

Assessment of the Te Oropuriri Road Alignments

30th September 2014



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Quality Information

Document: Assessment of the Te Oropuriri Road Alignments

Ref: 2014_012_Te_Oropuriri_Alignment

Date: 2 October 2014

Prepared by: Russell Gibb

Revision History

Revision	Revision Date	Details	Authorized by
Draft	29/9/14	Draft	R. Gibb
Review	30/9/14	Issued to Client	D. McCurdy
Final	02/10/14	Reviewed by Client	M. Dyer, D. McCurdy

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1.0 Introduction

The New Plymouth District Council, commissioned Geometria Ltd to undertake an assessment of four proposed road alignments that will join Oropuriri Road with Henwood Road. Specifically the brief was to provide an overview of the archaeological risk along each alignment, and to give an indication of cost for each affected landowner to undertake the required archaeological mitigation based on the disturbance areas required for the road construction.

This assessment uses archaeological techniques to assess archaeological values and does not seek to locate or identify wahi tapu or other places of cultural or spiritual significance to Maori. Such assessments may only be made by Tangata Whenua, who may be approached independently of this report for advice.

1.1 The Heritage New Zealand Pouhere Taonga Act 2014

Under the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA), all archaeological sites are protected from any modification, damage or destruction. Section 6 of the HNZPTA defines an archaeological site as:

" 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 the 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)"

To be protected under the HNZPTA an archaeological site must have physical remains that pre-date 1900 and that can be investigated by scientific archaeological techniques. Sites from 1900 or post-1900 can be declared archaeological under section 43(1) of the Act.

If a development is likely to impact on an archaeological site, an authority to modify or destroy this site can be sought from the local Heritage New Zealand Pouhere Taonga office under section 44 of the Act. Where damage or destruction of archaeological sites is to occur Heritage New Zealand usually requires mitigation. Penalties for modifying a site without an authority include fines of up to \$300,000 for destruction of a site.

Most archaeological evidence consists of sub-surface remains and is often not visible on the ground. Indications of an archaeological site are often very subtle and hard to distinguish on the ground surface. Sub-surface excavations on a suspected archaeological site can only take place with an authority issued under Section 56 of the HNZPTA issued by the Heritage New Zealand.

1.2 The Resource Management Act 1991.

Archaeological sites and other historic heritage may also be considered under the Resource Management Act 1991 (RMA). The RMA establishes (under Part 2) in the Act's purpose (Section 5) the matters of national importance (Section 6), and other matters (Section 7) and all decisions by a Council are subject to these provisions. Sections 6e and 6f identify historic heritage (which includes archaeological sites) and Maori heritage as matters of national importance.

Councils have a responsibility to recognise and provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga (Section 6e). Councils also have the statutory responsibility to recognise and provide for the protection of historic heritage from inappropriate subdivision, use and development within the context of sustainable management (Section 6f). Responsibilities for managing adverse effects on heritage arise as part of policy and plan preparation and the resource consent processes.

2.0 Archaeological Risk and Mitigation Cost Estimates

Four alignments are proposed: Northern, Central, Alternate Central and Southern. The risk and estimated costs to undertake the archaeological work for each alignment is discussed below. A more detailed breakdown for each alignment is described in the following tables.

2.1 Northern Alignment

The Northern Alignment (Figure 1) is assessed as the most expensive option due to the continuation of archaeological features directly associated with P19/262 (Te Oropuriri) and P19/261 (Broughton homestead) into this alignment, the probability of encountering features associated with an unrecorded archaeological site on the Graphite property, and proximity to the recorded site P19/334.

For a large section of the route adjacent to Te Oropuriri the archaeological risk is clearly defined as high due to previous excavation results and the presence of known archaeological features (Figure 2). These include a continuation of the defensive trench, whares and pit features, and features associated with the later Broughton occupation. As the Northern Alignment corridor is contiguous with the previous Te Oropuriri excavations as it passes the pa, it has the advantage, from an archaeological perspective, of providing a continuum of knowledge extending the archaeological understanding of Te Oropuriri. Further archaeological discovery is guaranteed and the type and density of features is expected to be similar to previous excavated features immediately to the north.

The stream crossing will require some investigation as there is the potential for deposited taonga to be located within the swampy margins of the stream. The extent and cost of this mitigation is largely dependent on the engineering design for the crossing, for example, whether it is bridged or filled with a drain/culvert arrangement.

The eastern extent of the alignment past the Waipapa Stream crossing has reduced risk due to the majority of this section having previous earthworks completed during the Bell Block Bypass construction.

