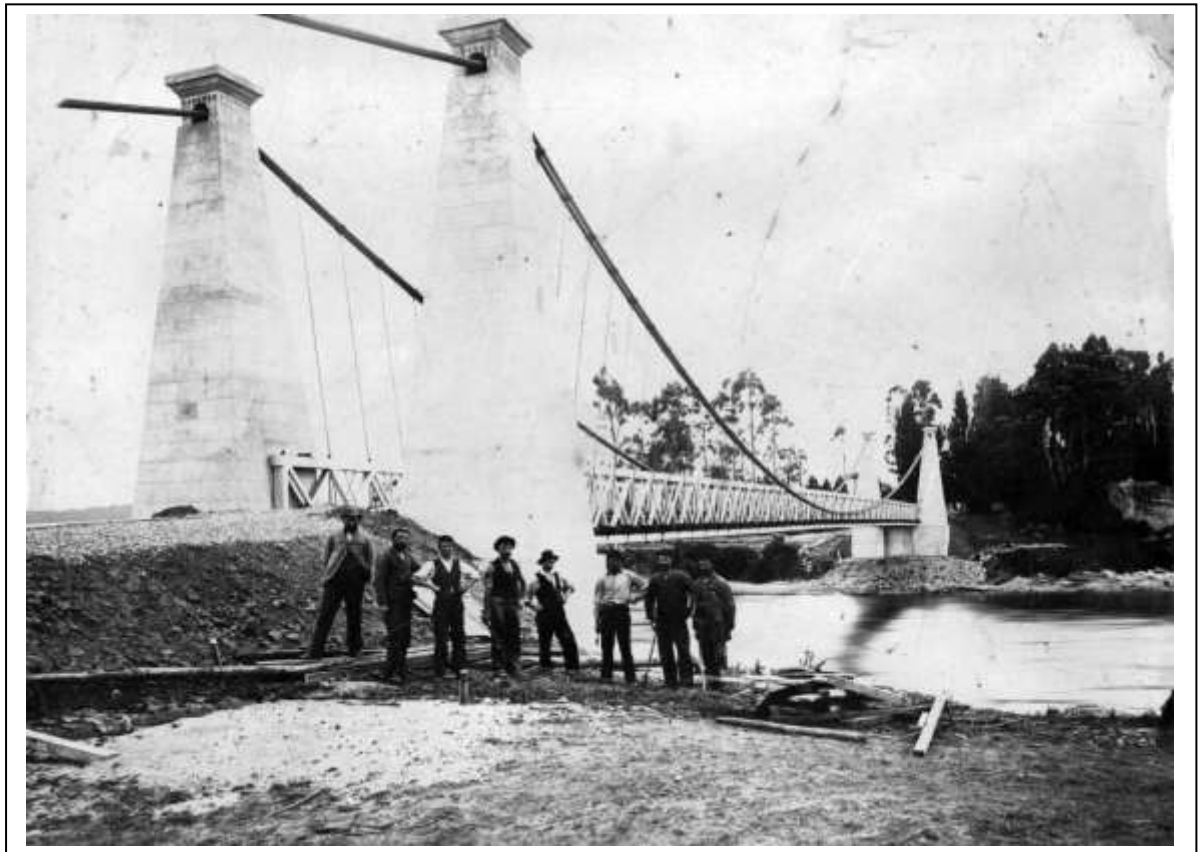


IPENZ Engineering Heritage Register Report

Clifden Suspension Bridge, Waiau River

Written by: Karen Astwood
Date: 3 September 2012



Clifden Suspension Bridge, newly completed, *circa* February 1899. Collection of Southland Museum and Art Gallery

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A. General information

Name: Clifden Suspension Bridge

Alternative names: Clifden Bridge; Waiau Bridge; Waiau River Suspension Bridge

Location:

Waiau River

Clifden

Southland

Geo-reference: Latitude -46.029, longitude 167.715

Legal description: Sec 38 Blk I Lillburn SD (CT SL7A/105), Southland Land District.
New Zealand Gazette 1984, p.493



Image courtesy of GoogleMaps

Access information:

The bridge is located in a historic reserve and spans the Waiau River between Bates and Gardner Roads. These roads are accessed from Clifden Highway, State Highway 99, north of Clifden township, Southland. The Clifden Suspension Bridge is west of the current highway bridge. Presently, the Clifden Suspension Bridge is closed to pedestrians.

