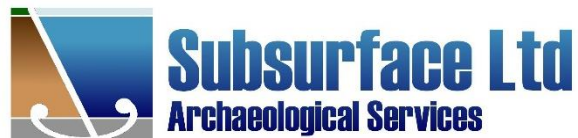


MANGAWEKA BRIDGE

ARCHAEOLOGICAL ASSESSMENT



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INTRODUCTION

BACKGROUND

The Manawatū District Council is investigating options for the upgrade of the Mangaweka vehicle bridge across the Rangitīkei River. As part of their scoping, the Council commissioned historical research, including an assessment of heritage values for the bridge (Burr 2015, Bowman and Burr 2015). The initial historic research suggested that components of the bridge were constructed prior to 1900. Physical remains pre-dating 1900 are protected under the archaeological provisions of the *Heritage New Zealand Pouhere Taonga Act 2014*.

Communication between the Manawatū District Council and Heritage New Zealand staff have highlighted the likely requirement for an archaeological authority to be in place before works commence, if those works are likely to affect pre-1900 sites or archaeological features. This assessment has been commissioned by the Manawatū District Council to inform its decision-making process. Specifically, its purpose is to:

- identify potential for pre-1900 archaeological features associated with, or in the vicinity of the bridge that might be affected by the proposed upgrade options;
- assess the effects on archaeological values for the various proposed upgrade options; and
- inform whether an authority is required before proceeding with any of the proposed options.

COMMISSION

Subsurface Ltd was contracted by Jim Mestynek of the Manawatū District Council to prepare an archaeological assessment of effects, and if necessary assist with an application to Heritage New Zealand for a general authority to modify archaeological sites.

METHODOLOGY

The New Zealand Archaeological Association Site Recording Scheme, Manawatū and Rangitīkei District Plans and the New Zealand Heritage List/Rārangī Kōrero were reviewed for sites in the Mangaweka area.

The history specific to the Mangaweka bridge has been compiled by historian Val Burr (Burr 2015). Background history for the wider area has been compiled from a number of secondary sources including area histories, Historic Area reports (Astwood 2009), Waitangi Tribunal reports (Stirling and Subasic 2010), and archaeological survey reports held in the Heritage New Zealand digital library (Donovan 1976).

The Heritage Assessment commissioned by the Manawatū District Council (Bowman and Burr 2017) has been consulted for analysis relevant to the archaeological values assessment. Additional research was carried out with reference to online material including Digital NZ and digitised survey plans accessed through Quickmap.

The author inspected the project area on 12 September 2017 in the company of Jim Mestynek, Senior Project Engineer for the Manawatū District Council.

CONSTRAINTS AND LIMITATIONS

The site visit that forms the basis of this assessment was carried out over two hours during which the bridge, its approaches, and the immediate areas up and down stream were visually inspected by the author. Some areas, particularly around the water supply intake upstream of the bridge on the true right, were not able to be accessed because of steep terrain and dense vegetation.

The subsurface nature of archaeological features means that they are often not evident solely based on above ground evidence. For this reason, this assessment necessarily relies in part on historic research and past archaeological recording to inform of the potential for archaeological deposits.

While this assessment covers aspects of the Māori history in the wider area, and assesses archaeological values associated with Māori sites, cultural values have not been assessed. This can only be provided by tangata whenua.

STATUTORY CONTEXT

There are two main pieces of legislation in New Zealand that control work affecting archaeological sites. These are the *Heritage New Zealand Pouhere Taonga Act 2014* (HNZPTA) and the *Resource Management Act 1991* (RMA).

Heritage New Zealand administers the HNZPTA. It contains a consent (authority) process for any work affecting archaeological sites, where an archaeological site is defined as:

(a) any place in New Zealand, including any building or structure (or part of a building or structure), that:

- (i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where that wreck occurred before 1900; and
- (ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and

(b) includes a site for which a declaration is made under section 43(1)

Any person who intends carrying out work that may damage, modify or destroy an archaeological site, or to investigate a site using invasive archaeological techniques, must first obtain an authority from Heritage New Zealand. The process applies to sites on land of all tenure including public, private and designated land. The HNZPTA contains penalties for unauthorised site damage or destruction. The archaeological authority process applies to all sites that fit the HNZPTA definition, regardless of whether:

- The site is recorded in the New Zealand Archaeological Association Site Recording Scheme or listed by Heritage New Zealand,
- The site only becomes known about as a result of ground disturbance, and/or
- The activity is permitted under a district or regional plan, or a resource or building consent has been granted.

Heritage New Zealand also maintains a list of Historic Places, Historic Areas, Wāhi Tūpuna, Wāhi Tapu and Wāhi Tapu Areas. The New Zealand Heritage List/Rārangi Kōrero can include

archaeological sites, and its purpose is to inform members of the public about such places and be a source of information for the purposes of the Resource Management Act 1991.

The RMA requires City, District and Regional Councils to manage the use, development, and protection of natural and physical resources in a way that provides for the wellbeing of today's communities while safeguarding the options of future generations. The protection of historic heritage from inappropriate subdivision, use, and development is identified as a matter of national importance (section 6f). Historic heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities. Historic heritage includes:

- historic sites, structures, places, and areas
- archaeological sites;
- sites of significance to Māori, including wāhi tapu and wāhi tūpuna;
- surroundings associated with the natural and physical resources (RMA section 2).

These categories are not mutually exclusive and some archaeological sites may include above-ground structures or may also be places that are of significance to Māori. Where resource consent is required for any activity, the assessment of effects is required to address cultural and historic heritage matters.

Statutory acknowledgements are outlined in various Claims Settlement Acts, and may apply when consents or archaeological authorities are being sought for activities in certain areas. The purpose of a statutory acknowledgement is to formally acknowledge statements of association between iwi and specific places, including areas of land or bodies of water. They also to require the notification of the consent application to the relevant iwi authority. The Rangitikei District Plan lists the Rangitikei River as one of the statutory acknowledgements from the *Ngāti Apa (North Island) Claims Settlement Act 2010*.

An application for an authority to modify archaeological remains in the Rangitikei River, therefore requires notification under this provision.

PHYSICAL ENVIRONMENT

LOCATION AND GEOGRAPHY

The Mangaweka bridge is located on Ruahine Road, and crosses the Rangitikei River 1.8 kilometres east of the Mangaweka town centre (Figure 1). It is a boundary bridge between the Manawatū and Rangitikei Districts. It is designated Bridge No. S250B by the Manawatū District Council, and Bridge No. 69 by the Rangitikei District Council.

The project area for this report includes the approaches to the bridge either side of the river on both the upstream and downstream sides. Legal Descriptions for this area are in the Wellington Land District and include: Pt Section 52 Blk X Hautapu SD; Section 114 Blk X Hautapu SD; Pt Subdivision 1B Sect 1 Blk X Hautapu SD; Lot 4 DP 348499; Pt Awarua 4B; Ruahine Road Reserve and the Rangitikei River bed. They include a mixture of Recreation Reserve, Conservation Land, Road Reserves and privately-owned land. Vegetation cover is presently varied under scrub, pasture, and open space campground with mature trees (Figure 2).

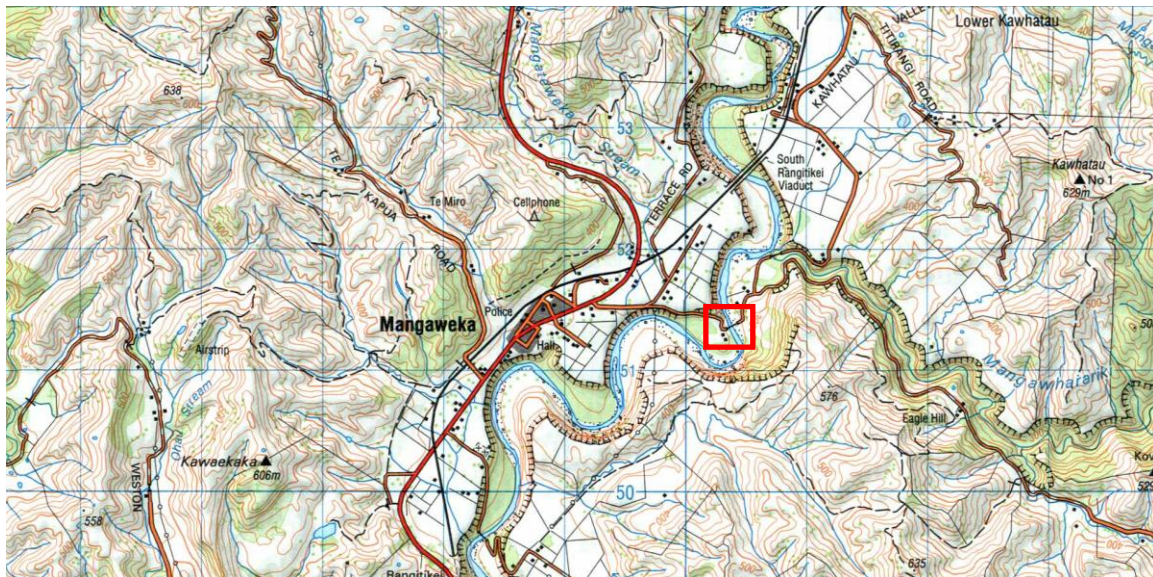


Figure 1: Location of project area. See Figure 2 for detail.

SOILS AND PEDOLOGY

The geography of the Mangaweka area is characterised by the deeply incised channel of the Rangitikei River which cuts through sedimentary terrace land, with hill country further back from the river on either side. On the eastern side of the river are a series of narrow intermediary terraces. The soils associated with the terrace land are generally a mixture of loess, ash and alluvium, while the hill country soils include a mixture of weathered sedimentary rock and erosion debris prone to slumping and slips (Molloy 1988:100-102; Donovan 1976:3-4).

The underlying geological units are alluvial river terraces of gravel, sand, silt and mud (Q2a) on the western side of the river, and Paparangi Group (Pp) mudstones and concretionary sandstones on the eastern side (Lee, Bland, Townsend, and Kamp 2011). The Rangitikei river bed in this area is alluvial gravels.



Figure 2: Google Earth imagery dated February 2015 showing the locations of the Mangaweka bridge and town



Figure 3: Google Earth imagery dated August 2009 showing the Mangaweka bridge and approaches

PROPOSED WORKS

At this stage, there are a number of options available for the upgrade of the Mangaweka Bridge. These have been outlined in an indicative business case (GHD 2017). Briefly summarized, the options that were considered were:

- Minimal intervention (do nothing);
- Minor strengthening of the existing bridge (26T-30T);
- Major strengthening of the existing bridge (35T);
- New (53T-80T) bridge on existing alignment;
- New (80T-100T) bridge on existing alignment;
- New (53T-80T) bridge on new alignment upstream or downstream;
- New (80T-100T) bridge on new alignment upstream or downstream;
- New (53T-80T) bridge adjacent to NIMT railway bridge; or
- New (80T-100T) bridge adjacent to NIMT railway bridge

The indicative business case has shortlisted three options:

- Minimal intervention (do nothing, included as control option);
- New (53T-80T) bridge on new alignment upstream or downstream;
- New (80T-100T) bridge on new alignment upstream or downstream;



Figure 4: Existing alignment (options 1 2 3 4a 4b)

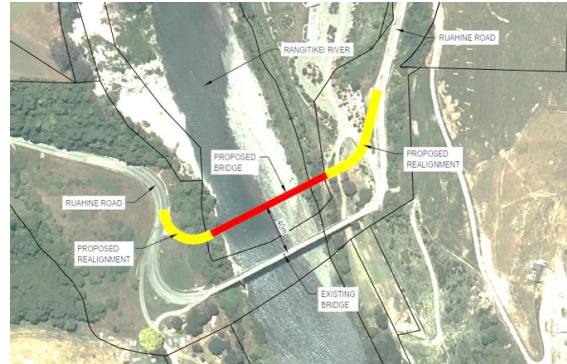


Figure 5: New alignment upstream (options 5a 5b)

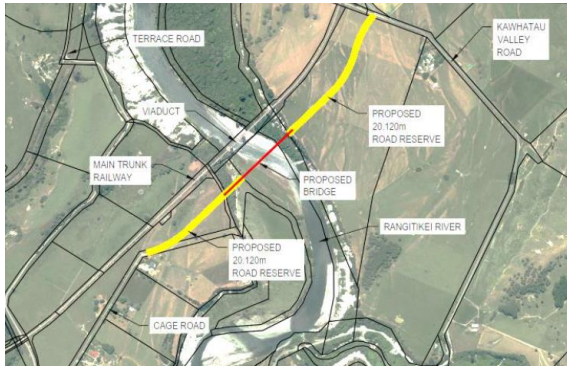


Figure 6: Alignment parallel to NIMT (options 6a 6b)

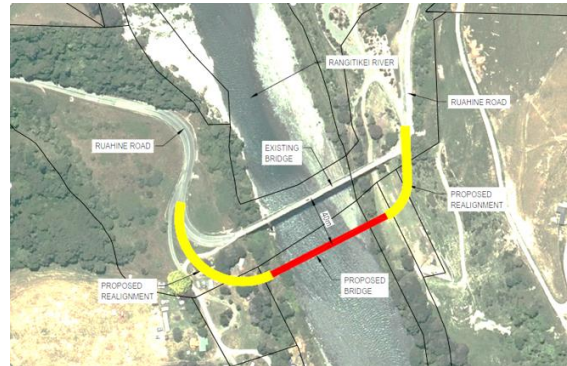


Figure 7: New alignment downstream (options 5a 5b)

The two options for strengthening of the existing bridge were not included in the shortlist because it was felt that the access would remain compromised. The construction of a replacement bridge on the existing alignment was also not included as it was felt that this would destroy a valued heritage feature, and vehicle access would be lost during the construction period. The options to realign the bridge parallel with the NIMT railway were rejected because of the high cost, and the need to forcibly acquire significant amounts of privately owned property.

The preferred option identified by the indicative business case is for a new alignment, approximately 40 metres south of the existing bridge, or 40 metres north of the existing bridge. The southern option would necessitate the realignment of the approaches through the campground on the western side and across what is presently privately-owned land on the eastern side (Figure 8). The northern option would remain within the road reserve on the western side, necessitate the realignment of the approaches through what is presently privately-owned land on the eastern side

In addition to the options shortlisted in the indicative business case, the Manawatū District Council has also requested that the archaeological assessment consider the effects of the demolition of the Mangaweka bridge once construction of the new alignment has been completed.

Their reason for doing so is that the New Zealand Transport Agency have offered to fund the demolition costs provided it is carried out as part of the upgrade project. Any future funding required for the maintenance and upkeep of the bridge will otherwise need to be met by the District Councils.

