Appendix O Archaeological Assessment

TAHAROA IRONSANDS CENTRAL AND SOUTHERN BLOCKS: ARCHAEOLOGICAL ASSESSMENT

Prepared for Taharoa Ironsands Limited

October 2025

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BASIS OF THE REPORT

This report has been prepared for Taharoa Ironsands Limited in respect of its application for all approvals under the Fast-track Approvals Act 2024 for the Central and Southern Blocks of the Taharoa Ironsand Mine. The Panel appointed to consider the Central and Southern Blocks application may rely on this report for the purpose of making its decision under the Fast-track Approvals Act 2024.

This report has been prepared in accordance with the Environment Court's Code of Conduct for expert witnesses, contained in the Environment Court's Practice Note 2023. The authors of this report agree to comply with the Code of Conduct, and confirm that unless otherwise stated, the issues addressed in this report are within the area of expertise of the authors. No material facts have been omitted that might alter or detracted from the opinions expressed in this report.

INTRODUCTION

Project Background

The Taharoa Ironsands Mine is on the west coast of the North Island, south of Kawhia (Figure 1–Figure 3). The Mine involves removal of the sand deposits for iron extraction in the property known as Taharoa C Block. Taharoa Ironsands Limited is proposing to undertake mining in new and previously mined areas in the Central and Southern Blocks of the Taharoa C Block (Figure 4 and Figure 5). This is known as the Central and Southern Block Mining Project, and is a listed project under the Fast-track Approvals Act 2024.

The proposal would see ironsand mining undertaken at higher RLs using dry mining units and at lower RLs using dredges (which can intersect with the groundwater table).

The Mitiwai Stream defines the northern extent of the current active and proposed mining areas on the Central/Southern Block. The mining area extends south past the Wainui Stream down to the Waiohipa Stream in the Southern Block. Together these blocks are approximately 911 ha. The legal description of the land where the proposed works are situated is Taharoa C Block and covers an area of some 1317 ha.

An archaeological assessment was commissioned by Taharoa Ironsands Limited to establish the potential effects of the proposed work on archaeological values. This report has been prepared as part of the required assessment of effects for a resource consent application and archaeological authority application (and associated application for approval of person to carry out an activity under an archaeological authority) for the Central and Southern Block Mining Project under the Fast Track Approvals Act. Recommendations are made in accordance with statutory requirements.

Methodology

The New Zealand Archaeological Association's (NZAA) site record database (ArchSite), District Plan schedules and the Heritage New Zealand Pouhere Taonga (Heritage NZ) New Zealand Heritage List/Rārangi Kōrero were searched for information on sites recorded in the vicinity. Literature and archaeological reports relevant to the area were consulted (see Bibliography). Early survey plans and aerial photographs were checked for information relating to past use of the project area.

A visual inspection of the property was conducted on 1-3 April 2025 by Doug Gaylard, Tom Clough-Macready, Kirstin Roth and Hannah Cohen-Smith. The ground surface was examined for evidence of former occupation (in the form of shell midden, depressions, terracing or other unusual formations within the landscape relating to Māori settlement, or indications of 19th century European settlement remains). Exposed and disturbed soils where encountered were examined for evidence of earlier modification, and an understanding of the local stratigraphy. Subsurface testing with a probe and spade was carried out at the recorded location of archaeological sites to determine whether buried archaeological deposits could be identified, establish the nature of possible archaeological features or examine the subsurface stratigraphy. Particular attention was paid to the spur and ridge lines/creek banks/coastal edge (topographical features where archaeological sites are often found to be located). Sites were photographed and GPS readings taken. Photographs were taken to record the area and its immediate surrounds.