City/District Council: Southland District Council

IPENZ category: Engineering work

IPENZ subcategory: Infrastructure

IPENZ Engineering Heritage number: 2347

Date registered: 16 October 2012

Other IPENZ recognition: N/A

Other heritage recognition:

- *New Zealand Historic Places Trust:* Category 1 historic place (Register no. 4921)
- *Local Authority District Plan:* Southland District Plan, Appendix 6.9, Registered Historic Buildings, Places and Sites, Site no. H2, Map 23

B. Description

Summary

Constructed between June 1898 and February 1899, Southland's Clifden Suspension Bridge was the first bridge built over the Waiau River.

The European settlement of west Southland, known as Wallace County, increased substantially in the late 19th century, helped by a Government land sales programme. At this time (before the subsequent hydro power developments on the river began) the Waiau River was among New Zealand's most forceful rivers and therefore bridging it was imperative to the success of settlements like Clifden and new surrounding farms. Indeed, a portion of each of the land sale proceeds were specifically earmarked for this, but it took several years and some strong campaigning by local Member of Parliament Michael Gilfedder (1865–1948) for the bridge to be realised.

The Public Works Department (PWD) delegated the design of the structure to the Southland County Council's esteemed engineer, Charles Henry Howorth (1851–1945), with the contract supervised on their behalf by PWD Dunedin District Engineer, Edgeworth Richard Ussher (1839–1916). Howorth's suspension bridge has a 111.5 metre (m) main span and consists of steel suspension cables and hanger rods, and a heart totara and Australian hardwood deck. The large concrete towers were plastered to create the illusion of masonry construction. The structure was built by respected Invercargill contractor William Baird.

The single lane bridge was closed to road traffic in 1978, being replaced on State Highway 99 by a new bridge. Soon after, the Clifden Suspension Bridge became a New Zealand Historic Places Trust property, used as a footbridge, and it remains a valued local landmark.

This structure is important because it marks the fruition of a representative Otago and Southland bridge type, and is distinguished by its high level of materials and design integrity. The Clifden Suspension Bridge has engineering significance because it had the longest main span in New Zealand at the time it was completed, and it continues to rank among the longest nationally. This structure is also a lasting tribute to the experience of, and regard for, Howorth as an engineer.

Historical narrative

Ngāi Tahu tradition states that Tamatea, the great early Māori chief and explorer, is said to have had difficulty navigating the Waiau River. Indeed, it was when the waka *Tākitimu* wrecked at the mouth of the river during a storm that he and the other survivors named the river Waiau because of “the swirling nature of its waters.”¹ Despite being potentially dangerous the Waiau River was an essential travel and trade route for local Māori, as well as a significant food source.²

Later, when earnest European settlement began in the mid-1800s, the river was the west boundary of Southland Province.³ However, by the time Wallace County was established in 1876, its territory had moved further west towards the fiords.⁴ When roads began to be established the river was a valuable source of high quality gravel, but mostly it was seen as a barrier to land transport. As such, it is said there was a ferry at Clifden, or Waiau as it was better known at the time, from 1852, which was very early in the settlement of Southland.⁵ It was during this period that European explorers began working their way inland up the Waiau River, with run holders following in their wake.⁶

It has been noted that “bridges and punts tended to be a pre-occupation of many in the Waiau Riding prior to the First World War”.⁷ The population seems to have increased steadily in the preceding decades, which provided greater impetus for bridges. In the early 1890s the Clifden area’s population was boosted when a Government scheme divided large tracts of land into farms, and the post office and public school were also opened in 1894.⁸ Clifden got its name because the town was formerly part of Clifden Station, a large sheep station, and it seems that from the

¹ ‘Schedule 69, Sections 205 and 206: Statutory Acknowledgement for Waiau River,’ in Ngai Tahu Claims Settlement Act 1998 097, The Knowledge Basket, URL: <http://legislation.knowledge-basket.co.nz/gpacts/public/text/1998/sc/097sc69.html> (accessed 12 June 2012)