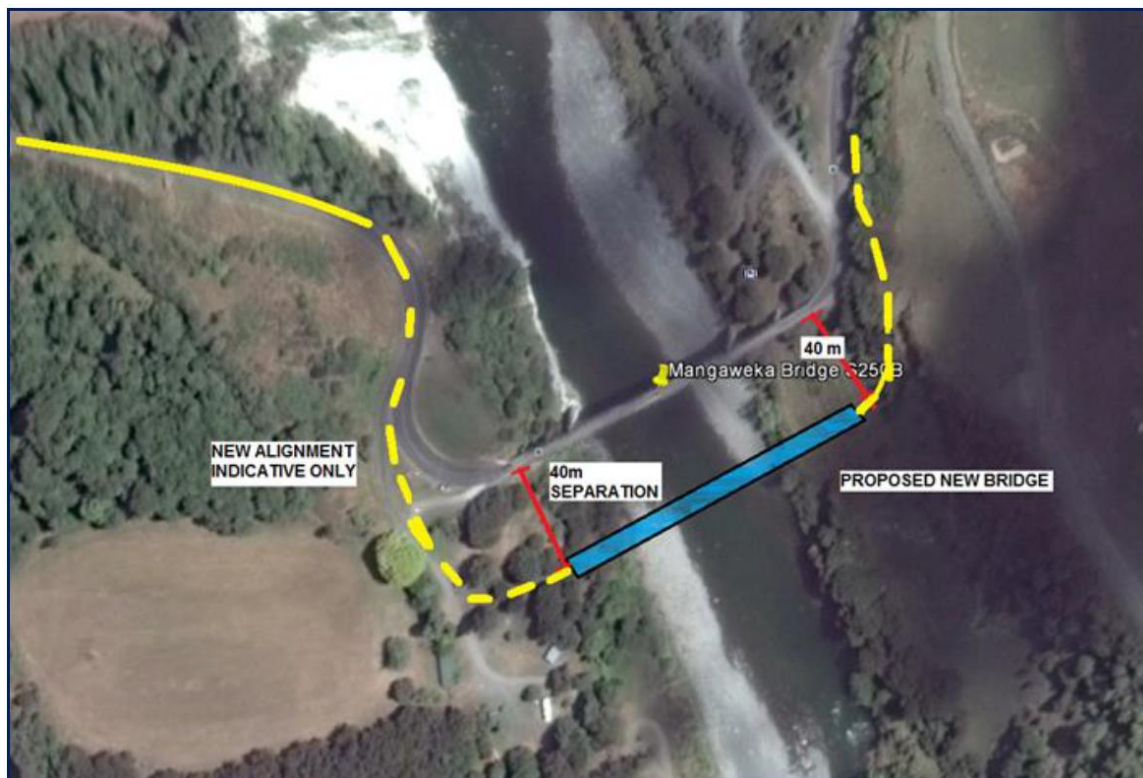


Figure 8: Aerial view showing indicative route of preferred option (Supplied Manawatū District Council)

HISTORIC BACKGROUND

MĀORI OCCUPATION

The initial settlement of New Zealand from East Polynesia is believed to have occurred by AD1250-1300 (c.800 BP/750 cal. BP) (Higham and Jones 2004:232). This is supported by environmental studies which show widespread forest clearance and establishment of fern species around AD1200-1400 (McGlone and Wilmshurst 1999:12).

People rapidly explored and settled the new country shortly after their arrival. They appear to have remained largely mobile while occupying coastal settlements, many of which also provided ready access to the resources inland (Anderson 2015:59). Exploration of the interior of the North Island using river systems, such as the Rangitīkei may have happened shortly after first arrival, but the transitory nature of these excursions can make earliest archaeological evidence difficult to find.

Early occupants of the Taihape District and Central North Island were the Ngāti Hotu. They were encountered by the ancestors of the Mōkai Pātea iwi¹ who claim common descent through Tamatea-Pokaiwhenua of the *Takitimu* waka (Stirling and Subasic 2010:13). Tamatea-Pokaiwhenua explored much of the district accompanied by his son Kahungunu. Ngāti Hauiti claim their whakapapa through Te Hika ā Kahukare, the descendants of Tamatea-Pokaiwhenua and his second wife Kahukare.² The eponymous ancestor, Hauiti, was the son of Whakaruruhau of Te Hika ā Kahukare.

Another Ngāti Hauiti tupuna, Topia Turoa, was born in close proximity to the Mangawharariki Stream which joins the Rangitīkei River a short distance upstream from the Mangaweka bridge.³

The Rangitīkei River route through the central North Island was used a number of times by taua (raids) and heke (migrations) during the Musket Wars of the 1820s and 1830s (Travers 1872:116; Downes 1910; Wilson 1914:218; Crosby 1999:196, 284-87). The focus of these incursions was conquests and lands to the south in the Kāpiti/Horowhenua areas, but they were also locally disruptive as the people of the Rangitīkei were subjected to some violence on the way through (Travers 1872:117).

One of the Ngāti Hauiti settlements along the Rangitīkei River near the present day Mangaweka bridge was known as Pounga. It was from this location that an overland track traversed in a north and northeasterly direction towards another settlement at Hawanga (Donovan 1976). This track formed part of the Otago-Taupō-Pātea overland route.

Te Pounga was mentioned briefly in the description of a heke between Taupo and Haowhenua in c.1834, referred to as Hou hou rongō ki Hoawhenua:

“After we returned from Kapiti we remained a long time at Taupo, and then came down again after Haowhenua. We came down by the Mōkai Pātea road mustering five hundred strong. At Mōkai Pātea a few of the Ngāti Tama met us, and came on with us to Kawa-tau. We travelled overland this time, and did not canoe down the river, but travelled the track by the river, calling at Te Pounga, Otago and Moko-bine, Te Pōhue, and Te Ana.” (Downes 1910:113)

Pō[h]unga was also mentioned briefly by James Coutts Crawford in his account of his journey up the Rangitīkei River in January 1862:

¹ Ngāi Te Ohuake, Ngāti Hauiti, Ngāti Tamakōpiri, and Ngāti Whitikaupeka

² <http://www.ngatihauiti.iwi.nz/ng257ti-hauiti-history.html> accessed 14.09.2017

³ communication Robert Martin to Jim Mestyaneck 07.09.2017

“On January 17th the weather was cooler, and we started at 8.30 A.M. The Maoris indulged in singing airs, which put me in mind of the drawling music of the Arabs and other Easterns. Having passed a succession of bad rapids, we stopped at Pohunga to dinner. Here the Taupo Road crossed the river. The cliffs are now entirely of a bluish-white clay with marine fossils beneath, and drift gravel, as of an old river bed at the top, from five to twenty feet thick. While dinner was being prepared, two pigeons alighted on a tree just above the fire, and were dropped by Mr. Deighton almost literally into the pot. At 4.30 P.M. we passed the Kawhatau junction. This tributary is almost as large as the main river, and falls in on the left bank.” (Crawford 1880:121).

The indicative location of Pounga is shown on some large-scale survey plans (eg. Plan of the County of Manawatu Province of Wellington NZ, dated 1881).

NATIVE LAND COURT

The lands either side of the Rangitikei River at Mangaweka remained in Māori customary ownership until they were brought before the Native Land Court in the later part of the nineteenth century. The river formed the boundary between two massive land blocks, the 270,000-acre Te Awarua Block on the west side, and the 104,000-acre Otamakapua Block on the east side. The Otamakapua Block was one of the first major land blocks to be purchased in the Taihape District by the Crown, and was the subject of Native Land Court Hearings from 1870-1894. The Awarua Block was put before the Native Land Court in 1886 (Stirling and Subasic 2010:29,56,82).

The Native Land Court processes saw these blocks subdivided into smaller pieces and much of the land was sold into Crown ownership. Most of the Otamakapua Block was sold into Crown ownership by 1884, and by 1900 the Crown had acquired just over half of Te Awarua (Stirling and Subasic 2010:60-61,84). Mangaweka township was later established on part of Awarua 4B (ML 1331).

One of the key drivers of Crown purchase of Māori land in the Rangitikei was the construction of the North Island Main Trunk Railway Line. The railhead, extending north, had reached Hunterville by 1887. Following the completion of the Makohine viaduct the railway line was open to Mangaweka by November 1902, and reached Taihape by 1904 (Astwood 2009:8,20).

MANGAWEKA

By 1891, there was a road which extended north from the railhead at Hunterville, eventually becoming a bridle track just south of Taihape (known as Ross’s track). The government had erected shelters along this road, and the third of these was at the future site of Mangaweka, hence the original name for the settlement, ‘Three Log Whare’. The town was renamed Mangaweka in 1894, and by this time it had a store, post office, school, hall and a number of businesses (*Cyclopedia of New Zealand* 1897). By the turn of the century, the population had reached almost 1000 people.

A farming settlement at Kawhatau on the opposite side of the Rangitikei River was established in 1894, and a road known as Three Log Road extended from the town to the river crossing. The alignment of Three Log Road was surveyed in 1893, and completed by November 1895 (*Feilding Star* 14.11.1895, p.2; SO 13499). The river could be forded at a number of locations including upstream in the vicinity of the NIMT railway bridge (associated with Clayton’s pack track) and downstream at the base of the cliff, nearer Mangaweka township (SO 13729). Three Log Road was renamed Mangawharariki Road in 1904 (*New Zealand Gazette* 1904, p.1109).

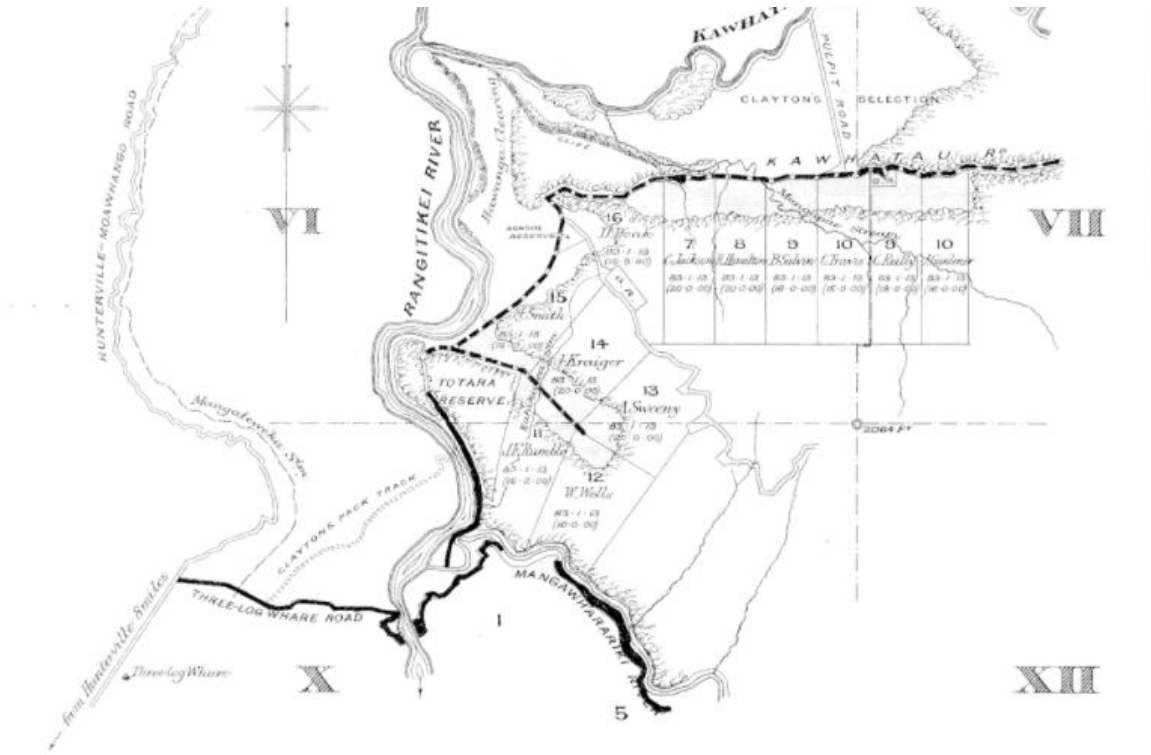


Figure 9: Map of the Kawbatau settlement in the Annual Report on the Department of Lands and Survey, 1895, Appendices to the Journal of the House of Representatives C1

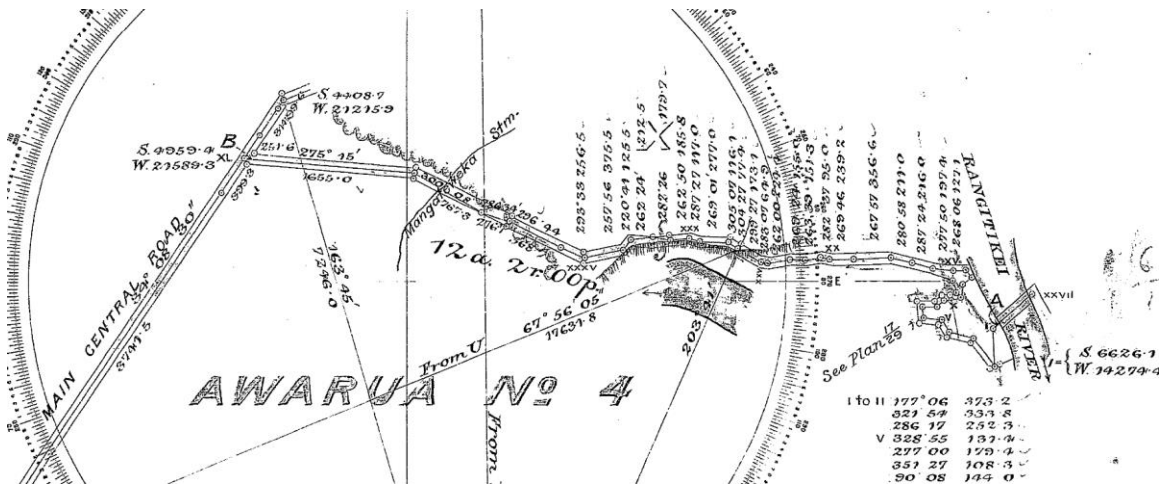


Figure 10: Detail of the survey plan for Three Log Road (SO 13499, dated 1893)