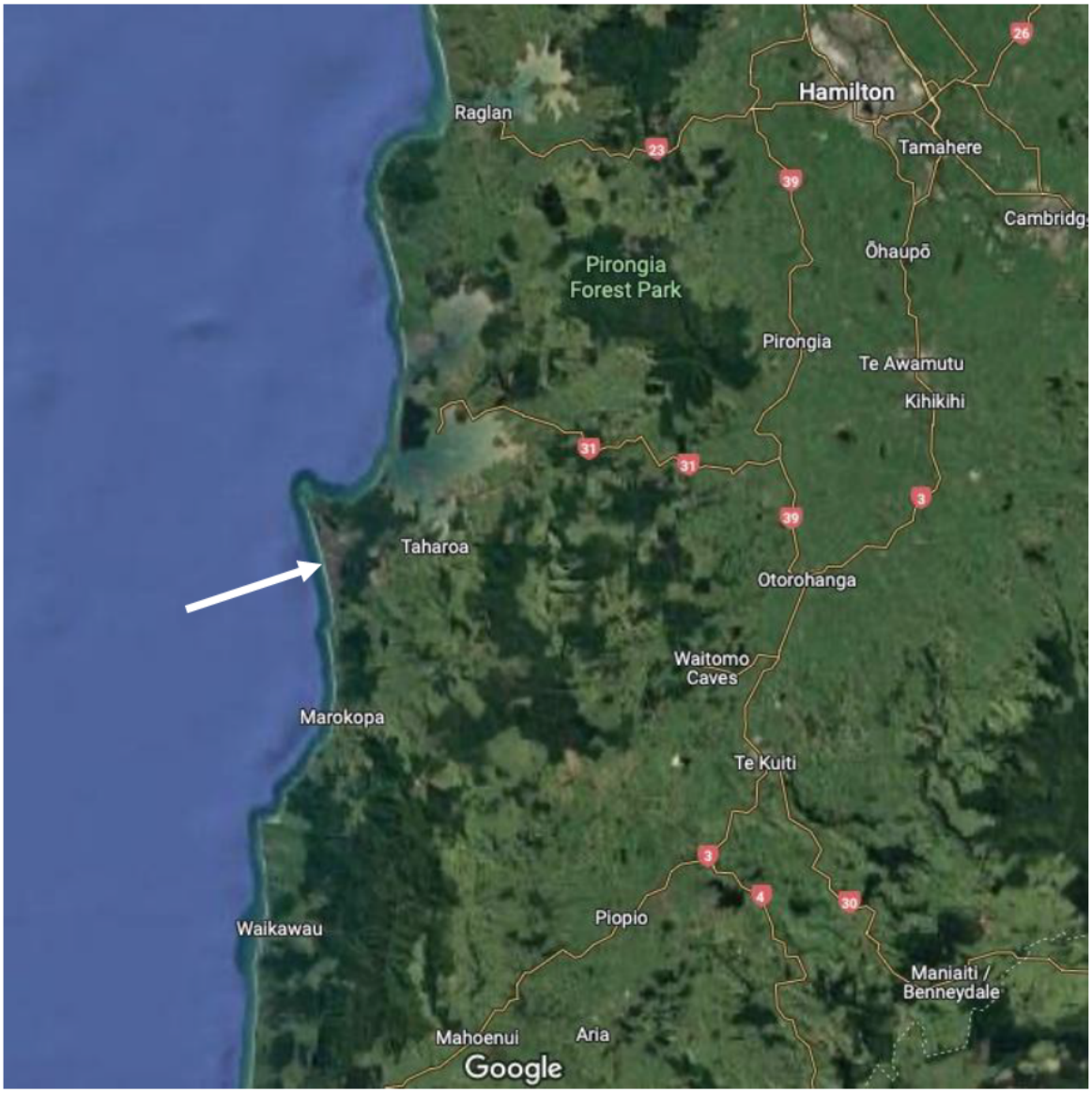

Figure 1. General location of Taharoa Ironsands (indicated by the white arrow). Source: Google Maps 2025

Figure 2. Detailed location of Taharoa Ironsands Central and Southern Blocks (indicated by the yellow outline). Source: Google Satellite

