

Molesworth Station

Historic Bridges Interpretation Panel

SUSPENSION BRIDGE

Welcome to The N.Z.E.D. Bridge. The New Zealand Electricity Department built three of these bridges on Molesworth to provide access to towers where the H.V.D.C. line crossed the river away from the road. This is the last of these bridges, the others having been washed away in floods. It is sometimes known as the Pig Trough Bridge after Pig Trough Gully, sited further upstream. Wild pigs were often seen around a wet soak near the head of the gully, hence the unusual name.

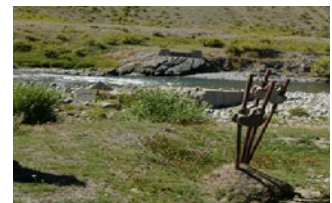
The N.Z.E.D. Bridge was the largest of the three Electricity Department bridges but was not used as a stock bridge. Other bridges on Molesworth were built as stock bridges. One remains on the Acheron just upstream of the Acheron/Clarence confluence, the second bridge on that site. All the others have been washed away by floods but foundations of most can still be seen. The N.Z.E.D. Bridge is maintained by the Department of Conservation as an historic bridge.



Molesworth sale steers crossing the Acheron.



Acheron Stock Bridge – map site 3.

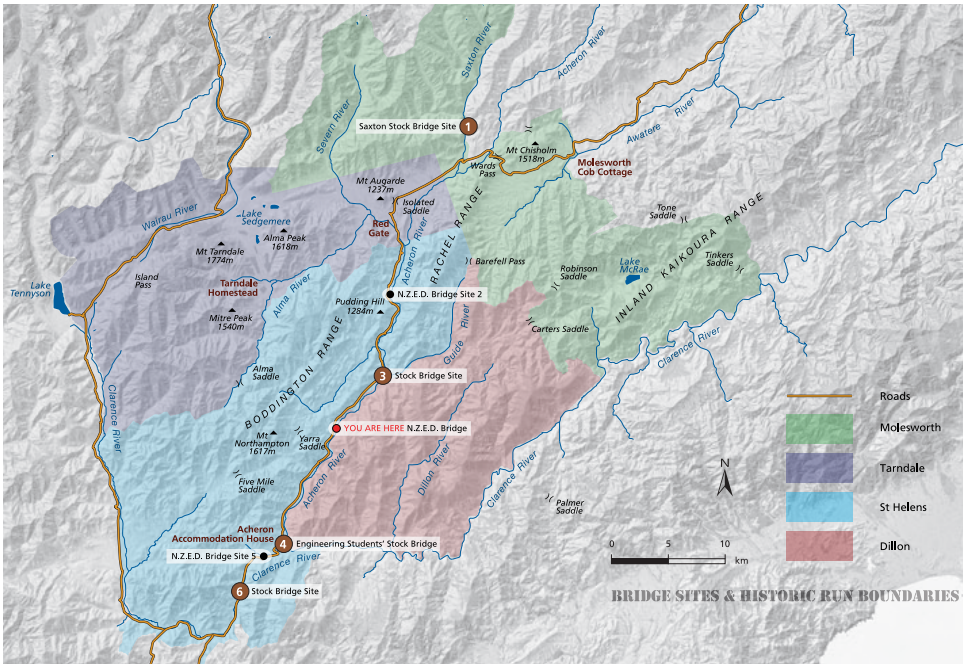


N.Z.E.D. Bridge – map site 2.



River crossing.

BRIDGE SITES & HISTORIC RUN BOUNDARIES



MATAGOURI SHRUBLANDS

The shrublands that once covered large areas of this landscape would have been dominated by matagouri. Matagouri or wild Irishman as it is sometimes known, is a nitrogen fixing native shrub which can grow into gnarly trees up to six metres in height. The plant's flowers and fruit provide important food for our native fauna. In an environment where there would naturally have been forest, the matagouri shrublands act as the succession vegetation cover in the journey from grasslands to tall trees.