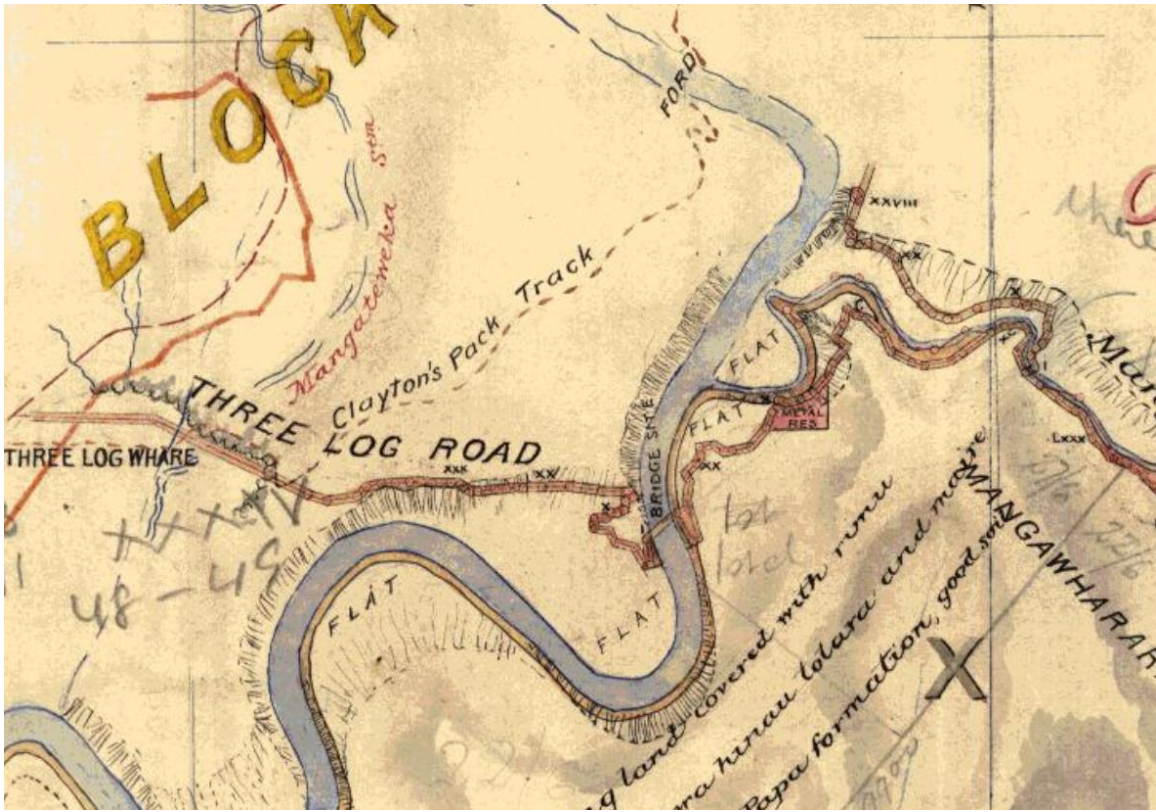


Figure 11: Detail of SO13472 (dated 1893, with later annotations) showing road and river crossings



Figure 12: Detail of SO 13729 (dated 1894) showing bridge, gravel reserve, and ford

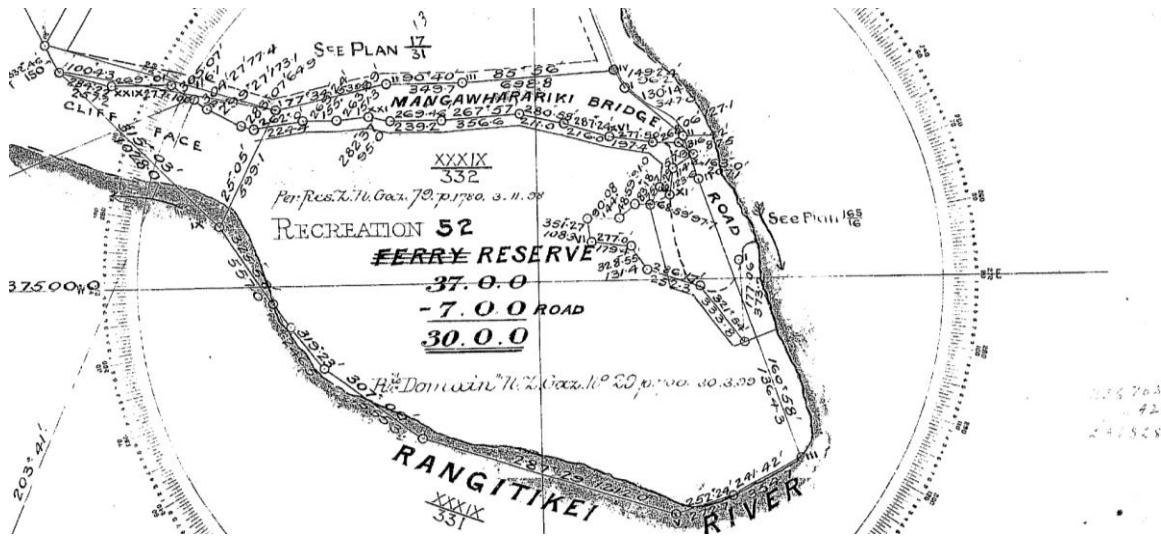


Figure 13: Detail of SO13794 (dated 1895) showing ferry reserve and road

RIVER CROSSINGS

A cage suspended on a wire cable that could transport people and goods was also in place here by November 1896 (*Feilding Star* 25.11.1896, p.2). The wire was suspended across the river downstream of the present-day bridge (Figure 14). Access to the cage was via elevated timber platforms on either side. The cage was washed away in the April 1897 floods, but appears to have been reinstated (*Feilding Star* 22.04.1897, p.2).

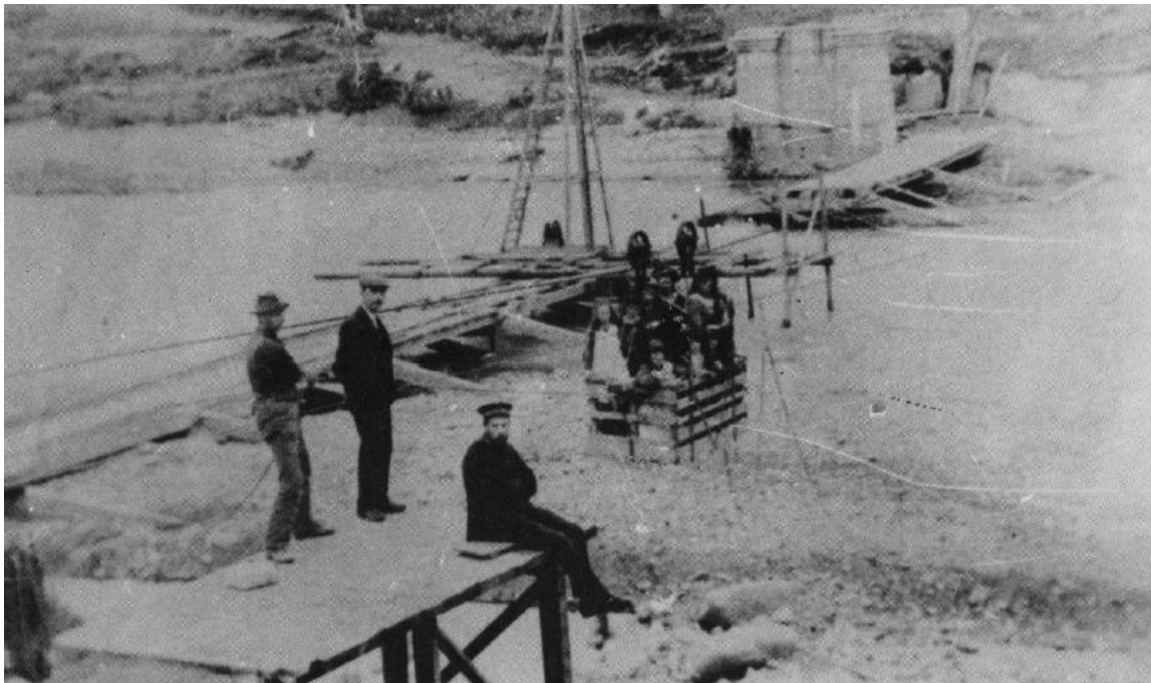


Figure 14: Photo showing the cage crossing with partially washed out low-level bridge and eastern pier for permanent bridge in background. Note also structure mid-stream for the placement of the central bridge cylinder (reproduced from Burr 2017)

Construction of the bridges appears to have commenced late in 1896. The contract for these was given to the road surveyor, G.T. Murray. Two bridges were planned, a low-level temporary bridge, and a more permanent elevated bridge on concrete piers. Government funds were first granted in 1895, and the timber low-level bridge appears to have been first constructed in 1896-97 (*Feilding Star* 25.11.1896, p.2). It was designed for flood waters to pass over the top, but was washed out on at least two occasions, and rebuilt. The low-level bridge can be seen in a number of historic photos with diagonal bracing on either side (Figures 15 and 16), although at least two photos have the bracing on the upstream side only.

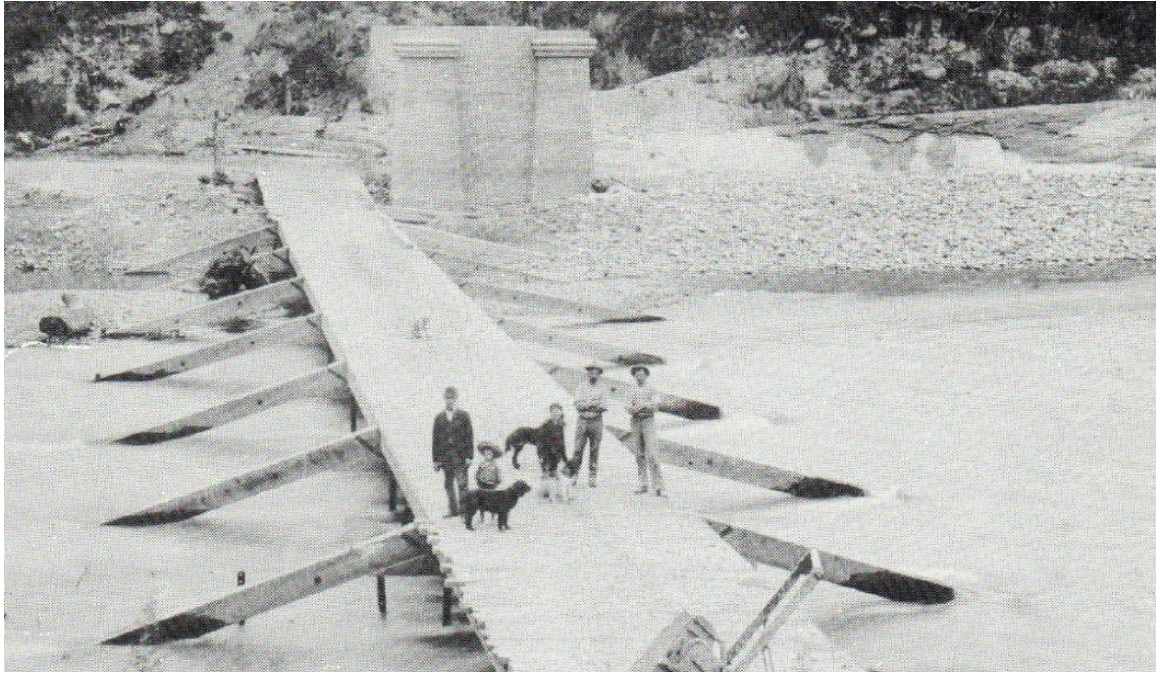


Figure 15: Low level bridge in with western pier for permanent bridge in background (reproduced from Laurenson 1979)



Figure 16: Low-level bridge c.1897 with concrete piers for permanent bridge on upstream side looking east (reproduced from Mangaveka and District's First 100 Years)

Work on the permanent bridge commenced concurrently with the low-level bridge, with the concrete piers for the permanent bridge being in place prior to the flooding in April 1897. The flood waters reached the top of the piers, forcing a redesign of the bridge structure (*Feilding Star* 22.04.1897, p.2; Figure 17).

Photographs from this time show the concrete piers considerably shorter than they are in present day. The tapered ends of the inner piers were topped with three courses of coping, which appears to have been removed when the piers were extended in 1904. The photos also show simple concrete abutments set into the bank about 10 metres back from the inner piers. The original design for this bridge included a central iron cylinder support. These were produced by Luke & Co's foundry at Te Aro, Wellington (*New Zealand Times* 28.12.1896, p.2). Staging for the erection of the cylinder was washed away in the January 1897 floods (*New Zealand Times* 13.03.1897, p.2).



Figure 17: Photo showing the height of 1897 flooding relative to the concrete piers (reproduced from Burr 2017)

PRESENT DAY BRIDGE

The revised plans (Figure 18) required the elevation in height of the two central concrete piers. Two new outer piers were constructed further up the bank, with the original piers left in situ, and extended in height. The outer piers, by comparison, are of a simpler design than the inner piers without the tapering columns. New abutments were constructed at the crest of the terrace, and cutwaters were added to the upstream side of the inner piers. During the addition of the truss sections, photos show the original 1897 abutments being used as footings for the scaffolding (Figure 19).

The bridge was finally completed in 1904 with the addition of the truss sections: these were manufactured by J. & A. Anderson of Christchurch. The low-level bridge remained in place after the completion of the truss bridge, but was eventually washed away by further flooding (Figures 20 and 21).

