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8 July 2019

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Appendix A: McFadgen report

Draft report to Mary O'Keeffe, Heritage Solutions, on the Geomorphological Aspects of the Montgomery Watson Subdivision, Stages 6a and 6b at Waikanae Beach.

B.G. McFadgen,

99 Sefton Street, Wadestown, Wellington.

29 April 2001.

Introduction

1. The Montgomery Watson subdivision is located on the southeast side of a man-made lagoon about 500 m from the sea and 600 m northeast of the Waikanae River (Figure 1). Two roads, Tamati Place and Wi Kingi Place (Figure 2) have been laid out and formed approximately to grade, and some underground services have been installed. The ground surface is covered with patchy grass and in many places is littered with shells.
2. Human bones discovered in 2000 in Wi Kingi Place, apparently with coffins, indicated that the subdivision might contain remains of archaeological value, in particular more human bones. Where the bones were found is marked as *graves* in the field book of an early cadastral plan (ML1491, Figure 3) dated 1898. Shortly afterwards, a lens of shells found 600 mm deep in a service trench along Tamati Place (Figures 3 and 4) suggested the possibility that other occupation remains such as undisturbed shell middens might be present.
3. In order to establish whether or not an Historic Places Trust authority is required to continue work on the area of subdivision southeast of where the human bones were found, it is necessary to establish the status of the shells and other material in this area. In particular, whether or not the shells and other material are *in situ* archaeological material, re-deposited archaeological material, or of non-cultural origin (O'Keeffe, 2000).
4. This report assesses the geomorphological aspects of the subdivision as they relate to the shells and other material on the ground surface.

Geomorphological context

1. The subdivision is near the seaward edge of the sand dune belt that extends from Paekakariki in the south to beyond the Manawatu River in the north. It is on the south bank of the former Waimeha Stream, which was once a large distributory of the Waikanae River (Adkin, 1941) that flowed west to southwest behind the coastal dunes towards the present Waikanae estuary. It is bounded to the southeast by a low dune ridge roughly parallel to the coast (Figure 5).
2. The sand dune belt has formed during the last 6500 years. Before then the shoreline was near the foot of the hills, and since then, as a result of sand accretion, the shoreline has moved seawards some 3.5 km to its present position.

3. About a kilometre inland of the subdivision a prominent sand dune ridge roughly parallel to the coast marks an intermediate position of the shoreline. The dune ridge, called the Taupo Dune, is a relict foredune that was the shoreline at the time of the Taupo Pumice eruption (Stevens, 1988) *ca*. 230 AD (Sparks *et al*, 1995).
4. The sand seawards of the Taupo Dune has accumulated since about 230 AD and is identified as belonging to the Waitarere and Motuiti dune-building phases (Stevens, 1988). At some time since 230 AD the beach was where the subdivision is today, and has been buried as the shoreline advanced further seawards. The Waimeha Stream, which at one time would have flowed to sea north of the subdivision, was probably forced to flow southwestwards by the accumulation of sand between it and the sea.
5. The graves were situated on a stream terrace that separated the stream from the low dune ridge (Figure 5). In 1898 the stream was about 90 m from the graves, but by 1920 it had moved to within 20 m of the graves.

Subdivision earthworks

1. In the last 30 years the ground surface of the subdivision has been considerably modified. In the 1970s the lagoon was excavated approximately along the course of the Waimeha Stream (James Hutchison, *pers. com*. 2000), and in 1990 and 1997 the ground surface of the subdivision was re-contoured (Engineering plans: 1605836 sheet 1, 1990; 1272233 sheet 1, 1999).
2. The lagoon was excavated with a floating suction dredge that pumped material from the bed of the lagoon and discharged it onto the southeastern lagoon shore (James Hutchison *pers. com*.). How far from the lagoon shore the material was re-deposited is not known, but it is reasonable to expect that it would have been used to level the surface of the terrace between the stream and the low dune ridge.
3. Changes to the land surface, as a result of earth moving, are determined from the contours and levels on engineering plans 1605836 sheet 1 and 1272233 sheet 1.
4. In 1990 the ground to the west of Wi Kingi Place was cut to a maximum depth of slightly more than 3m, and fill was deposited on the eastern part of the subdivision to a maximum depth of 4m (Figure 2). In addition, small pockets in the western part were filled to a depth of less than 1m. In 1999 the earthworks resulted in minor cutting to a maximum depth of about 1m on the northeastern boundary of Wi Kingi Place and along Tamati Place, and the western and northern parts of the subdivision were filled to a maximum depth of 1m (Figure 3). Small pockets of cut and fill were made along the dune ridge southeast of Tamati Place, the maximum cut being about 2m, the maximum fill about 1m.
5. It would have been normal practice to use the nearest source of material as fill and this would have included spoil cut from the higher parts of the subdivision. In 1990, however, some spoil was also brought in from the Major Durie Drive subdivision between Tamati Place and the Waikanae River and deposited along the southeastern dune ridge (James Hutchison, *pers. com*. 2000).
6. Following the cutting and filling in 1999, trenches were excavated along Tamati and Wi Kingi Places for underground services, and it was the cutting of these trenches that uncovered the shell lens on Tamati Place, and the graves on Wi Kingi Place.

From the history of the subdivision earthworks the following points are deduced:

1. The original material excavated from the lagoon was almost certainly reworked in 1990 and again in 1999. In 1990, the material west of Wi Kingi Place was cut and probably re-deposited on the eastern part of the subdivision (Figure 2). In 1999, material along Tamati and Wi Kingi Places was excavated and probably re-deposited on the western part of the subdivision (Figure 3).
2. The graves along Wi Kingi Place are in a part of the subdivision where fill was deposited in 1990. They were below the ground surface as it existed before the 1990 earthworks (Figure 4) and would have been undisturbed until the service trenches were excavated in 2000 AD.
3. Shells on the present ground surface of the subdivision are nearly all on fill and would have been deposited in their present position either during or since 1990 AD.
4. Even allowing for up to 1 m of cut, the lens of shells found 600 mm below the ground surface in Tamiti Drive east of the intersection with Wi Kingi Drive would be in fill and would have been deposited in that position in 1990 AD.
5. *It is therefore inferred from the history of earthworks on the subdivision that the shells on the ground surface and in the trenches are not in situ deposits*.

Origin of the shells

1. The shells (Table 1) are estuarine and open coast species found on the beach today. As similar species are also found in shell middens in the Waikanae area, the species themselves are not a reliable indication of either a natural or a cultural origin.

Table 1: Shell species collected from ground surface of the subdivision.

Shell species
Austrofusus glans
Dosinia anus
Mactra discors
Paphies australis
Paphies (Mesodesma) subtriangulata
Paphies (Mesodesma) ventricosa
Spisula aequilateralis

2. There is a general absence of cultural material such as artifacts, animal bones from food species, burnt and fractured oven stones, or charcoal that might indicate the shells are from old middens.
3. Blackened twigs and sticks similar in appearance to charcoal were seen in several places, as were stone fragments with blackened surfaces, or with the reddish colour of iron oxide, but natural processes can explain these materials.

4. On the lower slopes of the sand ridge southeast of Tamati Drive between the entrance to the subdivision and Wi Kingi Drive are irregular mounds of black peat about 2m across and 20 to 40 cm high. The peat is mixed with swamp-blackened twigs and sticks, rounded lumps of Taupo Pumice discoloured by swamp black and iron oxide, shells stained with iron oxide, and occasional stones some with blackened surfaces others stained with iron oxide.
6. The peat is probably from either re-deposited material excavated from the lagoon, or a former *in situ* wetland, dug out of a service trench along Tamati Place. Excavation of a new trench might clarify its origin. The wood fragments, stone, and shells can be matched on the present beach and are possibly from an old foreshore that later became incorporated in a wetland after the Waimeha Stream began to flow southwestwards.
7. A sample of shells was taken from the ground surface for radiocarbon dating. The ground surface over the subdivision had been sprayed with a mixture of PVA and grass seed, and PVA adhering to shells was removed by scrubbing the shells in tap water. The age of the shells, determined by radiocarbon dating, is between 935 and 1080 AD (Table 2). This age is substantially older than the date for the human settlement of New Zealand of *ca*.1250 AD (Anderson, 1991; McFadgen *et al*, 1994; Higham and Hogg, 1997) and indicates that the shells are not from an archaeological midden.

Table 2: Radiocarbon and calibrated ages (95% confidence interval) for tuatua shells (*Paphies (Mesodesma) subtriangulata*) collected from the ground surface of the Tamati Drive subdivision. The shells were physically pretreated by scrubbing in cold water to remove traces of PVA and then air-dried. The shells were chemically pretreated by washing in 5 M dilute hydrochloric acid for 500 seconds, rinsing and drying. □R=–30±13 (McFadgen and Manning, 1990).

Laboratory number	**Conventional Radiocarbon Age (years BP)**	□□□C **‰**	**Calibrated Age (years AD)**
Wk9144	1360±40	1.4±0.2	935–1080

8. The age of the shells indicates that they are from a natural deposit. Considering the earthworks that have been carried out on the subdivision, especially the excavation of the lagoon in the 1970s, *it is inferred that the shells on the subdivision are derived from a former beach in the position of the present lagoon*. The lagoon water level is less than a metre above mean high water mark, and the suction dredge would almost certainly have intercepted an old beach when the lagoon was excavated.
9. Excavating a trench near the present lagoon edge can test the inference. Shells should be found at or above the height of the lagoon bottom and have an age similar to that obtained for the shells on the present ground surface.
10. Not all of the shells on the subdivision are necessarily from a natural deposit, however. Some could possibly be from shell middens that were originally on the subdivision, or brought from Major Durie Drive, but their status as former midden shells would need to be demonstrated.

11. It is noted that if the shells in the subdivision are a result of the construction of the lagoon, it is possible that some of the human bones might have been similarly deposited if they had been originally buried on a former bank of the Waimeha Stream.

Conclusions

1. The shells scattered over the surface of the subdivision were deposited in their present position since 1990 AD.

2. The shells are older than the human settlement of New Zealand and have a calibrated radiocarbon age of 935–1080 AD.

3. The shells are probably derived from an old shoreline in the vicinity of the man-made lagoons.

4. Graves on Wi Kingi drive are noted in field notes for Maori Land Court Plan ML 1491 dated 1898 AD.

5. Some of the human bones found near the graves during subdivision development are probably from the graves.

6. Other human bones found near the graves may possibly have been derived from the vicinity of the lagoons and re-deposited when the lagoons were excavated.

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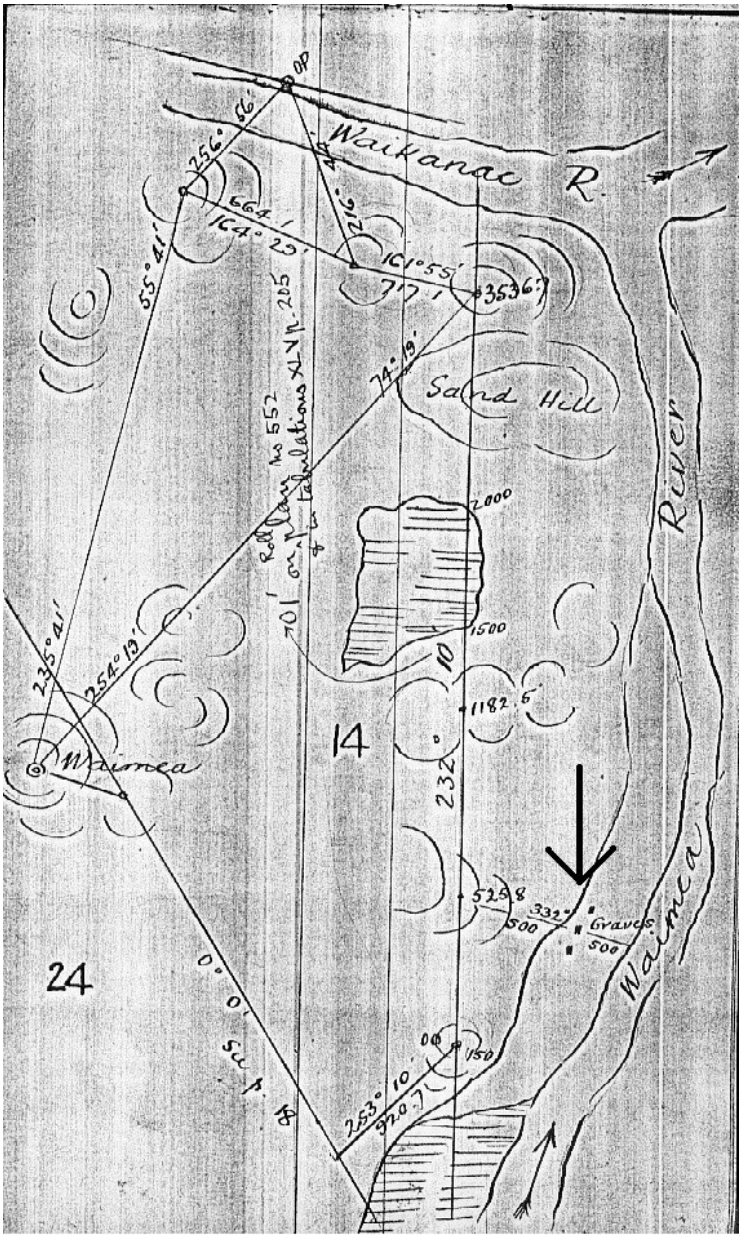
Appendix A: Page from surveyor's notebook 2140 (1891) containing data for survey plan ML 1491.
Graves showed arrowed



Appendix A: ML 1491, 1891

Appendix A: QGIS plan showing location of historic graves shown in surveyor's notebook.

Graves are lower pink dot within green area

Upper pink dot is the historic river edge, used as a mapping reference

Appendix A: Subasic report

Research Notes on Ngarara West A14 – Urupa/Cemetery

The purpose of this report is to discuss and clarify – insofar as it is possible – the uncertainty over the location of the surveyed Maori urupa/cemetery (or cemeteries) on Ngarara West A14 block at Waikanae. Two critical issues to be addressed were identified – firstly, whether there were one or two surveyed urupa/cemeteries on the A14 block, and secondly, whether there was a surveyed urupa/cemetery on the Ngarara West A14B1 section. The conclusions, based on the sources consulted (Maori Land Court Minute Books, and Maori Affairs and Lands and Survey files at Archives New Zealand) are presented below, along with some of the related surveying and partitioning issues which help clarify the overall picture.

The first reference to a cemetery on the Ngarara West A14 block appears in Otaki Maori Land Court Minute Book 31, when the Maori owners of the land applied in November 1896 before the Maori Land Court to have a section of the block set apart as a cemetery reserve, to be vested in all the owners. The cemetery was to:

> include the part to the westward of Section 15 between that boundary and the river Waimea to comprise an area of 10 acres if an area to that extent is comprised within the boundaries indicated, if not then such a quantity as may be found there whether more or less.[1]

Judge Mackay, who presided over the 1896 case, issued a provisional partition order to this effect, stipulating that the cemetery reserve was to be designated as Ngarara West A14A. The order, however, was not completed by survey. This in effect meant that the partition was not completed, and Ngarara West A14A as defined in the partition order did not come into existence as a cemetery reserve with a surveyed title.

The reference in the 1896 minutes to "the boundaries indicated" indicates that the boundaries of the cemetery reserve had been marked on the court's copy of the survey plan of the block. Unfortunately, the court's copies of such plans are not generally retained as official records and the plan before the court in 1896 has not been located.

Nine years later, in February 1905, the Maori owners of Ngarara West A14 made another application to the Maori Land Court for a cemetery to be partitioned out of the block. This time the application was dismissed, with the Judge noting that the provisional orders for this purpose had already been made in 1896, and all that was required at that point was for a survey of the section to complete the order.[2]

Again, no survey of Ngarara West A14A was completed. The probable reason for the lack of survey was the fact that at the time there was an outstanding survey lien on the Ngarara West A14 block dating back from the original partition of the block out of Ngarara West. Either the owners themselves were unwilling to incur a further survey lien by surveying the cemetery

[1] Otaki MB 31, p. 147.
[2] Wellington MB 13, pp.285-286.

section, or the surveyors were unwilling to survey the section until the outstanding debt to them was paid. The evidence consulted is silent on this matter, but the outstanding survey lien from the Ngarara West A14 block came to prominence in 1906. The surveyor took advantage of a change in legislation which allowed survey liens to be satisfied with land rather than cash, and applied to the Maori Land Court in May 1906 to have a section cut out of Ngarara West A14 to satisfy the survey lien. This was approved, and 75 acres were cut out of the block (leaving the balance of the block at 185 acres) to satisfy the lien; the section being designated as Ngarara West A14C.[3]

The designation of the 1906 partition as Ngarara West A14C is somewhat unusual, considering that sections A and B did not actually exist at this time, not then having been surveyed. It is possible that the Judge, still mindful of the provisional partition order from 1896 designating the cemetery reserve as Ngarara West A14A, anticipated that with the completion of a survey that section would come into existence and thus any potential confusion would be avoided (presumably Ngarara West A14B was used to designate the balance of the block).

