

## Appendix F Heritage Workshop Background Notes



## An Analysis of the Archaeological Risks for Route Options Within the North of Otaki to North of Levin Options Area



**Prepared by:**

inSite Archaeology Ltd  
48 Liverpool Street  
Levin, 5510  
phone: (027) 421-0803  
email: daniel@insitearchaeology.com

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**Author(s):** Daniel John Parker

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# INTRODUCTION

Since 2013 inSite Archaeology has been part of a team of technical experts providing research and advice to the New Zealand Transport Agency (the Transport Agency) in regards to potential route options for a new expressway between Taylor's Road and north of Levin: part of the Otaki to North of Levin Roads of National Significance project. Research into the archaeological risks associated with the various route options was undertaken in four stages related to proposed changes to the project scope between 2013 and 2016, as outlined below in the order of progression:

Daniel Parker (2013), *An Assessment of the Archaeological Risks Associated with Proposed Upgrades to the Connection of SH1 and SH57: Manakau to Levin*, research report prepared for MWH New Zealand Limited

Daniel Parker (2015), *An Assessment of the Archaeological Risks Associated with Proposed Upgrades to the Connection of SH1 and SH57: Otaki to Levin*, research report prepared for the New Zealand Transport Agency

Daniel Parker (2016), *A Brief Overview of the Archaeological Risks Identified Within the Levin Northern Connection Options Area*, research note prepared for the New Zealand Transport Agency

Daniel Parker (2017), *An Overview of Archaeological Risks Identified Within the Combined Routes, North of Otaki to North of Levin, Options Area*, research report prepared for the New Zealand Transport Agency

In early 2017 the Transport Agency decided to take a more active participatory approach with the wider community to help it identify and choose a route option to proceed with (Allan 2017). As part of this community engagement, the Transport Agency reviewed a wide range of possible routes over the course of a two-day Multi-Criteria Analysis (MCA) workshop that included input from the Transport Agency, technical experts, community group and iwi representatives<sup>1</sup>. Sixteen possible route options were identified and scored: 11 developed by the Transport Agency prior to the workshop, with five more added at the request of community participants after the first day.

Route options were presented as broad corridors 300 to 600 metres in width and would require refinement involving further investigations across a range of aspects to arrive at a final design. Routes were also divided into southern and northern segments to keep the number of route options at a manageable level while also allowing various north-south connection combinations to be evaluated. All southern options begin at Taylor's Road, north of Otaki, and terminate at various positions south of Levin on an east-west spread. Northern options continue on from the southern alignments to reconnect with State Highway 1 at various positions to the north of

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<sup>1</sup> This workshop was held on the 22nd and 29th of August 2017. Background information to the project and a field trip to key sites throughout the project area were presented on the 22nd. An introduction to the MCA process, discussion of key issues and scoring of route options took place on the 29th.

Levin (Figure 1).

The Transport Agency recognises that historic heritage, which includes archaeological sites, is a non-renewable resource that, “constitute[s] a unique and invaluable record which contributes to our understanding of the history and cultures of New Zealand” and that the “Avoidance of development impacts on, and preservation in situ of, historic heritage places are always the preferred options” (NZTA, 2015: 8). The following report describes and discusses the archaeological information that was presented at the workshops of the 22nd and 29th of August 2017 and the key reasons underlying the archaeological scoring of these route options to assist the Transport Agency in its decision making and the achievement of these objectives.

While previous MCA exercises followed a largely consistent methodology with regards to analysis and scoring, significant changes to the background archaeological data and project scope necessitated the development of a new method for scoring route options. The details of this new methodology and its underlying reasoning are presented below, followed by a brief background history of settlement and occupation in the Horowhenua region. The report concludes with an analysis of the route options presented to the workshop and discusses the scoring of each option in regards to the Transport Agency’s historic heritage objectives.

## RESEARCH METHODOLOGY

Route options reviewed by inSite Archaeology during earlier MCA exercises were generally evaluated and scored on the basis of potential effects to registered Historic Places, recorded archaeological sites, known archaeological sites, and unknown archaeological sites<sup>2</sup>, with an emphasis on the potential effects to specific Historic Places, recorded and known archaeological sites. Scoring for individual route options reflected a largely qualitative assessment of potential effects that was possible due to the limited number of options under review and their relatively tight geographic spread. However, the August 2017 workshop greatly expanded both the number of route options and their geographic spread. Given the changes in conditions it was not possible to continue with the previously established methodology in the time frame available (see Parker 2013: 12-16, 2015: 10-16, 2017: 5-8). Instead, a more quantitative approach using archaeological information compiled for a revision of the 2012 scoping report was undertaken (Peet et al., 2012).

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2 Registered Historic Places, predominantly historic buildings but also including archaeological sites, are “significant and valued historical and cultural heritage places” recognised and listed by Heritage New Zealand. The New Zealand Archaeological Association maintains an online database of archaeological sites that includes basic site details and location information. While the Association database contains a substantial number of sites, it is not a complete record and there are many known sites that are not included. For this reason, sites listed in the Association database are referred to as being ‘recorded sites’, while sites not included in the database, but identified through other sources, are ‘known sites’. Where there is no direct evidence for archaeological sites, but their presence is strongly inferred – on the basis of patterns in the distribution of known and recorded sites – reference may be made to potential ‘unknown’ sites.

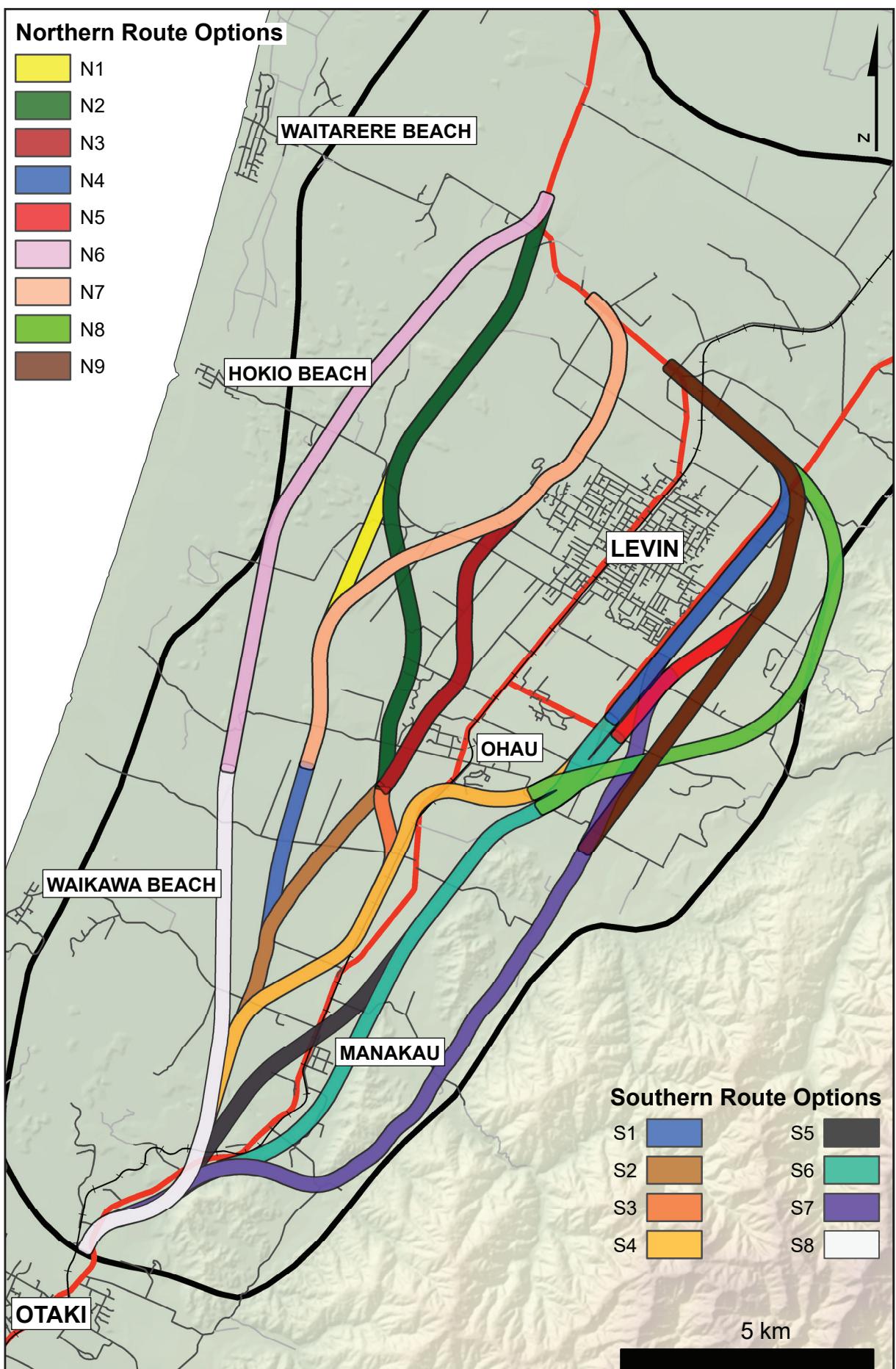


Figure 1: Route options under consideration for an expressway between Taylor's Road and north of Levin. Existing highways shown in red.