Although Molesworth Station is leased for grazing, the areas of higher conservation value have long been recognised and some of these have been fenced. One such area across the river from here is Pig Trough Gully which was identified for its shrublands and scree communities. This area was fenced to exclude grazing in the summer of 1994–1995.



1. Saxton River stock bridge.



3. Acheron River stock bridge above the Guide River junction.



4a. 1890s stock bridge at the mouth of the Acheron River.



4b. Second bridge on the same site at the mouth of the Acheron River – Engineering Students' Stock Bridge.



6. Clarence River stock bridge.

HAZARDOUS RIVER CROSSINGS

River crossings have always been a high country hazard. The larger rivers on Molesworth, particularly the Clarence and the Acheron, were often obstacles in the movement of sheep. River levels and channels at fords were always changing, requiring care on the part of musterers and drovers to ensure they lost no stock, or lives.

There have been various stock bridges built and washed away over the years and their foundations can still be seen in the river beds if you know where to look.

All were suspension bridges with the decking suspended from wire cables supported by timber towers on either bank. The longest of these was on the Acheron River just upstream of its confluence with the Guide. This is probably the bridge Duncan Rutherford was referring to when he wrote to the Lands Department in 1913.

"I have... ..paid two thirds of the cost of the stock bridge over the Acheron River (which is the first bridge ever erected between Marlborough and Canterbury), also a stock bridge over the Clarence River near Lake Tennyson."



Mustering on Molesworth just upstream of The N.Z.E.D. / Pig Trough Bridge, 1950s.

St Helens Station had a stock bridge from at least the 1890s across the Acheron just above its confluence with the Clarence. The bridge allowed access to the Dillon Block and was later replaced by the present suspension bridge in 1945. The 1945 bridge was designed and built by Canterbury University Engineering School students. It is reputed that their brief included the requirement that 'it support a man on a galloping horse'.

Other stock bridges were built across the Clarence just below Mitchells Cutting, and on the Saxton River.

Current road bridges in Molesworth are all a result of the roading done by the New Zealand Electricity Department (E.C.N.Z.) in the 1950s and 1960s.

Historical information obtained from various sources including DOC archives and Don and Ann Reid. Photographs – Don and Ann Reid Collection; Marlborough Museum and Historical Society; National Archives; A. D. H. Russell Collection; Department of Conservation; Cathy Jones; Rob Suisted www.naturespic.com



Stock Bridge Clarence River – map site 6.



Hand forged cable guide – map site 6.



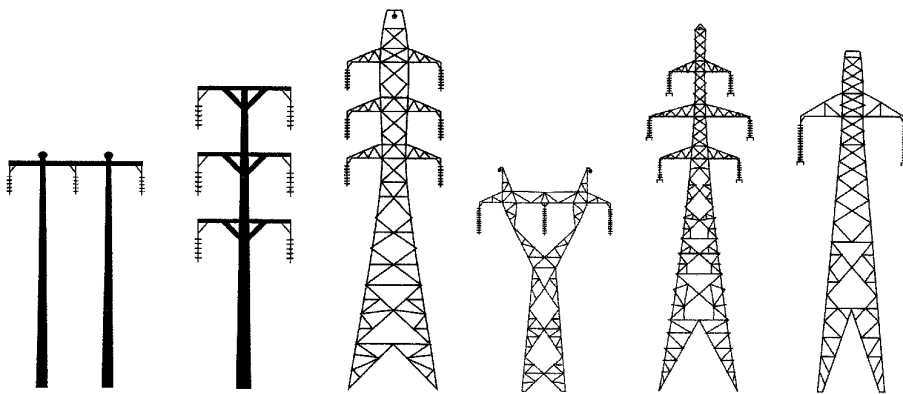
Engineering Students' Stock Bridge – map site 4.