Yet again, no survey of Ngarara West A14A or B followed in the coming years, and confusion over the designations crept in. The catalyst for this was the application of E. D. and H. Barber to the Maori Land Court to have their interests in the Ngarara West A14 block cut out in August 1915. The Barbers acquired interests in the block that had initially been obtained by C. B. Morrison from the Maori owners in the late 1890s and early 1900s.[4] Initially it was believed that the Barbers' interest in the block was 13½ acres, but it was soon realised that after Ngarara West A14C had been cut out to satisfy the survey lien, Morrison's interest amounted to only 9 acres 1 rood and 20 perches. This area was then cut out of the block, and designated as Ngarara West A14A – its boundary was drawn parallel to the southern boundary of Ngarara West A14C (the 75 acre section cut out in 1906 to satisfy the survey lien).

It is evident that the Ngarara West A14A defined in 1915 bore no relation to the Ngarara West A14A referred to in the provisional partition order of 1896. There are several factors strongly hinting at this. Firstly, there is no reference in the Court minutes (or in other official sources) to the land having been used, or it being intended to be used, as a Maori cemetery. Secondly, it seems fairly clear from the Maori Land Court minutes that the Ngarara West A14A being talked about in 1915 was a new title, rather than any sort of completion of an existing provisional order. Thirdly, even though the provisional Ngarara West A14A order of 1896 had still not been surveyed, it seems quite clear that it is not the same piece of land as the Ngarara West A14A which came into existence in 1915. The 1915 section is a 'slice' across the block and extends all the way to the coast (something which was not mentioned in the description of boundaries given at the hearing in 1896), and its location was determined largely in relation to the Ngarara West A14C block, rather than any previously given boundaries.

It is not clear why the Barbers' section was designated as Ngarara West A14A, when the section cut out to satisfy the survey lien some nine years earlier had been designated as Ngarara West A14C. Perhaps the Court believed that as no survey had been made for close to twenty years

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[3] Wellington MB 15, pp. 127-128.

[4] Wellington MB 20, p. 149. For more on Morrison's acquisitions, see Otaki MB 42, pp. 263-264.

since the provisional order was issued in 1896, the order was unlikely to be completed and therefore a return to the usual designation of sections was deemed appropriate. Perhaps the presiding Judge was simply unaware of the provisional order in the first place. Whatever the reason, the subdivision of Ngarara West A14 by late 1915 included Ngarara West A14A (Barbers' section, no relation to the Ngarara West A14A of 1896), Ngarara West A14B (the balance of the block remaining with Maori owners), and Ngarara West A14C (cut out in 1906 to satisfy the survey lien).

In June 1918, the Maori owners of Ngarara West A14B made an application to the Maori Land Court for a cemetery to be cut out from that section. The applicants noted a section had been set apart by Judge Mackay (who presided over the original partition hearing in 1896) but that it had not been surveyed. The cemetery section sought in 1918 was to measure around 20 acres, and the boundaries were to be pointed out by Hira Parata or some other person approved by the Judge. The order for this partition was given by the Judge, and the section was designated as Ngarara West A14B1 (Ngarara West A14B2 was the balance of the block which remained with the Maori owners).[5] The section was surveyed by 1920 (the delay between the issue of order and survey was explained because of the difficulty of arranging the survey with Hira Parata) and shown in the plan WD 3495 (interestingly enough, there was a survey lien registered against this section until at least March 1930).

It is not clear whether Ngarara West A14B1 is the same land as the land specified in the application for a cemetery reserve in 1896. The fact that the latter was never surveyed, and the description of its boundaries in the original application is fairly vague, makes this a difficult issue to clarify. There is also no description of the boundaries at the 1918 hearing that created Ngarara West A14B1 which could conceivably have been used in comparison with the 1896 provisional order. The discrepancy in the size of the two sections (approximately 10 acres and 20 acres) is not necessarily telling – it may have been a case of inaccurate approximation in the first instance, or the owners' need to enlarge the section after over twenty years had lapsed between the two applications. Another option is that there may simply have been two different pieces of land but, for the reasons set out earlier, this seems unlikely.

The evidence examined suggests that the block of approximately 10 acres which the Maori owners of Ngarara West A14 sought in 1896 to set apart as a cemetery reserve was in the location of Ngarara West A14B1 which was partitioned in 1918. Ngarara West A14B1 was gazetted as a cemetery under the Horowhenua County administration (although the lifting of that status in 1969 has not been examined by me). Other sources (notably tangata whenua oral evidence and County Council records) may be able to provide evidence regarding the actual usage of this site, but these have not been examined in the course of research for this report.

Evald Subasic

14 June 2011

[5] Wellington MB 21, p. 386.

Archaeological Geomagnetic Report: Tamati Place, Waikanae, Kapiti Coast

Prepared for:

Fitzherbert Rowe Lawyers
Private Bag 11016,
Palmerston North 4442

Prepared by:

Archaeology Solutions Ltd
PO Box 48134
Blockhouse Bay
AUCKLAND 0644
New Zealand
phone: (09) 626 7860
e-mail: info@archaeologysolutions.co.nz

Date: April 2018

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1.0 Introduction

Human remains were discovered on the subject site in 2000 when utility service trenching and pipeline installation was being finalised for a subdivision. Some of the human remains were described as having Maori characteristics but the rest as of unknown ethnicity (Tyles 2001, summarised in O'Keeffe 2012). The site is currently zoned residential but was previously designated "Maori Cemetery" (in the 1968 Horowhenua County Council District Scheme). Given the discovery of human remains on the site, the landowner would like to confirm whether the site was used for extensive burials other than the remains currently known. The question therefore, that has been posed to the author is whether burial pits can be detected with non-intrusive methods. The purpose of this geomagnetic survey was to address this question. A previously undertaken Ground Penetrating Radar survey indicated a number of individual anomalies, which remained unconfirmed but indicate pits which could have been used as burial pits.

2.0 Brief

Fitzherbert Rowe Lawyers on behalf of the landowner (Waikanae Land Company) instructed Archaeology Solutions Ltd to undertake a geomagnetic archaeological survey over the subject site.

3.0 Background

3.1 Project Background

The residential subdivision of the subject site (undeveloped land at Tamati Place, see Figure 1 & 2) is still proposed. The services were trenched and laid into the ground in 2000 under the terms of the subdivision consent previously given by the Horowhenua County Council. During final testing, and some additional digging for remedial pipeline work, human remains were discovered and initially removed from the land. Those remains were subsequently re-interred by Iwi on site close to the area where they were discovered.

The Waimea Stream was dredged in the 1960s to develop the current lagoon and the dredged material was placed over parts of the site to shape and contour it for further development (O'Keeffe 2012:22-24). The original land surface of the site is palaeo sand dunes. The western corner of the land clearly shows signs of this, but within the other areas of the proposed subdivision this is much less obvious. A test pit was dug in April 2017 to decide this question under an exploratory authority issued by Heritage New Zealand Pouhere Taonga.

The Tamati Place land was designated in the 1968 Horowhenua County Council District Plan as 'Maori Cemetery'. The designation was uplifted by the Horowhenua County Council

in or about 1969 following the statutory process set out in the Town and Country Planning Act 1953. This process included public notification and a hearing where an opposing submission by a member of the local Iwi was presented. The number of burials on the site is currently unknown and unconfirmed However, there were two headstones on the land in 1968 when it was purchased from the Maori Trustee (appointed by the Maori owners as their agent for effecting a sale). Those headstones were removed and now form part of a memorial established on adjoining reserve land. Local Iwi representatives advised the representatives of the landowner during meetings between 2014 and 2017, to discuss the recommencement of development of the site that they believed the site to be a burial ground referred to as Karewarewa. This view was supported by a Cultural Impact Assessment commissioned by Fiztherbert Rowe and undertaken by Te Atiawa ki Whakarongotai Charitable Trust (organisation representing the local Iwi). It is this information that the landowner sought to try and verify with this geomagnetic archaeological survey (pers comm Steven Kerr).

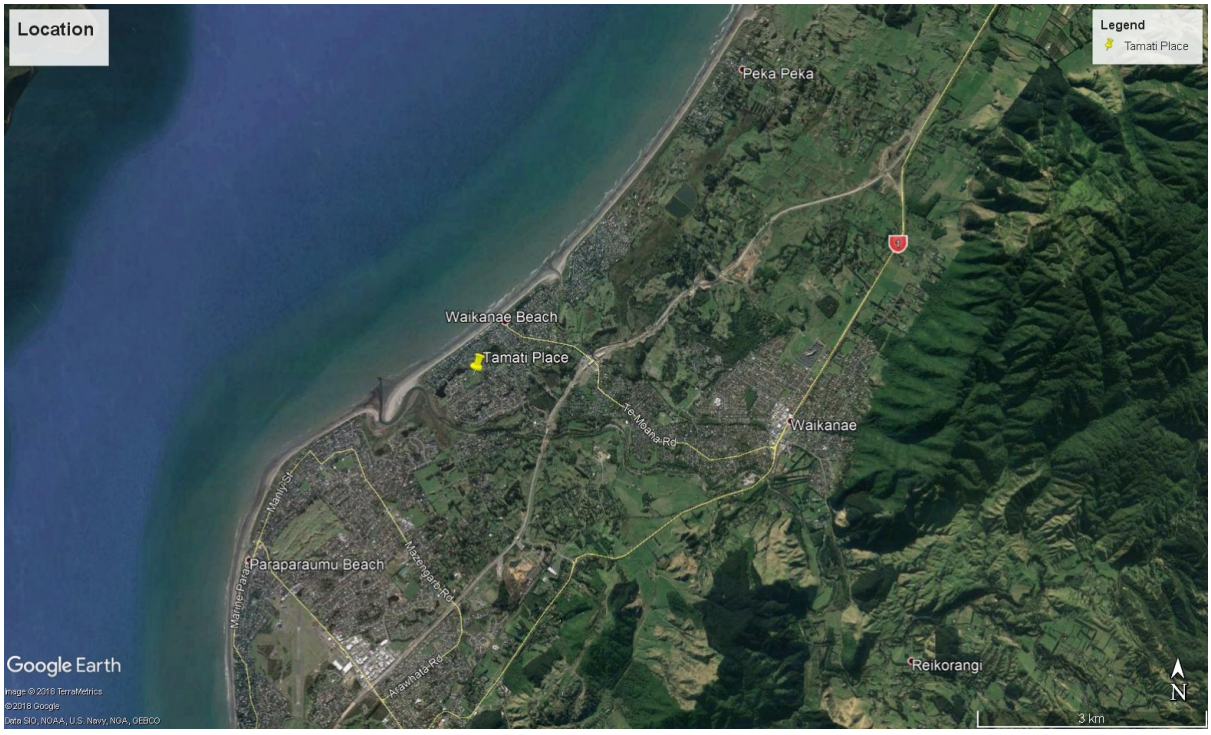

Figure 1: Location of subject area.

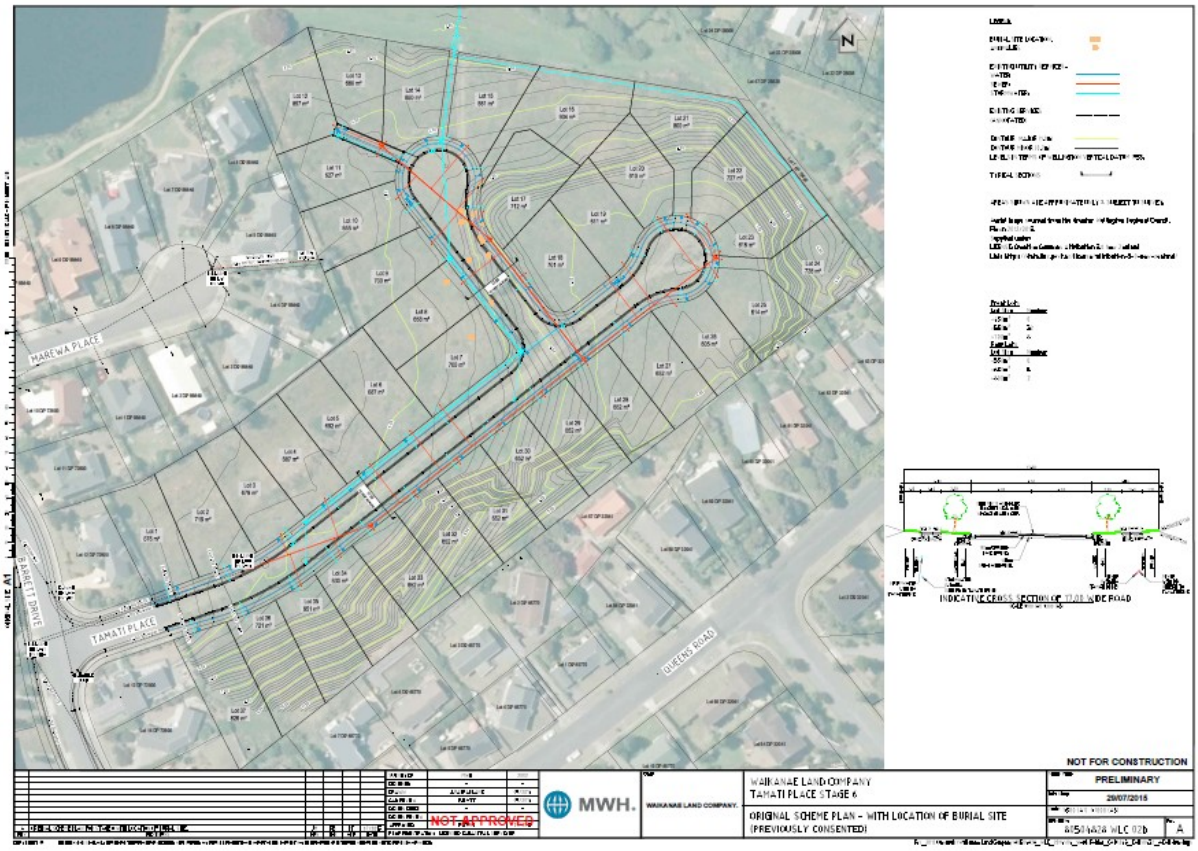

Figure 2: Proposed subdivision with service lines as planned, not as built.

3.2 Archaeological Background

The background to the project and discussion of the previous findings can be found in:

O'Keeffe, M. 2012. *Tamati Place - archaeological issues,* Report to Waikanae Land Company and NZ Historic Places Trust by Heritage Solutions, Wellington.

The information in that Report which is relevant for this investigation is summarised below.

3.2.1 Marked 'graves' (1898)

In the fieldbook 2140 for the plan ML 1491, dated 1898, three indicative 'Graves' are marked up (O'Keeffe 2012:14). They are arguably located within or near the proposed development (ibid.)

3.2.2 District Plan change (1969)

The Horowhenua County Council, after calling for objections and following a full public hearing, uplifted the designation of the land parcel as 'Maori Cemetery'. This decision allowed subdivision consent to be approved. O'Keeffe 2012 has a lengthy discussion on the details of the proceedings and archival materials relating to this.

3.2.3 Discovery of human remains (2000)

In 2000 service lines were installed within the Tamati Place Subdivision in preparation for the approved subdivision. During final digging for remedial work human remains were uncovered and consequently send to Otago University for further analysis.

The bones found represent a minimum of nine individuals identified as three adults (two male and one female) and six infants and children. Two of the adults and one child had Maori characteristics, while the ethnicity of the remaining six individuals could not be established.

3.2.4. Ground penetrating radar survey (2003)

In 2003 G.P.R. Geophysical Services undertook a preliminary electromagnetic induction survey over the area of the proposed development followed by a ground penetrating radar survey considered then to be preferable in the circumstances. Multiple geophysical methods were used but only the (presumably) 400 MHz antenna used on the ground penetrating radar showed useful results. Nine anomalies in two clusters are interpreted as possible burials by GPR Geophysical Services (G.P.R. 2003, plan repeated as Figure 12 in O'Keeffe 2012).