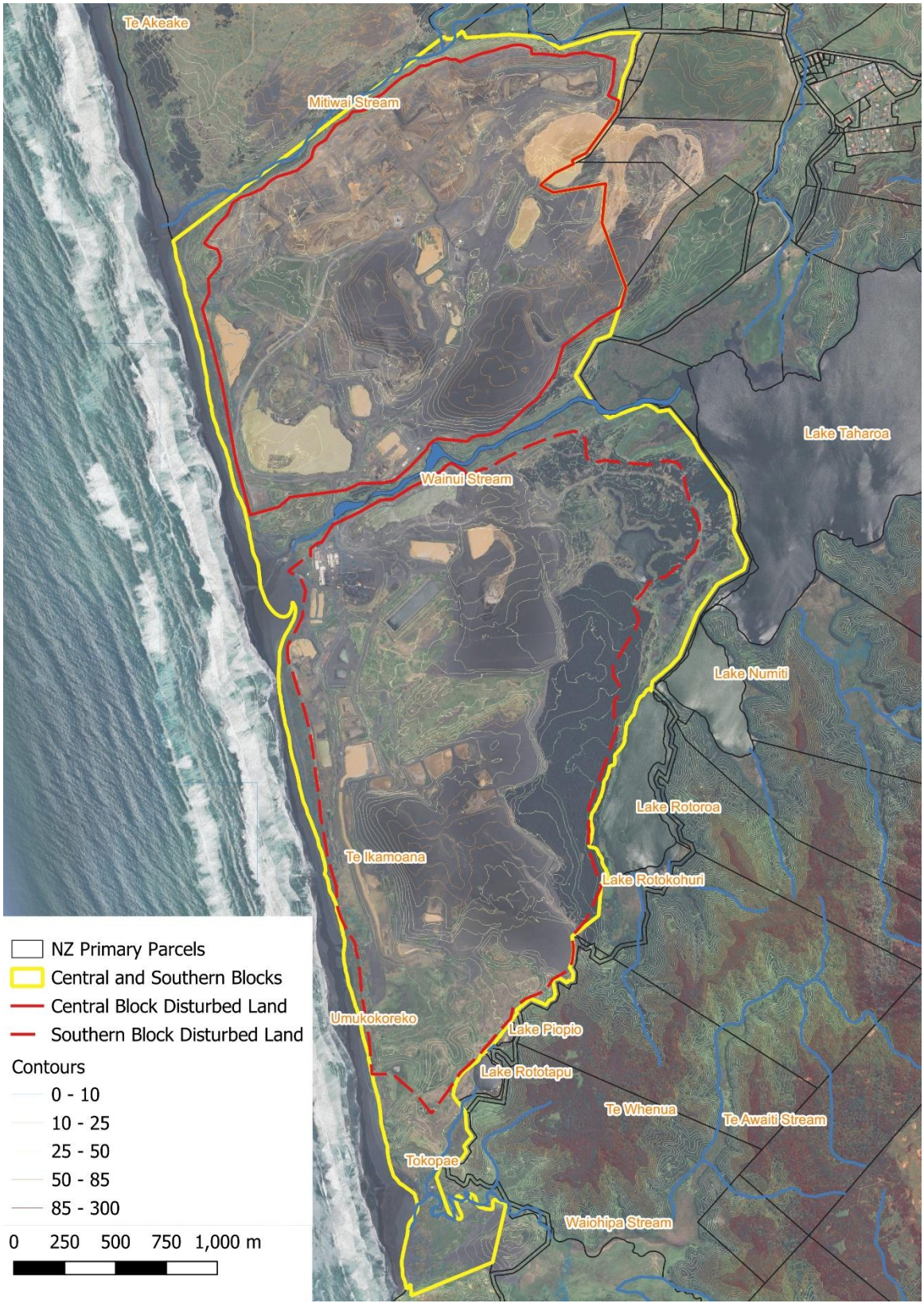

Figure 3. Plan showing the Central and Southern Areas, with geographical features identified and some place names recorded from historic plan ML 6206