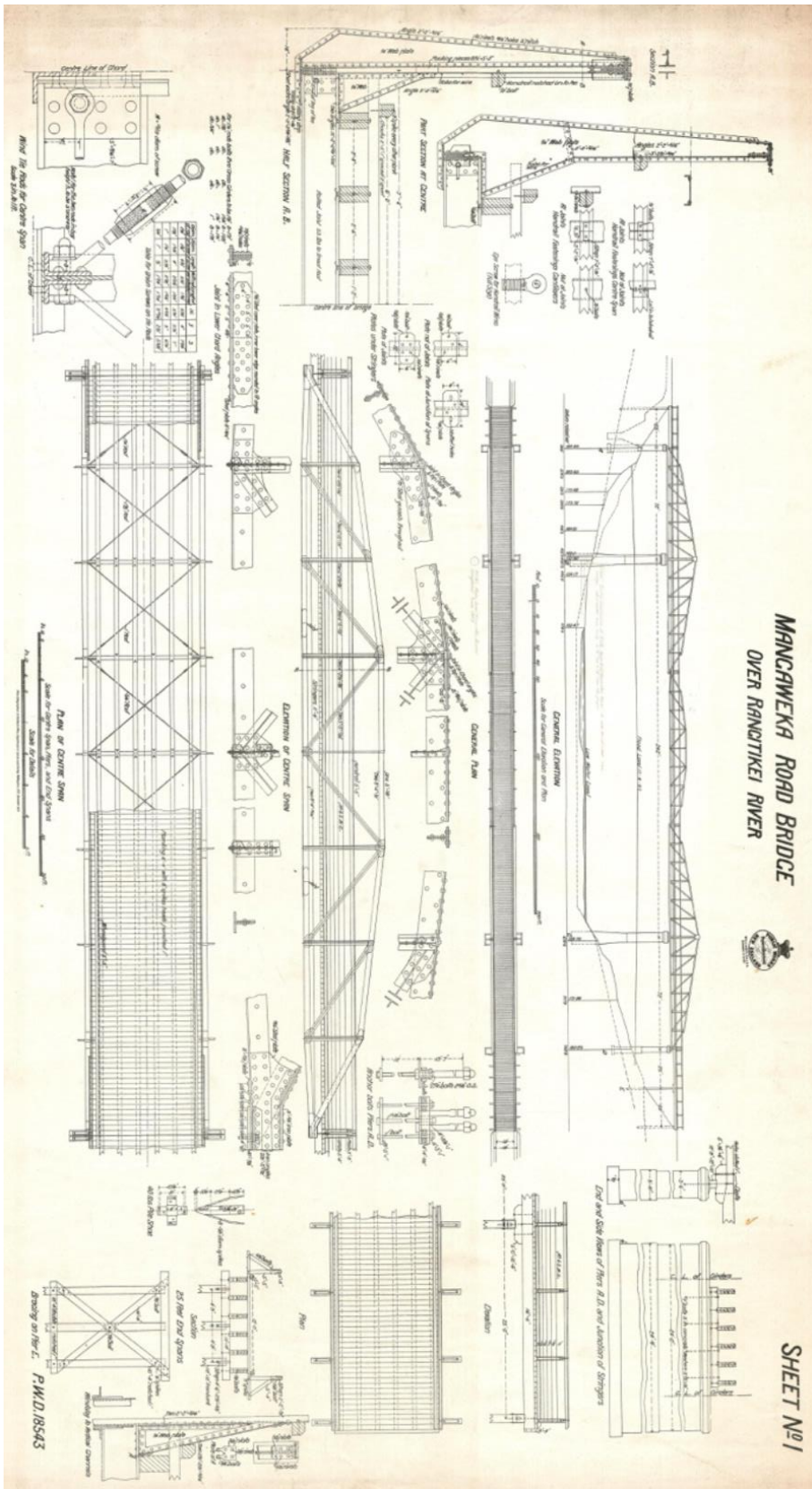


Figure 18: Plans for the cantilever truss bridge, dated 1899 (MDC archives)

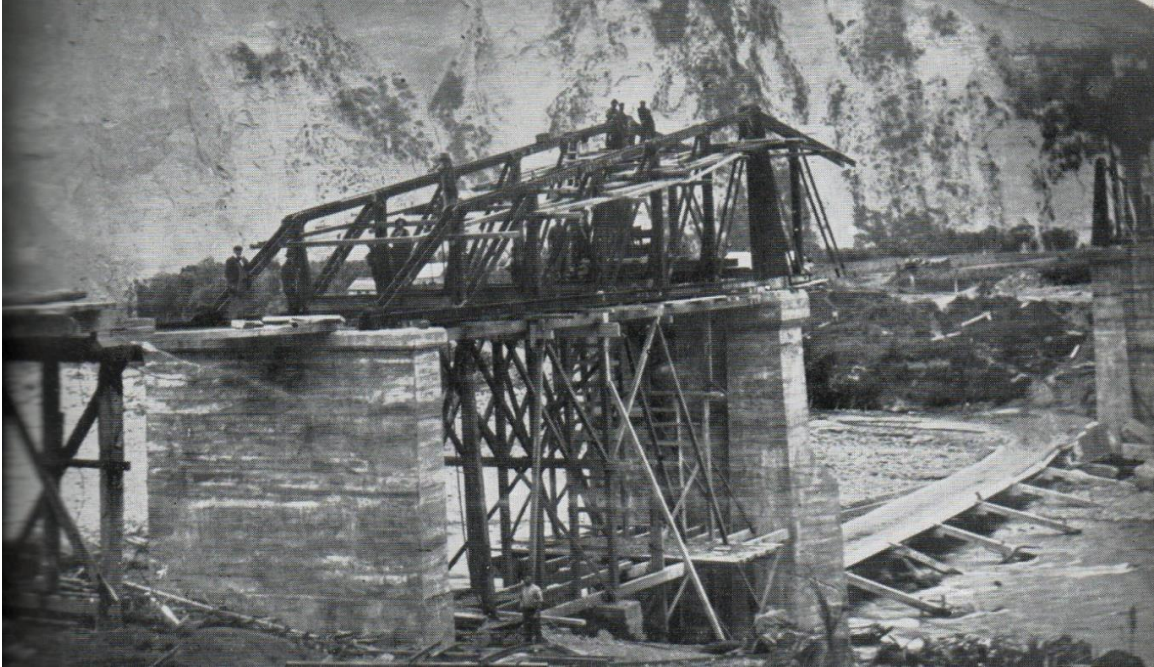


Figure 19: Cantilever bridge under construction in 1904. Note 1897 abutments being used as footing for scaffold



Figure 20: Completed cantilever bridge with low-level bridge beneath



Figure 21: Wash out of low level bridge (reproduced from Laurenson 1979)

During the different phases of construction, workers were accommodated in a camp on the western side of the river (Figure 22). Photos show a cluster of buildings, with a track leading down to the low-level bridge.

On the opposite side of the river a creamery was established by Joseph Nathan & Co. In September 1900, the *Feilding Star* reported that Joseph Nathan & Co had applied to the Land Board for sections at Mangaweka, Taihape and Ukitu on which they intended to establish creameries (*Feilding Star* 05.09.1900, p.2). By December that year the *Manawatu Standard* reported that the Ukitu butter factory had opened, and they expected the Mangaweka factory to open in early January 1901 (*Manawatu Standard* 20.12.1900). Photos of the creamery show a line of pitched roof weatherboard buildings with a number of ancillary structures and fences also visible (Figure 23).

Upstream of the bridge on the west side a pumphouse and water intake was constructed in 1912. The pumphouse was designed by consulting engineers, Turnbull & Jones Ltd, of Wellington. The original pumphouse was elevated from the river bed on a terrace a few metres above the water (Figure 24). This was superseded by a second pumphouse in 1947 which was positioned lower down, and slightly further south. Aerial photos dated 1961 show both pumphouse side by side (Figure 25).

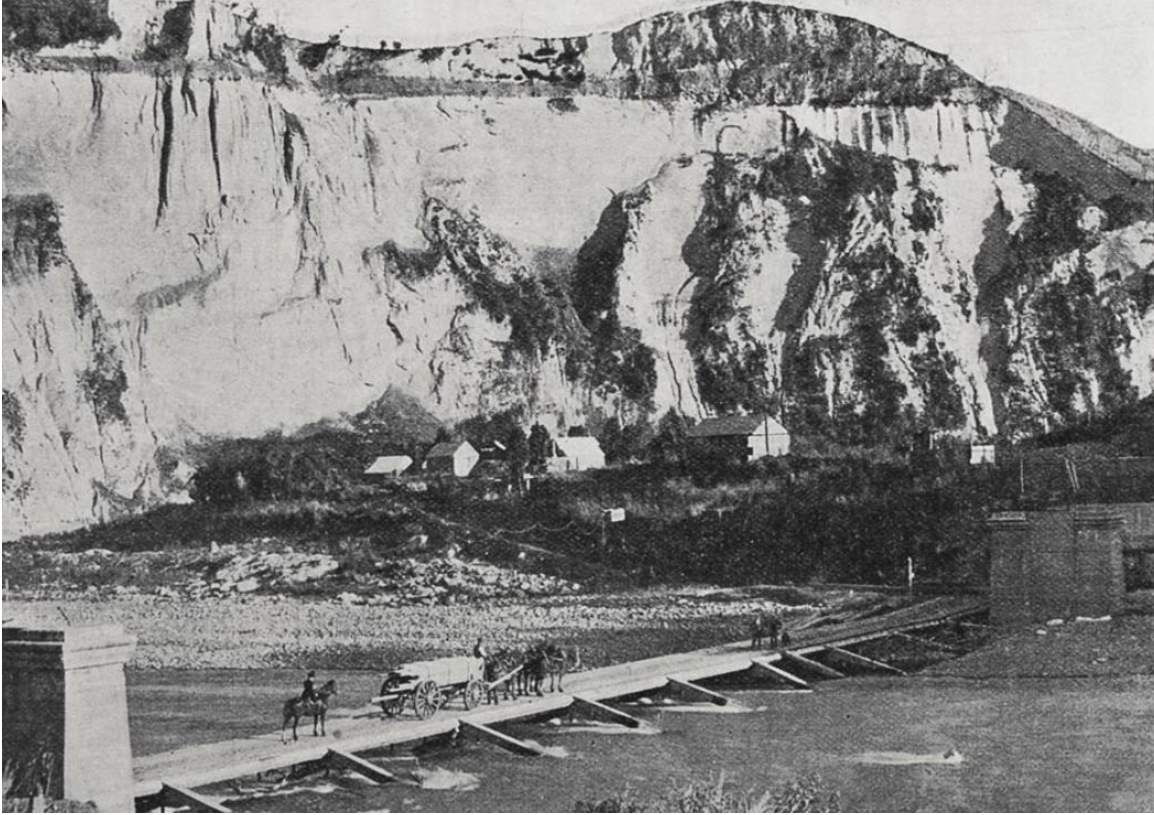


Figure 22: Workers' camp, taken prior to extending the concrete piers in 1904 (Auckland Weekly News photo)

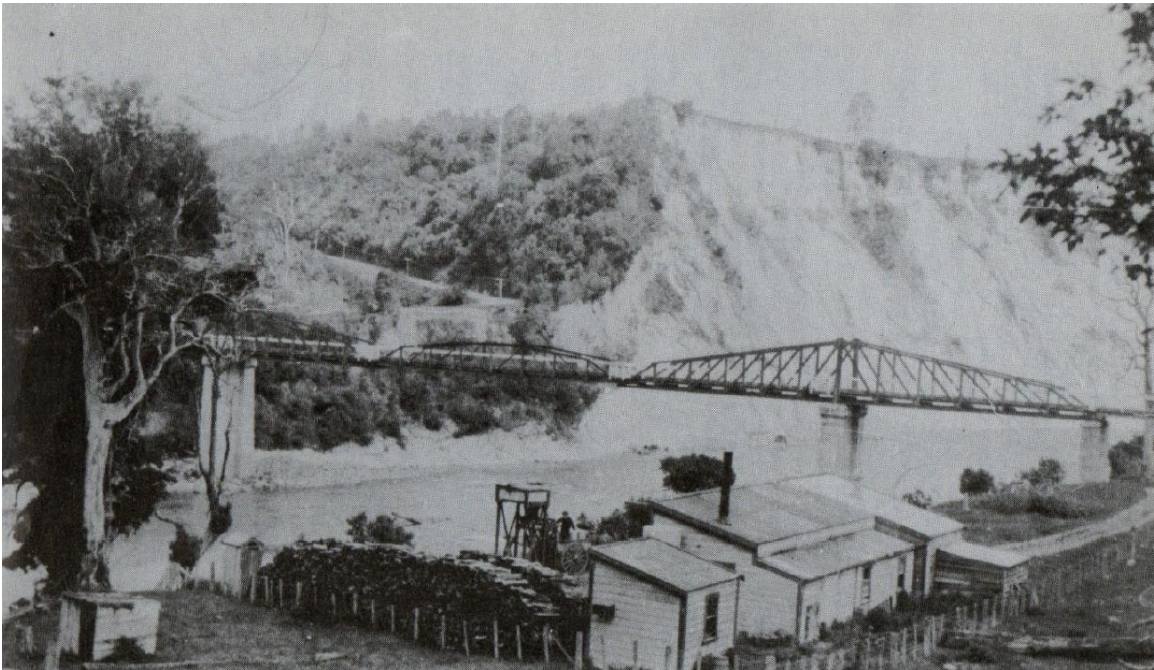


Figure 23: Joseph Nathan & Co creamery (reproduced from Mangaweka and District's First 100 Years)

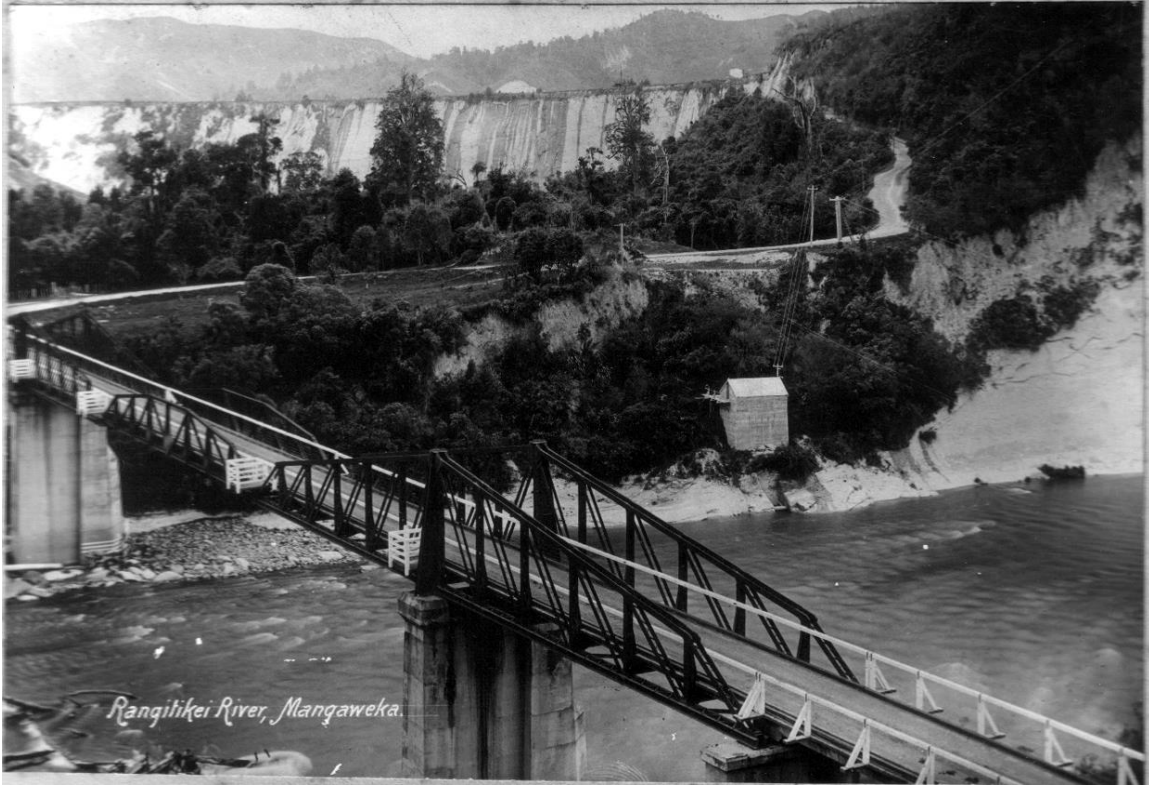


Figure 24: 1912 pumphouse to the north of the bridge (Waikato University photo collection)