4.0 Methodology

4.1 Geomagnetics

Five survey grid plots were laid out on the site on 12/07/2017, covering the centre of the proposed development area. They were surveyed using a Fluxgate Gradiometer Foerster Ferex 4.032 DLG STD in a two probe configuration. Transects were walked across these plots at 0.5 metre intervals and data taken in 0.2 metre intervals. Recorded data was normalized to reduce errors resulting from walking transects over uneven ground surfaces and Teslaview 1.0 software was used to analyse the data. The data is displayed in the following figures of this report showing grey shades between -20nT and +20nT.

Palaeomagnetism can be recorded by magnetometric methods such as through the use of a fluxgate gradiometer. These are widely employed in archaeological research competing mainly with soil resistivity using electrical resistance and ground penetrating radar using the reflection of radar waves usually in the 200 MHz to 900 MHz range (Goldberg et al 2006, p.313). Magnetometry is the method most commonly used due to its speed and reliability in widely different soil conditions (Goldberg et al 2006, p. 315, Johnson 2006, ch.9 by K. Kvamme).

The fluxgate gradiometer measures small underground magnetic anomalies. Both natural (geomorphological) changes and human-induced soil changes can be detected. A geomagnetic survey is influenced by three components (Zickgraf 1999, p.107-9):

A. The magnetic field of the earth is constantly changing and influenced by outside changes such as the intensity of the sun. The arrangement of the survey instrument

as a gradiometer using a magnetometer close to the soil surface and a second magnetometer in about 1 metre height compensates for those changes.

B. Magnetic susceptibility of any material inside a magnetic field changes the magnetic signature of different materials to different degrees. This allows recognition of foreign material in the soil (e.g. shell midden concentrations in the topsoil). Ferromagnetic materials (e.g. iron) can have a magnetic signature on their own (remnant magnetism).

C. Le Borgne effect: The susceptibility of the topsoil to about 30 cm depth can be up to 100 times stronger than the susceptibility of the soil at 100 cm depth. This is due to chemical reactions of the soil close to the surface. Therefore any trench or pit back filled with mainly topsoil shows a much stronger magnetic signature than the surrounding soil.

Fireplaces, houses and pits are standard features commonly recognised in archaeological geophysical surveys (Zickgraf, 1999, for examples see Duensberg p.130, Glauberg p.140, Mardorf-3 p.144 and Mardorf-23 p.146. The examples are mainly Neolithic and early Celtic earth built structures and settlements in Central Europe for which the archaeological signature is not dissimilar to pre-European Maori structures and archaeological deposits in New Zealand).

Fire events and shell midden have been recognised by geomagnetic surveys at Long Bay (Bader 2007a and b). The results underwent a rigorous ground testing (Phillips and Geometria 2007) that showed the validity of the geomagnetic data interpretation.

The distribution of small metal artefacts can also indicate patterns of historic settlements (Brooks et al 2009). Kvamme (in: Johnson 2006, p.216ff.) provides categories of detectable human activities using magnetometry:

1. Fires including hearth, fireplaces, burn-offs and accidental fires all create thermo-remnant anomalies.
2. Fired construction material like bricks can create the same effect.
3. Human occupation can enhance the Le Borgne effect (see above) and show the extent of settlements compared to unoccupied areas.
4. Accumulation of topsoil such as in the walls of sod houses can create anomalies. Often the natural backfill of a pit increases the amount of topsoil in the pit area and creates the same effect.
5. Removal of topsoil for ditch features or by footpaths or animal traffic can result in anomalies. The quick backfill of pits can result in similar anomalies as the topsoil ends up at the bottom of the pit and the subsoil on the top of the backfill.
6. Imported stone used as buildings or floor material often shows a difference to the surrounding soil matrix.
7. Iron objects will create a dipolar anomaly. Often these anomalies are not part of the archaeological site and can 'hide' weaker anomalies of the archaeological site.

4.2 Background "noise"

The plots surveyed were accessible, slope angle and vegetation cover were such that only in two very small areas no data could be collected (Figure 8 & 9, green areas equals 'no data'). The sandy background creates a very 'quiet' background. This means that the natural variation in readings of the undisturbed soil is small. Against this background, sharp changes in data can be identified as foreign items or features.

A fence on the side of one survey plot has distorted the soil readings close to it (see Figure 8, large variations in the readings along the northwestern edge of the survey area).

4.3 Other Data

The survey results have been overlaid onto an aerial photo from Land Information NZ and a number of historic roll plans (oversized historic survey plans usually used for planning purposes). None of the historic roll plans shows anything of interest, apart from the fact that at least for the last 200 years this area has always been dry land while the streams to the west and east meandered considerably. Please note that all images are for interpretive purposes only. They have been only approximately geo-rectified and are not appropriate for further geo-referencing onto plans or maps intended for other purposes.

4.4 Differences between geophysical investigations (2003 vs 2016)

In 2003 a ground penetrating radar (GPR) survey was conducted and in 2016 a geomagnetic survey (Fluxgate Gradiometer) was undertaken.

The ground penetrating radar detects any sharp interface between soil layers or between soil layers and other materials, e.g. rocks. The reflection of the radar wave is recorded. Any change from the 'normal' soil profile of top soil and sub soil is noted as long as the change is substantial. When considering the possibility of burials, the shape of a burial pit is interpreted from two changes when the radar is dragged over two sides of the pit. The difficulty in the interpretation arises when the difference between the 'normal' soil profile and the back fill of the pit does not create a distinguishable interface from which the reflection of the radar wave changes considerably enough to be seen in the radar profile. The profiles are said to be in 1 m distance from each other. Three disturbed and three undisturbed profiles are shown as examples for the interpretation (G.P.R. 2003, Appendix B).

In contrast the later geomagnetic survey in 2016 uses the magnetic anomalies created by disturbing the soil (Le Borgne Effect, see above) AND the size and pattern of these anomalies as displayed on a high resolution map 0.5m x 0.2m. Visibility of the service trenching with non-metallic pipes in them clearly indicate that the methodology works in this soil environment. A test trench (see below) also confirms a substantial difference between sub soil and top soil, thus any interruption of the continuous layers or mixing of soils should be visible.

Nonetheless burials are very difficult to detect whichever method is chosen. The Europae Archaeologiae Consilium (EAC) Guidelines for the Use of Geophysics in Archaeology, Questions to Ask and Points to Consider (Europae Archaeologiae Consilium, EAC Guidelines No.2, 2016; derived from the Historic England guidelines on Geophysical Survey in Archaeological Field Evaluation, 2008) recommend any geophysical survey only on areas where burials are suspected, a condition which is fulfilled here.

If GPR is chosen, they recommend a high resolution 0.25m x 0.05m which are lines in 0.25 m distance, not 1 m as documented in G.P.R. 2003. They also recommend it for stone lined coffins or cists which are nearly completely absent in New Zealand.

Furthermore in the general advice on a level 2 survey (Delineation: to delimit and map archaeological sites and features) GPR lines in 0.25m or 0.5m distance to each other should be used to create a three-dimensional data cube. Single isolated profiles should only be considered where large linear soil features can be crossed at right angles, e.g. moats or wide ditches. Also salty soils create a high signal loss and depth data has to be calibrated usually using test pits.

In contrast to the GPR, pits can be detected using geomagnetic data as long as the resolution is 0.5m x 0.25m. We have used 0.5m x 0.2m and visualised the data in a map that allows pattern recognition as is recommended in the above mentioned guidelines.

In short, detection of burials is difficult and requires quite specific tight grid lines for the different survey methods and specific displays that allow an archaeological interpretation of the pattern of the data.

The 2016 geomagnetic survey follows those recommendation of the EAC, but the earlier (2003) GPR survey does not follow these recommendations. The distance between survey lines in the GPR survey which is wider than recommended means that there is a possibility that some features were over looked.

5.0 Results

The geomagnetic survey was undertaken before the test trench authorised by Heritage NZ was dug. The test trench was necessary to answer the basic question of the existing soil layers and the results are presented here before the geomagnetic survey results in the logical order.

5.1 Test trench results

In April 2017 a test trench was dug in the area indicated in blue in Figure 14. It showed a deep topsoil, dark brown in the upper, modern part of it and more darker in the lower part. It overlays clean sand. There is no indication of a layer of dredged sand. The depth of the topsoil indicates centuries of build up of the top soil. It is very unlikely that these natural layers would have developed after the dredging of sand to create the lake nearby. As the land in this area seems to be untouched by the dredging, the geomagnetic data shows features and material accumulated close to the surface that could be relevant to the question

of burial pits (see Figure 11 to 14 for results and overlays and Figure 15 for a possible interpretation).

The mixing (mottled appearance) and micro layering that is typical of machine spreading is not visible in the profile and the depth and homogeneity of the top soil layer seems to be most likely the result of natural processes.

Most of the locations of the anomalies that were interpreted in the earlier GPR survey as possible burial pits (G.P.R. 2003, Appendix A) show small, negative anomalies in the geomagnetic survey. These are presented in the figures as small dark gray patches with fuzzy edges ('washed out'). This pattern is indicative of small pits back-filled with a mix of topsoil and subsoil. Anomalies of this nature are highlighted in the results as possible burial pits.

Many of the features shown in the geomagnetic survey have a strong positive and negative value close together (light and dark, often with a sharp edge). These are likely pieces of metal in the ground. The European farming, trenching for the services and building activities close to the edges of the investigation area resulted in intentional and unintentional burial of much metal.

The geomagnetic survey shows many more anomalies consistent with small pits compared to the earlier GPR survey. The possible reason for this is that the topsoil is very sandy/silty and not much different to the underlying sand in terms of density and friability. This results in weak separation of backfill of a pit and the surrounding soil matrix and it is this interface between the two that reflects the ground penetrating radar wave. Therefore the weaker the interface is, the less the radar wave reflects and therefore the harder it is to recognise a small pit. The geomagnetic survey on the other hand visualises the small magnetic difference between the natural soil layers and an area with mixed topsoil / subsoil in a pit. The test trench has shown that the topsoil build up is substantial and sufficiently different to the lower sand layer to express a different magnetic signature.

Figure 3: Soil layers in test trench. Depth about 60 cm from surface.

Figure 4: Soil layers in test trench: dark brown=modern topsoil, merging into an older and darker topsoil. Lowest level is nearly clean sand of the palaeo dune. The topsoil layers are quite sandy/silty. Natural build up of top soil over a long time is likely.

Figure 5: Location of test trench (with Daniel Parker and Steven Kerr).

5.2 Geomagnetic Results

A multitude of anomalies can be seen in the map of the geomagnetic data, most of them the result of modern developments and development work. These or some of them could be remnants of what is believed to have been plant irrigation systems established on the land by the landowner in the 1970s or of a large corrugated iron building then on the site and used during that period for storage of implements (bulldozers, tractors and rollers), a site office for on-site meetings, and a kitchen service area (pers comm Maurice Rowe).

Figure 11 to 14 show the geomagnetic survey results on its own and with various overlays in context. Figure 15 is an interpretation of the results, taking into account the historic and recent information available to the author. This is preceeded by a short discussion of the types of geomagnetic anomalies encountered in this survey (Figures 6 to 10).

The existing service trenches (earthworks in 2000), some with metal pipes (strong dipolar signals) and some with plastic pipes (light, positive lines), can clearly been seen in the data (Figure 6 and 7, and Figure 11 and 12).

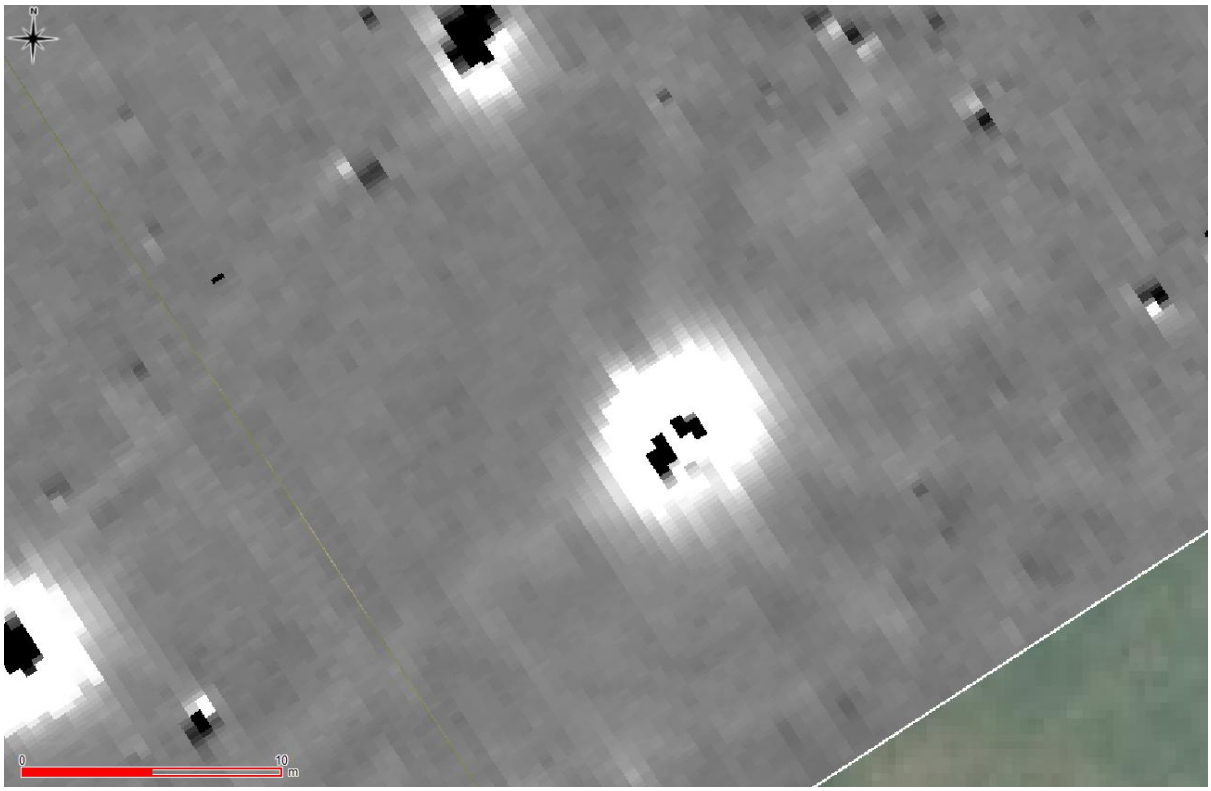

Figure 6: Lightly coloured service trenches radiating from a manhole; kerb from road turning circle visible too.

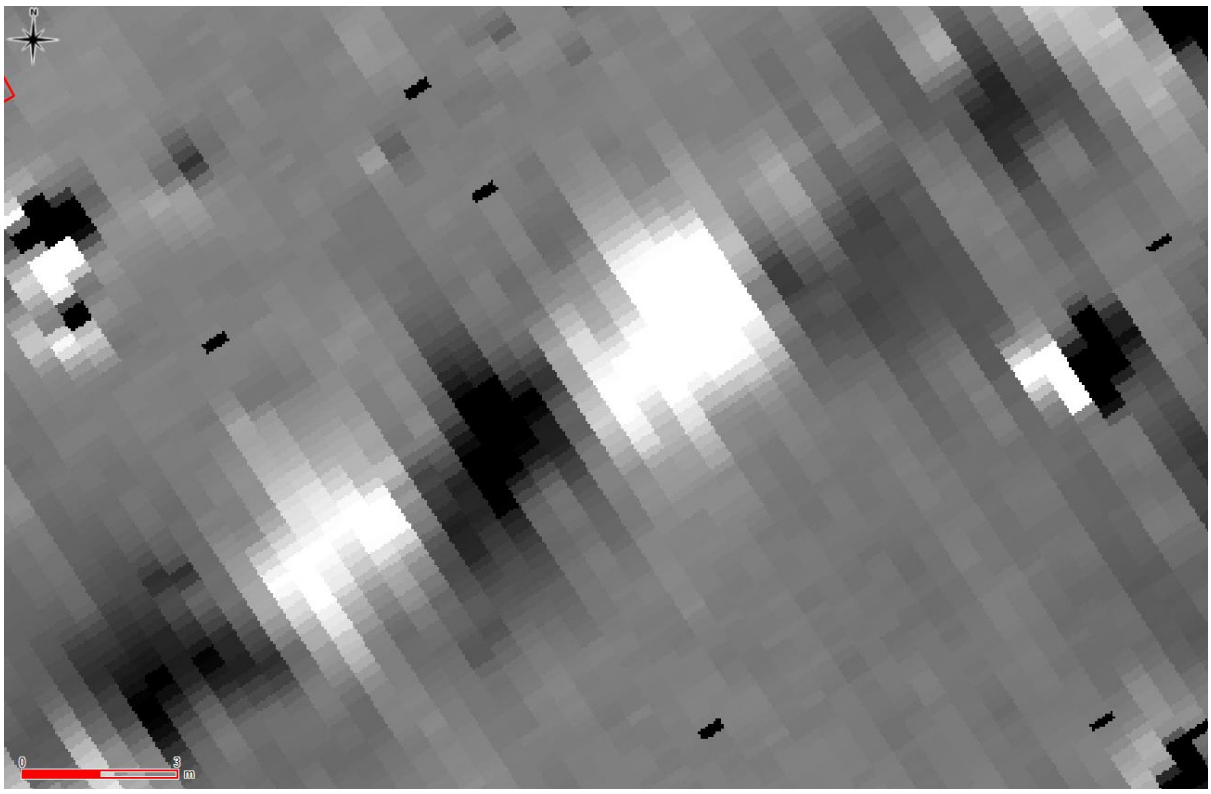

Figure 7: A metal pipe buried deeply, showing a linear alternating di-polar signature.