Due to the dependent relationship of the methods of analysis and scoring on the form of the revised area scoping archaeological site data – also produced by inSite Archaeology – a brief discussion of the revised area scoping data is presented below<sup>3</sup>. This is followed by a description of the methods of analysis and scoring used during the August 2017 MCA workshop.

## Summary of Area Scoping Archaeological Site Data Revision

The 2012 (Peet et al.: 49) scoping report collated three types of information from two official sources: historic buildings and notable trees, from the Horowhenua District Plan, and archaeological sites from the New Zealand Archaeological Association (NZAA) Site Recording Scheme database. In regards to archaeological sites, which is the focus of this report, at that time the NZAA held records for 55 sites that were located in the scoping area (Peet et al., 2012: Appendix D, Map 5). By July 2017, when the scoping revision was undertaken, the number of recorded sites had increased to 71. While this was a substantial increase (44%) in the number of recorded archaeological sites, it was felt that on its own the NZAA data substantially underrepresented both the magnitude and distribution of archaeological risk throughout the scoping area.

In response, inSite Archaeology was commissioned to undertake an examination of additional sources to supplement the data already compiled. In order to meet the requested timeframe for provision of the revised archaeological site data, a decision was made to limit the study of new sources to the published maps of Leslie Adkin (1948) and historic Māori Land and Survey Office plans of the Horowhenua District pre-dating 1900<sup>4</sup>. Most importantly, in order to include a broader range of information that better reflects the distribution of archaeological risk at the regional level, a somewhat looser definition of what constitutes an ‘archaeological site’ was used instead of the legal definition established in the Heritage New Zealand Pouhere Taonga Act (HNZPTA) of 2014<sup>5</sup>. The threshold for establishing an ‘association with human activity’ was lowered to include any place with a historic Māori-name association and any unnamed features of the natural environment that are generally regarded as having been focal points for past human activity. In doing so, the potential range of site types is expanded to include natural landscape features such as dunes, hills, lagoons, lakes, mountains, rivers and streams. There are a range of sources, for both the Horowhenua and wider New Zealand, which indicate that many of these places have, or are likely to have, an archaeological component that is as yet

3 For a more complete discussion of the revised area scoping archaeological site data, please see the following report, *Otaki to North of Levin - Area Mapping Update*, Stantec, August 2017.

4 Adkin’s (1948) book on place-names of the Horowhenua and their topographic/historical background includes more than 20 maps showing the location of more than 500 archaeological sites or sites of significance to iwi. More than 200 survey plans pre-dating 1900 were studied for this revision with more than 350 new sites identified. Where sites were identified in both historic survey plans and Adkin maps, the survey plan data was assumed to be more accurate and used to identify the approximate site location.

5 The legislative definition of an archaeological site is provided by the HNZPTA 2014, which states that an archaeological site is:

- Any place in New Zealand, including any building or structure (or part of a building or structure), that:
- Was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and
  - Provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and
  - Includes a site for which a declaration is made under section 43(1)

unrecognised due to issues of surface visibility or a limited history of landscape study<sup>6</sup>.

From these new sources, and with the revised ‘site’ definition, an additional 768 sites were identified to give a new total of 877 archaeological sites within the scoping area<sup>7</sup>.

In many cases, it was possible to define a detailed site location and extent, but for the sake of consistency with sites where this information was lacking and continuity with the previous scoping data, all new site location information was recorded with a point geometry. While discarding extent information compounds some of the historic errors associated with the recording of site locations and the difficulty of estimating the potential degree of adverse effects, the effect of this decision is somewhat limited for smaller sites, such as houses or whare, midden, springs, etc. However, for significantly larger sites that may be a hectare or more in size – such as pā or kāinga, cultivations, burial grounds, forest clearings, rivers, swamps etc – the effect of reducing a site to a single point is substantially more distorting.

The distortive effect produced by the reduction of site location and extent to a single point was overcome by interpolation of the point distribution, using a point density function, to an area (raster) coverage: conversion of archaeological information into a similar mapping scheme as ‘landscape/urban design quality’ and ‘landscape absorption capability’ (Peet et al., 2012: Appendix D, Maps 2 and 3) being a key objective of the area scoping revision project. As the purpose of the analysis was to illustrate the broad trends in the archaeological landscape, site density was calculated on a per square kilometre basis. The resulting risk map (Figure 2) is not only a suitable guide to the distribution of archaeological risk for the Otaki to North of Levin project as it relates to registered Historic Places, recorded and known archaeological sites but also the potential risks related to the distribution of unknown archaeological sites.

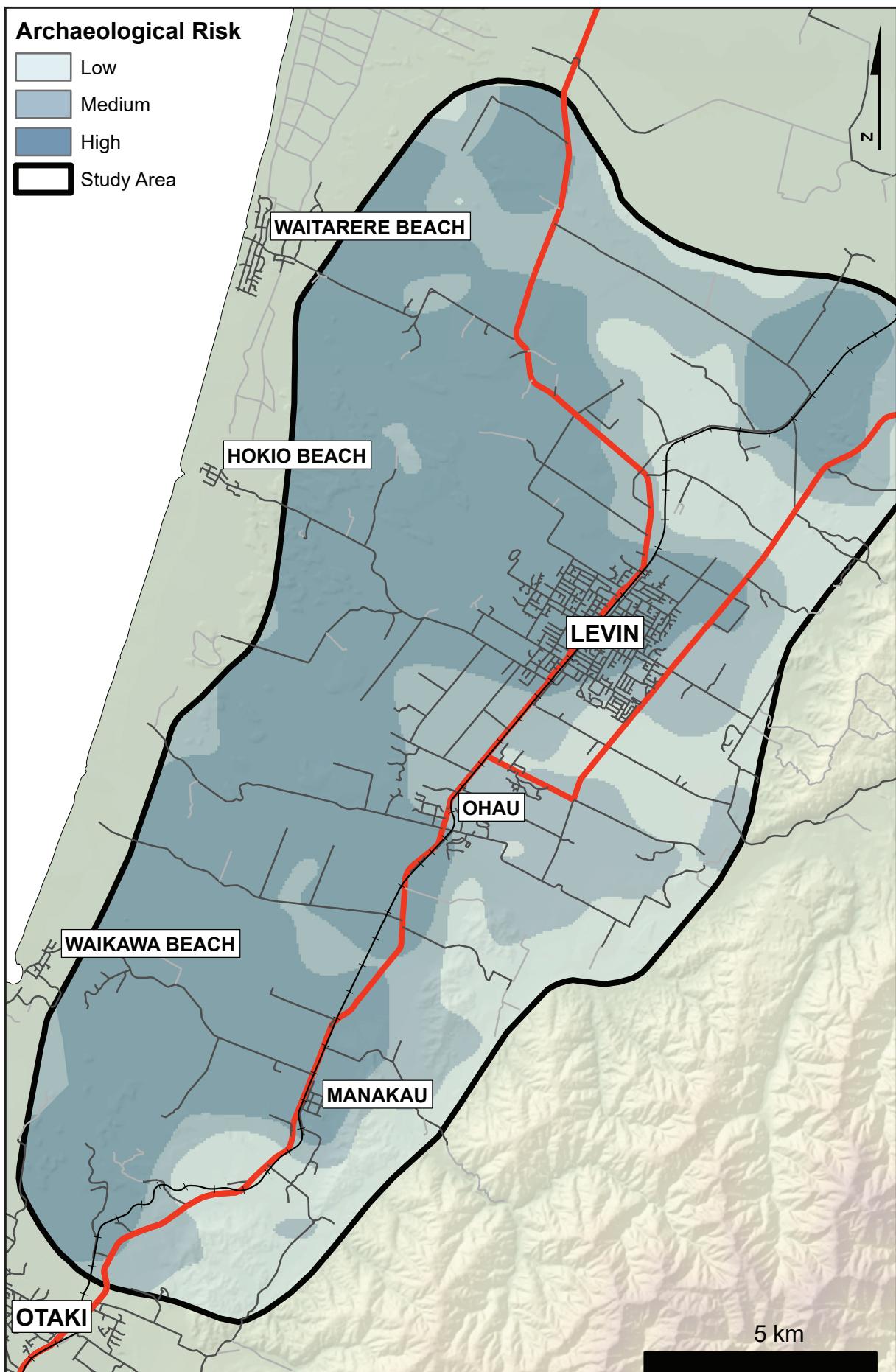
### **Methodology Applied to Scoring of August 2017 MCA Workshop**