Figure 25: Detail of 1961 aerial photo showing both pumphouses side by side (Archives Central HRC_0026_2-R21)

SUMMARY OF USEFUL SURVEY PLANS

Plan	Date	Surveyor	Description	Shows
SO 13472	1893	W.T. Morpeth	Rangitikei River between Otara Road and Mangawharariki Stream (Otamakapua-Rangitikei Block)	Three Log Road Clayton's Pack Track Mangaweka bridge site Metal Reserves Ford
SO 13499	1893	W.T. Morpeth	Mangaweka township to bridge, Awarua No.4	Road alignment Mangaweka township to bridge
SO 13623	1894	J.M Morrise	Mangawharariki Kawatau Block	Three Log Road Clayton's Pack Track Mangaweka bridge site Ford
SO 13729	1894	P.R. Earle	Otamakapua Block bounded by Rangitikei River and Mangawharariki Stream	Mangaweka bridge Gravel reserve
SO 13794	1895	H.J. Lowe	True right of Rangitikei, East of Mangaweka, below terrace lands	Ferry reserve 52
SO 13796	1895	J. D. Climie	Rakau Toru village, Blk X Hatapu Block shows terrace lands to the NE of Mangaweka	Cradle bridge Pack track Ford
SO13987	1896	R. Caldwell	Rakau Toru village, Blk X Hatapu Block	Crown Grant
SO14873	1900	W.H.R. Flyger	To the east of the Mangaweka bridge	Joseph Nathan & Co land
SO15251	1904	T Dix	Approaches to Mangaweka Bridge	Mangaweka bridge, and land taken for approaches
ML 1331	1895	??	Awarua Block subdivision	Mangaweka township
A 1229	1900	W.H.R. Flyger	To the east of the Mangaweka bridge	Joseph Nathan & Co land

PREVIOUS ARCHAEOLOGICAL WORK

There has been comparatively little archaeological work done in and around Mangaweka.

Although the New Zealand Archaeological Association Site Recording Scheme was first established in the late 1950s, the earliest recording of archaeological sites around Mangaweka was carried out in 1976.

This site recording was the result of an archaeological survey undertaken by Lorna Donovan for the New Zealand Railways Department, at the request of the New Zealand Historic Places Trust (Donovan 1976). The survey was carried out as part of an assessment for the deviation of the North Island Main Trunk Line between Mangaweka and Utiku, and focused on the area in the vicinity of the Rangitikei and Kawhatau Rivers. The report includes maps of the areas traversed by Donovan during her survey, which included the campground to the south of the bridge (downstream, true right) and the area now occupied by the Awastone Lodge (upstream, true left). The Mangaweka to Ukitu deviation was completed in 1981.

Site records for the Otago-Taupo-Patea track (T22/18) and the Māori settlement at Pouna (T22/5) were filed by Donovan at this time.

Of Pouna, Donovan writes:

“Settlement/Occupation area. On east bank of Rangitikei, near to Route 54 bridge across Rangitikei. Reputed to be Pouna (Te Pouna) – see earliest maps, 1880s., mentioned by Crawford, 1862. Ill defined. Terrace. Shallow depressions, long low mound. Presumed part destruction from road making” (Donovan 1976:28).

Her site record (T22/5) contains further details:

“Site consists of a number of shallow depressions approx.. 2m. in extent, most of which are on the upper side of a low impression. 75m. by approx. 20m. in length. To the south of this, nearer the stream edge, the contour drops into what appears as a flattened area, 1m. above the creek and about 5m. by 4m. in extent. Further ground irregularities occur nearer to the river edge of the paddock, near a group of pines, but as definition is so difficult, it can be assumed that these may well be the result of European activity.

Pouna sited as a settlement in 1888 map following sale of Awarua Block, also marked on similar maps of date proximity.”

Donovan’s description for a section of the Otago-Taupo-Patea overland track (T22/18) notes that from the confluence of the Mangawharariki and Rangitikei Rivers near Pouna it ascends the cliffs and traverses in a north and northeasterly direction towards another settlement at Hawanga. Little information is provided on the route to the south and southwest.

The other archaeological site previously recorded in the wider Mangaweka area (T22/21) relates to town sections at Mangaweka that are likely to have been occupied prior to 1900. This recording was carried out by Annetta Sutton of Archaeology North for Transit NZ in 2001, in response to proposed a minor road realignment.

PREVIOUSLY RECORDED SITES AND LISTED PLACES

Although historic records indicate the potential for many more, at present there are only two previously recorded archaeological sites within a kilometre of the project area (T22/5 & T22/18). Sites recorded in the NZAA Site Recording Scheme and listed in the Manawatū and Rangitikei District Plans in close proximity to the project area are listed in the tables below:

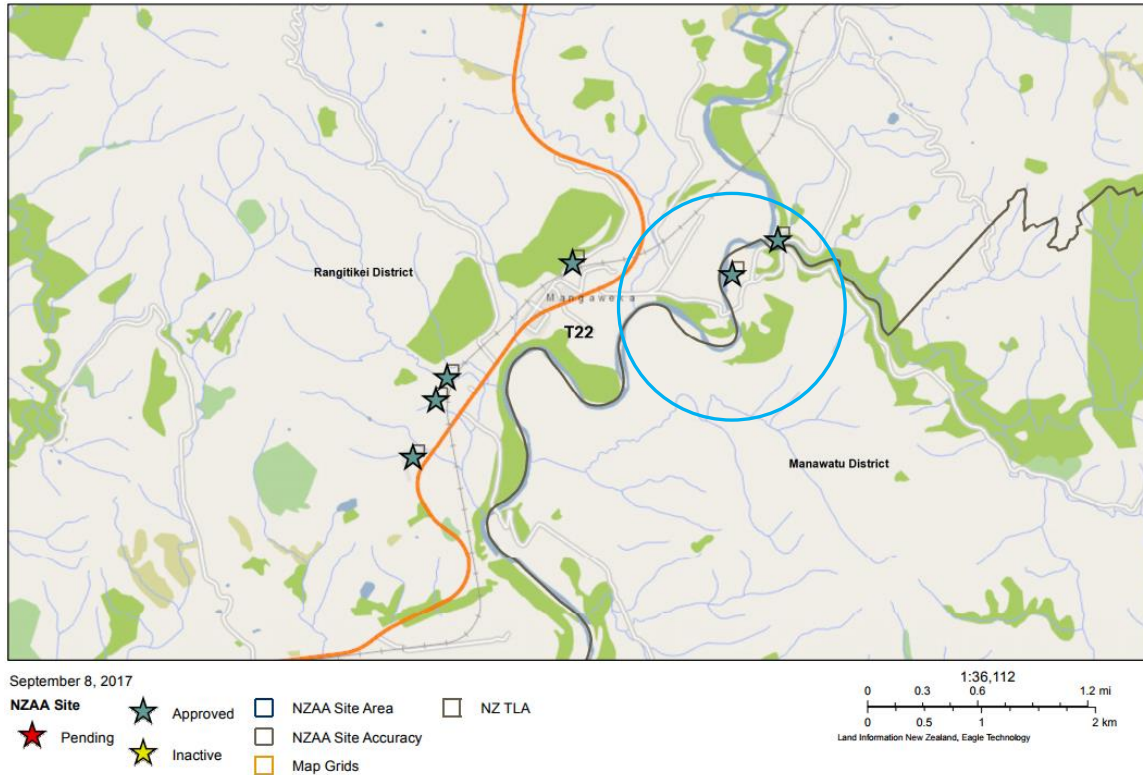


Figure 26: Archsite map generated 08.09.2017 showing locations of recorded archaeological sites in immediate vicinity of Mangaweka. Blue circle indicates 1 kilometre radius

Table 1: Recorded archaeological sites in the vicinity of Mangaweka, entries in bold are within one kilometre of the project area (as of 08 September 2017)

NZAA	Site type	Location	Recorded by
T22/3	Hut	Haweanga Road Conservation Area	Donovan, 1976
T22/4	Forge	Mangaweka	Donovan, 1976
T22/5	Occupation site (Pounga)	350 metres north of bridge	Donovan, 1976
T22/16	Pit	NIMT SW of Mangaweka	Donovan, 1976
T22/18	Overland track	800 metres NW of bridge	Donovan, 1976
T22/21	Township (Mangaweka South)	SH1 SW of Mangaweka	Sutton, 2001

It is important to note here that the absence of recorded sites in the immediate area reflects the lack of recording rather than the absence of archaeological deposits. The 2005 New Zealand Archaeological Association upgrade report for Manawatū District makes specific mention of this:

“There has been very little archaeological work carried out in the district in recent years. The coverage of archaeological survey of the district is not comprehensive and the recorded archaeological sites in the Site Recording Scheme should not be viewed as a complete and final list of all sites. Unrecorded sites will be present in un-surveyed areas and may also be

uncovered during earthworks where archaeological evidence may not be visible on the ground surface.” (Greig and Molly 2005:8).

There was no upgrade of NZAA data for the Rangitikei District at this time.

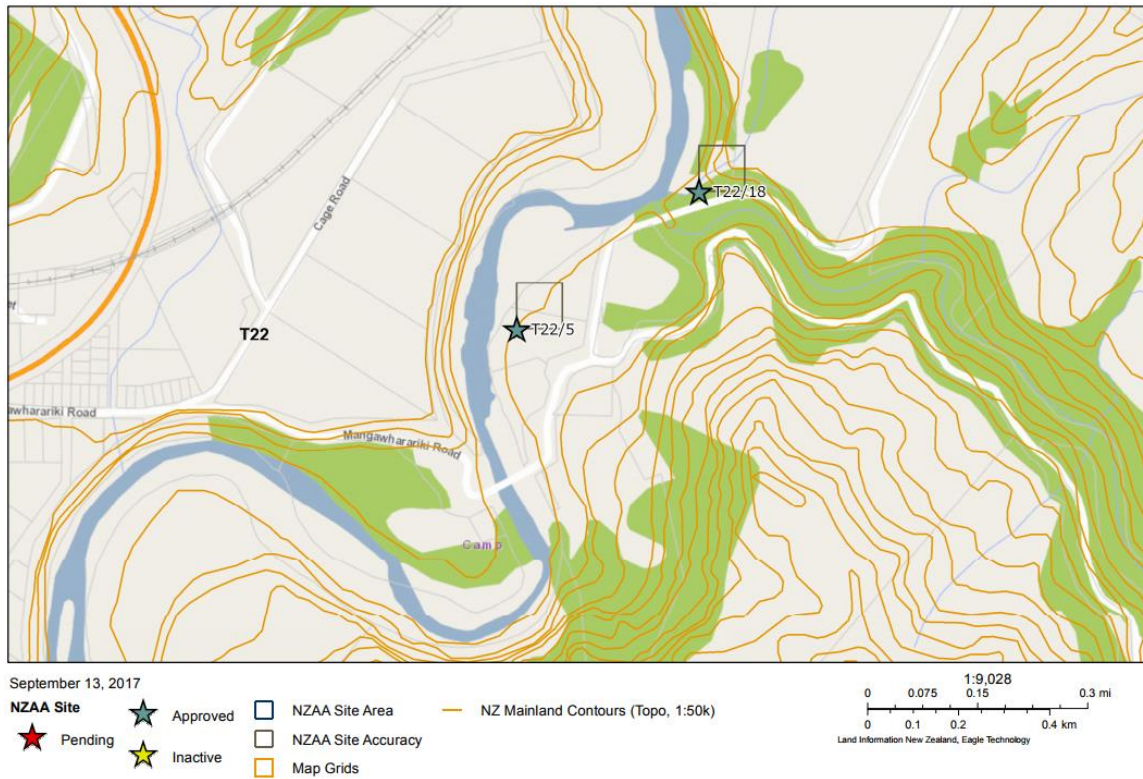


Figure 27: Detail of Archsite map generated 08.09.2017 showing locations of sites in the immediate vicinity of the project area

The Mangaweka bridge is not included in the District Plan heritage schedules, and with the exception of the NIMT Historic Area, the Heritage schedules in the Rangitikei and Manawatū District Plans do not include any places in the vicinity of Mangaweka.

A search for Manawatū and Rangitikei Districts in the New Zealand Heritage List online shows the nearest places to be the North Island Main Trunk Line Historic Area (No. 7793) which extends from Makohine viaduct south of Mangaweka to Taumarunui, and the Okahupokia pā (No.7611) on the Rangitikei River, approximately 8.2 kilometres to the southwest of the Mangaweka Bridge.

ASSESSMENT

The project area was the subject of a two-hour visit by the author on 12 September 2017, in the company of Jim Mestyaneck (project engineer for Manawatū District Council).

Seven archaeological sites have been recorded in Archsite on the basis of the site visit and historical research carried out for this assessment. Locations of these sites are shown as red stars on the updated Archsite map below (Figure 35). Not all are affected by the proposed works.