² Ibid.; Bill Dacker, ‘The South Land of Murihiku,’ in Paul Sorrell (ed.), *Murihiku: The Southland story*, Invercargill, 2006, p.45

³ Cyclopeda Company Limited, ‘Southland,’ *The Cyclopeda of New Zealand [Otago and Southland Provincial Districts]*, Christchurch, 1905, p.775

⁴ Cyclopeda Company Limited, ‘The Wallace County Council,’ p.962

⁵ Vince Boyle and Jim Brown, ‘Making Tracks – The Development of Land Transport in the South,’ in Sorrell, p.108; Vince Boyle, Jim Brown, Cathy Macfie and John Slattery, ‘Sea and Air Transport, Energy and Communication,’ in Sorrell, p.138

⁶ Linda Tyler and Julie Asher, ‘The Visual and Performing Arts,’ in Sorrell, p.354

⁷ Ken Bye quoted in Sorrell, p.138

⁸ Cyclopeda Company Limited, ‘Clifden,’ pp.967–68

outset a suspension bridge was planned to service the new settlement.⁹ The population continued to grow – in the five years from 1896 for example, the population of Wallace County increased from 6,657 to 7,989.¹⁰

The site for the first bridge over the Waiau River caused local debate which was aired in the Letters to the Editor pages of the *Otago Witness* in early 1894. Apparently, many of the new settlers preferred a site further south of Clifden.¹¹ However, at a “very enthusiastic” public meeting in 1898 the Clifden site was unanimously voted for.¹² By this time settlers were becoming incensed at the slow progress in building the bridge. They had a right to complain considering they paid a tax specifically for the structure’s construction as a condition of their land purchases.¹³ The May 1898 announcement that the contract for the Clifden Suspension Bridge had been let was met with local relief at finally having resolution to what has “long been a burning question”.¹⁴

By the early 20th century Wallace County had constructed seven bridges, including the Clifden Suspension Bridge, which was singled out as being a “fine suspension bridge”.¹⁵ The contractor, William Baird, seems to have begun work in June 1898, and it was reported that he “may be relied upon to push forward the work with his accustomed vigour.”¹⁶ Little biographical detail is available about Baird. However, it appears that he had several road building contracts with the Southland County Council in the late 1880s and 1890s, and was based in Invercargill.¹⁷

Charles Henry Howorth (1851–1945), the Southland County Engineer, designed the structure and seems to have advocated strongly for it in the face of Government assertions that the bridge could not be constructed for less than £10,000.¹⁸ It was uncommon for the design of Public Works Department (PWD) structures to be

⁹ Ibid.; ‘Southland Land Board,’ *Otago Witness*, 16 June 1892, p.15

¹⁰ Cyclopeda Company Limited, ‘Southland,’ p.775

¹¹ *Otago Witness*, 5 April 1894, p.14; 12 April 1894, p.22; 17 May 1894, p.17

¹² ‘Clifden,’ *Otago Witness*, 13 March 1898, p.30

¹³ ‘Clifden,’ *Otago Witness*, 31 May 1894, p.23; 14 June 1894, p.22; ‘Mid-Waiiau,’ *Otago Witness*, 1 July 1897, p.29

¹⁴ ‘Mid-Waiiau,’ *Otago Witness*, 12 May 1898, p.29

¹⁵ Cyclopeda Company Limited, ‘The Wallace County Council,’ p.962

¹⁶ ‘Mid-Waiiau,’ *Otago Witness*, 23 June 1898, p.25

¹⁷ ‘Southland County Council,’ *Mataura Ensign*, 18 October 1887, p.3; ‘Southland County Works,’ *Mataura Ensign*, 5 February 1895, p.4

¹⁸ ‘Clifden,’ *Otago Witness*, 6 April 1899, p.28. In the end the bridge cost £5007. ‘Clifden Suspension Bridge,’ NZHPT Register information, URL:

<http://www.historic.org.nz/TheRegister/RegisterSearch/RegisterResults.aspx?RID=4921&m=advanced> (accessed 3 July 2012)

delegated to the county engineers. However, some exceptions were made if the local county engineer was respected and highly experienced, and the PWD engineers were too busy. Therefore, Howorth being given responsibility for Clifden Suspension Bridge's design is evidence of professional regard and an acknowledgment of his proficiency.¹⁹ Howorth was cognisant of this and "felt honoured by the confidence placed in him by the Hon. J. McKenzie in entrusting him with the design of the bridge".²⁰

Howorth was born and educated in Otago. He spent most of his working life as the Southland County Engineer from 1880-1906, but was also a surveyor.²¹ He seems to have specialised in marine engineering because during his career he was the PWD assistant engineer on the Westport harbour works, a consulting engineer for the Bluff Harbour Board, and in 1908 Howorth was appointed Whanganui's resident harbour engineer.²² However, this position was cut short as a result of World War One economic conditions.²³ A multi-talented person, Howorth was also a noted landscape painter, and his works are in many public and private collections in New Zealand and Australia, including the Auckland Art Gallery.²⁴

Other people involved in the Clifden Suspension Bridge works included foreman G. Rough, J. Marr the inspector; and J. Johnston who fabricated the cables.²⁵ The PWD Dunedin District Engineer, Edgeworth Richard Ussher (1839–1916), supervised the contract.²⁶ Canadian born and educated, Ussher had come to New Zealand in the early 1860s and was mostly involved in road and railways surveying and engineering work. In 1887 he became the District Engineer, a position he retained until his retirement in 1908.²⁷

¹⁹ G. Thornton, 'Clifden Suspension Bridge, Waiau River,' IPENZ Heritage Assessment, 2007. At this time there was no Wallace County Engineer. Neil G. Hansen and J. Noel Hall, *The County Engineer of New Zealand, 1876-1989*, Tauranga, 1993, p.99

²⁰ 'Opening of the Waiau Bridge,' *Otago Daily Times*, 14 April 1899, p.3

²¹ 'Mr C. H. Howorth,' *Evening Post*, 24 August 1945, p.6; Hansen, p.38

²² 'Harbour Engineer for Wanganui,' *Wanganui Herald*, 7 March 1908, p. 5

²³ 'The Members' Tribute,' *Wanganui Chronicle*, 25 September 1917, p.4

²⁴ Una Platts, 'Howorth, Charles Henry 1856–1945,' *Nineteenth Century New Zealand Artists: A Guide and Handbook*, Christchurch, 1980, URL: <http://nzetc.victoria.ac.nz/tm/scholarly/tei-PlaNine-t1-body-d1-d614.html> (accessed 2 July 2012); 'Charles Howorth,' Auckland Art Gallery Toi o Tāmaki, URL: <http://www.aucklandartgallery.com/the-collection/browse-artists/979/charles-howorth> (accessed 2 July 2012)

²⁵ 'Opening of the Waiau Bridge'

²⁶ G. Thornton, *Bridging the Gap: Early Bridges in New Zealand, 1830–1939*, Auckland, 2001, p.193

²⁷ F. W. Furkert, *Early New Zealand Engineers*, Wellington, 1953, pp.284–85; Cyclopedia Company Limited, 'Public Works Department,' p.142