As described above, route options considered during previous MCA exercises were assigned scores on the basis of a largely qualitative assessment of potential adverse effects to specific, identified archaeological sites. Research that supported the discussion of potential effects to specific sites, however limited, was possible due to the limited number of site options under consideration and their tight geographic spread. For the present workshop, given the number of route options and their geographic spread, it is not possible to achieve the same level of discussion in the timeframe available.

The archaeological risk map provides a basis for qualitatively scoring route options, but provides no means of differentiating the potential effects of adjacent route options with similar risk profiles, nor any indication of the magnitude of differences between high and low-risk areas (Figure 3). To achieve greater differentiation, the total number of potentially affected sites was counted for each route option using the point locations of sites collected during the revision of the area scoping data and polygons of the route corridors supplied by Stantec New

6 Information included in Adkin’s (1948) place-name descriptions and native testimony recorded in the minute-books of local land claims hearings amply indicate this to be the case.

7 The total includes revised numbers for NZAA recorded archaeological sites and historic buildings. Notable trees were not included in this analysis.



**Figure 2:** Estimated archaeological risk levels in the project study area based on a density analysis of the revised area scoping site data.

Zealand. Two counts were compiled for each route option: the first, counting only those sites with a point located inside the boundary of the route option, and the second, counting not only sites located inside the route boundary, but also all sites located within 500 m or less of the route boundary. These route-and-site counts allow for greater differentiation of potential effects for routes crossing areas with similar risk profiles and were the primary basis for scoring the route options presented at the MCA workshop on the 29th of August.

In regards to scoring the route options, greater weight was given to the route-and-site counts that included sites within 500 m of the route boundaries. There are three reasons for this:

1. As discussed above, the simplification of site location and extent information to a single point introduces a range of potential errors and distortions. Extending the site count to include sites located beyond route boundaries ensures that smaller sites which may mistakenly be located just beyond a boundary, and larger sites which may have their point location outside, but extend across a boundary, are also included in the route-and-site counts.
2. Expanding the area of analysis provides a wider perspective on the potential range of site types and the patterns of occupation that may be present inside the route option. Some site types or occupation patterns that are only visible in the wider landscape will also be present inside the route option but as an invisible and as yet unknown risk<sup>8</sup>.
3. The comparison of within-boundary and boundary-plus-500-m route-and-site counts provides a guide to the relative intensity of historic occupation in the landscapes traversed by the route options. Routes with fewer sites, relative to other options, in their boundary-plus-500-m counts are likely to be located in landscapes with lower occupation intensities. For routes where the intensity of historic occupation appears to be higher, the unknown archaeological risks are also likely to be higher.

As indicated by 2 and 3, above, a significant proportion of the archaeological risk associated with each route option relates to the issue of unknown sites. The potential scope of the unknown site risk is highlighted by recent archaeological investigations undertaken as part of the Transport Agency's Mackays to Peka Peka Expressway project. While the formal results are still being prepared, early indications are that the number of previously unknown sites discovered during construction was substantially greater than the number of sites known beforehand (Figure 4). Prior to preliminary route investigations for the Mackays to Pekapeka Expressway being undertaken only nine archaeological sites had been identified within 500 m of what would be the eventual route. Twenty-two new sites were identified by the project archaeologists prior to

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8 With the vast majority of the world's archaeological sites unknown and invisible to human perception, due to their being hidden beneath the earth's surface, resolving the problem of site (in)visibility has been a challenge that archaeologists have grappled with for many decades. Since the 1960s, landscape based studies have been the preferred scale of analysis for archaeologists researching a range of questions (Kluiving and Guttmann-Bond, 2012: 9), including the detection of unknown sites (e.g., Bintliff, Howard, and Snodgrass, 1999; Campana, 2009). Internationally, the extent of landscape analysis beyond the design boundaries of major industrial/infrastructure projects varies in scale from hundreds of metres to kilometres in size (e.g., DOE and MDOC, 2009: 4.9-1-4.9-9; Lambert, Newman, and Oliver, 1996).