Molesworth Station

HVDC Line Interpretation Panel

TAKING THE ELECTRICITY NORTH – THE HVDC LINK

By the 1950s the State Hydro-electric Department (later the N.Z.E.D.) recognised that the potential for future hydro power generation lay strongly with the South Island. In that year their Chief Electrical Engineer, Bill Latta mooted that the recent development of high voltage submarine power cables could provide the answer to sharing this resource with the North Island. This 500 kV DC transmission line and submarine link was built between 1960 and 1965. The route runs from the Benmore Dam via the McKenzie Basin and the Canterbury Plains to Hanmer where it crosses Jacks Pass to the Acheron Valley which it follows to Wards Pass then down the Awatere Valley to its South Island terminal station at Fighting Bay at Port Underwood. The submarine cable linked Fighting Bay with the North Island terminal station at Oteranga Bay on the Wellington coast.



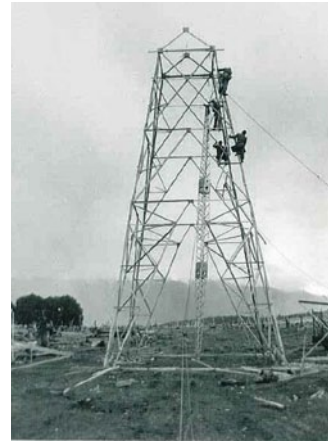
The HVDC line is 575 kilometres long and is supported by 1623 steel towers. Some of the types of towers used in New Zealand are shown above.



A pylon foundation digging gang possibly in the Upper Wairau 1957.



Road building and transporting components onto site required overcoming the challenges of difficult terrain.



Tower building using a floating gin pole. The gin pole is about to be hoisted up the centre of the partly-built tower to lift the next section into position

The construction of this line took five years. The N.Z.E.D. staff were based in construction camps along the route. The camps in the Molesworth section were at Hanmer and Langridge (Muller Station) while the earlier 220kV line had construction camps at Sedgemere and in the Upper Wairau near the Rainbow River junction. Each tower site had to be selected, surveyed and holes for the 3 to 5 metre deep foundations were often dug by hand. Sections of the towers were bolted together on the ground and then lifted into position by means of a floating gin pole that was raised inside the tower as it grew taller. The average tower is 35 metres tall and weighs approximately 5 tonnes. The power lines conductors were pulled from tower to tower across the ground by vehicle or if too steep by hand. Special trailer tensioning winches were used to string the conductors.

The line has subsequently been upgraded to maintain its capability to carry an increasing power load. In January 2004 extreme winds blew down three transmission towers near Wards Pass causing a break in the HVDC link. Replacement towers were quickly erected and the link restored within 5 days.



These tensioning winches were used to string the conductors (power lines) between the towers on the 500 kVDC line through Molesworth.

DEMAND FOR ELECTRICITY

The middle years of the 1900s saw a huge increase in New Zealand's generation of electricity. Between 1950 and 1965 eight hydro-electric and two thermal power stations were built. By 1958 the South Island was serviced by a single transmission network and by 1965 the High Voltage Direct Current (HVDC) link (the Cook Strait Cable) saw the whole country interconnected to the same system.

By the late 1940s the electricity supply in Nelson and Marlborough was still isolated from the rest of the South Island. This connection was made in 1955 by building a transmission line between Stoke and Inangahua on the West Coast.

MOLESWORTH STATION



These screen captures from a 1960s N.Z.E.D. film about the construction of the HVDC link show surveying, digging and building tower foundations, tower building and finally the stringing of conductors (lines).

DEMAND FOR ELECTRICITY CONT...

However the natural north-south routes through Molesworth were the logical and most direct choice when it came to transmitting electricity generated in the big southern power schemes northward, first to the top of the South Island and then across Cook Strait to the North Island.