The archaeological field costs for the Northern Alignment are estimated to be approximately \$147,000 and include both areas of monitoring and full excavation. A breakdown of these costs in relation to risk areas is shown in Table 1. Report costs are impossible to quantify but taking into account the density of features and artefacts recovered from the previous excavations, the expectation is that feature and artefact density will continue to be high and this will be reflected in high report costs,

possibly between \$50,000 - \$100,000. The costs of conservation for any wood artefacts recovered from the Waipapa Stream would likely be covered by the Ministry of Culture and Heritage.

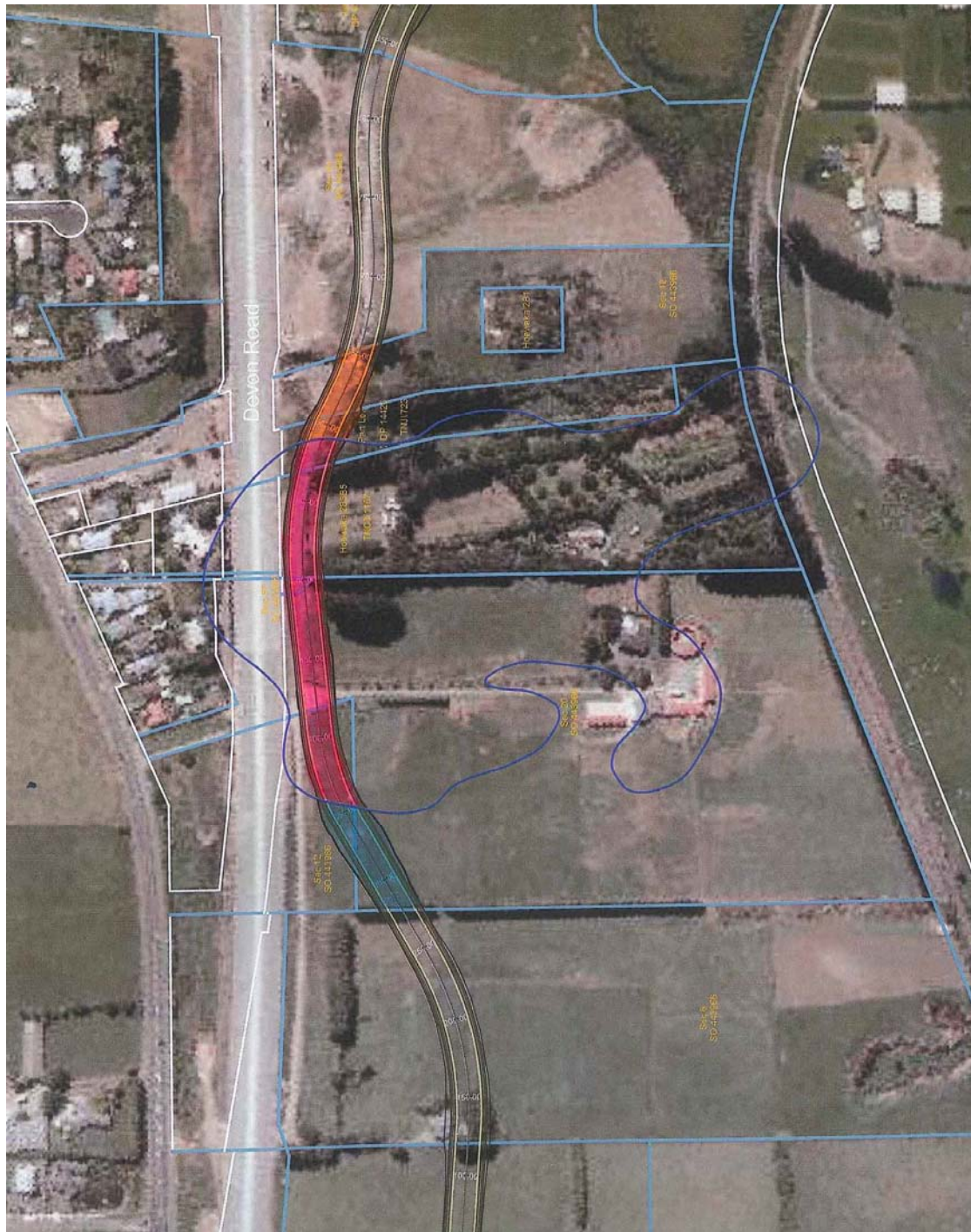


Figure 1: The Northern Alignment route.

Table 1: Breakdown of archaeological risk and estimated cost to undertake archaeological mitigation for the Northern Alignment.