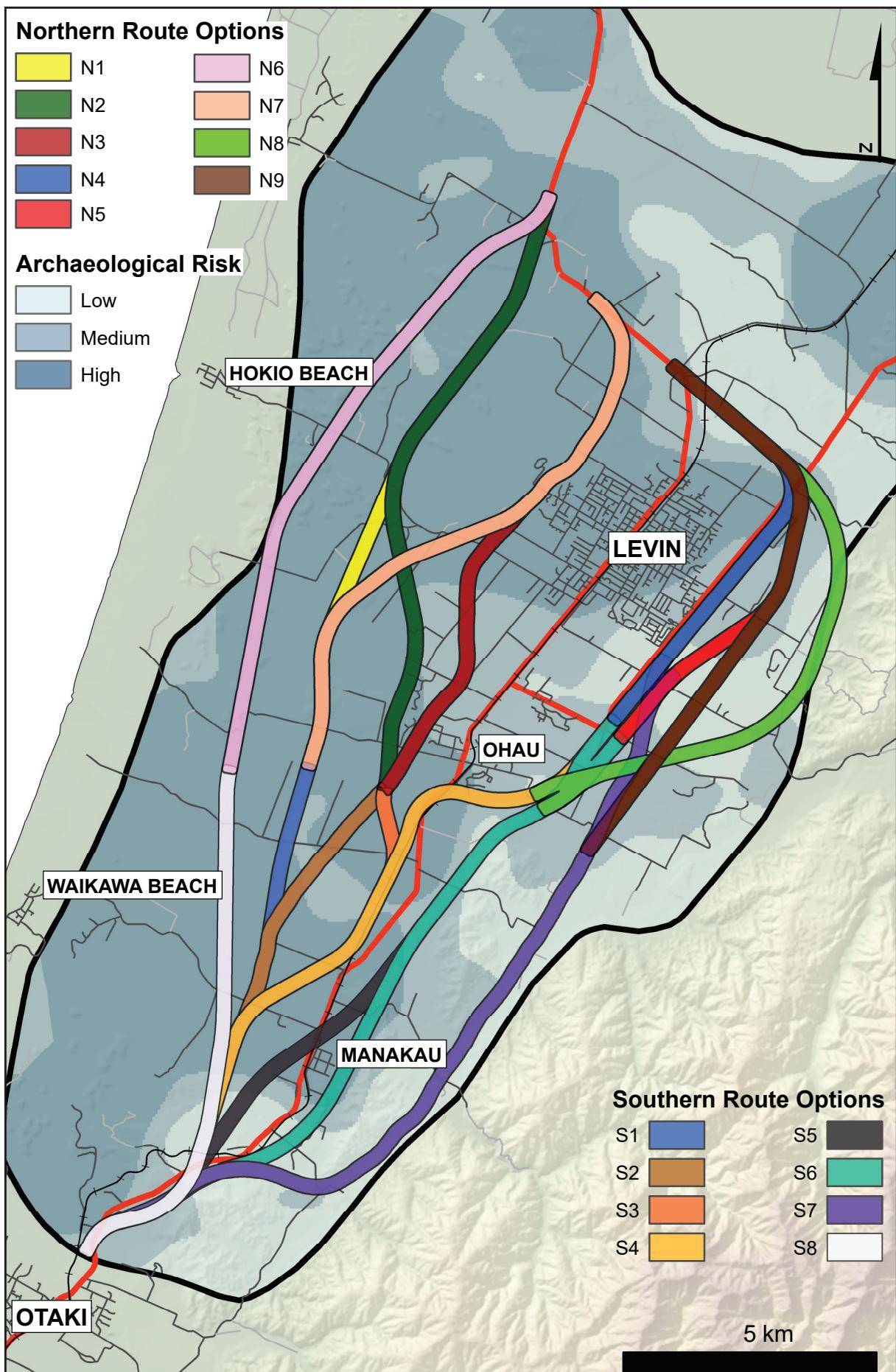
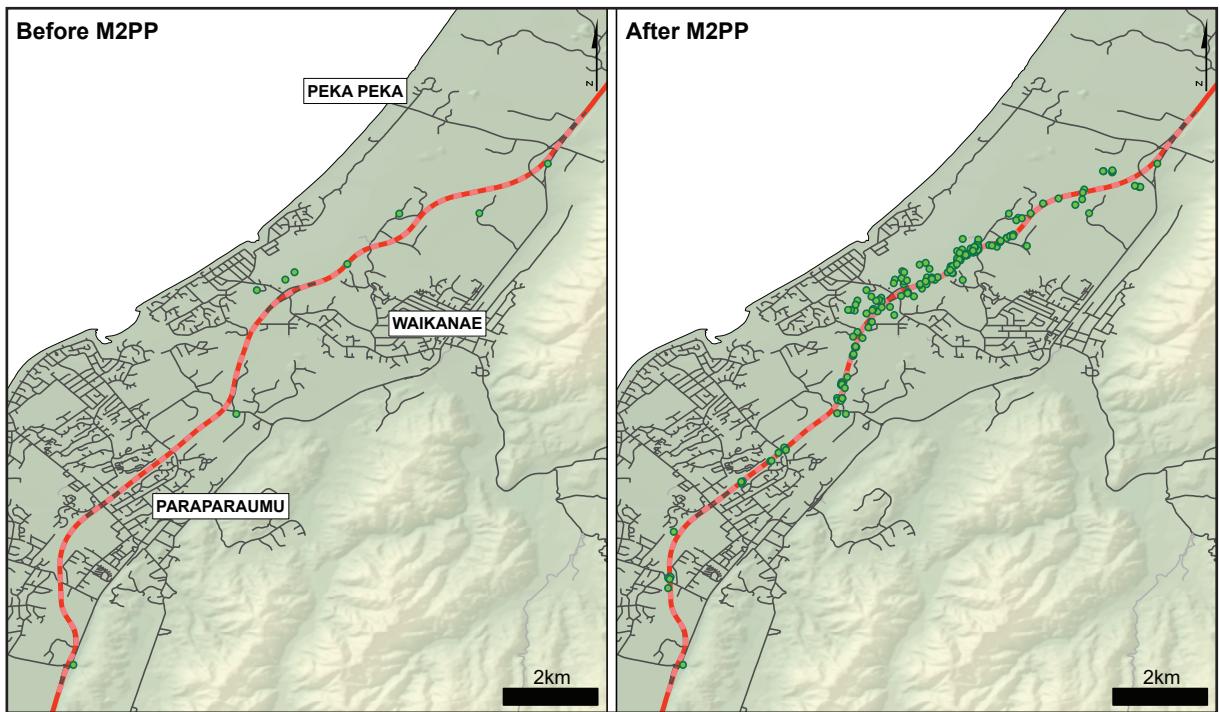


Figure 3: Route options in relation to the landscape of archaeological risks.



**Figure 4:** Two maps showing all archaeological site records held by the NZAA that are located within 500 m of the recently constructed Mackays to Peka Peka Expressway. (left) All site records created before route investigations and construction. (right) Total number of sites after route investigations and construction. More than 100 additional sites, pending approval, remain to be added to the NZAA records as a result of this project.

construction, with a further 200 new sites identified during the construction of the Expressway.

Earlier work undertaken by inSite Archaeology for the Transport Agency, as a part of the Waitarere Beach Road Curves project, contextualised project effects by studying the archaeological landscape within two kilometres of the project extent (Parker, 2015: 21-30). Use of a similar extent for the current project would result in substantial overlapping of adjacent route options, therefore a 500 m buffer beyond the route boundaries was used. This provided a wider landscape perspective without compromising the ability to differentiate the degree of risk associated with each route option.

The scores assigned during the MCA workshop of the 29th of August, as detailed below, were decided on the basis of the number of sites associated with each route option, relative to the number of sites associated with the competing options. It should be noted that while the total number of ‘affected’ sites varies for each route between the within-boundary and boundary-plus-500-m counts the broad trends remain the same and the same scores would be assigned regardless of which count is used. However, emphasis is placed on the boundary-plus-500-m counts due to the reasons described above that help to make the relative differences more pronounced.

With one exception<sup>9</sup>, scores were not weighted to account for effects relative to site values or significance. This was to ensure that the scoring was not biased by detailed information about

<sup>9</sup> Option N4 has been given a weighted score based on the high value of a specific site identified during an earlier stage of investigation. The exceptional value of this site has been reviewed and confirmed by an independent expert.

specific sites that had been collected during earlier stages of the project. A comparable level of information could not be collated for all sites within the current timeframe. However, as a general guide, sites of higher archaeological value or cultural significance are more frequently located in the dune systems to the west of the Horowhenua district.

Before moving to a discussion of the route options and their scores a brief history of human occupation in the Horowhenua is provided, below. It summarises the underlying historical factors that have influenced the distribution of archaeological sites in the district and thus also the scoring of the route options.

## BACKGROUND HISTORY

Radiocarbon (C14) determinations from coastal sites to the north and south indicate that Māori have occupied this part of the New Zealand coast for more than 700 years<sup>10</sup>. Within a relatively compressed landscape between the coast and the Tararua Ranges, there was a diverse mix of faunal and floral resources (Bevan sen., 1907: 10-11; O'Donnell, 1929: 5). Until the late-19th century, the major settlements and occupation sites of the various local iwi were predominantly located in the coastal dune belt and adjacent to the major rivers, streams, swamps, lagoons and inland lakes. The general disposition of Māori settlement in the district is succinctly illustrated by Keepa Rangihiwini (Major Kemp), a chief of Muaūpoko, who when asked where on the Horowhenua Block Muaūpoko had historically lived, replied:

On No. 11 alongside the [west of] lake [Horowhenua], from their ancestors down to the present day... They have permanent whares there; there are fortified pas [sic] there too. You could see the heaps of shells handed down from past generations; the other portion [i.e., the forest east of Lake Horowhenua] the birds and the rats occupied.” [emphasis added]<sup>11</sup>

The forested land to the east of the district was not totally unoccupied, but traditional Māori and European historical accounts indicate that it was not intensively settled until after the completion of the Wellington-Manawatu Railway in 1886. Prior to this, the forest was used primarily for resource gathering, including bird snaring, collecting forest fruits and obtaining timber. Tracks out of the district also passed through the forest. The thickness of the forest, outside of clearings and tracks, made navigating through the forest almost impossible and:

“people [were] apt to walk in circles and become lost in a few acres. From time to time the mill-hands would go pig or cattle hunting and be missing for a night or even two.” (Wilson, 1959: 116)

<sup>10</sup> See reference dates WK1757 and NZ0682 from the NZ Radiocarbon Database, at [www.radiocarbondating.co.nz](http://www.radiocarbondating.co.nz).

<sup>11</sup> Testimony of Keepa Rangihiwini, quoted during the examination of Alexander McDonald by the Horowhenua Commission (AHJR 1896: 78).

Sites relating to Māori occupation during this period were generally located in small clearings (both natural and man-made), areas of raised ground, or along the margins of the streams and tracks that crossed the forest. The largest of these clearings, some of which contained sizeable settlements, are for the most part located west of State Highway 1 (Figure 5).