Figure 8 shows a multitude of mainly metal objects (strong dipolar signals)that are within the area. Most of them are shown very sharp which would suggest that they are close to the surface. Major disturbances and many foreign items in the ground can be seen close to the boundary at the western edge. These are most likely remnants of the building processes next door and any previous activities on the property (see above).

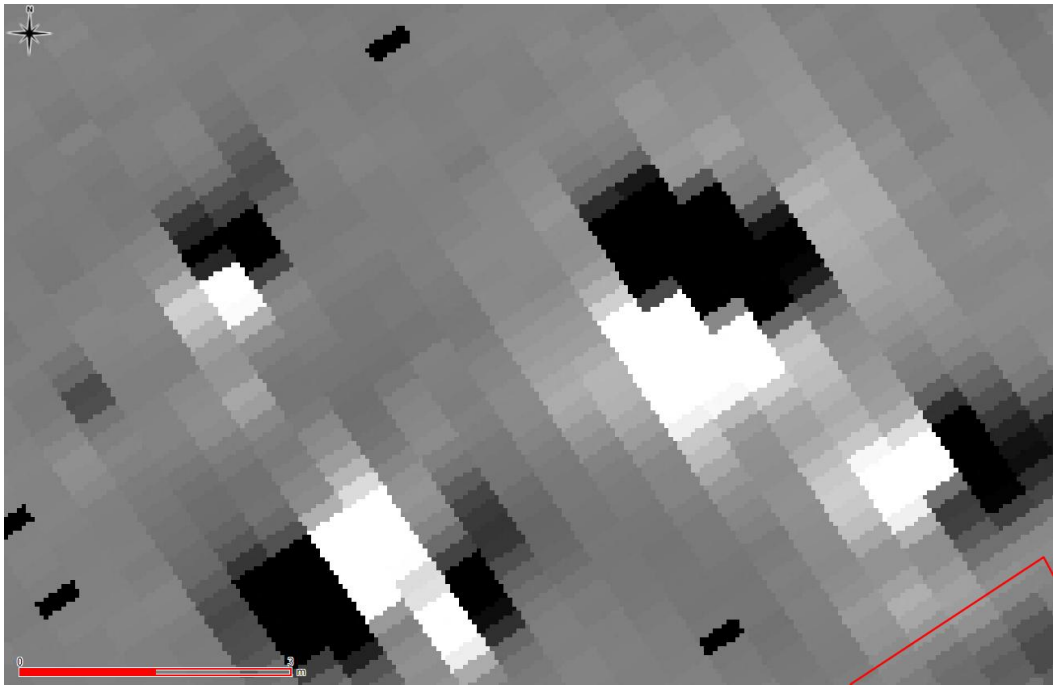

Figure 8: Strong di-polar (plus and minus values close together) anomalies indicating pieces of metal under the surface.

Figures 9 and 10 show some small anomalies which present themselves quite 'washed out' and are largely negative. These are consistent with small pits. Some fall within or very close to the previously recorded 'anomalies' in the GPR survey. But there are a good number more of similar 'anomalies' towards the north and northwest of the area of the previously recorded anomalies, tentatively identified as possible burial pits.

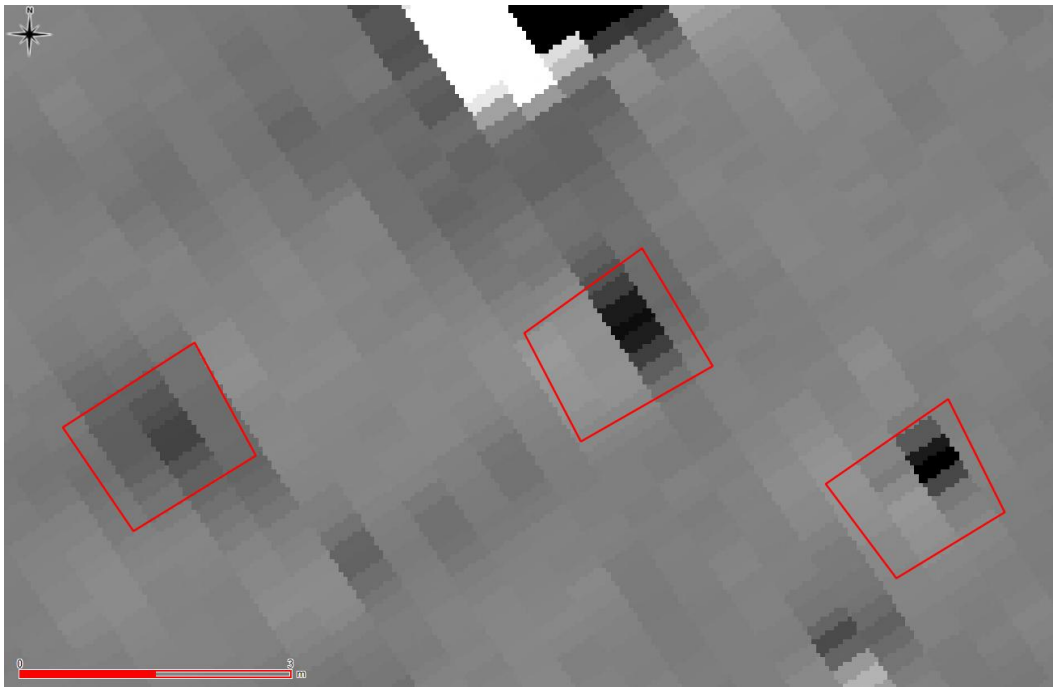

Figure 9: Possible small pits without metal. Approximately 1.5m x 1m disturbances to the natural soil layers. Some stronger, some weaker.

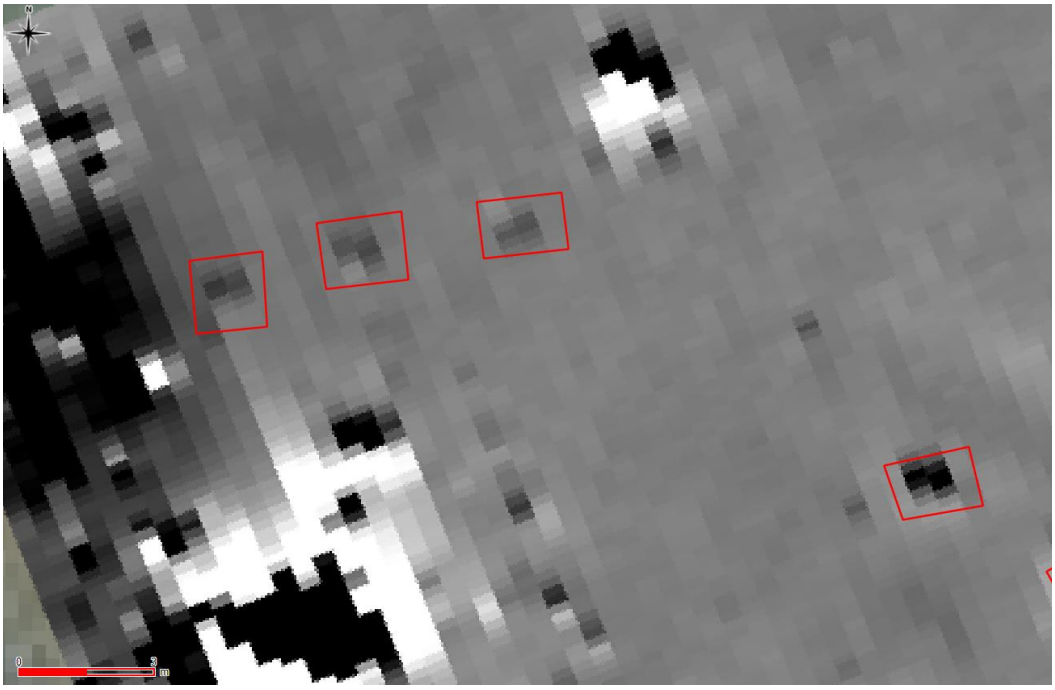

Figure 10: Possible small pits without metal. Roughly rectangular. 1.5m x 1m. Three weaker anomalies and one stronger one. Strong metal anomalies nearby, especially to the left. Also visible are very small soil disturbances that are too small to be pits. Together with the metal they are probably remnants of the building process (e.g. burning of the building rubbish) to the west of the proposed development.

A relevant question for the anomalies identified in this geomagnetic survey, is their depth within the original ground surface before sand was dumped onto the surface. If the original surface is close to the current surface, these anomalies would be consistent with pits to a reasonable depth. If the original surface is deeper than a metre, these items are more likely part of the dumping event. A small hand dug test trench showed that there is no over burden in the north and northwestern area of the investigation and therefore the anomalies can be understood as possible small pits cut into the original topsoil (see chapter 5.1.).

Figure 11: Geomagnetic survey overlaid onto aerial and cadastral (green areas within the survey extent indicate small area with no data due to dense vegetation cover).

Figure 12: as above. Overlaid with proposed development and services as planned.

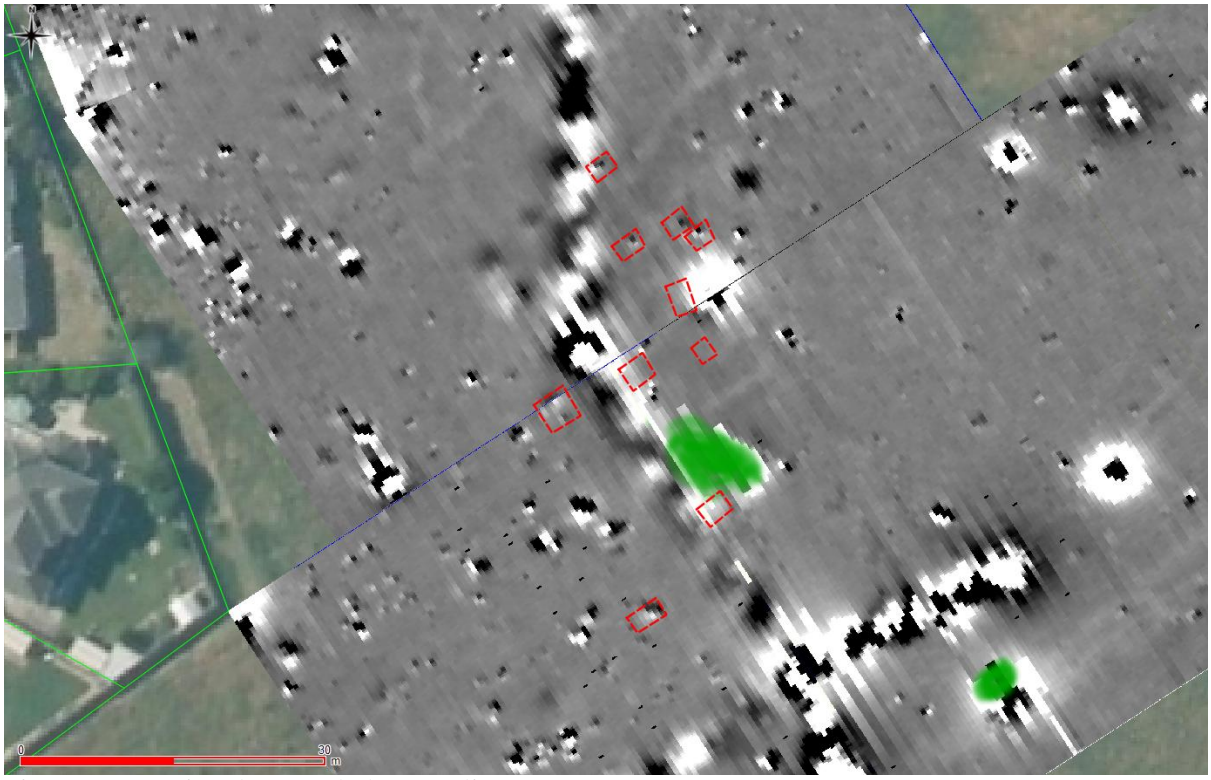

Figure 13: Previously recorded anomalies.

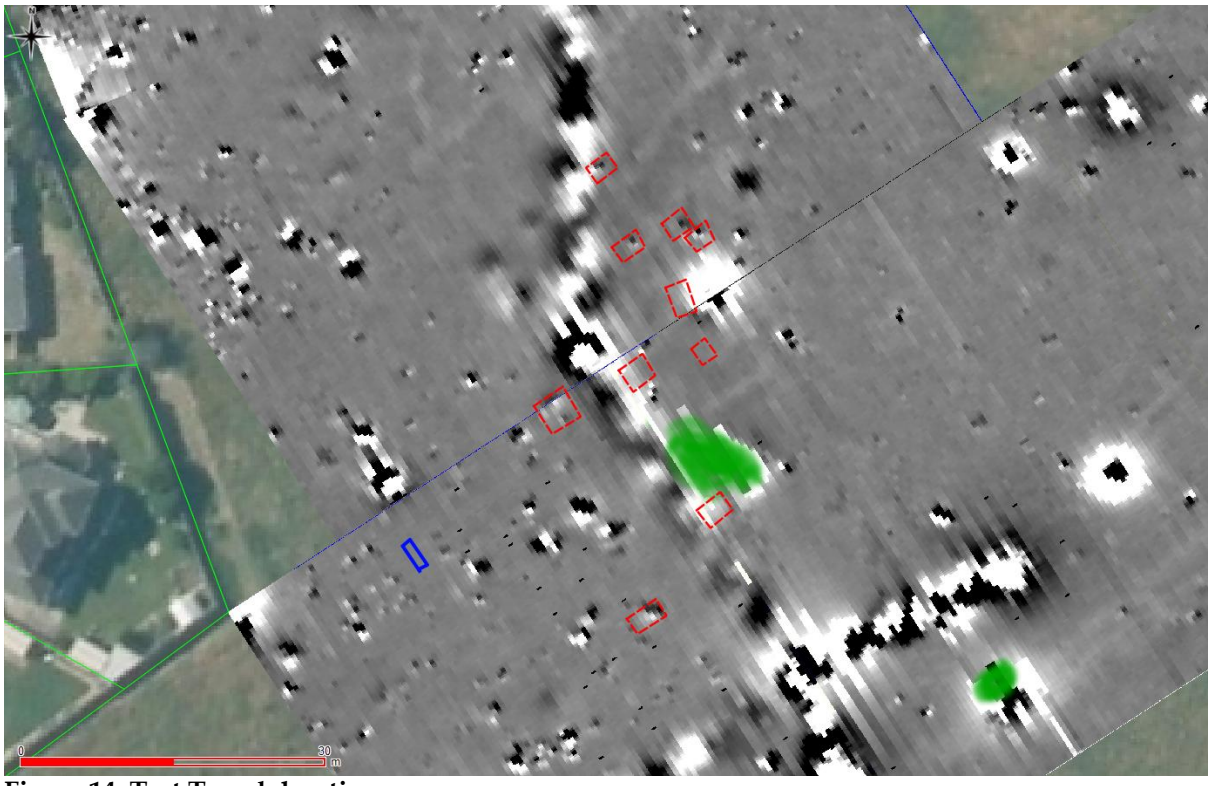

Figure 14: Test Trench location.