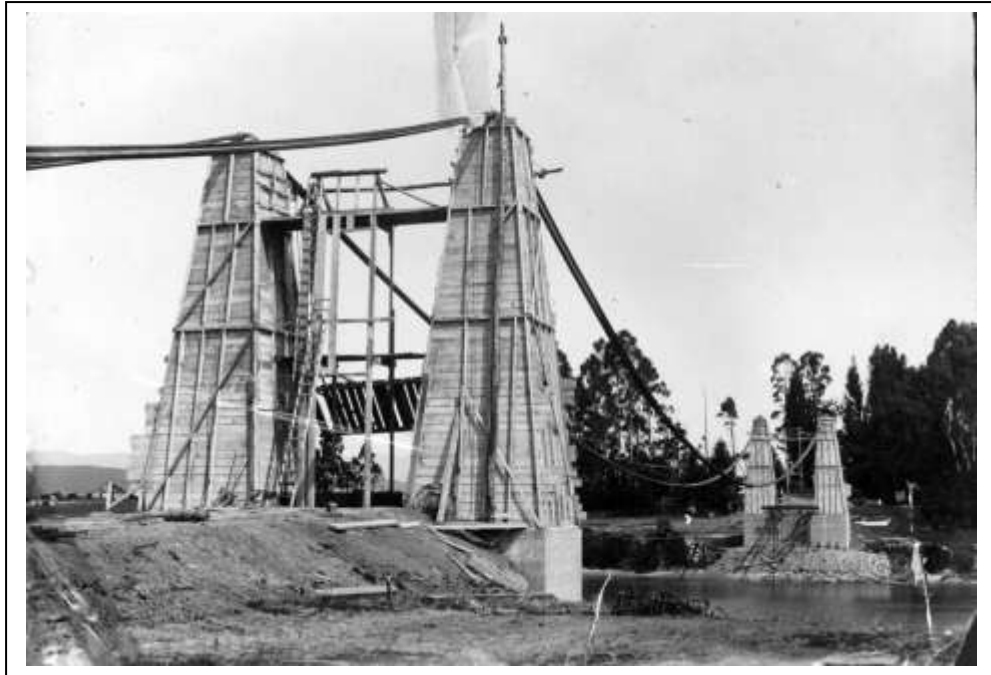


Figure 1: Construction of Clifden Suspension Bridge, 1898. Collection of Southland Museum and Art Gallery

The Clifden Suspension Bridge was completed by late February 1899.²⁸ The official opening ceremony was not until 5 April (see Figure 3), with the Hon. Joseph George Ward (1856–1930) presiding on behalf of the Minister for Lands, the Hon. John McKenzie (1839–1901). Some expressed the opinion that Michael Gilfedder (1865–1948), Wallace Member of Parliament, should have been given the honour of opening the structure which he had stringently fought for.²⁹ However, he had to settle for a position among other dignitaries, including the Commissioner of Crown Lands, D. Barron, and William Walker, the Chairman of the Wallace County Council.³⁰ Gilfedder's efforts were recognised by Ward, saying that the Clifden Suspension Bridge was “a credit alike to the designer, builder, and to their Member [of Parliament] for his successful efforts to get the vote sanctioning the expenditure passed”.³¹

The Clifden Suspension Bridge was part of State Highway 99 until 1978 when it was closed to road traffic. It then became part of a historic reserve vested with the New

²⁸ 'Mid-Waiiau,' *Otago Witness*, 23 February 1899, p.29

²⁹ 'Clifden,' *Otago Witness*, 6 April 1899, p.28. Locals may also not have been too impressed with Ward opening the structure considering he had been bankrupt only a few years earlier and was not reinstated to Premier Richard Seddon's cabinet until later in 1899.

³⁰ 'Opening of the Waiiau Bridge'

³¹ *Ibid.*

Zealand Historic Places Trust (NZHPT) in 1984, to be used by pedestrians.³² The NZHPT had previously taken on the Springvale Suspension Bridge in Rangitikei as one of their properties. When the Clifden Suspension Bridge was offered to them they “accepted it with alacrity”.³³ This represented the broadening of the NZHPT’s definitions of what constituted heritage to include growing recognition of the importance of industrial and engineering heritage. The structure was added to the NZHPT register as a Category 1 historic place in 1990.³⁴