The first Europeans to settle on the Horowhenua coast were predominantly whalers or traders who arrived in the mid decades of the 19th century. These early settlers lived in or nearby the Māori settlements among the coastal dune belt and traded for raw materials that could be sold in the Wakefield settlements or exported to the markets in Sydney. This substantially changed in 1886 when the Wellington-Manawatu Railway, which passed through the former Weraroa clearing at what is now the southern end of Levin (Figure 5), was completed.

European settlement, in particular, shifted inland to be nearer the railway line which was now the primary transportation, trade and communication route. An influx of new settlers was attracted by the extensive tracts of land made available by the government at the burgeoning settlements of Otaki, Manakau, Ohau, Levin, and Shannon. Felling of the dense lowland forests by the incoming settlers, in order to fulfill their obligations to the government to ‘improve’ the land, resulted in a rapid transformation of the Horowhenua landscape. So dramatic was this change in such a short space of time that Park (1995: 269) states:

“Never before or since has a New Zealand landscape been so quickly and ruthlessly ‘cleared’. Within 20 years of the forest tunnel [Wellington-Manawatu Railway] being cut, only nature’s geological lineaments were still there.”

Archaeological sites with a European association can generally be placed into one of three categories:

1. Homesteads and associated farming structures;
2. Civic buildings and retail stores; and
3. Industrial sites associated with railway construction, forest clearance/saw milling and other agriculture.

These sites are generally located near the existing town and township centres, the North Island Main Trunk Railway (NIMTR) and old roads (Figure 5).

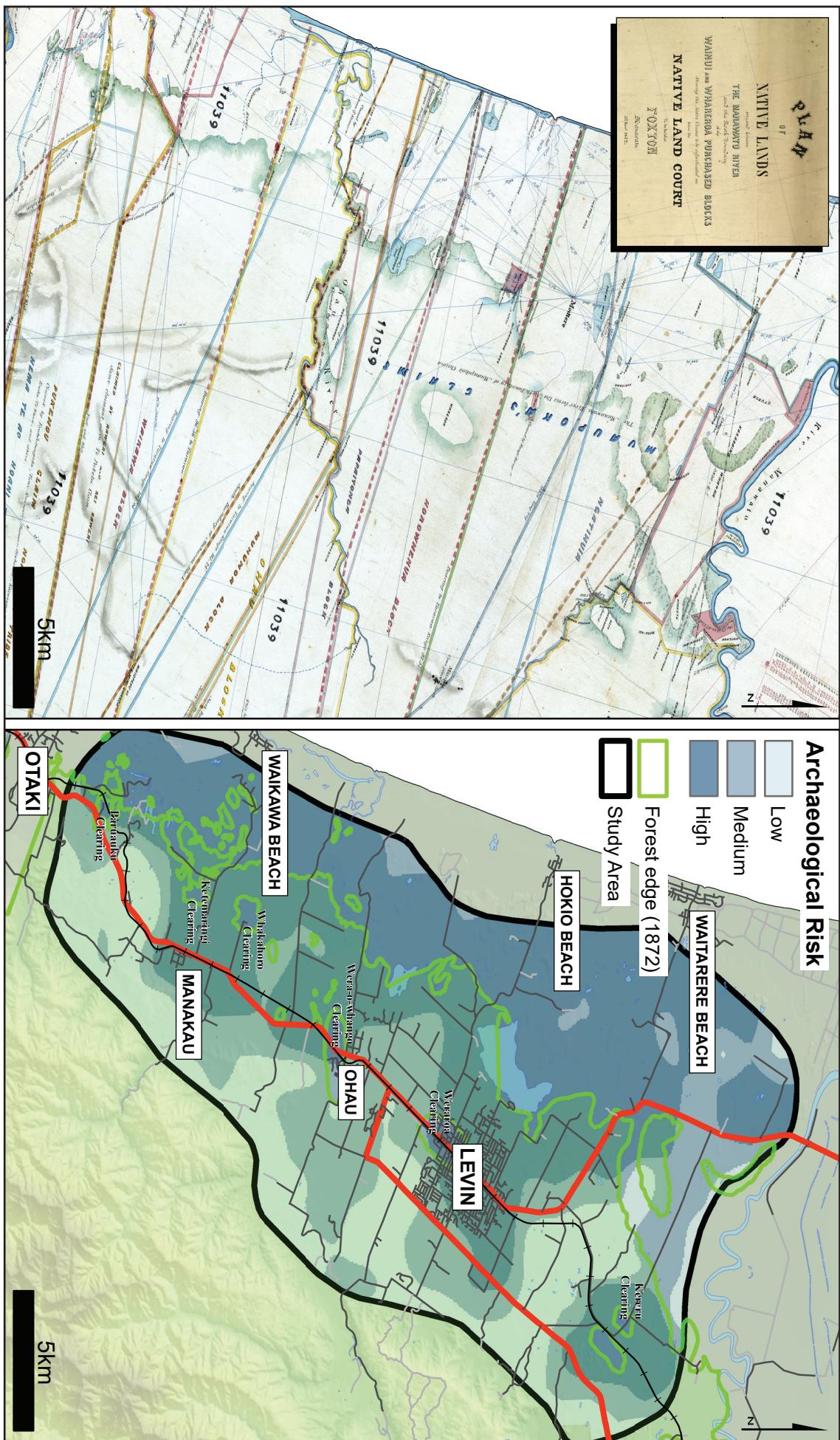


Figure 5: (left) Detail of historic survey plan SO 11039 (1872), showing some site locations and the boundary between the dense forest and open dune land. (right) The relationship between archaeological risk, the historic forest boundary and modern settlements.

# ANALYSIS OF ROUTE OPTIONS AND SCORING

As outlined in the introduction, in regards to the assessment of state highway options, the Transport Agency recognises that historic heritage is a non-renewable resource and that the “Avoidance of development impacts on, and preservation in situ of, historic heritage places are always the preferred options” (NZTA, 2015: 8). In keeping with the Transport Agencies objectives, route options that are identified as having fewer potential effects to archaeological sites are accorded better scores than those with potentially greater effects. Scores are assigned on a 1 to 5 scale, where lower scores represent better route options with fewer effects relative to the other options under consideration. Southern and northern route options are scored separately. Individual route option plans are presented in Appendix I.

It is important to note that the width of the route options reviewed here are substantially in excess of the actual amount of land that is likely to be required for any expressway that may be constructed. Therefore, there is some scope to mitigate potential adverse effects to archaeological sites by incorporating site avoidance objectives during the design process. However, total site avoidance is unlikely to be possible, for any route option, given the Transport Agency’s geometric design constraints for new highways<sup>12</sup>. There is also the potential that design changes made for the purpose of avoiding a known site result in otherwise avoidable adverse effects to an as yet unknown site. This is particularly true for the western route options located in areas with higher archaeological site densities. As a result, consideration of the potential for the mitigation of adverse effects by site avoidance is better left to the later stages of the project when more detailed design information will be available. Potential mitigation for route options is not discussed below though it should be noted that there is likely to be greater scope for mitigation by avoidance along the more eastern route options.

## Southern Route Options

There are eight route options between the north of Otaki and south of Levin (Figure 6). Routes S1 to S7 were presented at the workshop on the 22nd and route S8 was added at the suggestion of community group representatives. All southern route options begin at Taylor’s Road, north of Otaki, and terminate on an east-west spread south of Levin. Four options – S1-3 and S8 – are predominantly located west of State Highway 1 and end at the southern bank of the Ohau River. Options S4 and S5 have portions of their alignment to the east and west of State Highway 1. Options S6 and S7 are entirely aligned to the east of the current highway. These final four alignments – S4-7 – cross the Ohau River and terminate adjacent to State Highway 57 in the vicinity of the Kimberley or Tararua roads.

Although all eight routes traverse what is usually a low-risk landscape inside the former forest margins, route-and-site counts at the boundary-plus-500-m level are noticeably larger for the

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<sup>12</sup> For the Transport Agency’s geometric design guidelines see, <https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/safety-and-geometric-design/geometric-design/>.