Route	Chainage	Topography	Archaeological Risk	Landowner	Archaeological Potential	Archaeological Requirement	Estimated Archaeological Fieldwork Costs	Justification
Northern Alignment	125-200	Low hillock with downslope to pasture	Existing house on small hillock - date of construction post 1900. Three earlier structures shown here on ML 245 (1892) so medium/high archaeological potential associated with hillock.	Graphite	High	Monitoring/Excavation	\$10,000	Pre-1900 structures once located on the hillock and proximity to recorded site P19/334.
	200-275	Flat pasture.	Flat paddock with nothing recorded along the bulk of this path in the adjacent Bell Block Bypass corridor.	Graphite	Low	Monitoring	\$2,000	Adjacent area largely devoid of archaeological features during Bell Block Bypass excavations.
	275-350	Flat pasture.	Passes close to the P19/334 - the extent of which not fully known as not excavated beyond the Bell Block Bypass footprint. Some archaeological potential with peripheral area of site near recorded boundary of P19/334.	Caskey	Low	Monitoring	\$5,000	Adjacent area largely devoid of archaeological features during Bell Block Bypass excavations.
	350-400	Flat pasture to rising slope on periphery of Te Oropuriri.	Low archaeological potential. Nothing recorded along the bulk of this path in the adjacent Bell Block Bypass corridor. Some potential from slopewash from pa terrace above. Possible garden area.	Caskey	Low	Monitoring	\$5,000	Ground surface reveals no potential archaeological features. Adjacent area largely devoid of archaeological features during Bell Block Bypass excavations.
	400 - 475	Archaeological terrace - part of Te Oropuriri.	Terrace at rear of archaeological features recorded at Te Oropuriri. Features from previously excavated extent are known to extend into this area, including at least one large whare.	Caskey	High	Complete excavation	\$25,000	Previous excavations for the Bell Block features are known to extend into this area.
	475-500	Terrace leading to top of hillock.	Area containing possible ditch defense protecting the hillock/possible tihi above. Dense in situ archaeological features and artefacts - probable defensive ditch, other anomalies identified in geophysical surveys.	Caskey	High	Complete excavation	\$25,000	Previous excavations for the Bell Block features are known to extend into this area.
	500-575	Top of hillock and downslope	Dense in situ archaeological features and artefacts including continuation of defensive ditch, palisades, pits and house sites. Some disturbance to surface from driveways being cut into surface. Artefacts exposed in cuttings at various points along the redundant accessway (upper) and contemporary (lower) drive. Flat gentle sloping area between 520m and 575m is known to have a continuation of pa features exposed during previous excavations, and later historic house remains.	Rowe	High	Complete excavation	\$40,000	Previous excavations for the Bell Block features are known to extend into this area.
	575 -600	Downslope of pa/stream crossing/upslope	Area on periphery of known extent of Te Oropuriri but some related elements may exist downslope and artefacts deposited by slopewash a possible factor. Stream/swamp would have to be investigated for possibility of in situ wooden artefacts.	NPDC	Medium	Monitoring/Excavation	\$10,000	Probably outside the main area of Te Oropuriri but some potential given close proximity to the site.
	600-650	Gentle rise to level ground	Some potential for in situ features associated with Hoewaka/Ngahinepouri. Ground surface has been worked over but some potential still exists and has had some previous earthworks associated with the development of the Bell Block Bypass. However some of the area is lesser disturbed and ephemeral depressions have been noted just to the south of the corridor between it and Hoewaka/Ngahinepouri - possibly related to occupation of the pa.	NPDC	Low	Monitoring	\$5,000	Most of this section has been monitored/cleared as part of the bypass development. Distance from Hoewaka/Ngahinepouri reduces the risk but features noted outside of fenced boundary toward road corridor suggest archaeological features are extending north of the existing urupa fencing.
	650-725	Level ground	Some potential for in situ features associated with Hoewaka/Ngahinepouri.	NPDC	None	No archaeological work required	\$10,000	This section is part of a larger area where earthworks happened during the bypass construction.



Figure 2: Distance in metres along the Northern Alignment showing level of risk. Refer Table 1 for estimated archaeological cost per section.

2.2 Central Alignment

The more direct route of the Central Alignment (Figure 3) will pass through what is interpreted, in general, as probable lower density archaeological areas than the Northern Alignment, being further south of the known concentration of features associated with Te Oropuriri. However, this alignment crosses over areas of varying archaeological potential with some known archaeological deposits and carries a high degree of archaeological risk through the Te Oropuriri/Caskey ridgeline and Rowe property (Figure 4). The sloping gradient of the open orchard ground on the east of Te Oropuriri ridgeline may reduce the archaeological potential of this area due to this not being entirely suitable for occupation features such as whares.

Where the alignment passes to the north of Hoewaka/Ngahinapouri there are a number of ephemeral depressions between the pa and to the south of the alignment, and these are likely to be archaeological. At this chainage the alignment is contiguous with a section of earthworks undertaken during the Bell Block bypass construction. These earthworks did not reveal any archaeological features.

As with the Northern Alignment the stream crossing will require some investigation and the extent and cost of the archaeological mitigation will largely be dependent on the engineering design for the crossing.