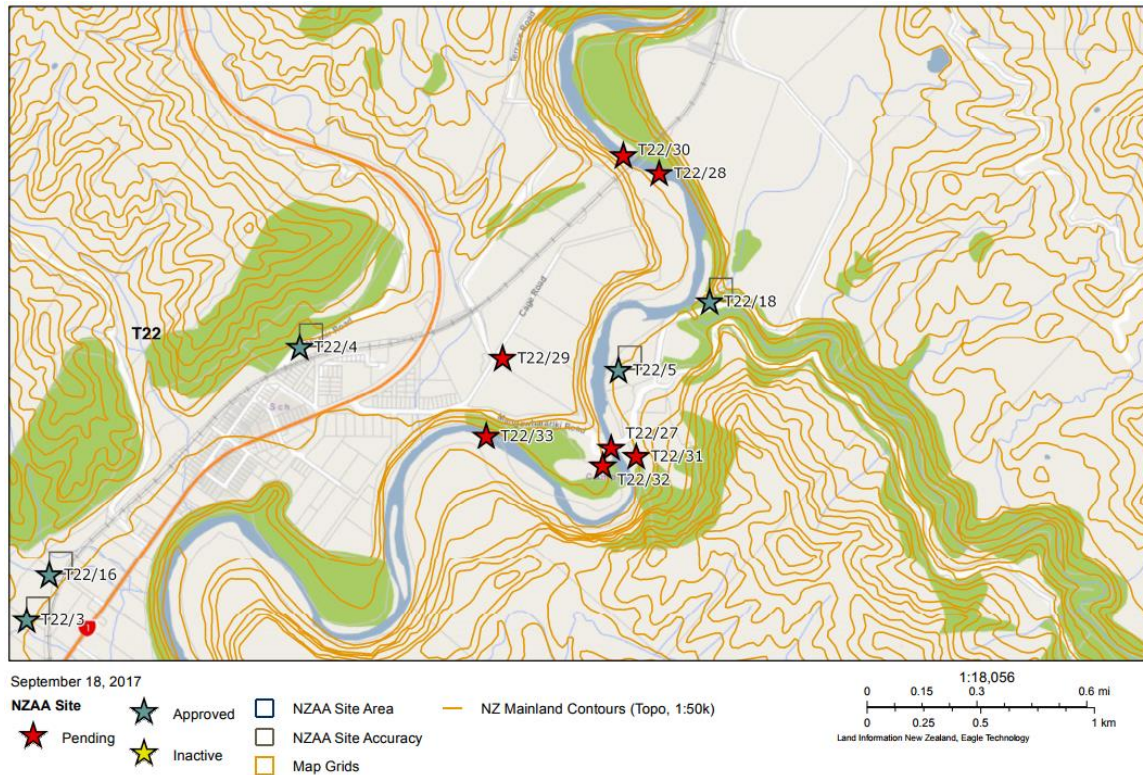


Figure 31: Locations of archaeological sites recorded as a result of this assessment (Archsite map generated 18.09.2017)

T22/27 Mangaweka Bridge

E1840349 N5589681

This site is at the present-day crossing. It includes the cantilever steel truss bridge (1904) and its approaches, and abutments from the cylinder bridge (1897). It also includes any remains of the timber low-level bridge preserved in the river bed, and any benched tracks leading down to the river. There is also some potential for archaeological remains to survive from the timber stages associated with the cage bridge (1896), such as in ground anchor points, or postholes for the timber platforms.

Photographic evidence showing the approaches to the bridge suggests that on the western side it descended quite steeply down from the terrace land. On the eastern side, this was a gentler gradient traversing between the inner pier and the earlier abutment, ascending in a northerly direction along the present-day access to the river.

Archaeological evidence of the cylinder bridge, confirmed during this assessment includes the bases of the inner bridge piers, and the concrete abutments. The height of the abutments can be used to

determine the portion of the bridge piers that predates 1900. The 1897 abutments measure 6.9 x 0.9 metres, and have 4 steel rods (with threaded ends and square bolts) protruding from the top approximately 0.7 and 1.15 metres from each end. The foundation for the central pier was started prior to the eventual abandonment of that design, so some evidence of this may also survive underwater in the stream bed.

Archaeological evidence associated with the low-level bridge may survive in the bed of the river. Although there is nothing visible above water, or protruding from the banks on either side, piles for the bridge could remain in situ. A photo showing the partially destroyed bridge shows a fairly simple design with cross beams supporting joists and decking timbers. Another photo shows the diagonal bracing held in place with iron rails, which might also survive in the river bed.

Pre-1900 features

Lower portion of inner piers; cylinder bridge abutments; approaches to the low-level bridge; structural remains related to the cage bridge; remains in the river associated with the low-level bridge or the staging for the central cylinder.

Post 1900 features

Upper portion of inner piers; cutwaters; steel trusses; wooden decking; modern bridge abutments; outer piers; water gauge tower; lower pumphouse; upper pumphouse remains.



Figure 32: 1897 abutment on eastern side, viewed from below

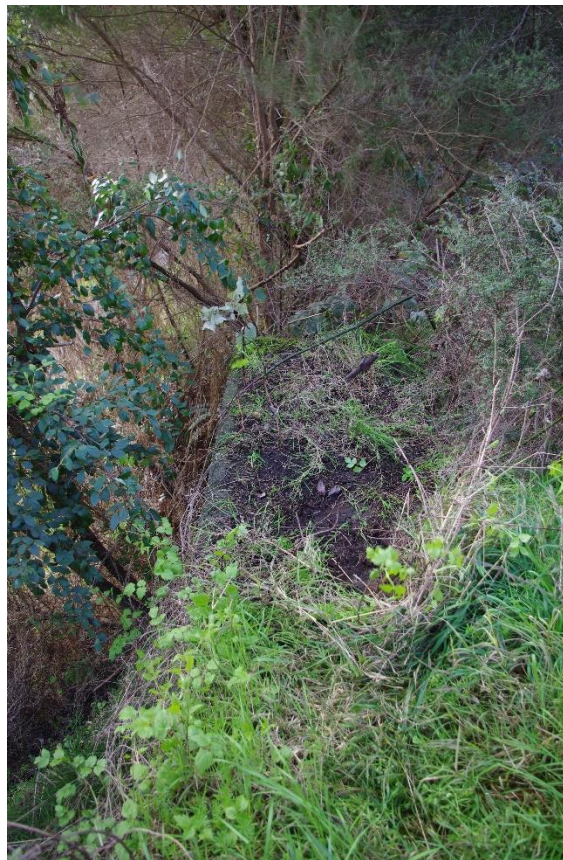


Figure 33: 1897 abutment on eastern side, viewed from above



Figure 34: 1897 abutment on eastern side of the river viewed from below, with 1904 pier in background



Figure 35: Mangaweka bridge viewed from eastern side



Figure 36: Former location of low-level bridge viewed from east side of river

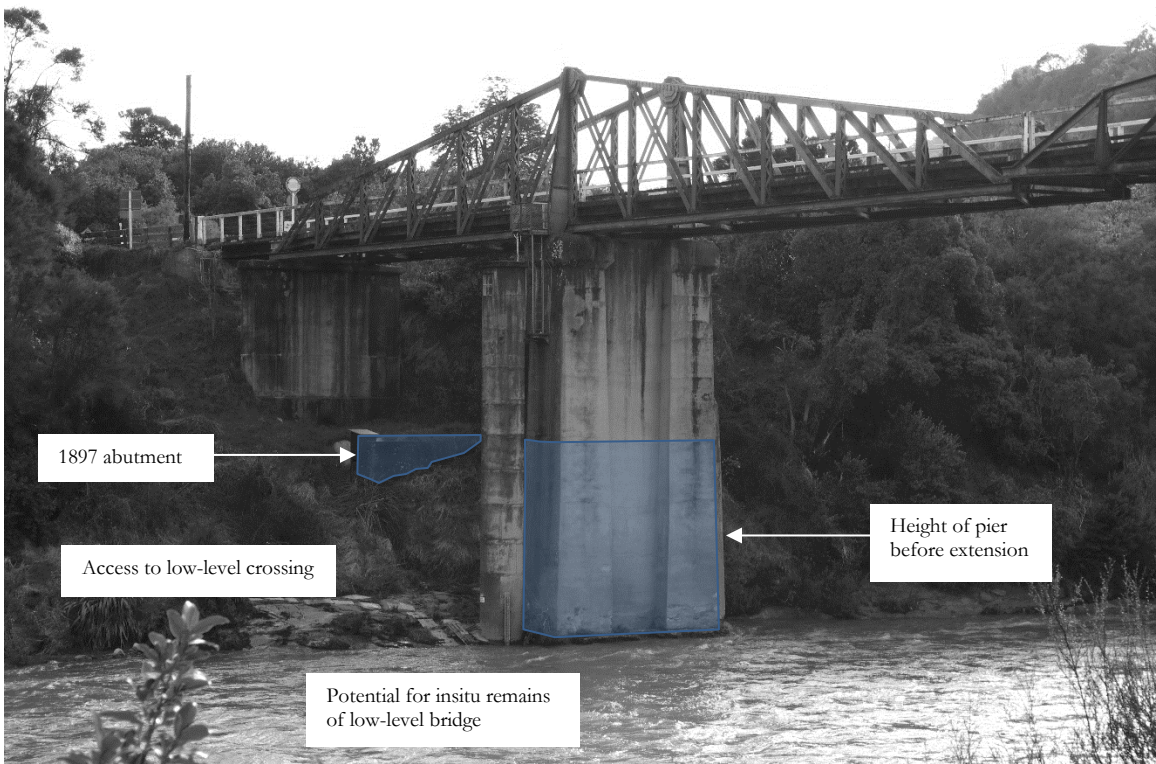


Figure 37: Present day bridge on western side of river highlighting pre-1900 components

T22/28 Ford

E1840561 N5590886

This site is a ford shown on nineteenth century survey plans (SO13472; SO13623 and SO13796). This would have been located on the east (downstream) side of the NIMT railway crossing, and was the river ford associated with Clayton's Pack Track. This area was not inspected during the site visit on 12 September because it was outside of the immediate project area. However, it has been recorded as part of this assessment as it would be relevant to the original proposal to realign the road with the NIMT railway line as outlined in the indicative business case.

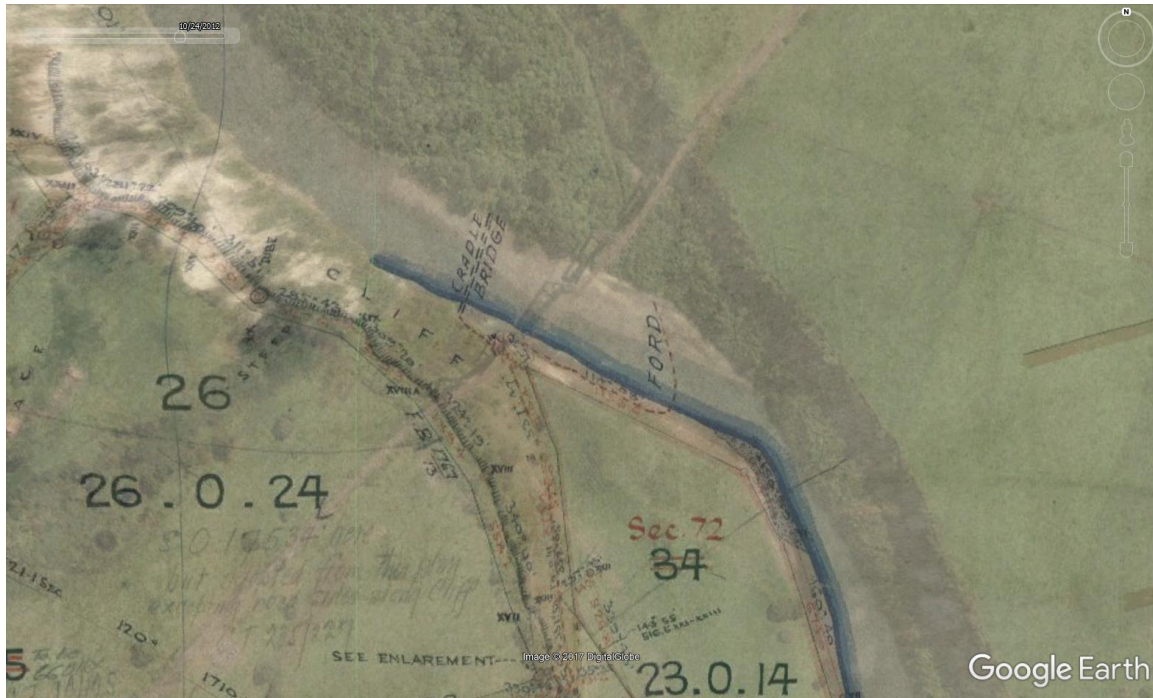


Figure 38: Google aerial with overlay of SO13796 showing the locations of the ford (T22/28) and cradle bridge (T22/30) relative to the present-day alignment of the NIMT railway bridge

T22/29 Clayton's Pack Track

E1839873 N5590074

This site is a named pack track shown on nineteenth century survey plans (SO13472; SO13623 and SO13796). The alignment roughly followed what is now Cage Road. From Mangawharariki Road (formerly Three Log Road), the pack track followed the approximate alignment of Cage Road for about 250 metres before deviating to the east. It then descended the cliff at the northeastern end of Cage Road paper road, and crossed the Rangitikei River to the east (downstream) of the NIMT railway crossing. As with the ford (T22/28) the alignment of the pack track was not inspected during the site visit on 12 September because it was outside of the immediate project area. Possible archaeological features associated with the pack track are most likely to survive on the alignment where it descended the cliff before crossing the river, as it would have been necessary to bench the track in that location.



Figure 39: Google aerial with overlay of SO13796 showing the surveyed alignment of Clayton's Pack Track (T22/29) relative to Cage Road

T22/30 Cage bridge (aerial cableway)

E1840403 N5590963

This site is the location of a cage bridge across the Rangitikei River shown on the 1895 survey plan, SO13796. It was positioned about 200 metres upstream of the ford crossing (T22/28). As with the ford (T22/28) and pack track (T22/29) the site of the cage bridge was not inspected during the site visit on 12 September because it was outside of the immediate project area. Possible archaeological features associated with cage bridge might include anchor points for the wire rope, and post holes for the raised timber platforms either side of the river.

T22/31 Joseph Nathan & Co creamery

E1840460 N5589643

This site is the location of Joseph Nathan & Co's creamery erected in 1900. The title for the land that the creamery was constructed on was issued in September 1900 (A1229), and in December 1900 the *Manawatu Standard* reported that the creamery was scheduled to open early in January 1901. This area was inspected during the site visit on 12 September. There are no visible above ground features associated with the creamery, but archaeological features associated with its construction and use are likely to survive in this location.

T22/32 Construction workers' camp

E1840313 N5589601

This site is the location of the workers' camp used during the construction of the Mangaweka bridge between 1897 and 1904. It is unclear if this location was used for this purpose during the erection of the construction of the low-level bridge and erection of the concrete piers in 1897, but it is clearly visible in the background of photos showing the construction and installation of the steel trusses by A. J. Anderson of Christchurch. Prior to the construction of the bridges, the area was gazetted as Ferry Reserve 52 (SO13794 dated 1895). The workers' camp is shown in a photograph published in the *Auckland Weekly News* dated 19 January 1905. It shows several timber buildings, and an access track leading down to the low-level bridge. This area was inspected during the site visit on 12 September. Aside from the access track to the low-level bridge, there are no features that are immediately apparent as being associated with the construction workers' camp.



Figure 40: Overlooking the site of the Joseph Nathan & Co creamery. Viewed from the road bridge looking south



Figure 41: Former location of construction workers' camp now the Mangaweka camping ground. Looking south from Ruahine Road

A ford is shown in this location on survey office plan SO13729 (dated 1894). It was not inspected during the site visit on 12 September because it was outside of the immediate project area.