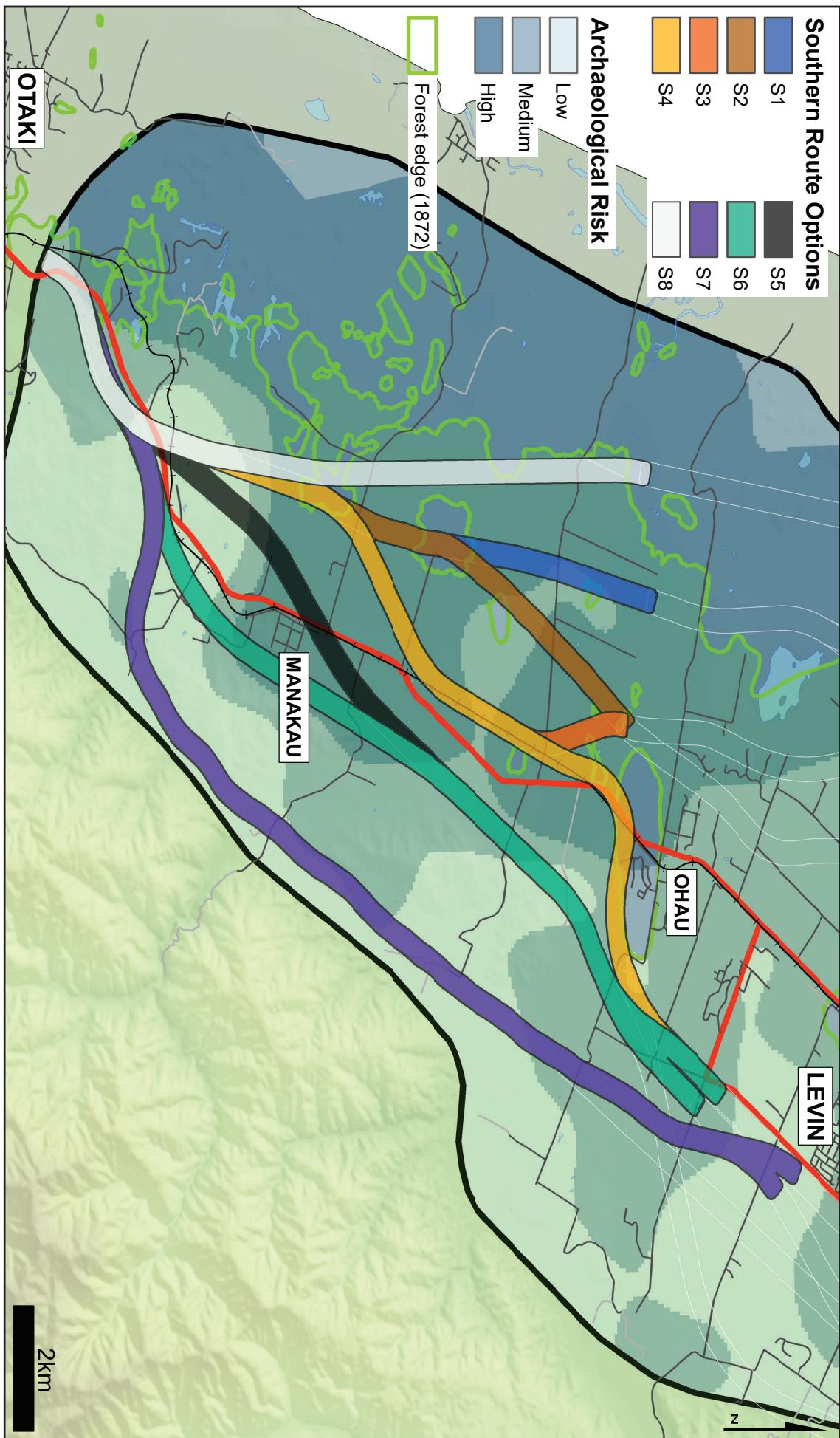
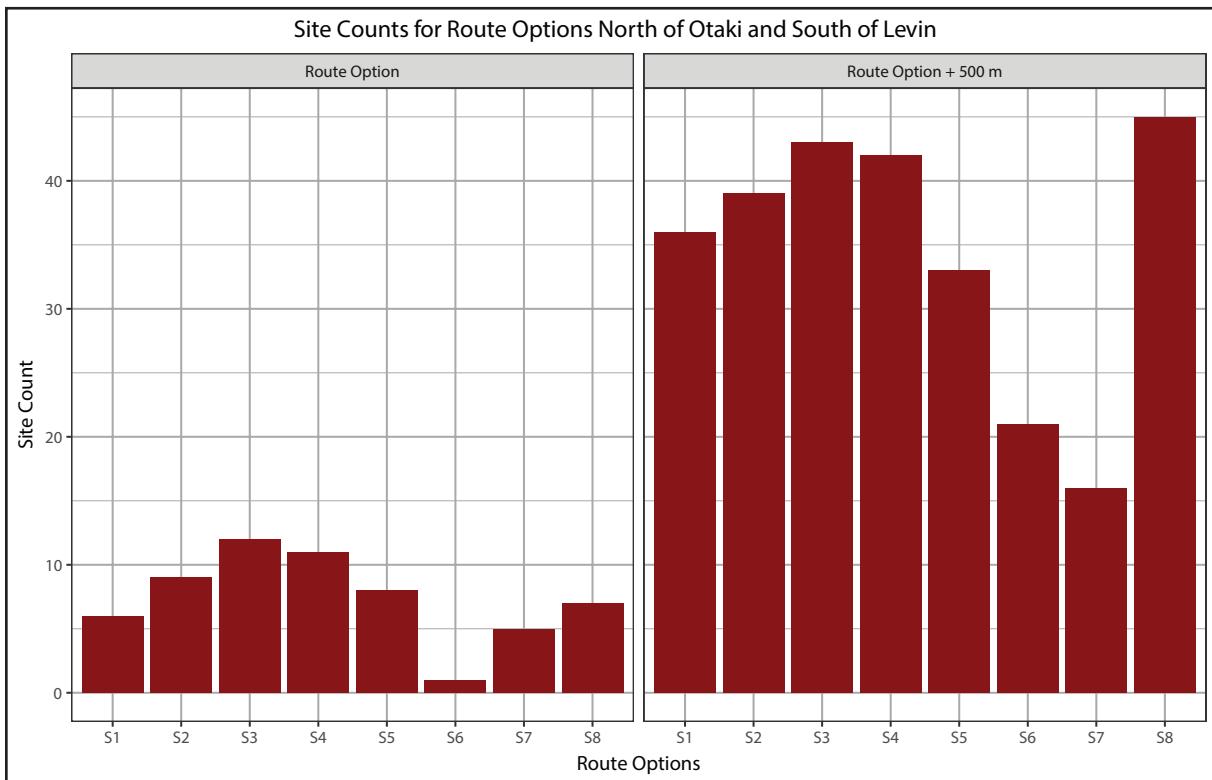


Figure 6: Route options and archaeological risk between the north of Otaki and south of Levin.



**Figure 7: Route-and-site counts for southern route options between the north of Otaki and south of Levin.**

options aligned to the west of State Highway 1 (Figure 7). This is due to these options passing through, or in close proximity, to a number of forest clearings that have a history of intensive occupation by both Māori and early European settlers. All four western options cross the Ketemaringi clearing, to the west of Manakau. S1 and S2 continue on through the Whakahoro clearing and then diverge, S1 clipping the Kai a te Toki clearing and S2 the Tikorangi clearing. After passing through the Ketemaringi clearing, options S3 and S4 move to the east and follow a route parallel to the NIMTR and intersect a number of smaller clearings on the southern bank of the Ohau River. On the north bank of the Ohau River, S4 cuts the large Wera-a-Whango clearing to the south of the Ohau township.

As the main open spaces in an otherwise densely wooded forest, the clearings listed above were focal points for a wide range of forest based activities and sites of intensive occupation by Māori and, at a later date, early European settlers. Sites associated with Māori occupation in these clearings are likely to be larger and more complex than sites located deeper in the former forest. A number of pā, kāinga and cultivation grounds are known to be present. Archaeological sites located in the clearings, of both Māori and European association, are likely to be older than those located in and around the settlements adjacent to the NIMTR. There is also a high risk of encountering new, unknown sites along these route options. For these reasons options S1, S2, S3, S4, and S8 are given a score of 4.