It should be noted that the fenced area of Hoewaka/ Ngahinapouri represents the delineation of the site proximate to the legal cadastral boundary but does not truly represent the true geographical extent of the original pa. Also the possibility of burials outside of the fenced area of Hoewaka has to be considered, although this is not likely given the legal designation and then subsequent use of the site as an urupa.

The density of archaeological features, and subsequent cost of excavation, is deemed to be lower along this corridor due to the existing ridgeline modification as a result of access ways being cut along the ridgeline, and due to the distance away from the known concentration of occupation features associated with Te Oropuriri.

The archaeological field costs are estimated to be approximately \$97,000 and include both areas of monitoring and full excavation. A breakdown of these costs in relation to risk areas is shown in Table 2. Report costs are likely to be significantly lower than the Northern Alignment as the field evidence suggests a lower density of features and artefacts through this alignment. Report costs are estimated to range between \$40,000 - \$60,000. Report costs through the Central Alignment would need to include the provision to use C14 assays to date any features associated with Hoewaka/ Ngahinapouri as the date of this pa is not yet known. The costs of

conservation for any wood artefacts recovered from the Waipapa Stream would likely be covered by the Ministry of Culture and Heritage.

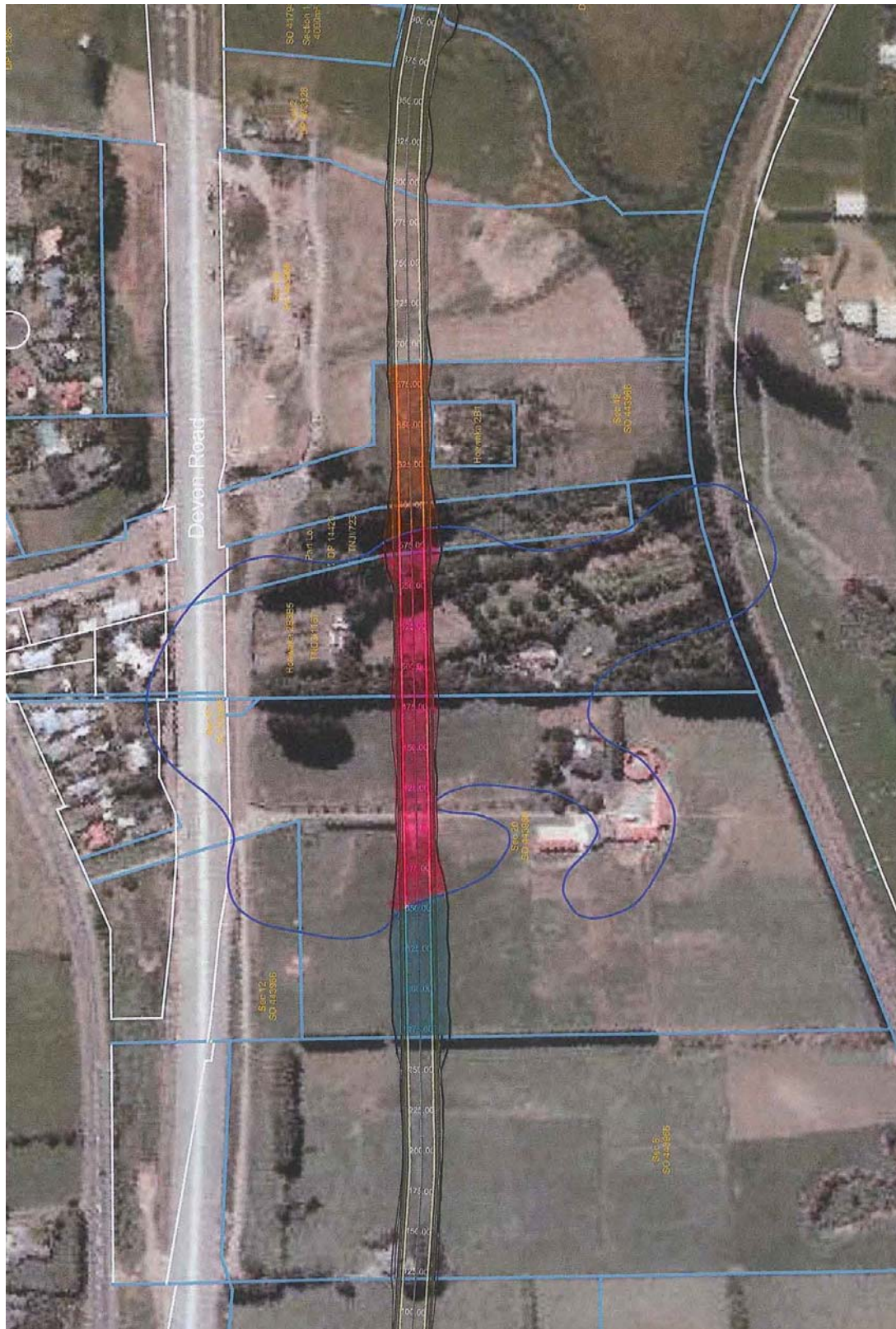


Figure 3: The Central Alignment route.