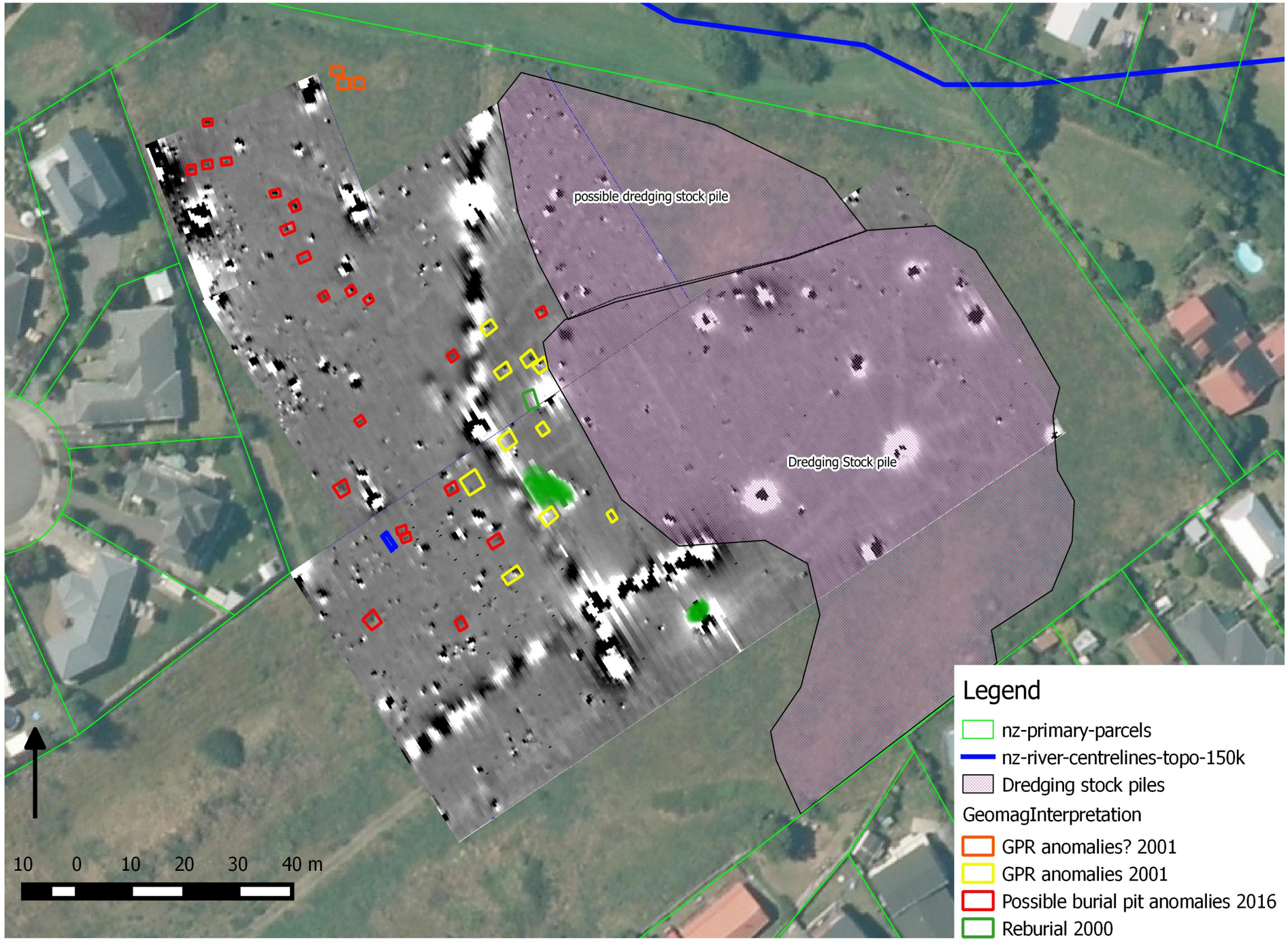

Figure 15: Interpretation of the geomagnetic survey (test trench in blue)

6.0 Discussion

This survey presents a difficult problem. Small pits, like burial pits, without any further context (e.g. a kainga or paa) are difficult to detect using any geophysical method. It is only recommended in the international literature if there is an independent indication of a burial ground in the area, which in this case is supplied by the accidental discovery of several burials. Multiple events of earthworks and since removed buildings add complexity and ambiguity to the data.

Any geophysical method used in an archaeological context relies on accurate pattern recognition. Pattern recognition can be ambiguous and more than one explanation model can fit a pattern. Therefore it is always recommended to ground test any explanation model. It is obvious that ground testing possible burial pits poses the problem of being culturally sensitive. Especially as we already know that at least some burials were undertaken in the area.

The issue with the model presented here is that the burials could have possibly been much wider spread over the property than the previous work and the accidental discovery locations suggest. If ground testing of the results would be undertaken this could be done from the fringes to the center until the extent of burial locations becomes clear. In a technical sense this approach is the least intrusive. But as it is intrusive an authority by Heritage New Zealand will be required, as we have reasonable suspicion of the presence of archaeological features on each of the possible ground testing locations. Such intrusive work is best undertaken with the support of mana whenua.

7.0 Acknowledgments

The author would like to thank Mary O'Keeffe and Daniel Parker for their help on site and off site. A special thanks to the iwi representative Les Mullen who patiently helped on site.

8.0 References

8.1 Primary Sources

LINZ – aerial photograph
cadastral
historic maps

8.2 Secondary Sources

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Appendix G: Email from Ben Ngaia to Mary O'Keeffe

RE: Tamati Place

Reply | Reply All | Forward | ...

Fri 08/07/2016 11:43

BN

Ben Ngaia <Ben.Ngaia@nzqa.govt.nz>
To mary@heritagesolutions.net.nz
Cc Uncle Les Mullen

You replied to this message on 08/07/2016 12:57.
If there are problems with how this message is displayed, click here to view it in a web browser.

Tēnā koe Mary,

Uncle Les Mullen will be available to be on site. Please contact Uncle Les in regards to this work.

Ngā mihi,

Ben Ngaia
Te Āti Awa, Taranaki, Ngāti Ruanui
Pou Arahi
Te Tari Pou Whakahaere Tuarua Māori
NZQA - Mana Tohu Mātauranga O Aotearoa
125 The Terrace
PO Box 160
Wellington 6140
☎ (04) 463 3155
✉ ben.ngaia@nzqa.govt.nz

Appendix A: Report on test pit in fulfilment of Authority 2017/316

TO Heritage New Zealand

FROM: Mary O'Keeffe, Heritage Solutions

SUBJECT: Tamati Place authority 2017/316

DATE: 29 May 2017

An archaeological authority (2017/316) was granted by Heritage New Zealand Pouhere Taonga for a hand dug test pit on a partially developed subdivision on the Kapiti Coast. This report is presented in fulfilment of condition 4 of the authority.

Tamati Place is a partially developed subdivision on the Kapiti Coast. Its location is shown in Figure 1.

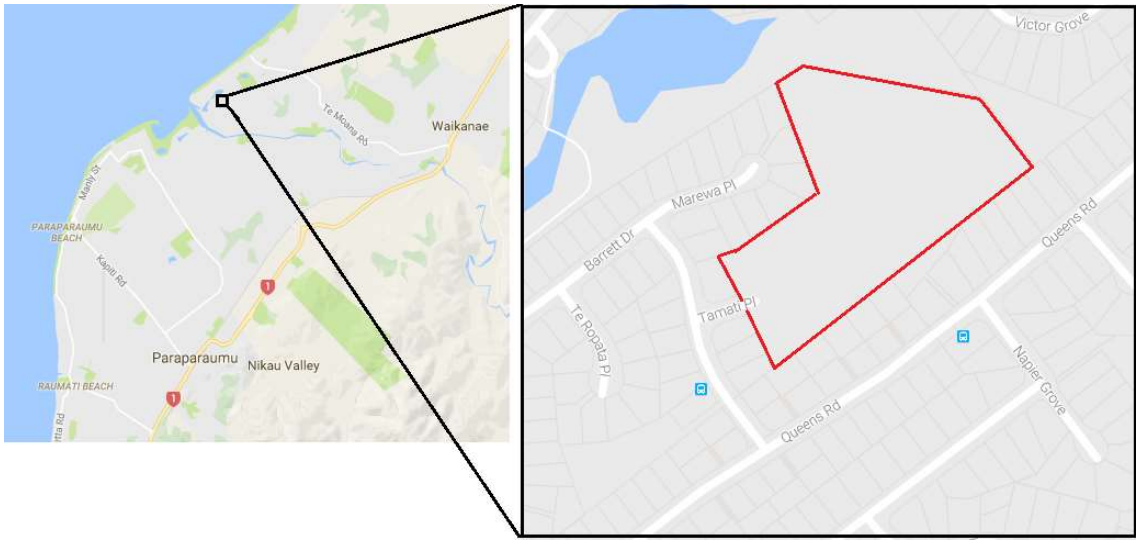

Figure 1: Location of Tamati Place (area of proposed subdivision outlined in red)

Koiwi were uncovered on site in 2000 during trenching work for services for development of the proposed subdivision.

Subsequent research established that the area had previously been used as an urupa, although the extent and intensity of burials has yet to be confirmed. The site was designated as a cemetery. Following the sale of the site to the Waikanae Land Company in 1969, the designation was uplifted in 1970.

The area was significantly modified in 1969-71. A swampy area that was the former bed of the Waimeha River was created into a lagoon named the Waimanu lagoon. Dredges sucked out the former river bed and beach material, and deposited the material onto the site raising the ground surface, which includes land that is now the area of Tamati Place.

A geomagnetic survey was undertaken by Dr Hans Dieter Bader in July 2016, to determine the possibility of further burials across the area of the proposed subdivision. In order to verify the results of the geomagnetic survey Dr Bader required a test pit to be hand dug on the site, to determine the depth and nature of the substrate. As noted, in the course of constructing the landscape in 1969-71 dredged material was dumped onto the existing ground surface. The test pit was to check and verify the location and depth of this dumped material, to assist in the interpretation of the data obtained by the geomagnetic survey.

Due to the cultural sensitivities of the site the archaeologist felt a conservative and cautious approach was appropriate. Therefore an archaeological authority was sought for the hand dug test pit, despite the fact that no known archaeological material was being disturbed, and the test pit was located away from anomalies identified in the course of the geomagnetic survey.

The location of the test pit is shown in Figure 2.

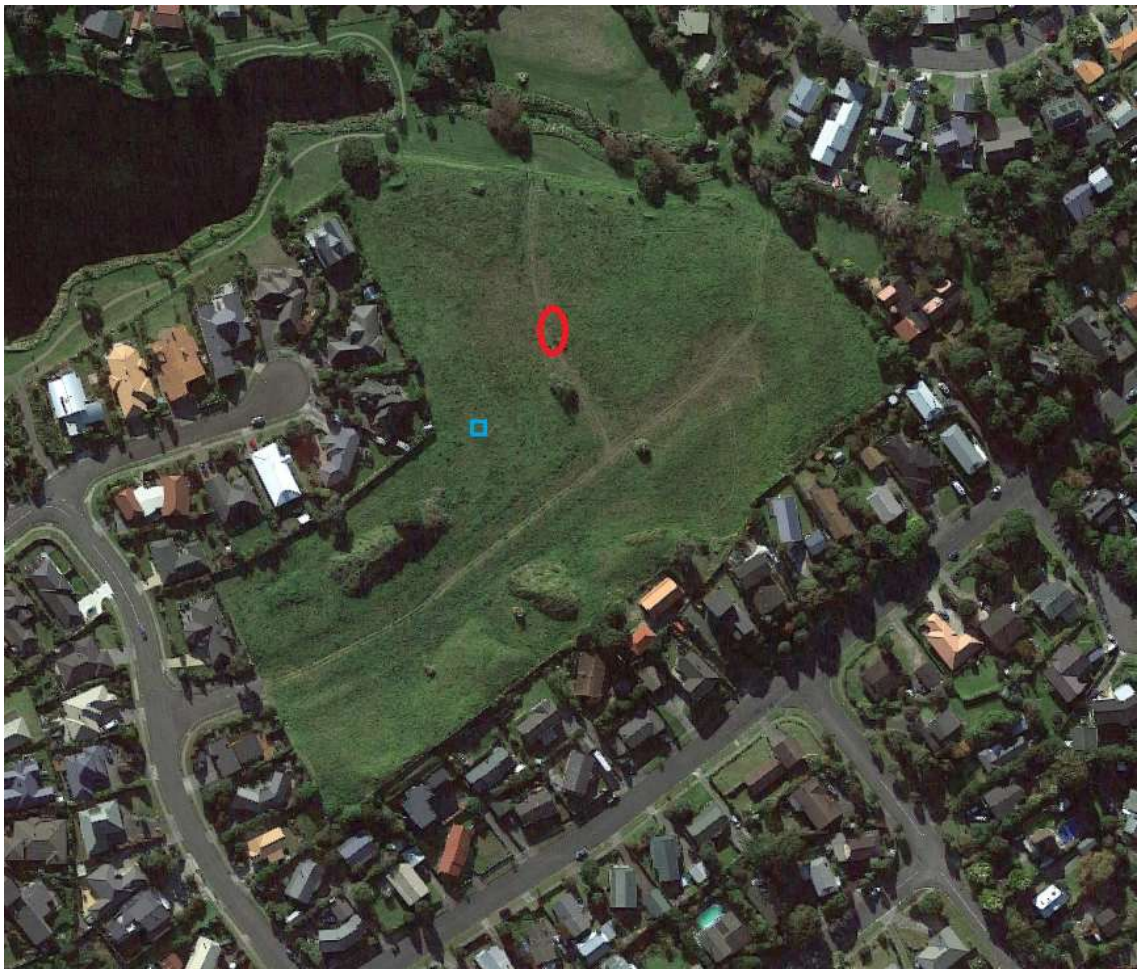

Figure 2: Location of test pit
Test pit: blue outline
Koiwi exposed in 2000: red oval

The hand dug pit was excavated by Dr Hans-Dieter Bader.

Bader reports:

> "[The pit] showed a deep topsoil, dark brown in the upper, modern part of it and more darker in the lower part. It overlays clean sand. There is no indication of a layer of dredged sand. The depth of the topsoil indicates centuries of build up of the top soil. It is very unlikely that these natural layers would have developed after the dredging of sand to create the lake nearby. As the land in this area seems to be untouched by the dredging, the geomagnetic data shows features and material

accumulated close to the surface that could be relevant to the question of burial pits."[1]

Figure 3: Stratigraphic section in test pit
The soil layers in the test pit, from surface to base are

- Yellow/dark brown=modern topsoil

[1] Archaeology Solutions, 2018:10

- Upper layer merging into an older and darker topsoil. This lower topsoil has a clear well formed lower boundary, indicating the dune was stable for some time to allow this clear horizon to form
- Lowest level is nearly clean sand of the palaeo dune.

A clearer understanding of the wider stratigraphy of the landscape was also enabled by the results of the test pit, as well as data from the geomagnetic survey and observation of physical landform. Of particular note is a large spoil heap of deposited dredged material on the eastern corner of the site (shows as the yellow outline in Figure 4).

