major highway link to the community north of us, it is important for all of us to understand the significant changes and benefits the bridge will mean for our daily commute."

The Tutira students have been using a specially-designed bridge building kit from Futureintech to learn how bridges are constructed. As well as bridges in New Zealand, students have learnt about bridges overseas and also heard from professional engineers what it’s like to construct bridges for a living.

Several students have parents or friends who are part of the construction team so they have been able to share stories of their own.

Port Ahuriri School in Napier learnt about the four main types of bridges – beam, arch, cantilever and suspension/cable-stayed. They then put it into practice designing and decorating a bridge-shaped cake, with the winner being a suspension bridge cake.

Your 8 students at Hastings’ Twyford School spent a term studying bridges and built their own out of paper, cardboard, straws and ice block sticks to test their strength.

Come and see displays by the students of Tutira School at the open day.

CONCRETE STRUCTURES (NZ) LTD

CONGRATULATIONS TO THE NEW ZEALAND TRANSPORT AGENCY ON THE OPENING OF THE SH2 MATAHORUA GORGE REALIGNMENT.

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Concrete Structures is well-positioned to provide an integrated service to the construction sector with the manufacture, delivery and erection of concrete products for the construction of buildings, bridges, dams, reservoirs, stock underpasses and other civil structures.

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