Table 2: Breakdown of archaeological risk and estimated cost to undertake archaeological mitigation for the Central Alignment.

Route	Chainage	Topography	Archaeological Risk	Landowner	Archaeological Potential	Archaeological Requirement	Estimated Archaeological Fieldwork Costs	Justification
Central Alignment	125-200	Low hillock with downslope to pasture	Existing house on small hillock - date of construction post 1900. Three earlier structures shown here on ML 245 (1892) so medium/high archaeological potential associated with hillock.	Graphite	High	Excavation	\$10,000	Pre-1900 structures once located on the hillock and proximity to recorded site P19/334.
	200-275	Flat pasture.	Flat paddock with nothing recorded along the bulk of this path in the adjacent Bell Block Bypass corridor.	Graphite	Low	Monitoring	\$2,000	Adjacent area largely devoid of archaeological features during Bell Block Bypass excavations.
	275-350	Flat pasture gently rising on periphery of rear of ridge running behind Te Oropuriri.	Low archaeological potential. Nothing recorded along the bulk of this path in the adjacent Bell Block Bypass corridor. Possible garden area.	Caskey	Low	Monitoring	\$5,000	Ground surface reveals no potential archaeological features. Adjacent bypass corridor largely devoid of archaeological features.
	350-440	Flat terraced area below ridgeline.	Possible extension of archaeological features into this area from Te Oropuriri but no surface evidence recorded. Medium archaeological potential.	Caskey	Medium	Monitoring/Excavation	\$20,000	Southern extent of Te Oropuriri is yet to be determined but previous excavations have shown features extending to the south towards the corridor, and geophysical surveys indicate anthropogenic disturbance immediately to the north of the central corridor.
	440-475	Ridgeline behind Te Oropuriri	Ridgeline has a number of depressions along it and may be a continuation of Te Oropuriri. Mr. Caskey has dug rubbish holes up here in the past but there is evidence of artefacts in old driveway cut on other side of fence in Rowe's property.	Caskey	High	Excavation	\$15,000	Ephemeral features are located on the ridgeline and artefacts have been recorded in the adjacent accessways on the Rowe property. Narrow width of ridgeline reduces cost.
	475-575	Ridgeline sloping down to stream	Some disturbance to surface from driveways being cut into surface. Artefacts exposed in cuttings at various points along the redundant accessway (upper) and contemporary (lower) drive. Lower area has some modification associated with orchards and ephemeral depressions along with several possible modern drainage depressions. Risk probably reduces further downslope from the ridgeline.	Rowe	High	Excavation	\$20,000	Evidence in accessway batters indicates both Maori and historic period occupation. Possible archaeological features noted in orchard.
	575-600	Stream crossing/upslope towards pa	Stream/swamp would have to be investigated for possibility of in situ wooden artefacts.	NPDC	Medium	Dammed, drained and tested.	\$10,000	Any authority granted will most likely require some investigation into the possibility of artefacts buried in the stream/swamp. Relates to Te Oropuriri, Hoewaka village and Hoewaka/Ngahinapouri.
	600-700	Flat gently sloping area above the stream and below the pa/urupa.	Proximity of corridor to pa/urupa would lead to high potential for in situ features associated with Hoewaka/Ngahinepouri. Throughout this area there are a number of ephemeral depressions which are likely to be archaeological. Also the possibility of burials outside of the fenced area of Hoewaka has to be considered. The fenced area represents the delineation of the site proximate to the legal cadastral boundary but does not necessarily represent the true extent of the original pa.	NPDC	High	Excavation	\$15,000	Ephemeral features noted outside of fenced boundary toward road corridor suggest archaeological features are extending north of the existing urupa fencing.



Figure 4: Distance in metres along the Central Alignment showing level of risk. Refer Table 2 for estimated archaeological cost per section.

2.3 Alternate Central Alignment

The Alternate Central Alignment (Figure 5) poses similar risk and archaeological potential (Figure 6) to the Central Alignment, being almost an almost identical route. However, the dip around the south of Hoewaka/Ngahinapouri appears slightly more risky given its close proximity to site and a number of ephemeral features that lie immediately outside of the fenced urupa, and which are likely to be archaeological. This area carries a lot of uncertainty as it has never been archaeologically tested and, as mentioned previously, the fenced area of Hoewaka/Ngahinapouri represents the delineation of the site proximate to the legal cadastral boundary but does not truly represent the true geographical extent of the original pa.