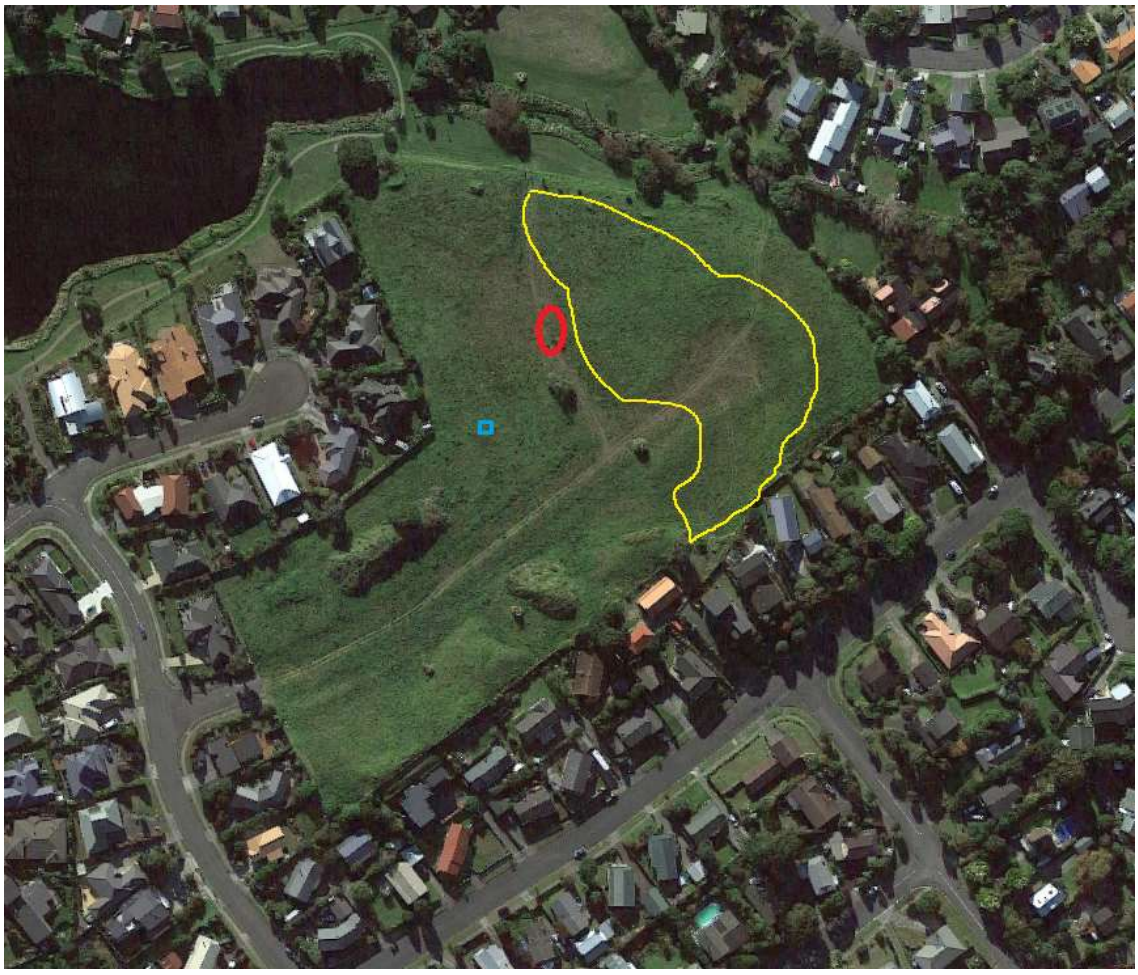

Figure 4: Location of dredged spoil heap (yellow outline)

Implications for site of test pit results:

The test trench has shown two important things that are relevant to understanding of the physical site of Tamati Place:

- Dredged material is only located over part of the subdivision. Therefore anomalies shown by a geophysical survey are not being interpreted through a thick layer of deposited material, and are likely to be reasonably close (less than 2m) below the ground surface
- The topsoil build up is substantial and sufficiently different to the lower sand layer to express a different magnetic signature.

Sources:

Archaeology Solutions Ltd. 2018. Archaeological Geomagnetic Report: Tamati Place, Waikanae, Kapiti Coast. Unpublished report for Fitzherbert Rowe Lawyers, Palmerston North

Appendix I: Examples of emails from O'Keeffe to Trustees requesting to meet

Tamati Place - archaeology

MO

Mary O'Keeffe <mary@heritagesolutions.net.nz>
To 'Andre Baker'; 'Mahina-arangi Baker'
Cc 'Kristie Parata'

Reply | Reply All | Forward | ...

Thu 19/01/2017 10:40

Kia ora Andre and Mahina

Happy new year to you both; I hope you've had a good restful summer break.

Towards the end of last year, many emails were exchanged between various parties on the issue of Tamati Place. I was deeply distressed and dismayed by the content of several of these emails, as they completely misrepresent my involvement in the project, and my actions and motivations.

I have not raised this matter up to now, as I did not want to distract attention from the more important issue of the resolution of Tamati Place.

However I would greatly appreciate an opportunity to meet with you both, so I can clarify the nature and history of my involvement with the project, and the background to and context of my actions and motivations. Can you advise when you both might be free to meet?

Regards

Mary O'Keeffe
Heritage Solutions

56 View Rd, Houghton Bay, Wellington 6023
M 027 440 3769
www.heritagesolutions.net.nz

Tamati place

MO

Mary O'Keeffe <mary@heritagesolutions.net.nz>
To 'Andre Baker'
Cc 'Les Mullen'; 'Mahina-arangi Baker'

Reply | Reply All | Forward | ...

Tue 01/11/2016 07:44

Kia ora Andre

Thank for you including me in the ongoing recent conversations around Tamati Place.

I have however been following the conversations with distress and bit of dismay. It seems that there is some unintentional misunderstanding around the role and scope of archaeology in the process.

Its really important to me that everyone understands the background and scope (and just as importantly, the limitations) of the archaeological part of the situation. To this end, I would deeply appreciate an opportunity to meet with you to talk about this. I've included uncle Les in this email as, with his knowledge and experience, he'll be able to contribute to the conversation too. Tamati Place is such a massively important and complex place, with hugely important values, and I really want to contribute to an appropriate outcome.

Could you let me know if you're free for a conversation?

Nga mihi

Mary O'Keeffe
Heritage Solutions

56 View Rd, Houghton Bay, Wellington 6023
M 027 440 3769
www.heritagesolutions.net.nz

**** Please note my new email address: mary@heritagesolutions.net.nz ****

RE: Heritage New Zealand Archaeological Authority 2017/316

MO
Mary O'Keeffe <mary@heritagesolutions.net.nz>
To 'Mahina-arangi Baker'; 'KHurren@heritage.org.nz'
Cc 'Andre Baker'; 'Te Kenehi Taylor'; 'Kristie Parata'; 'ben@tekau.maori.nz'; 'tiaki.tuatara@xtra.co.nz'

Reply | Reply All | Forward

Wed 19/10/2016 12:09

Follow up.

Kia ora Mahina

Thank you for including me in this conversation – I appreciate the opportunity to explain why I have not discussed this with the iwi.

You're correct that I met with the Board recently and didn't raise the issue of Tamati Place. This was entirely based on a respectful basis, from two aspects:

- my agreed kaupapa was to discuss the M2PP archaeology programme, and I felt it would be disrespectful and unfair to raise an issue as important as Tamati Place with no prior warning, which would not have those present time to gather their thoughts on the issue or discuss it prior to establish a position.

- Further, I was aware of Andre checking his watch a couple of times during my presentation – I was really mindful of taking more time than I had planned, and that the Board had other matters to discuss in the evening, so I didn't want to take up any more of their time.

I'm also mindful that it's the client's responsibility to undertake and manage consultation for this issue. I am therefore hesitant to undertake consultation without their direction, as I don't know what conversations they may already be having and I don't wish to inadvertently derail established conversations. I also want to ensure that they fully take on their responsibilities of consultation.

I hope this assists

Best wishes

Mary O'Keeffe
Heritage Solutions

From: Mahina-arangi Baker [mailto:taiao@teatiawakikapiti.co.nz]
Sent: Wednesday, 19 October 2016 10:18 AM
To: KHurren@heritage.org.nz
Cc: Andre Baker; 'Te Kenehi Taylor'; Kristie Parata; mary.okeeffe@paradise.net.nz; ben@tekau.maori.nz; tiaki.tuatara@xtra.co.nz
Subject: FW: Heritage New Zealand Archaeological Authority 2017/316

Kia ora Kathryn,

Te Ātiawa ki Whakarongotai Charitable Trust (TAKW) wish to appeal the granting of Authority 2017/316 for the digging of a test pit in our urupā Te Kārewarewa.

I have just spoked with our Chair Andre Baker who is copied into this email and he has asked me to question who from TAKW was consulted on this authority and when?

To our collective knowledge we have not been consulted on the application as indicated in the authority.

We have not seen the application or had any discussion with Mary as the project archaeologist or any representative of the landowners. The Chair also wished me to raise that Mary met with the Board just over a month ago to discuss a different project, and this authority application was not raised at all. The Board would have seen this as an ideal opportunity to consult and is disappointed that this didn't occur.

TAKW provided a CIA in response to three proposals for subdivision of the site. This CIA did not involve any specific consultation on the digging of a test pit. The CIA concluded that TAKW opposed all three proposals and that the significant of the site warranted the full appropriate protection as an urupā and site of national historical significance.

Will be good to discuss this further at our meeting this morning. Please note I have also copied in Ben Ngaia who is the Chair of Takamore Trust who are kaitiaki of our waahi tapu, and Paora Ropata who is the claimant for the Waitangi Tribunal Claim over Te Kārewarewa for their information.

Ngā mihi

Mahina-a-rangi Baker, M.Env.Stud.

Report to Montgomery Watson:

Tamati Drive Subdivision, Waikanae

Archaeological Assessment

May 2001

Tamati Drive Subdivision: Archaeological Assessment

Prepared for Montgomery Watson

Mary O'Keeffe
Heritage Solutions
56 View Rd
Melrose, Wellington

May 2001

Executive Summary

1. Waikanae Land Company are preparing a subdivision to be located around Tamati Drive and Wi Kingi Place, Waikanae Beach.

2. Disturbance of koiwi (human remains) on site in July 2000 during site preparation work implied the possibility of archaeological remains. This necessitated the need for an assessment of archaeological values for an application to the Historic Places Trust for an authority to modify, damage or destroy archaeological sites under Part 1 of the Act.

3. Mary O'Keeffe of Heritage Solutions was engaged to undertake this assessment.

4. Information was gathered from the archaeological record, survey plans and records, historical documents, contemporary sources, and from geomorphological data.

5. It is inferred from the history of earthworks on the subdivision that the shells observed on the ground surface and reported from in the trench are not *in situ* archaeological deposits. It is likely they are derived from a former beach in the position of the present lagoon, and were deposited as part of the lagoon dredging.

6. It is inferred from traditional and contemporary sources that the area including the proposed subdivision is a Maori burial ground, probably in use from 1839.

7. Burials recorded on an 1898 plan makes the area an archaeological site in terms of the definition in the Historic Places Act.

8. Archaeological values are considered to be such that further development is considered inappropriate.

9. **It is recommended** that the client does not apply for an authority under the Historic Places Act, as the archaeological values are considered sufficiently high to preclude further work. It is considered very unlikely that Historic Places Trust would grant an authority with strong evidence of the presence of a burial ground.

1. Introduction

The Waikanae Land Company wish to develop a subdivision located at Tamati Drive, Waikanae Beach. Work has already been undertaken on site to prepare the site and construct service trenches.

The consultant has been engaged to undertake an archaeological assessment of the proposed subdivision, and of the work already undertaken on site, in fulfilment of the requirements of an application for an authority under Part 1 of the Historic Places Act 1993.

The subdivision area is within Pt Lot 1 DP71625.

1.1 Scope and limitations of this report

At the time of writing Historic Places Trust Pouhere Taonga (HPT) are prosecuting Payne Sewell (now known as Montgomery Watson) and their subcontractors, Higgins Contractors Ltd, over incidents on site in June 2000 when koiwi (human bones) were uncovered. The author of this report is taking no part in this prosecution, and is not associated with it in any way. However, aspects of the prosecution impacts on this archaeological assessment, but the author of this report was not on site when the koiwi were disturbed, and, as all information associated with this is *sub judicae* at the time of writing, is unable to establish the archaeological context of the burials.

This report presents a full archaeological assessment of the planned subdivision, but it is only that. There may be sites or features that are also of significance to the Iwi through tradition or association; this report does not constitute an assessment of Maori values. The developer will need to obtain such an assessment from the Iwi.

2. The archaeological resource

2.1 Context and Data

Archaeological sites are defined in the Historic Places Act 1993 as:
"…any place in New Zealand that

(a) Either -

(i) was associated with human activity that occurred before 1900; or
(ii) is the site of the wreck of any vessel where that wreck occurred before 1900; and

(b) is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand.[1]"

Archaeological sites by implication are physical and tangible; they can be observed and measured. Archaeological sites may be of Maori origin and therefore of significance to Maori. There may also be other sites of significance to Maori for their spiritual and traditional values, and which may have no physical or tangible remains, and therefore do not fall within the legal definition of an archaeological site. This report is looking only at the archaeological resource in the study area, and will not attempt in any way to comment on or judge the Maori values of these sites. This is not meant to diminish or undermine the value of these places of significance to Maori; rather, this acknowledges that it is not appropriate for an archaeologist to comment on matters of significance to Tangata Whenua.

Archaeological sites only have a sense of meaning if they are examined in the context of a cultural landscape. Sites can be examined by archaeological methodology, that is, by applying a variety of scientific techniques to examine and rationalise the date; however, ultimately these places must been seen as remains of human populations, and their relationships with environmental factors are a by-product of this.

Archaeology can never say definitively "what happened" on a site or a landscape; instead data and information is gathered, and a hypothesis is proposed to explain the possible relationships between data, known information and possible interpretations.

Data for this study was sourced from CINZAS (Central Index of New Zealand Archaeological Sites), the electronic version of the NZ Archaeological Association's (NZAA) site recording file that is maintained by the Department of Conservation.

The definition of an archaeological site is noted above, and this definition includes places of both Maori and European origin. Archaeological sites in New Zealand are recorded by the NZAA and records entered into the site recording scheme. A site will be included simply by virtue of its existence; the NZAA file is an information database and makes no selection or ranking. Grid references given for an archaeological site are simply an indication of the site's location, and do not delimit the site's extent. Also, some sites included in the NZAA list may no longer exist, as they may have been destroyed since they were recorded.

[1] Historic Places Act 1993, Section 2, Interpretation.

All archaeological sites in New Zealand that conform to the definition from the Historic Places Act 1993 cited above have legal protection under Part 1 of the Historic Places Act 1993, whether or not they are recorded or their existence is known.

3. Contextual research

3.1 Maori occupation of the Kapiti coast

Although relatively little strategic archaeological surveying has occurred along the Kapiti coast, enough sites have been recorded to give a clear idea of the nature of occupation in the pre-contact period. The Maori population would have been living in an environment rich with resources and opportunities. The coast and estuaries would have provided fish and shellfish, the forested dunes would have provided birds, rats and plant species, and the swamp areas would have yielded birds, eels and yet more plant species.

Behind the flat coastal edge the hills would have provided soils for gardening. Other resources were not far away, such as the food and plant resources available from Kapiti Island, and the important lithic (stone) resources available from D'Urville Island at the top of the South Island[2].

Muaupoko lived along the Kapiti coast until about 1822. At this time Te Ati Awa of Taranaki accompanied Te Rauparaha on his great heke of 1821-22, and they settled around the Waikanae estuary area (WRC River Flood Plain Management Plan, 1992).

At this time Te Ati Awa built the Waimea pa, located at the junction of the Waimeha stream and the Waikanae River (Carkeek, 1966:152). Carkeek also notes the spelling would probably be more correct as Waimeha (*ibid.*). Carkeek also notes Arapawaiti pa, located on the southern side of the Waikanae River (*ibid.*:110, 173). However the main pa of the immediate area was the Waikanae pa at Kenakena, located on the southern side of the Waikanae River near the old river mouth.

A key event at this time was the Kuititanga battle of 1839. This battle was fought at the Waikanae estuary between Te Ati Awa and their northern neighbours, Ngati Raukawa, over disputed land, and was the last tribal battle fought in the Waikanae district (Carkeek, 1966:55). Although Ati Awa repelled the Ngati Raukawa attack, a large number of warriors on both sides were killed. Ngati Raukawa attacked the Waimeha pa, and forced Te Ati Awa to retreat across the Waikanae River to Arapawaiti. Here Te Ati Awa rallied and forced Ngati Raukawa back up the beach (MacLean, 1988:20).

Reports of casualties of the battle varied. Jerningham Wakefield said 18 Te Ati Awa and 50 Ngati Raukawa were killed (MacLean, 1988:20), Te Kahui cited in Carkeek stated 39 Te Ati Awa and 200 Ngati Raukawa were killed at the Ngati Raukawa pa of Kukutauaki up the Waikanae beach (Carkeek, 1966:59). Carkeek also states that many of the Ngati Raukawa were taken prisoner and were killed at the "main Waikanae settlement" (presumably the Waikanae pa at Kenakena), and that 55 were

[2] D'Urville Island argillite is an important source of stone for adzes and other tools, and artefacts made from this material were being traded throughout New Zealand at least by the 12th Century AD (Davidson, 1984:195)

buried in one grave. Carkeek notes that when Archbishop Williams visited the battle scene a short time after he was told that the dead had been buried "in European fashion", in contrast to ancient customs pertaining to war (*ibid*:60). The surgeon and naturalist Ernst Dieffenbach also made the same observations: he noted "…that in deference to new attitudes brought by Christianity…" Te Ati Awa buried their own dead and buried the bodies of their enemy in one mass grave rather than feasting on them (MacLean, 1988:20)

Christianity and associated "European" behaviour was just taking a hold on the Waikanae Coast at this time. During the 1830s the teachings of the missionaries in the north began to spread southwards, largely carried by slaves, many who became Christian after being released by their newly converted masters. Rev. Octavius Hadfield arrived with Archbishop Williams very soon after the Kuititanga battle, as noted above (Williams in fact took part in the peace talks) (MacLean, 1988:20). Hadfield remained in the Waikanae region for many years, and built his church at Kenakena which was completed in 1843.