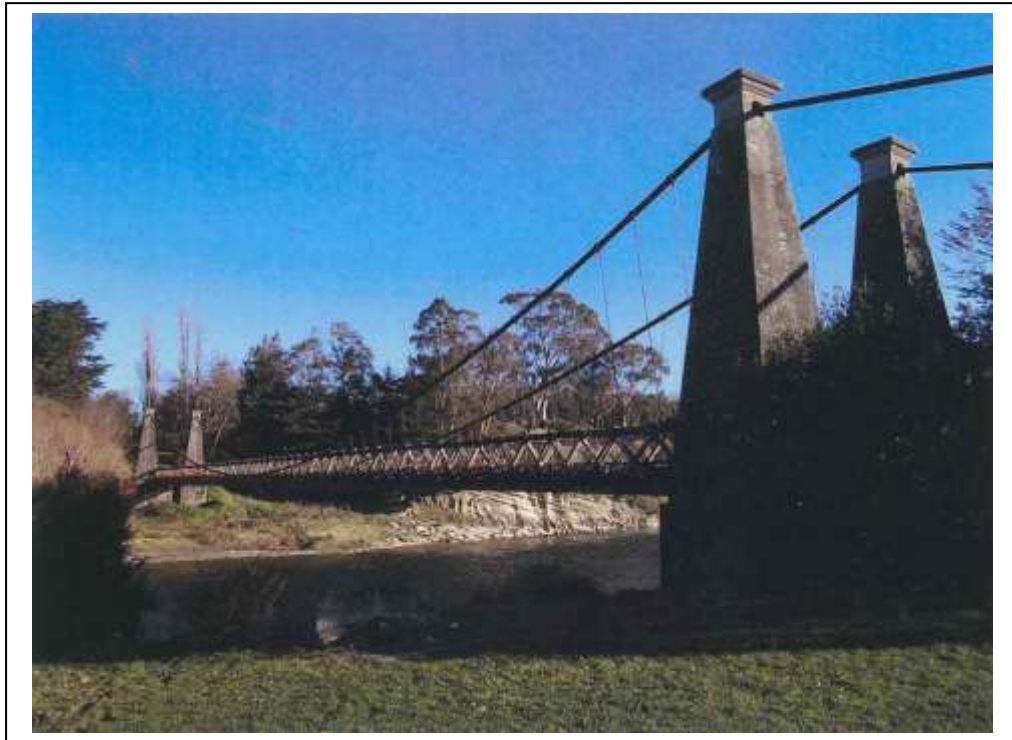


Figure 2: Clifden Suspension Bridge, circa 2010. NZHPT, File 13010-008 Vol. 2

In 2010 some local people were dismayed to find that pedestrians were prohibited from the Clifden Suspension Bridge because of safety concerns. The bridge was closed because structural deficiencies were found during a detailed inspection by engineers from Opus International Consultants Limited. The bridge will be closed until remedial work can be undertaken, which is anticipated for 2012–2013.³⁵

³² ‘Clifden Suspension Bridge,’ NZHPT Register information

³³ Geoffrey Thornton, interviewed by Shona McCahon, IPENZ Oral History Project, National Oral History Centre, Alexander Turnbull Library, 22 June 2010, Recording 7

³⁴ ‘Clifden Suspension Bridge,’ NZHPT Register information

³⁵ Shirley Whyte, ‘Bridge closure stuns Tuatapere residents,’ *Southland Times*, 27 April 2010, URL: <http://www.stuff.co.nz/southland-times/news/3625148/Bridge-closure-stuns-Tuatapere-residents> (accessed 5 June 2012); ‘Clifden Suspension Bridge closure,’ NZHPT Information release, 20 April 2010, URL: <http://www.historic.org.nz/en/News/2010-Apr20-ClifdenBridge.aspx> (accessed 5 June 2010); Pers Comm, Karen Astwood and Peter Walker (NZHPT Heritage Destinations Programme Manager), 4 July 2012

Social narrative

Southland is known for its high rainfall and numerous rivers. The combination of these two created dangers for late 19th century travellers in the region, and bridges were seen as a safer alternative to the numerous fords and ferries located along transport routes.³⁶ Prior to 20th century hydro-power developments, the Waiau River had a reputation for being particularly fierce, because it was the vehicle for heavy rain discharges from the Te Anau, Manapouri and Monowai inland catchments. In the period when the Clifden Suspension Bridge was constructed, the Waiau River was second only to the Clutha River for the volume of water that flowed down it.³⁷



Figure 3: Opening day of the Clifden Suspension Bridge, 5 April 1899. Collection of Southland Museum and Art Gallery. Sir Joseph Ward and wife are the two passengers at the front of the cart.