Option S5 crosses State Highway 1 and the NIMTR in two places, moving to the west at Pukehou and returning east to the north of Manakau township. The small portion of S5 aligned to the west of State Highway 1 and the NIMTR avoids the forest clearings crossed by the other western options. For the remainder of its alignment, S5 stays to the east of State Highway 1, crosses the Ohau River and ends with a dual connection option along Arapaepae Road (State

Highway 57), north of Kimberley Road. While this route avoids most of the major southern risk areas, it is likely to affect a number of sites located to the west and north of Manakau. There is also a high risk of encountering new, unknown sites associated with the early history of the Manakau township. This option is also given a score of 4.

Options S6 and S7 are entirely aligned to the east of State Highway 1 and cross the Ohau River. S6 follows a small gully between the Manakau township and the Hanawera Ridge, terminating in dual connection options at Arapaepae Road, north of Kimberley Road. S7 is the eastern most option and follows the Waiaute Stream to the east of the Hanawera Ridge, before following a north-eastern alignment terminating in dual connection options at Arapaepae Road, north of Tararua Road. Options S6 and S7 have the lowest known archaeological risk, with S6's greatest risk being its proximity to the Manakau township and S7's being its potential effects to Māori cultivation grounds adjacent to the Waiaute Stream and Ohau River. There is also an unknown sites risk, though this will be lower than that of the western options. There are fewer archaeological risks associated with options S6 and S7, therefore they are given a score of 2.

## Northern Route Options

There are nine route options for the Levin northern connection (Figure 8). Routes N1 to N5 were presented at the workshop on the 22nd, with routes N6 to N9 added at the suggestion of community group representatives. The northern route options are a continuation of one or more of the southern options, starting south of Levin on an east-west spread and terminating to the north of Levin where they reconnect to State Highway 1. Five options – N1-3 and N6-7 – are aligned to the west of Levin and are reconnected to State Highway 1 in the vicinity of Kawiu and Waitarere Beach Roads. Four options – N4-5 and N8-9 – are aligned to the east of Levin and reconnect to State Highway 1 in the vicinity of Heatherlea East Road. As with the southern options, routes located further to the west have a higher degree of archaeological risk than their eastern counterparts. Overall, in comparison to the southern options, the archaeological risks are much greater for the northern options (Figure 9). This is due to the different environmental landscapes that are crossed and the intensity of historic occupation in this area, by both Māori and Europeans.

Three options – N1, N2, and N6 – pass to the west of Lake Horowhenua, with all or a substantial proportion of their alignment located in the coastal dune belt that was intensively occupied by Maori prior to the late 19th century. There are a great number of historic settlements in this area, from early Māori pā and kāinga<sup>13</sup> to smaller hamlets of just one or two houses/whare belonging to Māori or Europeans. There are numerous horticultural and aquatic cultivations and a number of known burial grounds or urupā located along these corridors. Option N1 passes through an area containing several urupā to the south of Lake Papaitonga (Waiwiri). At their northern extent, both N1 and N2 are likely to affect access to the historic urupā at Paeroa<sup>14</sup>, which is still in use. The unknown archaeological risk, of any route either north or south, and of any site type, including burials, is greatest in this area. The unknown risk is likely to be greatest around

<sup>13</sup> Several of these pā and kāinga are located on the dune ridge directly to the south of the State Highway 1-Waitarere Beach Road intersection.

<sup>14</sup> This hill is also a pā site with numerous other sites clustered around it.

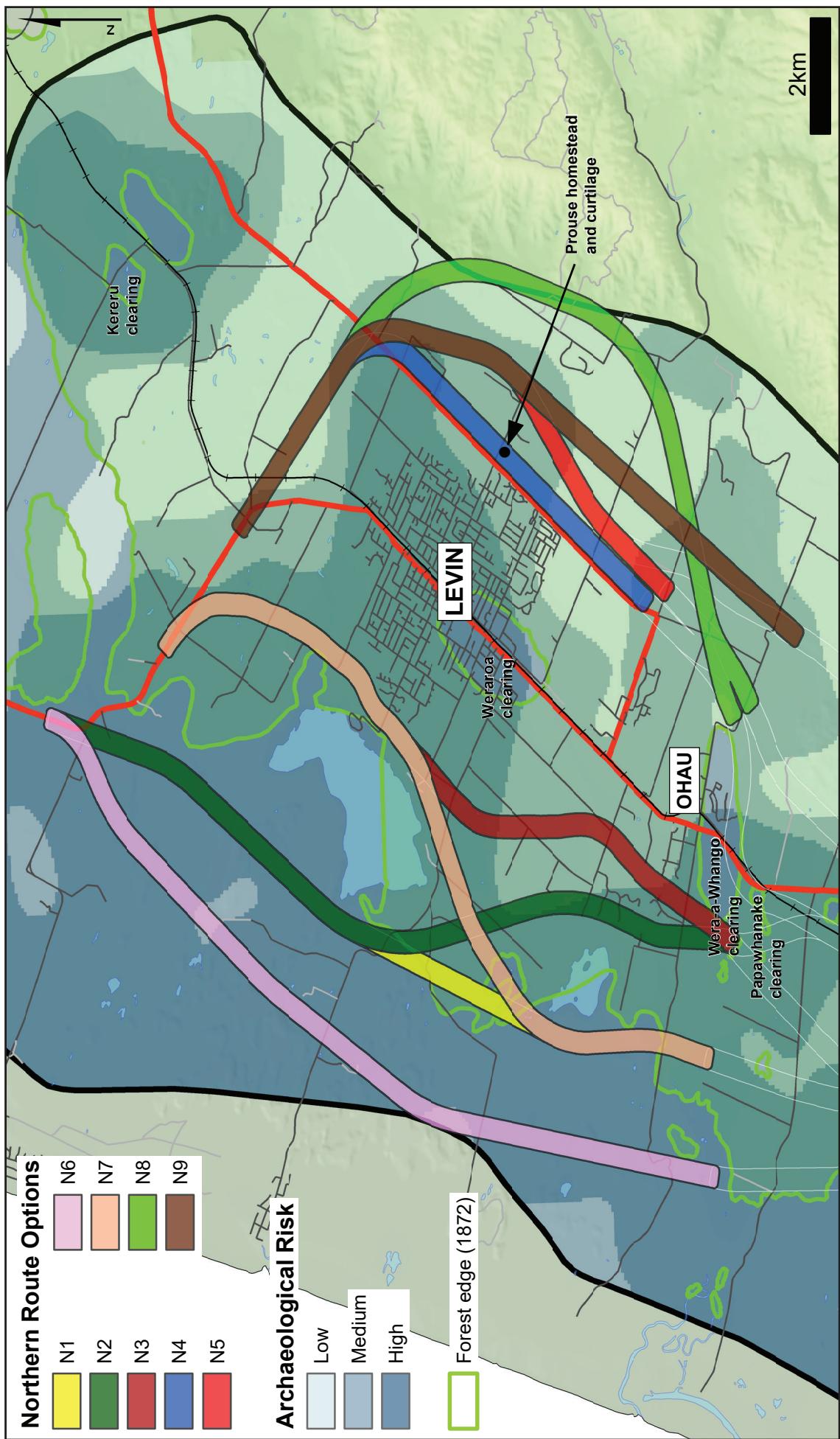
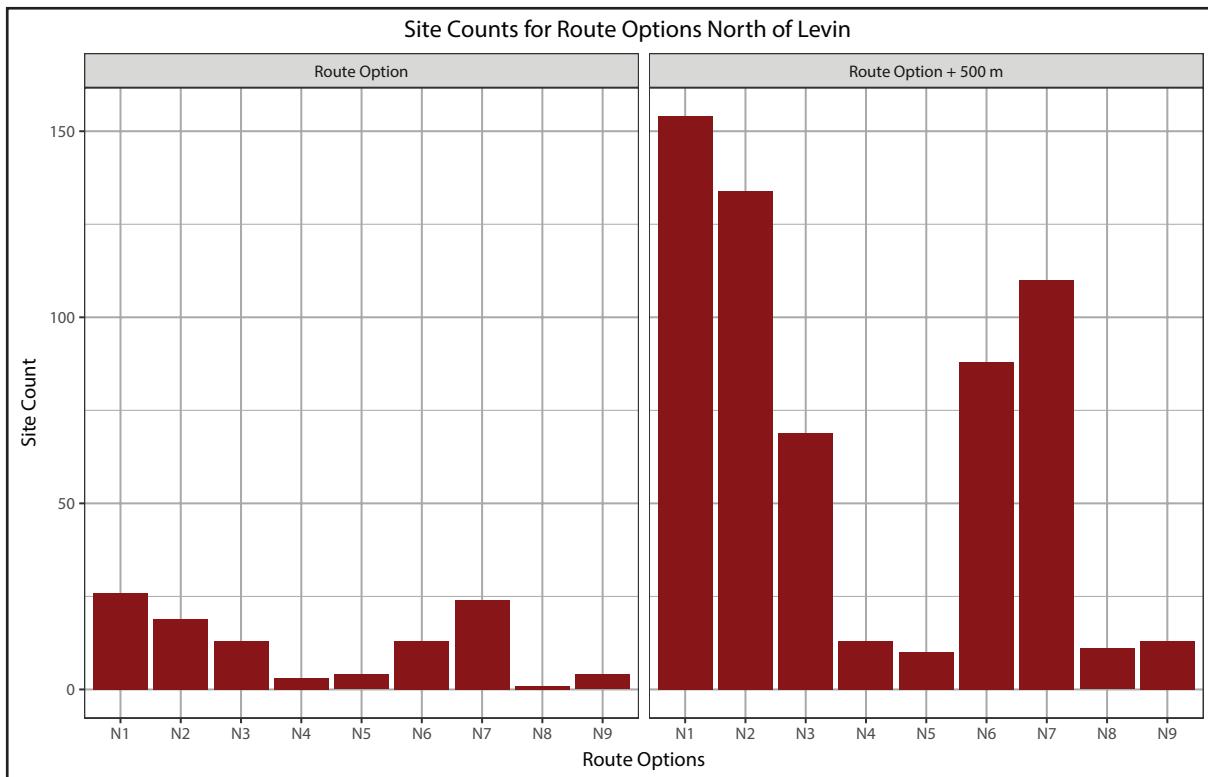