The archaeological field costs are estimated to be approximately \$102,000 and include both areas of monitoring and full excavation. A breakdown of these costs in relation to risk areas is shown in Table 3. Report costs are likely to be similar to the Central Alignment at around \$40,000 - \$60,000 and again would include provision to use C14 assays to date any features associated with Hoewaka/Ngahinapouri as the date of this pa is not yet known. The costs of conservation for any wood artefacts recovered from the Waipapa Stream would likely be covered by the Ministry of Culture and Heritage.

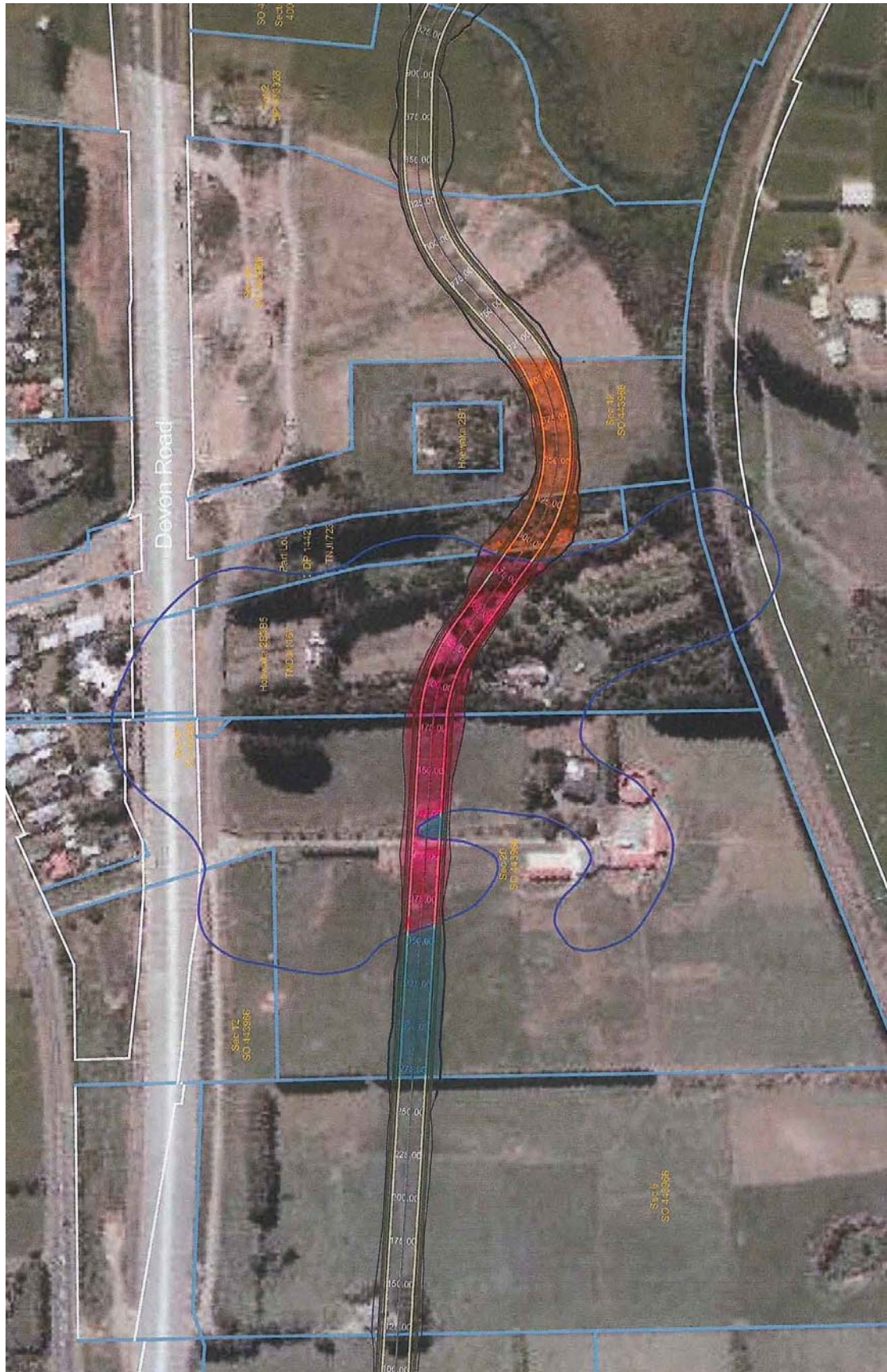


Figure 5: The Alternate Central Alignment route.

Table 3: Breakdown of archaeological risk and estimated cost to undertake archaeological mitigation for the Alternate Central Alignment.