Therefore, it was imperative to the growing west Southland settlements and farming community of the late 19th century that a bridge was constructed across the Waiau River. Such a structure was seen as essential in providing increased access for people and goods. It is not surprising, then, that the Clifden Suspension Bridge's opening was described as a "red letter day for Waiau".³⁸ The opening festivities drew people from all over the district, with approximately 300 pedestrians crossing the structure after the dignitaries in their vehicle. Even with this load on the structure it

³⁶ Vince Boyle and Jim Brown, p.112

³⁷ Neville Peat, 'Land and Environment – Tranquil Plains to Soaring Wilderness,' in Sorrell, p.32

³⁸ 'Opening of the Waiau Bridge'

was said that “scarcely [a] tremour could be detected”.³⁹ After the ceremony a banquet and ball were held in the town hall.⁴⁰ For over a decade the Clifden Suspension Bridge remained the only bridge across the Waiau River.⁴¹

Early on the structure had a reputation as a “magnificent suspension bridge”.⁴² The bridge has continued to be highly esteemed by the local community despite no longer being used for road traffic. The structure has recently been described as a “valuable icon” which is not only a well-known tourist attraction and picnic spot, but a popular place for weddings and other events.⁴³

The Clifden Suspension Bridge has further local community importance as the site of Clifden’s World War One Memorial and Roll of Honour. This marble tablet was paid for by donations and fundraising proceeds. Despite the location of the memorial being confirmed in 1920, it was not until 1924 that the memorial was installed and unveiled on one of the bridge’s towers.⁴⁴



Figure 4: Clifden Suspension Bridge memorial, date unknown. Geoffrey Thornton Photograph Collection, IPENZ

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Thornton, 2001, p.116. A bridge, south of Clifden, at Tuatapere was completed in 1914.

⁴² Cyclopedia Company Limited, ‘Clifden,’ p.967

⁴³ ‘Bridge Closure Stuns Tuatapere Residents’

⁴⁴ ‘Welcome Home at Clifden,’ *Otautau Standard and Wallace County Chronicle*, 28 October 1919, p.1; ‘Wallace County Council,’ *Otautau Standard and Wallace County Chronicle*, 25 May 1920, p.3; ‘Clifden Soldiers’ Memorial,’ *Otautau Standard and Wallace County Chronicle*, 2 December 1924, p.3

Physical narrative

Single span suspension bridges were the favoured type of bridge for ferocious rivers such as the Waiau and the Clutha because they did not require piers in the river, which would have been highly prone to scour and flood damage. Another reason suspension bridges were also particularly popular in Central Otago was their suitability for crossing deep gorges.⁴⁵

Once a common local type, the group of Central Otago and Southland late 19th century suspension bridges has gradually dwindled. Early remaining examples are the Manuherikia River Bridge, Alexandra (1879), and the Alexandra Bridge (deck and catenary now removed), Daniel O'Connell Bridge, Ophir, and Kawarau Gorge Suspension Bridge, all completed in 1880. The Skippers Canyon Suspension Bridge can also be counted among this group despite being finished a few years after the Clifden Suspension Bridge, in 1901.

Of these bridges, the Clifden Suspension Bridge had the longest main span, at 111.5 m. Indeed, it was not until a couple of decades later that road bridges more commonly had lengthier spans. A particularly substantial example was the Opiki Suspension Bridge, south of Palmerston North (1918) with its 144 m span. The deck of this bridge was removed in the late 20th century.⁴⁶ Developments in materials and engineering knowledge throughout the 20th century have led to significantly longer spans, such as the 243.8 m long central span of Auckland's steel Harbour Bridge. However, even now the longest span in a railway bridge in New Zealand is 110 m.⁴⁷ Therefore, the Clifden Suspension Bridge is special because it is among New Zealand's earliest surviving vehicle traffic bridges with the longest main spans.