3.2 Recorded sites

Traditional accounts and documented sources such as Land Court records indicate there was reasonably substantial Maori settlement and population along the Kapiti Coast, as would be expected from such a desirable environment.

There have been 30 sites recorded within in the general vicinity of the subdivision area. Appendix 1 lists the recorded sites, which are contained in a square including the area of the planned subdivision and the Waikanae River in the west, running east to the hills, and from south of the Waikanae River to just north of Waikanae Beach. The grid square is bounded by grid references easting: 2677000-2684000, northing: 6034000-6037000.

This data needs careful interpretation. The distribution of recorded sites does not represent the actual distribution of people or settlement in the prehistoric context – these are simply where sites happen to have been recorded. Neither does an absence of recorded sites infer an absence of settlement. The large cluster of sites around Waikanae is a product of the development of this land for housing, where sites have been located as the ground was cleared. This cluster does not necessarily represent an actual preference for this location in the prehistoric context.

There has been sporadic site recording in the Kapiti region from the 1950s through to the present. Only one planned systematic survey has been undertaken, by Colin Smart and students of the Wellington Teachers College in 1959-61. Smart was specifically sampling and analysing midden, so arguably was not concentrating on other possible sites. However he also noted the relationship between the dunes and the midden sites.

Beckett wrote in 1957 of observations made in the 1920s and before, prior to substantial development of the area. Of note is the fact that Beckett recorded 7 pa within the study area. Three of these sites would today be considered pa within the archaeological definition of the term, being a defended settlement. The other four

would be considered settlements or kainga. However Beckett's notes provide invaluable data on sites that are now completely destroyed.

Most other recording has either been opportunistic sightings, or sites notified after exposure through development or landmoving.

There have been about 33 midden sites recorded in close vicinity to Tamati Drive; all of these were recorded by Smart in the 1960s, and few now remain. There are no recorded sites within the boundaries of the subdivision.

3.3 1898 graves

At much the same place where the koiwi were disturbed in 2000 is marked as *graves* in the field book of an early cadastral plan (ML1491, Figure *) dated 1898[3]. The graves were situated on a stream terrace that separated the Waimea stream from the low dune ridge (Figure *). In 1898 the stream was about 90m from the graves, but by 1920 it had moved to within 20m of the graves.

It is considered significant that the surveyor used the word "graves" in his fieldbook, and three small rectangles are shown to mark the graves. From the specific use of this term it may be inferred that the graves were of European style, marked either with headstones, crosses or a boundary fence. Generally when surveyors were recording unmarked Maori burial grounds they used terms such as "native burial ground", "burial ground" or similar.

3.4 Historical burials

The WRC reports states that during the work in 1970-71 to create the Waimeha lagoons

> "Nearby several gravestones made of Sydney sandstone were discovered. They mark the burial place of, among others a whaler named William Browne, Margaret Nairn, and Penelope Durie, a daughter of Major Durie, Police and Customs Officer 1847-1851. Until recently large flax bushes had grown over the headstones all but obscuring the remains of a large burial ground which once covered nearly 20 acres. The headstones have been restored and are now visible by the Waimanu Lagoon" (WRC, 1992:105).

Unfortunately this information not sourced, but the text is extremely similar to that used in Chris MacLean's book on Waikanae, which suggests this as the source. The text in MacLean only lists William Browne and "…a daughter of Major Durie…" (MacLean, 1988:196) and equally unfortunately does not list the source for identifying these people.

[3] The transect and offset lines in the surveyor's notebook have been transposed to a current map. The 1898 survey reference points are still in use today.

The author of this report found the relocated headstones beside the lagoon (figure*); the writing on them is largely so weathered as to be unreadable.

The Biographies index of the National Library lists a William Franklin Browne, born in Barbados and died 11 August 1911. He married Erena, daughter of William Jenkins, a well-known whaler of the district, who married Paeroke Rawiri; William Jenkins built the Jenkins Accommodation House at Waikanae (now known as Jenkins cottage, and still lived in by a family descendant) (NZ Biographies Index, Baldwin, 1988). Marriage to a Waikanae woman would have explained why William Browne was buried at Waikanae; however, the obituary for William Franklin Browne notes he was buried at Karori cemetery, so this cannot be the William Browne buried at Waikanae (NZ Times, 14 August 1911).

The biographies index does not have an entry for Penelope Durie. She was probably named after her mother 1840 (NZ Biographies index). Major David Stark Durie (1804-1874) arrived in New Zealand in May 1840, and was the Police and Customs Officer at Waikanae between 1847-1851. His entry in the NZ Biographies index notes he had 6 children, including 4 daughters. Only three of the daughters are named, and their "society weddings" are described; it is speculated that the fourth daughter was not named or her life noted because she died as a child. The register of deaths index at the National Library has deaths noted for a William Browne in 1890, 1892 and 1893, for a Margaret Nairn in 1893 and for a Penelope Durie in 1896. Further research could be undertaken by obtaining these death certificates from the Registrar of Births, Deaths and Marriages; however this research is considered peripheral to the archaeological issues of this work.

The New Zealand Cemeteries Records index at National Library was checked, as were the New Zealand Gazettes between 1857-1920. There is no record of a formal or gazetted cemetery at Waikanae.

It is possible that the graves of Browne, Nairn and Durie are the same three graves shown in the surveyor's notebook of 1898. However this has not been proven and can only be speculation. It is also noted that the WRC report states that Nairn and Durie shared one grave, and only two headstones were relocated during the lagoon construction work; therefore, if these people are the three in the 1898 plan there at least one further unknown person in the third grave.

3.5 Traditional burial ground

The Maori Land Court minute books were examined for information pertaining to this area. The Wellington Minute Book no. 21 records a hearing before Judge Jones on 18 June 1918. The record notes that the petition was being made for the purposes of cutting out a graveyard. It was noted that a survey had not yet been carried out. The order was for the portion to be called Ngarara West A Section 14B1. The boundaries were to be pointed out by Hera/Hine(?) Parata or failing him by some other person as approved by the judge. It was noted the portion to be cut out was about 20 acres. The

remaining area of land was to be called Ngarara West A Section 14B2, and comprised about 158 acres[4]. (Figure *)

A scribbled note at the bottom of this page noted plan 3495, and had the word "approved" written beside it.

Plan ML 3495 was obtained from Land Information New Zealand (Figure *). This was surveyed in October 1920 for the "native owners". It shows the 20 acre area of section 14B1, and the surveyed boundaries of this piece.

It is concluded that this burial ground was surveyed in 1920, and its boundaries established by survey.

Using the known survey pegs, the boundaries of this burial ground have been overlain on a current aerial photo to relate to the planned subdivision (figures * and *). It shows that the subdivision is located entirely within the area of the burial ground, and that in fact much of it has already been built on.

The area was described as the Waimeha burial ground near the old Waimeha pa to Wellington Regional Council in preparation of their flood plain management plan. Metapere Waipunahau is reported to have been buried there on her death in 1853; she was the mother of Wi Parata Te Kakakura Waipunahau, Chief and leader of Te Ati Awa (WRC, 1993:4).

A newspaper report from the Evening Post of 28 October 1969 records the plan of the Waikanae Land Company to buy the 20 acre block which at that time was designated Maori Cemetery, and of the plan to change the designation. The article notes three recognised Maori burial grounds in the Waikanae area, and names the burial ground in question as Karewarewa. The article notes that the burial ground then in current use at Waikanae was the Tukimore [sic] ground, the other two being considered filled. This statement implies Karewarewa burial ground had been in use prior to that time. Carkeek (1966:114) recorded Wi Parata referring to Karewarewa as a village belonging to his ancestors. In the same source Mere Pomare, mother of Sir Maui Pomare, recorded it as a burial ground, and noted that her mother, the famous chieftainess Te Raouterangi, was buried there.

It is not clear whether the designated burial ground was already in use and the Maori Land Court was formalising an existing land use, or whether the area was cut out for planned future use. However given the traditional and documented previous burials of notable people in this vicinity, it is suggested that the burial ground was already in use.

[4] The original handwriting of this minute book entry was illegible in places. At some point someone had attempted a translation: their words are written in smaller writing above the main entry. In some cases they could not decipher the words, in others, this author disagreed with their translation.

3.6 Other documents

Further documents were searched in an attempt to obtain information on the land and its use. The current certificate of title (53B/939 issued 21 July 1998) was examined, as were previous CTs (7A/1139 issued 12 June 1969, cancelled and 8B/524, issued 3 August 1970, cancelled). These latter two CTs also referred to Maori Register documents that were obtained (MR 10/62 and 10/139).

The Ngarara West A file was examined (National Archives AAMA 20/27 Vol 1, accession W3150). The only reference to a cemetery was a letter dated 28 January 1926 from a Pono Timihana of Taranaki, requesting a copy of a sketch map of the Waimea Block to show the two cemeteries, Waimea cemetery and Takamore cemetery. The reply from the Chief Surveyor of 28 January 1928 notes there were no plans in the office showing these cemeteries. There is no further correspondence on this matter on the file.

4. Archaeological issues

The archaeological issues of the site are addressed in this report in two parts: the landscape archaeology and the koiwi. That is not to separate the koiwi from the landscape in which they were found but to describe the specific archaeological issues of each.

A key component of the context and interpretation of the archaeology of this site is closely linked with the underlying geomorphology and environmental context. For this reason Dr Bruce McFadgen was subcontracted to assist with issues of geomorphology, especially the sand dune sequence. Dr McFadgen is a geologist and archaeologist, and is author of *Archaeology of the Wellington Conservancy: Kapiti-Horowhenua. A Prehistoric and Palaeoenvironmental Study* (McFadgen, 1997).

4.1 Fieldwork undertaken

Two site visits have been made. The first was in the company of James Hutchison on 14 December 2000, shortly after being commissioned to undertake the archaeological assessment. The purpose of this visit was familiarisation with the site, and discussion of the work that had occurred on site up to then.

The second visit was with Dr Bruce McFadgen. The site was walked over and visual observations were made. A surface collection of shells was made to be radiocarbon dated. The need for this surface collection was discussed by phone with Dr Rick McGovern-Wilson, senior archaeologist of Historic Places Trust, on 10 January 2001, and Dr McGovern-Wilson agreed to a non-invasive surface collection.

4.2 Geomorphological context

Survey plans and aerial photos housed at Land Information New Zealand were studied to gain information on the changing environmental context of the area.

The subdivision is near the seaward edge of the sand dune belt that extends from Paekakariki in the south to beyond the Manawatu River in the north. It is on the south bank of the former Waimeha Stream, which was once a large distributory of the Waikanae River (Adkin, 1941) that flowed west to southwest behind the coastal dunes towards the present Waikanae estuary. It is bounded to the southeast by a low dune ridge roughly parallel to the coast (Figure *).

The sand dune belt has formed during the last 6500 years(Gibb, 1978). Before then the shoreline was near the foot of the hills (Fleming, 1972), and since then, as a result of sand accretion, the shoreline has moved seawards some 3.5 km to its present position.

About a kilometre inland of the subdivision a prominent sand dune ridge roughly parallel to the coast marks an intermediate position of the shoreline. The dune ridge,

called the Taupo Dune, is a relict foredune that was the shoreline at the time of the Taupo Pumice eruption (Stevens, 1988) *ca*. 230 AD (Sparks *et al*, 1995).

The sand seawards of the Taupo Dune has accumulated since about 230 AD and is identified as belonging to the Waitarere and Motuiti dune-building phases (Stevens, 1988). At some time since 230 AD the beach was where the subdivision is today, and has been buried as the shoreline advanced further seawards. The Waimeha Stream, which at one time would have flowed to sea north of the subdivision, was probably forced to flow southwestwards by the accumulation of sand between it and the sea.

4.3 Recent work on site

In the last 30 years the ground surface of the subdivision has been considerably modified. In the 1970s the lagoon was excavated approximately along the course of the Waimeha Stream (James Hutchison, *pers. com*. 2000).

The Waikanae Land Company was formed around *1969 to develop areas of land on the Kapiti Coast for subdivision. Among land purchased was a block that contains the area of what is now the Tamati Drive subdivision. Part of this block was subject to a designation for a Maori cemetery. This is shown on a Horowhenua County Council planning map of 1968. It is not known when this designation was placed[5], but the Waikanae Land Company successfully sought to have this designation lifted in 1969 in order to allow zoning to change to residential use. It is noted that the area of this designation shown on the planning map is of very similar size and alignment as the 20 acre block cut out for a burial ground in 1918.

Between 1969 and 1971 a swampy area that was the former bed of the Waimea River was created into a lagoon named the Waimanu lagoon (Maurice Rowe, *pers. comm*.). The lagoon was excavated with a floating suction dredge that pumped material from the bed of the lagoon and discharged it onto the southeastern lagoon shore (James Hutchison *pers. com*.). How far from the lagoon shore the material was re-deposited is not known, but it is reasonable to expect that it would have been used to level the surface of the terrace between the stream and the low dune ridge.
The nature of the dredge meant it was automatically compacting material as it was deposited (Maurice Rowe, *pers. comm*.). A recreation reserve was created around the edges of the lagoons.

The 1990 ground surface is therefore likely to have been material of varying thickness deposited by the dredge. To determine the actual thickness and extent of the dredgings, and whether prior disturbance of the ground surface occurred, will require a stratigraphic examination of the deposits.

A report and photograph in the Kapiti Observer of 9 July 1970 shows the suction dredge at work. The story reports plans for a marine and housing development. The Kapiti Observer has further stories and photos in its editions of 29 October 1970 and

[5] Horowhenua Council records have been moved in part to the Kapiti Coast District Council. Many records are missing or incomplete. The district plan which shows the map became operative on 1 June 1968.

17 December 1970. In October it notes the dredge previously worked on the Kapuni pipeline project.

As the work proceeded on the lagoons reports state that "an extensive Maori burial ground was uncovered" (WRC, 1992:105). This report speculates that these burials may have "included warriors killed during the battle of Kuititanga" (*ibid*:105). This report is also included in Chris MacLean's book *Waikanae: past and present* (it is likely that MacLean was a source for the WRC report – text in both is very similar)[6].

However it is possible sources have become confused over the years. Maurice Rowe is emphatic that no burials were located or disturbed during the lagoon development work; he remembers the finding of the headstones, but no bodies in association with these or anywhere else.

This report from the MacLean book and the WRC report was discussed with Kapakapanui at a meeting of 13 February 2001; in a follow-up e-mail from Susan Forbes on this issue Susan states "some of that info has become somewhat generalised over the years. Burials were uncovered at the airport and at Queens Road and none of us could think of any at Waimeha – Chris's sources were probably talking about Queens Road - not far away but far enough to be unrelated to this project" (e-mail exchange: Susan Forbes to Mary O'Keeffe, 15 February 2001).

Also during the development work for the lagoons, "several" gravestones were discovered, which reported to mark the burial places of William Browne, Margaret Nairn, and Penelope Durie (WRC, 1992:105). These headstones have been relocated to the recreation reserve beside the current lagoons; the report does not state whether the bodies of the people were also recovered, and if so, what became of them.

In 1990 and 1999 the ground surface of the subdivision was re-contoured (Engineering plans: 1605836 sheet 1, 1990; 1272233 sheet 1, 1999). Changes to the land surface, as a result of earth moving, are determined from the contours and levels on engineering plans 1605836 sheet 1 and 1272233 sheet 1.

In 1990 the ground to the west of Wi Kingi Place was cut to a maximum depth of slightly more than 3m on the dune ridge, and slightly more than 0.5m west of the intersection between Tamati Drive and Wi Kingi Place. Fill was deposited on the eastern part of the subdivision to a maximum depth of 4m (Figure 2). In addition, small pockets in the western part were filled to a depth of less than 1m.