Route	Chainage	Topography	Archaeological Risk	Landowner	Archaeological Potential	Archaeological Requirement	Estimated Archaeological Fieldwork Costs	Justification
Alternate Central Alignment	125-200	Low hillock with downslope to pasture	Existing house on small hillock - date of construction post 1900. Three earlier structures shown here on ML 245 (1892) so medium/high archaeological potential associated with hillock.	Graphite	High	Monitoring/Excavation	\$10,000	Pre-1900 structures once located on the hillock and proximity to recorded site P19/334.
	200-275	Flat pasture.	Flat paddock with nothing recorded along the bulk of this path in the adjacent BB Bypass corridor.	Graphite	Low	Monitoring	\$2,000	Adjacent area largely devoid of archaeological features during Bell Block Bypass excavations.
	275-350	Flat pasture gently rising on periphery of rear of ridge running behind Te Oropuriri.	Low archaeological potential. Nothing recorded along the bulk of this path in the adjacent BB Bypass corridor. Some potential from slopewash from pa terrace above. Possible garden area.	Caskey	Low	Monitoring	\$5,000	Ground surface reveals no potential archaeological features. Adjacent bypass corridor largely devoid of archaeological features.
	350-440	Flat terraced area leading up towards ridgeline	Possible extension of archaeological features into this area from Te Oropuriri but no surface evidence recorded. Medium archaeological potential.	Caskey	Medium	Monitoring/Excavation	\$20,000	Southern extent of Te Oropuriri is yet to be determined but previous excavations have shown features extending to the south towards the corridor, and geophysical surveys indicate anthropogenic disturbance immediately to the north of the central corridor.
	440-475	Ridgeline behind Te Oropuriri	Ridgeline has a number of depressions along it and may be a continuation of Te Oropuriri. Caskey has dug rubbish holes up here in the past. Evidence of artefacts in old driveway cut on other side of fence in Rowe's property.	Caskey	High	Excavation	\$15,000	Ephemeral features are located on the ridgeline and artefacts have been recorded in the adjacent accessways on the Rowe property. Narrow width of ridgeline reduces cost.
	475-575	Ridgeline sloping down to stream	Some disturbance to surface from driveways being cut into surface. Artefacts exposed in cuttings at various points along the redundant accessway (upper) and contemporary (lower) drive. Lower area has some modification associated with orchards and ephemeral depressions along with several possible modern drainage depressions. Risk probably reduces further downslope from the ridgeline.	Rowe	High	Excavation	\$20,000	Evidence in accessway batters indicates both Maori and historic period occupation. Possible archaeological features noted in orchard.
	575-600	Stream crossing/upslope	Stream/swamp would have to be investigated for possibility of in situ wooden artefacts.	NPDC	Medium	Dammed, drained and tested.	\$10,000	Any authority granted will most likely require some investigation into the possibility of artefacts buried in the stream/swamp. Relates to Te Oropuriri, Hoewaka village and Hoewaka/Ngahinapouri.
	600-700	Flat gently sloping area above the stream and south and below the pa/urupa.	Proximity of corridor to pa/urupa would lead to high potential for in situ features associated with Hoewaka/Ngahinapouri. There are a number of ephemeral depressions leading down from the pa which are likely to be archaeological. Also the possibility of burials outside of the fenced area of Hoewaka has to be considered. The fenced area represents the delineation of the site proximate to the legal cadastral boundary but does not necessarily represent the true extent of the original pa.	NPDC	High	Excavation	\$20,000	Ephemeral features noted outside of fenced boundary toward rail corridor suggest archaeological features are extending south of the existing urupa fencing. Close proximity of the corridor to the fenced urupa increases risk.



Figure 6: Distance in metres along the Alternate Central Alignment showing level of risk. Refer to Table 3 for estimated archaeological cost per section.

2.4 Southern Alignment

The Southern Alignment (Figure 7) represents the least archaeological risk and subsequently is the cheapest option with regards the potential archaeological mitigation required. Risk is greatly reduced due to the siting of the alignment further away from the known extent of Te Oropuriri and away from the hillock where Hoewaka/Ngahinapouri sits. As such, it is anticipated that any archaeological features encountered along this alignment would be of a low density.

Archaeological risk (Figure 8) is greatest as the alignment passes across the southern perimeter of the Caskey and Rowe properties and below Hoewaka/Ngahinapouri. There is some possibility that defensive features associated with Te Oropuriri may be found here on the Caskey and Rowe properties, although the railway corridor and batter would likely have impacted upon these if they actually did once exist.

As with the Northern Alignment the stream crossing will require some investigation as the extent and cost of this mitigation is largely dependent on the engineering design for the crossing.