When the Clifden Suspension Bridge was opened it was said that over 2,000 tons of material was used to create the 3.5 m wide single lane road traffic structure.⁴⁸ The bridge consists of pairs of concrete tapering towers on either bank of the river,

⁴⁵ Thornton, 2001, p.176. A good example of the use a suspension bridges to cross a deep gorge is the Kawarau Gorge Suspension Bridge, IPENZ Register, URL: <http://www.ipenz.org.nz/heritage/itemdetail.cfm?itemid=56> (accessed 4 July 2012)

⁴⁶ Thornton, pp. 203–04

⁴⁷ 'Auckland Harbour Bridge,' IPENZ Engineering Heritage Record, URL: <http://www.ipenz.org.nz/heritage/itemdetail.cfm?itemid=117> (accessed 4 July 2012); The North Island Main Trunk railway's prestressed concrete North and South Rangitikei, and Kawhatau, Viaducts, completed between 1979 and 1981, all have the longest main span of a New Zealand railway bridge. Karen Astwood, 'North Island Main Trunk Historic Area, Vol. II,' NZHPT report, 27 May 2009, p.24

⁴⁸ 'Opening of the Waiau Bridge'

approximately 7.5 m high and plastered to look like masonry (see p.1 and Figure 1). The marble war memorial plaque is located on the eastern river bank's northern tower.⁴⁹ The 28 steel suspension cables pass through the tower caps which have fluted plaster decoration and heavy cornices, adding to the monumental appearance of the towers. The abutments are also concrete and the suspension cables are anchored into the limestone bedrock. The connection between the cables and the deck is made with steel hanger rods. The bridge's superstructure mostly consists of the heart totara, used in the stringers, deck, and stiffening trusses which form the sides of the bridge. The deck's transoms are Australian hardwood.⁵⁰



Figure 5: Clifden Suspension Bridge, date unknown. Geoffrey Thornton Photograph Collection, IPENZ

Interestingly, for a structure of this age there do not appear to have been any significant modifications to the bridge while it was part of the road network. This is perhaps evidence of how well the valuable asset was maintained by the local council.⁵¹ In 1999 the NZHPT undertook some remedial work at the structure, which

⁴⁹ Thornton, 2007; Opus International Consultants, 'Clifden Suspension Bridge Details Structural Inspection,' Report, April 2010, p.1. NZHPT File 13010-008 Vol. 2. The boxing for the concrete can be seen in Figure 1

⁵⁰ Opus International Consultants, pp.1-2

⁵¹ Thornton, 2007

included painting, some repair of timber and steel components, as well as professional cleaning of the war memorial.⁵²

Currently work is being planned to secure the Clifden Suspension Bridge's structural integrity. This includes the replacement of decayed timber and steel components, as well as other interventions to bring it up to current structural standards and the Building Code. These include upgrading the current handrail, and removing potentially hazardous, structurally extraneous, decayed stringers.⁵³

Key physical dates

June 1898	Construction begun
February 1899	Construction completed
1999	Remedial work: painting, timber and steelwork repair, cleaning of memorial plaque

⁵² Hadley and Robinson Limited, 'Restoration of the Clifden Suspension Bridge, Clifden Southland,' Tender document, 1999. NZHPT File 13010-008 Vol 1

⁵³ Opus International Consultants, pp.ii-iii

C. Assessment of significance

The first bridge over the forceful Waiiau River, the Clifden Suspension Bridge has historical importance because it promoted social and economic expansion in west Southland until it was replaced as a highway asset in 1978. Its acceptance as a New Zealand Historic Places Trust property in the mid-1980s reflects the contemporary growth in the recognition of engineering structures as important aspects of New Zealand heritage.

The Clifden Suspension Bridge has outstanding engineering heritage because it marked a key milestone in New Zealand bridge building, having the longest main span in the country when it was completed in 1899, and it continues to rank highly in these statistics among extant structures. It also is an excellent example of a once popular form of bridge in Central Otago and Southland.

A key local landmark, the Clifden Suspension Bridge is also remarkable because it remains largely unchanged in features and materials since it was constructed to Charles Henry Howorth's design. The structure is a lasting testimony of Howorth's engineering experience and skill, with the Public Works Department's delegation of the Clifden Suspension Bridge's design being strong evidence of the high professional standing that Howorth achieved as Southland County Engineer.

Therefore, Clifden Suspension Bridge is of sufficient engineering heritage significance to merit inclusion on the IPENZ Engineering Heritage Register.

D. Supporting information

List of supporting information

'Clifden Suspension Bridge,' New Zealand Historic Places Trust (NZHPT) Register information, URL:

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