In 1999 the earthworks resulted in minor cutting to a maximum depth of about 1m on the northeastern boundary of Wi Kingi Place and along Tamati Drive, and the western and northern parts of the subdivision were filled to a maximum depth of 1m (Figure 3). Small pockets of cut and fill were made along the dune ridge southeast of Tamati Drive, the maximum cut being about 2m, the maximum fill about 1m.

[6] This particular section was unreferenced in the MacLean book: Chris MacLean was contacted and asked if he could remember the source. Chris was kind enough to check his records for his book; he had no written records for this report, so suspected it came from an oral interview undertaken for his book. He considered the lack of referencing would have been deliberate to ensure the anonymity of the source.

It would have been normal practice to use the nearest source of material as fill and this would have included spoil cut from the higher parts of the subdivision. In 1990, however, some spoil was also brought in from the Major Durie Drive subdivision between Tamati Drive and the Waikanae River and deposited along the southeastern dune ridge (James Hutchison, *pers. com*. 2000).

Following the cutting and filling in 1999, trenches were excavated along Tamati Drive and Wi Kingi Place for underground services. In the course of cutting of these trenches burials were disturbed in two episodes at Wi Kingi Place. The author of this report was not present when these burials were disturbed or recovered, and again, because this information is *sub judicae* is unable to gain detailed information from the archaeologist who was present. *The trench at this point along Wi Kingi Place excavated *how deep below the original ground surface.

Susan Forbes' evidence to the District Court states that 2 skulls, 1 shoulder bone, 2 collarbones, rib fragments and two leg bones were removed from the trench on 5 July 2000. During the same site visit Ms Forbes observed "extensive areas of intact and modified midden/oven material" (Forbes, n.d.:4). Ms Forbes observed shell and hangi stone scattered over the subdivision, and observed at least three intact deposits of shell visible in service trenches (*ibid*).

Subsequent work in the same trench disturbed further burials on 19 July 2000. Ms Forbes' evidence states that the following koiwi were removed:

- A skull in the trench removed by the site workers
- Several large bones and a skull removed from the spoil heap
- 2 rib bones from the northern side of the trench
- 2 further burials removed from the trench

During this second site visit Ms Forbes also observed at least six intact middens along a service trench. Unfortunately it is not known exactly which trench or where along it Ms Forbes observed these and the previous midden. However James Hutchison noted the locality of the midden, as he recalled it, as being approximately opposite the intersection with Wi Kingi Place.

4.4 Interpretation of the shell

The original material excavated from the lagoon was almost certainly reworked in 1990 and again in 1999. In 1990, the material west of Wi Kingi Place was cut and probably re-deposited on the eastern part of the subdivision (Figure *). In 1999, material along Tamati Drive and Wi Kingi Place was excavated and probably re-deposited on the western part of the subdivision (Figure *).

Shells on the present ground surface of the subdivision are nearly all on fill and would have been deposited in their present position either during or since 1990 AD.

If the shell lens found 600 mm below the ground surface in Tamati Drive was found east of the intersection with Wi Kingi Place, then even allowing for up to 1m of cut in 1999, it would be in fill and probably deposited in that position in 1990 AD. If it was

found at or west of the intersection it could have been deposited in that position in 1970 AD as dredge spoil.

It is therefore inferred from the history of earthworks on the subdivision that the shells on the ground surface and in the trenches are not *in situ* deposits. Excavation of a trench where the shell lens was found would test the inference that the shell lens is in re-deposited material.

4.4.1 Origin of the shells

The shells (Table 1) are estuarine and open coast species found on the beach today. As similar species are also found in shell middens in the Waikanae area, the species themselves are not a reliable indication of either a natural or a cultural origin.

Table 1: Shell species collected from ground surface of the subdivision.

Shell species	
Scientific name	**Common name**
Austrofusus glans	ostrich foot
Dosinia anus	ringed dosinia
Mactra discors	
Paphies australis	pipi
Paphies (Mesodesma) subtriangulata	tuatua
Paphies (Mesodesma) ventricosa	toheroa
Spisula aequilateralis	triangle shell

There is a general absence of cultural material such as artifacts, animal bones from food species, burnt and fractured oven stones, or charcoal that might indicate the shells are from old middens.

Blackened twigs and sticks similar in appearance to charcoal were seen in several places, as were stone fragments with blackened surfaces, or with the reddish colour of iron oxide, but natural processes can explain these materials.

On the lower slopes of the sand ridge southeast of Tamati Drive between the entrance to the subdivision and Wi Kingi Drive are irregular mounds of black peat about 2m across and 20 to 40 cm high. The peat is mixed with swamp-blackened twigs and sticks, rounded lumps of Taupo Pumice discoloured by swamp black and iron oxide, shells stained with iron oxide, and occasional stones some with blackened surfaces others stained with iron oxide.

The peat is probably from either re-deposited material originally dredged from the lagoon in the 1970s, or is from a former *in situ* wetland. In either case it has probably been dug out of a service trench along Tamati Drive. Excavation of a new trench might clarify its origin. The wood fragments, stone, and shells can be matched on the present beach and are possibly from an old foreshore that later became incorporated in a wetland after the Waimeha Stream began to flow southwestwards.

A sample of shells was taken from the ground surface for radiocarbon dating. The ground surface over the subdivision had been sprayed with a mixture of PVA and grass seed, and PVA adhering to shells was removed by scrubbing the shells in tap water. The age of the shells, determined by radiocarbon dating, is between 935 and 1080 AD (Table 2). This age is substantially older than the date for the human settlement of New Zealand of *ca.*1250 AD (Anderson, 1991; McFadgen *et al*, 1994; Higham and Hogg, 1997) and indicates that the shells are not from an archaeological midden.

Table 2: Radiocarbon and calibrated ages (95% confidence interval) for tuatua shells (*Paphies (Mesodesma) subtriangulata*) collected from the ground surface of the Tamati Drive subdivision. The shells were physically pretreated by scrubbing in cold water to remove traces of PVA and then air-dried. The shells were chemically pretreated by washing in 5 M dilute hydrochloric acid for 500 seconds, rinsing and drying. $\Delta R = -30 \pm 13$ (McFadgen and Manning, 1990).

Laboratory number	**Conventional Radiocarbon Age (years BP)**	**$\delta^{13}C$ ‰**	**Calibrated Age (years AD)**
Wk9144	1360 ± 40	1.4 ± 0.2	935–1080

The age of the shells indicates that they are from a natural deposit. Considering the earthworks that have been carried out on the subdivision, especially the excavation of the lagoon in the 1970s, it is inferred that the shells on the subdivision are derived from a former beach in the position of the present lagoon. The lagoon water level is less than a metre above mean high water mark, and the suction dredge would almost certainly have intercepted an old beach when the lagoon was excavated.

Excavating a trench near the present lagoon edge can test the inference. Shells should be found at or above the height of the lagoon bottom and have an age similar to that obtained for the shells on the present ground surface.

Not all of the shells on the subdivision are necessarily from a natural deposit, however. Some could possibly be from shell middens that were originally on the subdivision, or brought from Major Durie Drive, but their status as former midden shells would need to be demonstrated.

It is noted that if the shells in the subdivision are a result of the construction of the lagoon, it is possible that some of the human bones might have been similarly deposited if they had been originally buried on a former bank of the Waimeha Stream.

4.5 Interpretation of the burials

The graves along Wi Kingi Place are in a part of the subdivision where fill was deposited in 1990. They were below the ground surface as it existed before the 1990 earthworks (Figure *) and would have been undisturbed until the service trenches were excavated in 2000 AD.

*depth of trenches

The first groups of burial were removed from the site and have been reinterred. The second group were also removed from site and were put into safekeeping at the Waikanae Funeral Home. These burials have been analysed by Dr Nancy Tayles of Otago University.

*Nancy's report

In her evidence Ms Forbes notes that the "bones recovered had been laid either on wooden slats or in coffins" (Forbes, n.d.:7). She does not say what the evidence for this is: whether she observed pieces of wood *in situ*, or staining in the soil/sand that is interpreted to be wood.

However the burials analysed at the Waikanae Funeral Home also contained fragments of wood that displayed regular holes consistent with a hole left by a rusted nail. It is inferred that these wooden fragments are the remains of coffins, which in turn implies burial in a "Christian" style. However it cannot be inferred that all the burials disturbed on site were in coffins or on slabs. In her evidence Ms Forbes notes that several of the disturbed burial and bones were recovered from the spoil heap (Forbes, n.d.). Equally these wooden fragments could originate from wooden crosses and/or wooden fences used to mark graves, which also are associated with Christian style of burial.

Two pieces of information have been established about the burials: some at least are of post-contact age (on the basis of the wooden fragments), and they are Maori in origin (Tayles*).

Therefore there are several possibilities for the origins of the burials.

- The first is that they are Muaopoko, dating from before the settlement of Te Ati Awa in the region. This is not considered likely from the post-contact context inferred from the wood attributed to coffins or wooden crosses.
- The second is that they are Ngati Raukawa dead after Kuititanga battle. Carkeek notes that all the Raukawa dead were buried in one grave, and in "European fashion" (Carkeek, 1966:60). This is considered a possibility, although if all were buried in coffins and great number of coffins would have needed to have been obtained within a very short timeframe. It is considered far more likely that bodies were wrapped in shrouds or cloths of some sort, and were buried in a mass grave, as recorded by Carkeek.
- The third is that they are Te Ati Awa from mid to late 19th Century. There are no grounds to discount this as a possibility. Such burials could be in coffins, and could have wooden crosses or boundary fences, which could explain the wooden fragments with the burials.
- The fourth is that they are Te Ati Awa from the early 20th Century, and that the precise location of the burial ground has fallen out of traditional memory. These graves also could have coffins or wooden crosses or boundary fences, which could explain the wooden fragments with the burials.
- The fifth is that they are a combination of the second, third and fourth options: that the burial ground was first used after the Kuititanga battle, and that Te Ati

Awa continued to use it until an unknown date, probably in the late 19th or early 20th century.

This last option is considered likely, on the basis of historical and documented use of the site. It is reasonable to assume that some at least of the burials predate 1900, so are archaeological in terms of the definition in the Historic Places Act. There is nothing to firmly date any of the burials, except for a likely post-contact context, but the documented dated historical event of the Kuititanga battle provides a possible origin.

It is possible that bones disturbed on site are from a variety of historical origins, and have been mixed and disturbed prior to 2000AD. Some of the human bones might have been disturbed by preparation of the ground surface (e.g. by removal of topsoil or vegetation) before the lagoon dredgings were deposited in 1970, or by smoothing the ground surface after the dredging was finished. Also, it is possible that later burials intercut earlier burials, and that further disturbance by the digger in 2000AD has mixed bones of various origins.

The link between the headstones found on site and relocated in 1970, and the three graves marked on the 1898 survey plan has not been established, nor has the relationship between the occurrence of the burials of Browne, Nairn and Durie in a traditional Maori burial ground.

Conclusions

Geomorphological evidence demonstrates that the shoreline was originally located at the foot of the hills, and has progressively moved west to its current position. Changing accumulations of sand would have redirected the Waimeha stream over time.

It is proposed that the shells scattered on the site surface and observed in trenches is of natural origin. It is likely they are derived from a former beach in the position of the present lagoon, and were deposited as part of the lagoon dredging. Further reworking of the site has moved the material around. The radiocarbon date verifies the age of shell as pre-human.

This archaeological hypothesis needs testing by trenching.

The subdivision area has been modified three times in the last 30 years – by deposition of dredge spoil, by 1990 recontouring and placement of spoil from Major Durie subdivision and 1999 recontouring. It is therefore inferred from the history of earthworks on the subdivision that the shells on the ground surface and in the trench are not *in situ* archaeological deposits.

Traditional and recorded evidence states that the subdivision area was in use as a burial ground at least by 1839 after the Kuititanga battle. Subsequent burials of people of note are reported to have taken place there.

Records show a 20 acre burial ground was cut out in 1918; there is no indisputable evidence that it was already in use. However a reference to a burial ground named Karewarewa implies it was filled, so had been in use for some time. Records show the designation for a Maori Cemetery in the 1969 district plan, of an area of very similar location, size and alignment to the 1918 burial ground.

It is considered there is strong evidence that the area is the location of a traditional burial ground, likely to have been in use since 1839 and with subsequent burials. Koiwi on site are considered to be associated with the Kuititanga battle or later 19th century burials, and may post-date 1900.

Therefore there is considered to be a high likelihood of further intact or disturbed burials in the vicinity, which could be anywhere within the 20acre block. This hypothesis requires testing to verify, but such testing is considered inappropriate.

However records verify that there were burials in this location in 1898, which makes the area an archaeological site in terms of the definition in the Historic Places Act.

As such the area has high archaeological values, and further development is considered inappropriate.

It is recommended that the client does not apply for an authority under the Historic Places Act, as the archaeological values are considered sufficiently high to preclude

further work. It is considered very unlikely that Historic Places Trust would grant an authority with strong evidence of the presence of a burial ground.

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Appendix 1: Recorded sites

These are sites in the NZ Archaeological Association index of sites.
These are sites in a square including the area of the planned subdivision and the Waikanae River in the west, running east to the hills, and from south of the Waikanae River to just north of Waikanae Beach.

The majority of the sites recorded in 1961 were part of Colin Smart's work on the midden sites on the Kapiti Coast. The burial ground (R26/96) is located beside the old Waikanae pa at Kenakena, on the south side of the Waikanae River.

The grid square is bounded by grid references easting: 2677000-2684000, northing: 6034000-6037000.

metric mapsheet and site number	metric easting	metric northing	site description	Date recorded
R26/186	2681600	6036100	midden	1961
R26/269	2678300	6034300	church site	1961
R26/38	2682500	6036200	midden	1961
R26/39	2682500	6036200	midden	1961
R26/40	2681700	6036000	midden	1961
R26/41	2681900	6036200	midden	1961
R26/42	2681800	6036500	midden	1961
R26/43	2682200	6036900	midden	1961
R26/44	2682200	6036700	midden	1961
R26/45	2682100	6036700	midden	1961
R26/46	2680100	6035200	midden	1961
R26/47	2679900	6035300	midden	1961
R26/48	2679900	6035300	midden	1961
R26/49	2679900	6035400	midden	1961
R26/50	2680000	6035400	midden	1961
R26/51	2679900	6035400	midden	1961
R26/52	2679900	6035300	midden	1961
R26/53	2680000	6035400	midden	1961
R26/54	2680100	6035100	midden	1961
R26/55	2680200	6035100	midden	1961
R26/56	2680200	6035200	midden	1961
R26/57	2680300	6035400	midden	1961
R26/58	2680300	6035300	midden	1961
R26/59	2680200	6035400	midden	1961
R26/60	2680200	6035400	midden	1961
R26/61	2680000	6035800	midden	1961
R26/62	2680200	6035200	midden	1961
R26/63	2680000	6035300	midden	1961
R26/64	2679900	6035200	midden	1961
R26/65	2679900	6035200	midden	1961
R26/69	2684000	6036100	midden	1961

metric mapsheet and site number	metric easting	metric northing	site description	Date recorded
R26/71	2679900	6035800	midden	1961
R26/72	2681100	6036500	midden	1961
R26/77	2680100	6036000	midden	1961
R26/78	2680100	6035900	midden	1961
R26/79	2680100	6035800	midden	1961
R26/80	2680200	6035800	midden	1961
R26/81	2680100	6035900	midden	1961
R26/82	2679800	6035800	midden	1961
R26/83	2679800	6035900	midden	1961
R26/84	2680100	6035700	midden	1961
R26/85	2680100	6035400	midden	1961
R26/86	2679900	6035500	midden	1961
R26/87	2680100	6035300	midden	1961
R26/88	2679700	6035300	midden	1961
R26/96	2679000	6034500	burial ground ?	1966
R26/97	2679000	6034600	midden	1966
R26/231	2678800	6034600	burial	1982
R26/260	2679800	6034400	burial	1983
R26/241	2679600	6034800	middens	1984
R26/253	2682500	6035300	midden	1989
R26/272	2681000	6035300	urupa	1997
R26/273	2680800	6035400	midden	1997
R26/274	2680800	6035400	midden	1997
R26/275	2680800	6035400	midden	1997
R26/276	2680800	6034500	midden	1997
R26/277	2680900	6035500	midden	1997
R26/278	2680900	6035600	hearth	1997
R26/279	2680900	6035600	hearth	1997
R26/280	2680800	6035600	hearth(s)	1997
R26/281	2681300	6035200	village/tree	1997