The archaeological field costs are estimated to be approximately \$53,000 and include both areas of monitoring and limited full excavation. A breakdown of these costs in relation to risk areas is shown in Table 4. Report costs are likely to be significantly lower than the Northern and Central Alignments as the field evidence suggests a lower density of features and artefacts through this alignment. Report costs are estimated to range between \$20,000 - \$30,000.



Figure 7: The Southern Alignment route.

Table 4: Breakdown of archaeological risk and estimated cost to undertake archaeological mitigation for the Southern Alignment.

Route	Chainage	Topography	Archaeological Risk	Landowner	Archaeological Potential	Archaeological Requirement	Estimated Archaeological Fieldwork Costs	Justification
Southern Alignment	125-175	Low hillock with downslope to pasture	Existing house on small hillock - date of construction post 1900. Three earlier structures shown here on ML 245 (1892) so medium/high archaeological potential associated with hillock.	Graphite	High	Excavation	\$10,000	Pre-1900 structures once located on the hillock and proximity to recorded site 19/334.
	175-325	Flat pasture and low hillock	No identified features but some potential over small hillock. However similar landform features in adjacent Graphite development have shown no archaeological features. Possible garden area.	Graphite	Low	Monitoring	\$5,000	Adjacent area largely devoid of archaeological features during Bell Block Bypass excavations.
	325-550	Flat pasture gently rising on periphery of rear of ridge running behind Caskey house	No identifiable surface features and proximity away from Te Oropuriri would suggest low potential. Possible garden area.	Caskey	Low	Monitoring	\$8,000	No ephemeral features noted and proximity away from main area of Te Oropuriri suggest lower probability of encountering dense archaeological features.
	550-675	Upslope to ridge and downslope to stream	Area has terracing on both the west and east sides of the ridgeline which are thought to relate to the development of the orchard rather than an earlier Maori phase of occupation. Still has some potential through undisturbed areas.	Rowe	Medium/high	Monitoring/Excavation	\$15,000	Evidence in accessway batters indicates both Maori and historic period occupation further to the north and possible archaeological features noted in orchard.
	675-700	Stream crossing/upslope	Stream/swamp would have to be investigated for possibility of in situ wooden artefacts. Distance from other sites reduces archaeological risk.	NPDC	Low	Dammed, drained and tested.	\$10,000	Any authority granted will most likely require some investigation into the possibility of artefacts buried in the stream/swamp. Relates to Te Oropuriri, Hoewaka village and Hoewaka/Ngahinapouri.
	700-775	Flat gently sloping area above the stream, below the pa/urupa and adjacent to the railway corridor batter.	Proximity away from pa/urupa lowers risk but still some archaeological potential given the surface depressions noted upslope towards the pa/urupa.	NPDC	Low/medium	Monitoring/Excavation	\$5,000	Distance away from Hoewaka/Ngahinapouri reduces risk but ephemeral features are noted further upslope (north).



Figure 8: Distance in metres along the Southern Alignment showing level of risk. Refer to Table 4 for estimated archaeological cost per section

3.0 Summary of Costs

The total estimated cost for each landowner per alignment is summarised below in Table 5.

Table 5: Cost Estimates by landowner

Alignment	Caskey West	Caskey East	Rowe	NPDC	Total	Report
Northern	12,000	60,000	40,000	35,000	147,000	50-100,000
Central	12,000	40,000	20,000	25,000	97,000	40-60,000
Alternate Central	12,000	40,000	20,000	30,000	102,000	40-60,000
Southern	12,000	8,000	15,000	15,000	53,000	20-30,000

4.0 Assumptions and Exclusions

Estimates of costs do not include Iwi consultation and tangata whenua related on-site monitoring costs.

An application to Heritage New Zealand for an archaeological authority will require a detailed Research Strategy for the proposed work and this should reference, and tie in to, previous archaeological work undertaken at Te Oropuriri, P19/261 and P19/334. No cost estimate has been provided for this.

Heritage New Zealand do not charge for an authority application but additional costs may be incurred by NPDC during the authority application and consultation process.

5.0 Conclusion

Four roading alignments have been proposed as options for connecting Oropuriri Road with Henwood Road. Each alignment has been assessed for archaeological risk and an estimate of costs to meet archaeological mitigation requirements for each landowner has been assessed.

Archaeological risk is highest through the Northern Alignment where the continuation of known archaeological deposits associated with Te Oropuriri requires full excavation, and risk tends to decrease as the alignments move south away from the central excavated area of Te Oropuriri. There is some uncertainty as to the nature and density of archaeological deposits through the Caskey and Rowe properties, which are high risk areas and probably would require full excavation. At the western

extent of the alignment area all four alignments pass over a potential unrecorded archaeological site on the Graphite property which relates to several small buildings annotated on a pre-1900 survey plan.

As a minimum monitoring would be required for the majority of the alignment and excavation undertaken as required.