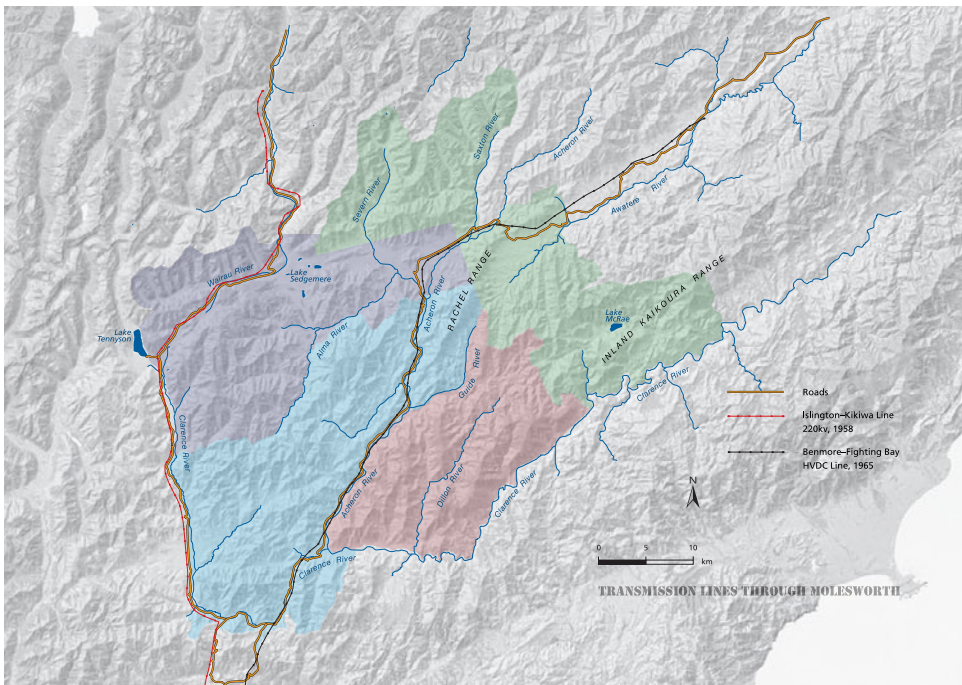
Two lines run through Molesworth. The first was built in 1958. This is the 220kV (kV=1000 volts) line that was built from Islington, Christchurch, to connect power from the Roxburgh Dam to Nelson/Marlborough. The route chosen ran across country to Hanmer, over Jacks Pass and through Molesworth via the upper Clarence and Island Saddle, down the Upper Wairau River to Tophouse and then to the Kikiwa substation from where it was reticulated around the district.



The 'new' road above Sedgemere linking North Canterbury and Nelson via the upper Clarence Valley and Island Saddle, built to serve the construction and maintenance of the 1958 line. An electricity workers' camp with a line of huts can just be seen in the middle distance at right.

The second line to be routed through Molesworth was built between 1960 and 1965 – the 500kV DC transmission line and submarine line known as the HVDC Link. This is the line that passes within sight of this shelter and is the reason the nearby bridge was constructed.

TRANSMISSION LINES THROUGH MOLESWORTH



Historical information obtained from DOC archives and the book *Connecting the Country, New Zealand's National Grid 1886-2007* by Helen Reilly, 2008. Photographs – Marlborough Museum & Historical Society; Grid Heritage, Transpower; E.C.N.Z.; Department of Conservation; Rob Suisted www.naturespic.com



Assembling a new transmission structure.



NEW ZEALAND ELECTRICITY DEPARTMENT

In 1958 the State Hydro-electric Department became the New Zealand Electricity Department (N.Z.E.D.). This name lasted until until the Electricity Corporation of New Zealand (E.C.N.Z.) was established in 1986 under the State Owned Enterprises Act.