Figure 8: Route options and archaeological risk for the Levin Northern Connection.



**Figure 9: Route-and-site counts for the Levin Northern Connection route options.**

the margins of the former lagoons and swamps that were focal points for subsistence activities, but sites may be found anywhere in the landscape (cf. Figure 4, which illustrates the known/unknown site risk for a similar environmental landscape). These options are scored as a 4.

Options N3 and N7 are also located west of Levin but are threaded between the town and Lake Horowhenua. While predominantly located inside the lower risk area of the former forest, in their proximity to Lake Horowhenua these routes are likely to affect a number of clearings on the eastern of the lake that served as cultivation grounds, hunting camps and access points for tracks inland. While there were generally few permanent settlements on the eastern side of the lake, prior to the 19th century, both routes are likely to affect a settlement in the former Ngurunguru clearing. Like option N1, in the vicinity of Lake Papaitonga N7 may affect a number of urupā and settlements in this area. While the unknown archaeological risk for these options is slightly lower than for those further to the west, there is still a sufficient unknown risk, in combination with the known risks, to score these routes a 4.

Four options – N4 and N5, and N8 and N9 – are aligned to the east, between Levin and the Tararua foothills. Options N4 and N9 are aligned parallel to State Highway 57, N4 is adjacent to the highway and N9 offset by approximately 1 km. N5 begins on an alignment parallel to the highway but diverts to the east towards the Waiopehu Reserve and N8 is located furthest to the east, skirting the base of foothills. North of Roslyn Road all four options turn northwest and reconnect to State Highway 1 in the vicinity of the Heatherlea East Road intersection. There are substantially fewer archaeological risks associated with these options, due to their being located in a landscape that was densely forested until the late 19th century. For the most part, it is not possible to identify specific risks for each of these eastern routes due to the poor quality of the site location information<sup>15</sup>. The risk of encountering unknown sites is lowest in this area

<sup>15</sup> Most archaeological sites with Māori associations known to be located east of Levin can only be defined

and any sites that are found are expected to be relatively small. Given their low known and unknown risk profiles, options N5, N8 and N9 are scored a 2.

As previously mentioned, scores have not been weighted to account for effects relative to site values or significance. However, there is one exception. The general landscape in the vicinity of N4 is one of relatively low risk, as described above, but there is one specific, high-value site that is taken into consideration when scoring this option: the historic Prouse homestead, ‘Ashleigh’, at 1024 Queen Street, Levin. Reports prepared at earlier stages of this project had identified the Prouse homestead as being of, “significant archaeological, historic and cultural value for both the town of Levin and the wider Horowhenua District”. An independent review confirmed that the Prouse homestead had locally and possibly regionally significant value. In recognition of these exceptional known values and for consistency with earlier MCA route scoring, option N4 is given a score of 4.

## Conclusion

There are a number of uncertainties that must be considered when undertaking archaeological research of this type: uncertainties of site location and extent, and even the existence of sites themselves. It is for this reason that a landscape approach, one that looks beyond the route boundaries, has been used here. The broad trends of historic occupation in the district were defined after a revision of the 2012 area scoping data (Figure 3). Specific differences in the scale of historic landscape occupation intensity have been made clearer by research presented in this report (Figures 7 and 9). It is also important to remember that this is only a measure of the archaeological risks in the known sample population. Archaeological investigations that were recently undertaken in a similar environment, for the Mackays to Peka Peka Expressway, indicate that there is likely to be a significant unknown component to the total population (Figure 4). Therefore, the relative differences in archaeological risk for each route option are likely to be far greater.

The history of human occupation in the Horowhenua District is long and complex, and while there is substantial variation in the intensity of historic occupation throughout the landscape, there are no ‘zero risk’ options for the proposed expressway. However, in accordance with the Transport Agency’s objective to avoid development impacts on historic heritage, the scores assigned to both southern and northern route options reflect a preference for options located to the east of the study area (Table 3). This scoring bias is a product of the history of human occupation in the district, that is itself a product of historic biogeography. The archaeological risks are greater for the western routes (Figure 3) because the intensity of human occupation has historically been far greater amongst the dunes, lagoons, lakes, swamps and forest margins than it is at present. Of course, the historically forested land to the east (Figure 5) has always been occupied, but intensive occupation of this land is only a relatively recent, late 19th century and

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to a broad ‘area of interest’ and specific details of site location or extent cannot be defined. This issue with ambiguous site location is due to two factors:

1. Difficulties with accurate surveying in dense forests during the late 19th and early 20th centuries when some Māori occupation site locations were recorded, and
2. The difficulty of relocating past Māori occupation sites in a landscape that was largely devoid of aids to location identification after the forest had been cleared.

onwards, phenomenon.

**Table 1: Summary table of route options, scores and scoring definitions.**

ROUTE OPTION	SCORE	DEFINITION
<b>SOUTHERN OPTIONS</b>		
S1	4	The option includes extensive areas of difficulty in terms of the criterion being evaluated. Mitigation is not readily achievable
S2		
S3		
S4		
S5		
S6	2	The option presents only minor areas of difficulties on the basis of the criterion being evaluated, taking into account reasonable mitigation proposals. There may be some benefits in terms of the attribute.
S7		
S8	4	The option includes extensive areas of difficulty in terms of the criterion being evaluated. Mitigation is not readily achievable
<b>NORTHERN OPTIONS</b>		
N1	4	The option includes extensive areas of difficulty in terms of the criterion being evaluated. Mitigation is not readily achievable
N2		
N3		
N4		
N5	2	The option presents only minor areas of difficulties on the basis of the criterion being evaluated, taking into account reasonable mitigation proposals. There may be some benefits in terms of the attribute.
N6	4	The option includes extensive areas of difficulty in terms of the criterion being evaluated. Mitigation is not readily achievable
N7		
N8	2	The option presents only minor areas of difficulties on the basis of the criterion being evaluated, taking into account reasonable mitigation proposals. There may be some benefits in terms of the attribute.
N9		

**Author comment:**

Heritage was considered to be a key enduring issue for the community and was afforded a full (100%) weight in the community weighting schedule. The route option scores that I provided were accepted as presented and without challenge.

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# APPENDIX 1:

## ROUTE OPTION PLANS

Separate plans for individual route options, each plan including: the archaeological risk model, approximate forest edge in 1872 (SO 11039), alternate route options (outlined in white), existing road network and the North Island Main Trunk Railway.