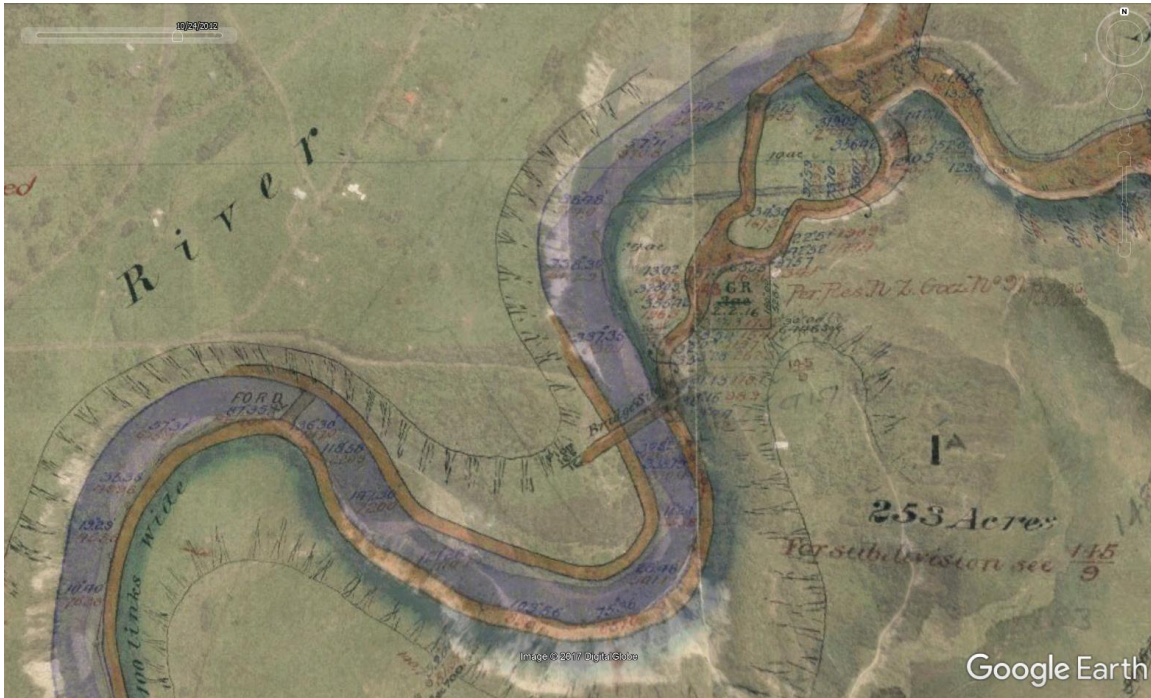


Figure 42: Google aerial with overlay of SO13729 (dated 1894) showing the locations of the ford (T22/33). Note the locations for the proposed bridge site and gravel reserve on the east side of the river.

ARCHAEOLOGICAL SIGNIFICANCE

The following statements of significance have been prepared separately for each of the recorded sites, and tentatively for unrecorded sites. Archaeological significance has been assessed according to accepted guidelines (Gumbley 1995, Walton 1999; NZHPT 2006, NZHPT 2013).

Site	Value	Assessment
Pounga T22/5	Condition	Unknown. The site identified by Donovan in 1976 is now occupied by Awastone lodge. This area was not inspected during the current assessment, but it seems unlikely that the surface features described by Donovan have survived. Subsurface remains may be present.
	Rarity/ Uniqueness	Sites of nineteenth century Māori occupation are infrequently recorded along waterways this far inland, and few have been investigated archaeologically. Many are likely to have been destroyed by erosion and development without investigation.
	Contextual Value	Pounga can be viewed in the context of other documented Māori settlements along the Rangitikei River. It also has association with overland and riverine pathways through the central North Island.
	Information Potential	Largely dependent on survival and condition. However, in light of the scant archival information relating to Pounga, and almost complete absence of information from archaeological investigation of inland Māori sites along the Rangitikei River, any investigation of archaeological remains is likely to add significantly to the existing knowledge.
	Amenity Value	Not a prominently visible site, but interpretative signage could be installed in the campground or at Awastone with the owners' permission
	Cultural Associations	Māori

Site	Value	Assessment
Bridge T22/27	Condition	The cantilever bridge is maintained in use to present day. The 1897 abutments are clearly visible, and the 1895 portions of the central piers survive at the base of the 1904 extensions. There is no visible evidence of the low-level bridge above water, and MDC advises that there are also no remains visible during periods of low water flow. There is potential for remains of the low-level bridge to survive in the bed of the river, and these might include timber and metal elements, such as struts and piles. The approaches to the low-level bridge survive as cuttings into the bank.
	Rarity/ Uniqueness	Archaeological remains associated with nineteenth century bridges are potentially quite common, but are comparatively rarely recorded and investigated. Many nineteenth century bridges on major roads have been upgraded or replaced (for rarity of the existing cantilevered steel truss bridge structure refer to the heritage assessment (Bowman and Burr 2017).
	Contextual Value	The bridge is important in the economic development of the Mangaweka and Kawhatau areas. Fords were often dangerous and once completed the bridge provided a safe means of crossing the river.
	Information Potential	Archaeological investigation of in ground features could complement the information available from archival sources such as photographs, design plans and newspaper reports.
	Amenity Value	There is good potential for interpretative signage if the bridge is retained as a heritage feature. The amenity value is increased if it can be incorporated into a pedestrian trail and/or cycleway. If the bridge is to be destroyed, erecting interpretative signage in the campground is a poor mitigation measure, but better than nothing.
	Cultural Associations	Colonial period (1840-1900) non-Māori.

Site	Value	Assessment
Ford T22/28	Condition	Unknown. Not inspected during the present assessment.
	Rarity/ Uniqueness	Fords are commonly marked on nineteenth century plans, but relatively few have been recorded archaeologically in the wider Mangaweka/Rangitikei area.
	Contextual Value	The ford was part of Clayton's pack track (see also T22/29; T22/30; T22/33). Prior to the construction of bridges, fords were a necessary means of crossing rivers but often dangerous due to changes in the river bed that were not always apparent above water.

Information Potential	There is limited information potential, but it is possible that artefacts could be recovered in locations where crossings were frequent.
Amenity Value	There is limited amenity value unless the ford is incorporated into a walking track. Fords are not readily observable as above ground archaeological features
Cultural Associations	Colonial period (1840-1900) non-Māori

Site	Value	Assessment
Pack track T22/29	Condition	Unknown. The alignment of Clayton's pack track was not traversed during the present assessment. The most likely location for archaeological evidence to survive is where the pack descended from the terrace land to the river.
	Rarity/Uniqueness	Pack tracks are often marked on nineteenth century plans, and a number are recorded archaeologically in other parts of New Zealand. Relatively few have been recorded archaeologically in the wider Mangaweka/Rangitikei area. The Māori overland track (T22/18) is recorded on the opposite side of the river to the southeast.
	Contextual Value	Clayton's pack track is associated with a number of river crossings (see also T22/28; T22/30; T22/33). Pack tracks were often the precursor to formed roads and facilitated travel through the district.
	Information Potential	There is limited information potential, but the dimensions of the track could be documented to add to the existing knowledge from archival sources.
	Amenity Value	Cage Road appears to have derived its name from the cradle bridge (T22/30) that was incorporated into Clayton's pack track. There is some amenity value if it were to be incorporated into a walking trail or similar.
	Cultural Associations	Colonial period (1840-1900) non-Māori

Site	Value	Assessment
Creamery T22/31	Condition	Unknown. There are no immediately apparent above ground features, but there is good potential for subsurface archaeological evidence of the creamery to survive.
	Rarity/Uniqueness	Creameries are occasionally recorded as archaeological sites, but none of the others established by Joseph Nathan & Co have been recorded in Archsite.
	Contextual Value	Joseph Nathan & Co established a number of creameries in the Rangitikei area around the turn of the century. They were important for the economic development of the district and contributed to the viability of dairy farming here.
	Information Potential	There is good potential for archaeological information to complement the archival sources of information. It is likely that the site will contain rubbish pits as well as structural remains which can show the layout of the buildings and changes over time.
	Amenity Value	The creamery is on privately owned land, but could be the focus of historic interpretation if incorporated into a cycleway or walkway.
	Cultural Associations	Twentieth century non-Māori

Site	Value	Assessment
Workers' camp T22/32	Condition	Unknown. There are no immediately apparent above ground features, but there is good potential for subsurface archaeological evidence of the workers' camp to survive.
	Rarity/Uniqueness	Workers' construction camps are occasionally recorded as archaeological sites in Archsite, they can be said to be uncommon rather than rare. Few have been recorded in the Rangitikei and Manawatū districts.
	Contextual Value	The workers' camp is one of the wider landscape features associated with the Mangaweka bridge construction. Workers' camps were a necessary for the construction of infrastructure in remote areas.
	Information Potential	There is good potential for archaeological information to compliment the archival sources of information which are relatively scant. The archaeological remains of workers' camps can provide information about the day to day activities of the construction workers which are often missing from historical accounts. It is likely that the site will contain rubbish pits as well as structural remains which can show the layout of the buildings and potentially changes over time.
	Amenity Value	The workers camp is located on reserve land presently occupied by a council run campground so there is good potential for erecting historic interpretation signage
	Cultural Associations	Twentieth century non-Māori

EFFECTS ON ARCHAEOLOGICAL VALUES

The options considered in the indicative business case are assessed for impact on archaeological values below. When evaluating impact on archaeological features, the differences in alignment are more significant than the differences in bridge size and capacity.

Action	Option	Effects	NZAA	Authority required
Minimal intervention (do nothing)	1, 2, 3, 4a/4b	No impact on archaeological values	n/a	No
New alignment 40m upstream	5a/5b	Affects post-1900 water intake structures and pre-1900 approaches to low-level bridge; low-med probability, but could encounter archaeological features associated with Pounga	T22/5; T22/27	Yes
New alignment 40m downstream	5a/5b	Affects pre-1900 construction workers' camp and pre-1900 approaches to low-level bridge; potentially affects features associated with Joseph Nathan & Co creamery. Low probability but could encounter archaeological features associated with Pounga.	T22/5; T22/27; T22/31; T22/32	Yes
New alignment parallel to NIMT	6a/6b	Potentially affect remains associated with pre-1900 pack track and ford.	T22/28; T22/29	Yes
Demolition of existing bridge (removal of steel trusses leaving piers in situ)	MDC	Destroys a valued heritage structure (Mangaweka bridge).	T22/27	No
Demolition of existing bridge (complete removal)	MDC	Destroys a valued heritage structure (Mangaweka bridge) and removes pre-1900 components of the bridge including the 1897 abutments, and lower portion of the central piers.	T22/27	Yes

Of the two options to realign the road and construct a new bridge adjacent to the existing road bridge (5a/5b), the upstream option will avoid the workers' camp (T22/32) and creamery (T22/31) sites, but will have a greater chance of encountering archaeological remains associated with Pounga (T22/5). The upstream option will also affect the site of the 1912 pumphouse, and its 1947 replacement.

The downstream option will impact on archaeological remains associated with the workers' camp and creamery, but will avoid the pumphouse sites. Because it is further away from the recorded location of Pounga, the chances of encountering archaeological features associated with Māori settlement is less for the downstream option.

Both upstream and downstream options will affect the nineteenth century approaches to the low-level bridge (T22/27). Demolition and removal of the existing bridge will necessarily involve the destruction of the pre-1900 elements of that structure. The distance of 40 metres on the northern (upstream) side of the existing structure will avoid underwater archaeological remains associated with the low-level bridge. It is likely that they will also be avoided with the downstream option, but maybe dependent on construction methodology and placement of plant.

CONCLUSION

The Mangaweka bridge was completed in 1904, and on that basis, it post-dates the cutoff date for the archaeological provisions of the *Heritage New Zealand Pouhere Taonga Act*. However, the structure incorporates elements that pre-date 1900, and the site of the bridge was also the location of other pre-1900 crossings such as the low-level bridge and cage bridge of which archaeological deposits may survive.

The eastern bank of the Rangitikei River was also the general location of a Māori settlement known as Pounga (T22/5). While it is possible that the settlement was further north, in the vicinity of what is now Awastone Lodge, both the reported position on survey maps, and the features mentioned on the archaeological site record are vague. The potential for archaeological features associated with nineteenth century Māori activities on the intermediary terraces on the eastern side of the river cannot be discounted. The potential for encountering Māori archaeological remains is greater for earthworks on the northern side of the bridge.

The option of siting a new bridge approximately 40 metres downstream of the existing bridge would likely avoid any archaeological remains in the river associated with the low-level bridge, but would impact on the site of the creamery (T22/31) and the workers' camp (T22/32).

The option of siting a new bridge approximately 40 metres upstream of the existing bridge would avoid the site of the creamery (T22/31), the workers' camp (T22/32), and any archaeological remains in the river associated with the low-level bridge, but would impact on the site of the 1912 pumphouse and its 1947 replacement. The pumphouse sites are not protected under the archaeological provisions of the *Heritage New Zealand Pouhere Taonga Act*.

Demolition of the existing bridge would involve the removal of pre-1900 bridge components and would also have potential to affect archaeological remains associated with the cage bridge and low-level bridge (T22/27).