Molesworth Station

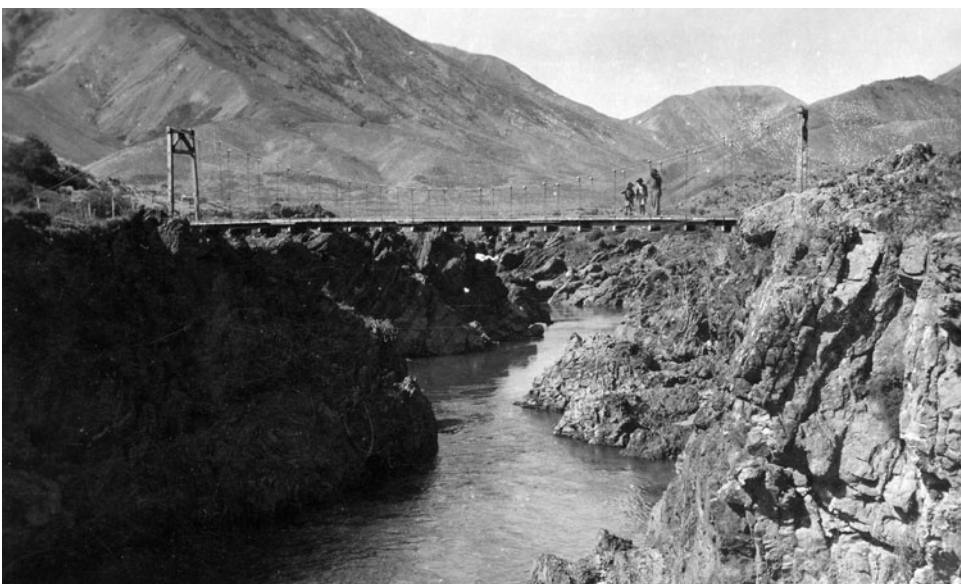
Engineers' Bridge Interpretation Panel

THE ENGINEERING STUDENTS' STOCK BRIDGE

Spanning 23.5 metres, the 1945-built bridge was designed to enable an annual muster of around 15,000 sheep on St Helens Station to cross the Acheron River. An earlier bridge had been washed away. A problem with the earlier bridge was that it was just one sheep wide and it must have taken two or more days to push the flock across. The replacement bridge had to be sufficiently strong to support the sheep crossing two-abreast or a musterer and horse. Even if 30 sheep crossed in a minute, it would still take eight hours for the whole flock to cross the new students' bridge.



ABOVE The first bridge over the Acheron River at this site. BELOW The second bridge on the same site, the Engineering Students' Stock Bridge, which was built in 1945 and restored by DOC in 2013.



ST HELENS STATION

St Helens Station had a stock bridge here in the early 1900s, as seen in the 1930s photograph. It allowed access to the Dillon Block and was used for the annual sheep muster as well as general access. River crossings were always a high country hazard. Levels and channels at fords were always changing, requiring care on the part of musterers and drovers to ensure they lost no stock. Bridges helped, but were not a guarantee that stock would be safe. Driving a huge mob of skittery sheep across a narrow bridge was a skilled job. Wing fences helped to funnel the mob and prevent them plunging over the steep sides.

In 1944 a class of engineering students at Canterbury University were given a brief to design and build the bridge that stands before you. This exercise, which covered the practical component of their degree requirement, saw them spending their summer holidays living in the high country. At least one man from that class, Roger Harding, had fond memories of the experience that included eating endless meals of mutton. In stories to his family he called it Roger’s Bridge and over the years the family made a number of return visits to the site.



Starting to renew the first tower.



Using a turfer winch to position parts.



Assembling a new tower.



Moving materials to the other side.



Putting finishing touches to the second new tower.



Replacing decking.



Strapped into safety harnesses while working on the deck.

The engineering students’ bridge was only used for a few seasons following its completion in 1945. Sheep grazing was discontinued on St Helens in 1948 and the station amalgamated with Molesworth, which grazed only cattle.

Restoration of the bridge took place in the summer of 2013. Six men – Kim Forbes, Kevin McGrath, Ray Bennett, Rob Avery, John Taylor and Matt Page (with technical advice from historian Steve Bagley and engineer Jonathon Calder), worked for 13 days of around 12 hours per day. At a casual glance upon completion, much of the bridge looks new. Yet between the two new towers and under the replaced decking boards still lies old, sound material. Three transoms and 50% of the bearers were renewed. The cables did not require replacing.

Information from Department of Conservation. Photographs – A. D. R. Russell Collection, Anne & Don Reid Collection; Janet Bathgate; DOC.



**“TO SUPPORT
A MAN ON A
GALLOPING HORSE”**

Roger Harding describing
the bridge design brief.

**“THE MOST
REWARDING JOB
I HAVE DONE FOR
DOC YET”**

Kevin McGrath describing
the restoration.