REFERENCES

PRIMARY SOURCES

LAND PLANS

ML 1331 (1895)

SO 13472 (1893); SO 13499 (1893); SO 13623 (1894); SO 13794 (1895);
SO 13796 (1895); SO 13987 (1896); SO 14873 (1900); SO 15251 (1904)

A 1229 (1900)

PWD 18543 (1899)

NEWSPAPERS AND PERIODICALS

Feilding Star 14.11.1895, p.2; 25.11.1896, p.2; 22.04.1897, p.2; 05.09.1900, p.2

Manawatu Standard 20.12.1900

New Zealand Times 28.12.1896, p.2; 13.03.1897, p.2

Annual Report on the Department of Lands and Survey. *Appendices to the Journal of the House of Representatives* 1895 C-1

New Zealand Gazette 1904, p.1109

ARCHIVAL PLANS

Jones and Coleridge, 1881, Plan of the County of Manawatu Province of Wellington NZ

SECONDARY SOURCES

PUBLISHED SOURCES

Anderson, A., 2015, 'Pieces of the Past AD 1200-1800' in Anderson, A., Binney, J., and A. Harris (eds.) *Tangata Whenua: A History*. Bridget Williams Books, Wellington

Crawford, J.C., 1880, *Recollections of Travel in New Zealand and Australia*. Ballantyne, Hanson and Co, London

Crosby, R., 2012, *Musket Wars: A History of Inter-Twi conflict 1806-1845*. Libro International, Auckland

Cyclopedia Company Ltd, 1897, *Cyclopedia of New Zealand [Wellington Provincial District]*, Cyclopedia Company Ltd, Wellington

Downes, T.W., 1910, 'Early History of Rangitikei, and notes on the Ngati Apa Tribe.' *Transactions of the Royal Society of New Zealand* 42:74-114

Higham, T. and M. Jones, 2004, 'Chronology and Settlement', in Furey, L. and S. Holdaway (eds), *Change Through Time: 50 Years of New Zealand Archaeology*. NZAA Monograph 26. New Zealand Archaeological Association, Auckland

Lee, J., Bland, K., Townsend, D. and P. Kamp (comps), 2011, *Geology of the Hawke's Bay area*. Institute of Geological & Nuclear Sciences, Lower Hutt

McGlone, M. and J. Wilmshurst, 1999, Dating initial Māori environmental impact in New Zealand. *Quaternary International* 59:5-16

Molloy, L., 1988, *Soils in the New Zealand Landscape: the living mantle*. Mallison Rendel Publishers, Wellington

Travers, W., 1872, *The Stirring Times of Te Rauaparaha*. Whitcombe and Tombs Ltd, Auckland

Wilson, J., 1914, *Early Rangitikei*. Whitcombe and Tombs Ltd, Christchurch

UNPUBLISHED SOURCES

Astwood, K., 2009, *Registration Report for a Historic Area: North Island Main Trunk Historic Area*. Vol. 1. Unpublished report for New Zealand Historic Places Trust.

Bowman, I. and V. Burr, 2015, *Heritage Assessment. Mangaweka Bridge*. Unpublished client report

Burr, V., 2015, *Ruahine Road Bridge / Mangaweka Bridge*. Unpublished client report

Donovan, L., 1976, *Mangaweka Railway Deviation: Archaeological Survey. Report of a survey of the Rangitikei and Kawhatau Rivers area, between Mangaweka and Toe Toe Road, Utiku*. Unpublished client report

GHD, 2017, *Manawatu District Council and Rangitikei District Council. Mangaweka Bridge Replacement (250B) Indicative Business Case*. Unpublished client report

Greig, K., and N. Molloy, 2005, *New Zealand Archaeological Association Site Recording Scheme Upgrade Project. Manawātū District*. Unpublished client report



New Zealand Historic Places Trust. 2006. *Guidelines for Writing Archaeological Assessments*. New Zealand Historic Places Trust, Wellington

New Zealand Historic Places Trust. 2013. *Archaeological Assessment Template*. New Zealand Historic Places Trust, Wellington

Stirling, B. and E. Subasic, 2010, Taihape: Rangitikei ki Rangipo Inquiry District. Technical Research Scoping Report. WAI2180. Unpublished report.


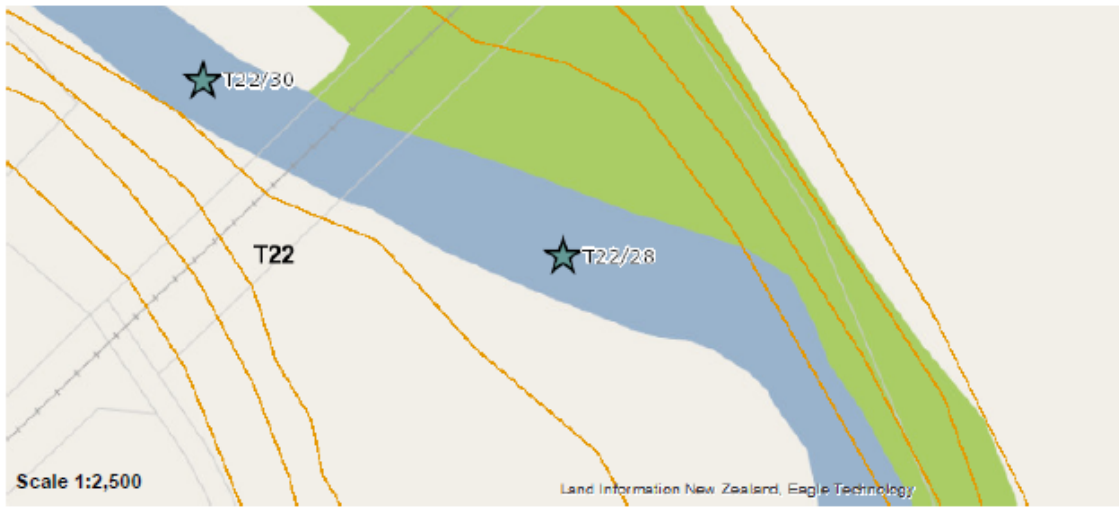
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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: T22/27</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s): Mangaweka Bridge/ Ruahine Road Bridge</p> <p>Record last updated: 18/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1840349 Northing: 5589681 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER: T22/27</p>	
	
<p>Finding aids to the location of the site Rangitikei River, 1.8 kilometres east of Mangaweka. Where Mangawharariki Road meets Ruahine Road.</p>	
<p>Brief description of the site</p>	
<p>Condition of the site when last visited Good</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>


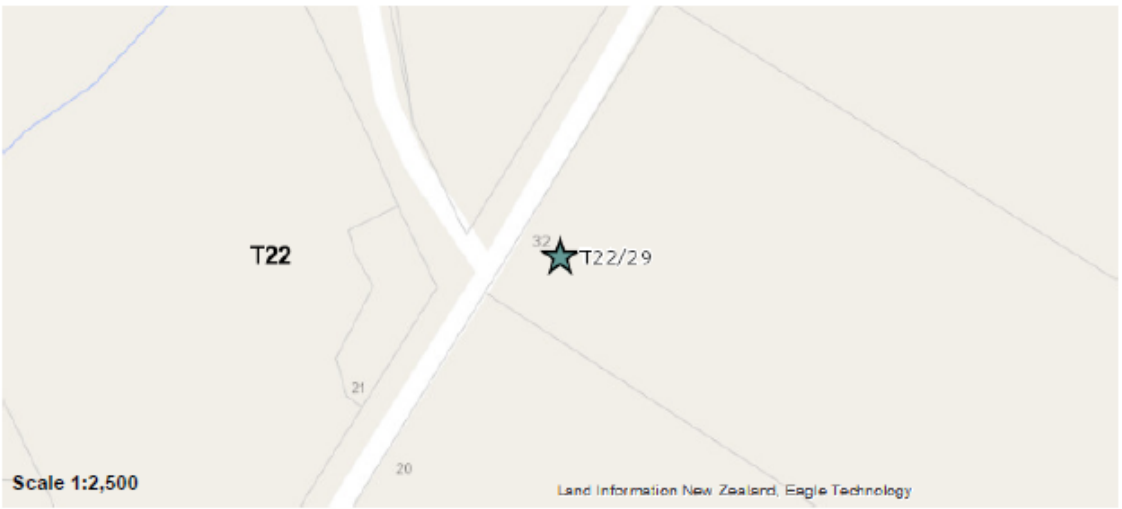
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 <p>Summary Site Record</p>		<p>NZAA SITE NUMBER: T22/28</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s): Clayton's pack track</p> <p>Record last updated: 28/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1840561 Northing: 5590886 Source: On Screen</p>		
<p>IMPERIAL SITE NUMBER:</p>		<p>METRIC SITE NUMBER: T22/28</p>
		
<p>Finding aids to the location of the site Rangitikei River. Downstream (east) of the NIMT railway crossing at Mangaweka.</p>		
<p>Brief description of the site Ford shown on nineteenth century survey plans (SO13472; SO13623 and SO13796).</p>		
<p>Condition of the site when last visited</p>		
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>		<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>


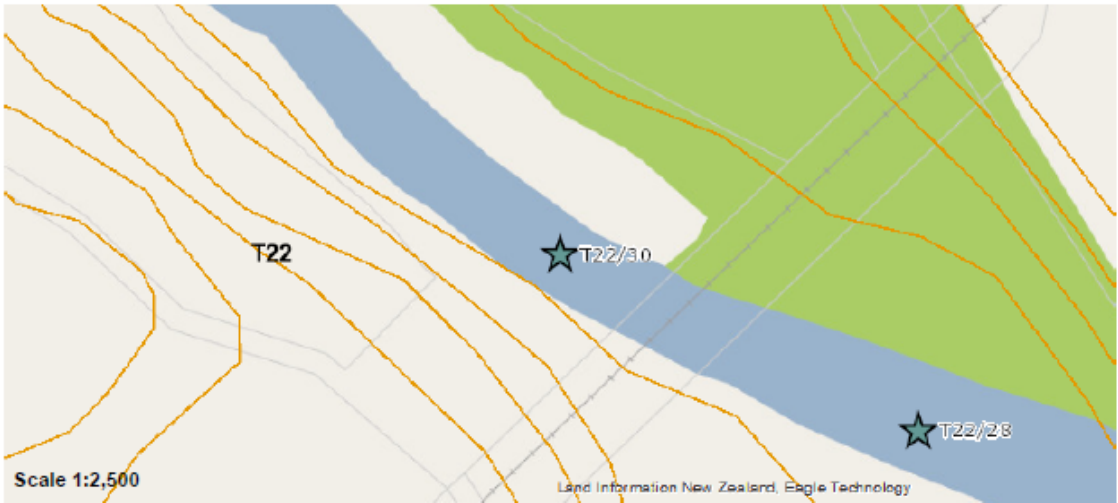
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 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: T22/29</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s): Clayton's Pack Track</p> <p>Record last updated: 19/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1839873 Northing: 5590074 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER: T22/29</p>	
 <p>Scale 1:2,500</p> <p>Land Information New Zealand, Eagle Technology</p>	
<p>Finding aids to the location of the site</p> <p>NE of Mangaweka. Alignment extends from Mangawharaniki Rd (formerly Three Log Rd) along the approximate alignment of Cage Rd for 250m, then deviates to the E of Cage Rd, before descending the cliff and crossing the river E of present NIMT railway bridge.</p>	
<p>Brief description of the site</p> <p>Pack track, recorded from SO13472, SO13623 and SO13796 survey plans.</p>	
<p>Condition of the site when last visited</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact:</p> <p>ArchSite Coordinator, PO Box 6337, DUNEDIN</p> <p>admin@archsite.org.nz</p>


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 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: T22/30</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s):</p> <p>Record last updated: 28/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1840403 Northing: 5590963 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER: T22/30</p>	
	
<p>Finding aids to the location of the site Rangitikei River. North of Cage Road end, and upstream (northwest) of the NIMT railway bridge.</p>	
<p>Brief description of the site A cradle bridge is shown at this location on survey plan SO13796 (dated 1895). The crossing was associated with Clayton's Pack Track (T22/29) and was approximately 200 metres upstream of the ford (T22/28).</p>	
<p>Condition of the site when last visited</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>



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 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: T22/31</p> <p>SITE TYPE: Agricultural/ pastoral</p> <p>SITE NAME(s): Nathan & Co creamery</p> <p>Record last updated: 28/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1840460 Northing: 5589643 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER: T22/31</p>	
	
<p>Finding aids to the location of the site On the eastern (true right) side of the Rangitikei River. Southeast (and down stream) of the Mangaweka Bridge</p>	
<p>Brief description of the site Location of a creamery constructed in 1900 recorded on the basis of historical information.</p>	
<p>Condition of the site when last visited Not visible</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact:</p> <p>ArchSite Coordinator, PO Box 6337, DUNEDIN</p> <p>admin@archsite.org.nz</p>


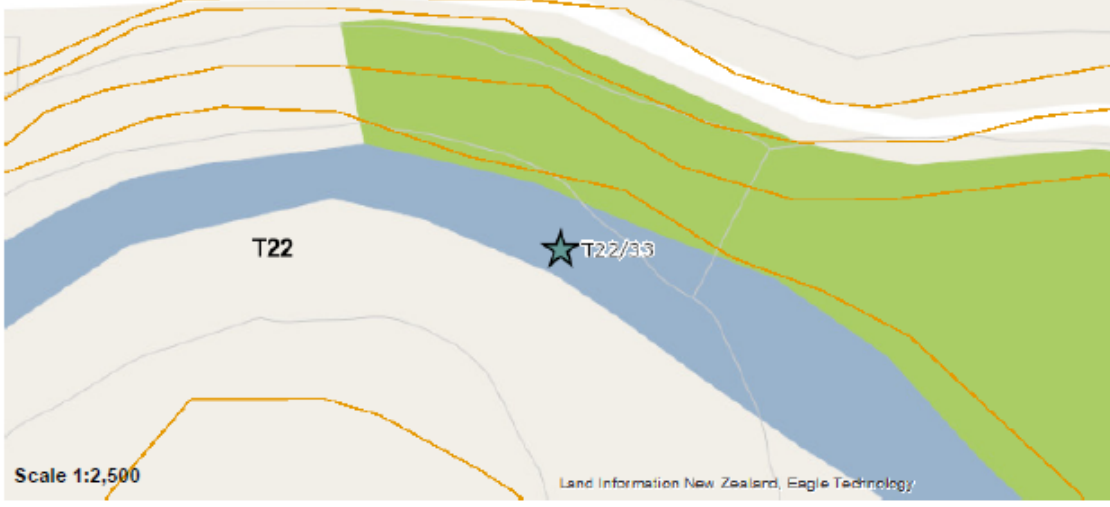
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 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: T22/32</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s): J & A Anderson Ltd workers' camp</p> <p>Record last updated: 18/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1840313 Northing: 5589601 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER: T22/32</p>	
	
<p>Finding aids to the location of the site On western (true left) side of the Rangitikei River, south of Mangawharariki Road and downstream of the Mangaweka Bridge. Presently occupied by Council operated Mangaweka Camping Ground.</p>	
<p>Brief description of the site</p>	
<p>Condition of the site when last visited Not visible</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact:</p> <p>ArchSite Coordinator, PO Box 6337, DUNEDIN</p> <p>admin@archsite.org.nz</p>

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 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: T22/33</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s):</p> <p>Record last updated: 28/09/2017</p>
<p>SITE COORDINATES (NZTM) Easting: 1839801 Northing: 5589733 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER: T22/33</p>	
 <p>Scale 1:2,500</p> <p>Land Information New Zealand, Eagle Technology</p>	
<p>Finding aids to the location of the site Rangitikei River, downstream from Mangaweka Bridge and Camping Ground. Southeast of intersection of Mangawharariki and Cage Roads.</p>	
<p>Brief description of the site A ford is shown in this location on survey office plan SO13729 (dated 1894).</p>	
<p>Condition of the site when last visited</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>