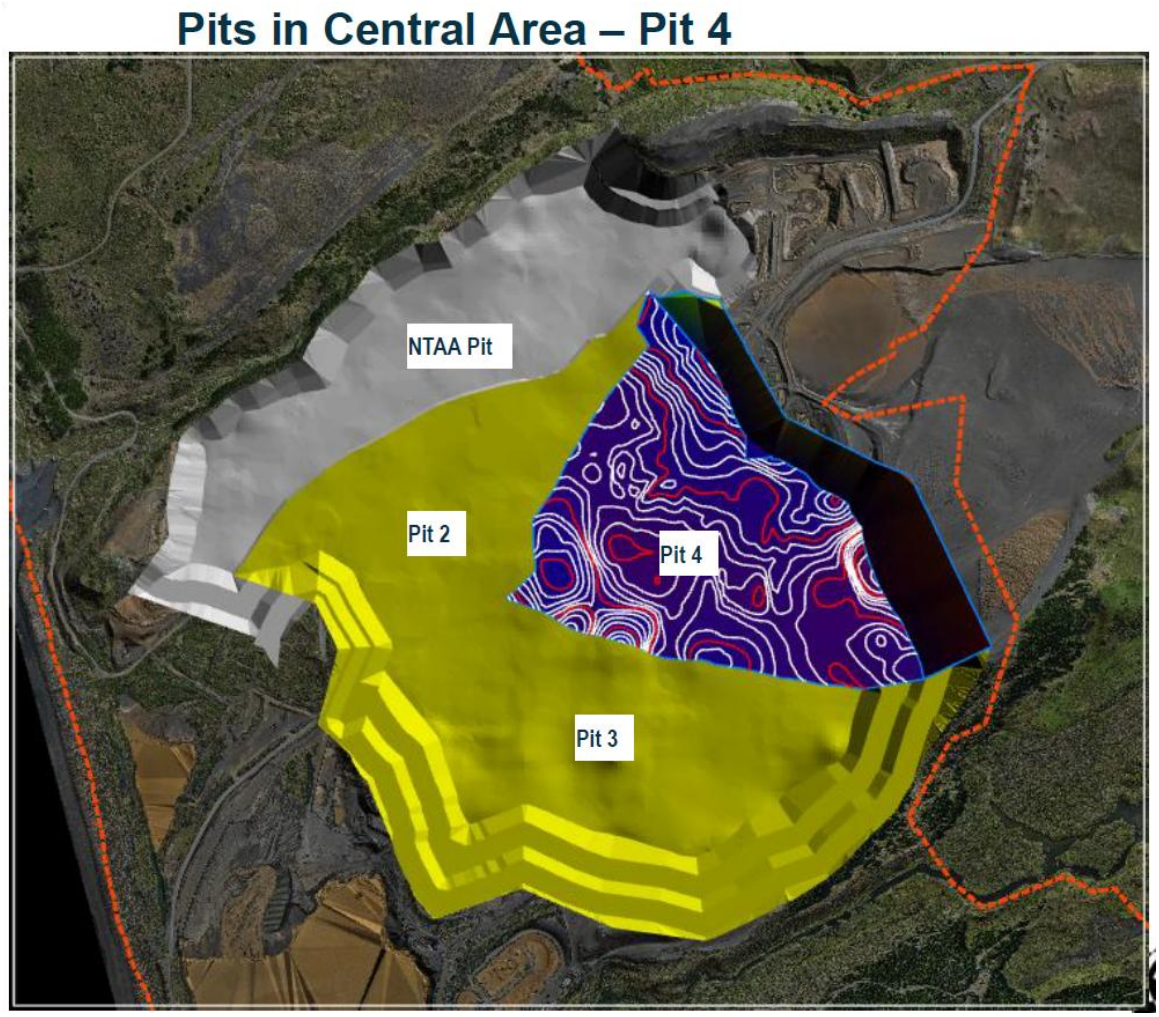

Figure 4. Indicative planned development of mining pits in the Central Area

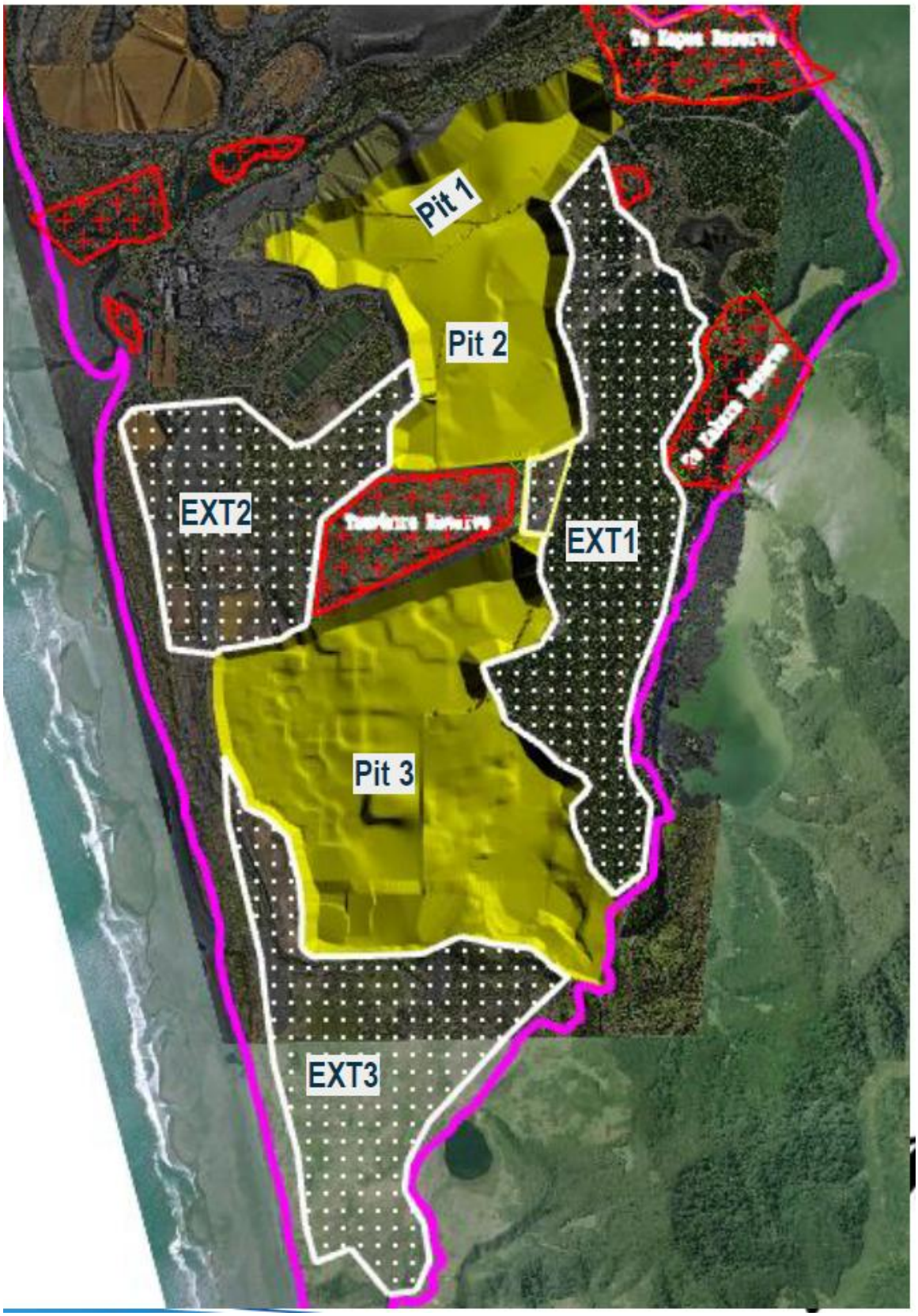

Figure 5. Indicative planned development of mining pits and extensions in the Southern Area

HISTORICAL BACKGROUND

Kawhia Harbour was historically one of the main landing places for the Tainui Canoe after it journeyed from Hawaiki, commanded by Hoturoa, after exploring both coasts of the central North Island. Consequently, Māori settlement in the area has a long history. Kawhia Harbour is the only sheltered bay along the coastline of King Country, with Marokopa, Waikawau and Awakino the only other places where large canoes could be launched or landed in all but the wildest weather (Wilkes 1994).

In the early 1820s, pressure from stronger northern tribes – particularly Ngāti Maniapoto – forced Ngāti Toa to migrate south. The Battle of Te Kakara near Lake Taharoa marked a turning point. Vastly outnumbered, Ngāti Toa suffered a major defeat and lost the famed warrior Raparapa of Ngāti Tama. This was followed by the siege of Te Arawi pā, during which Ngāti Toa, under increasing pressure, began their retreat from Kawhia (Smith 1909).

Jones and Biggs (1995) provide a comprehensive history of Tainui and their establishment in the area. A more personal history of the Māori families prior to the mine opening at Taharoa is provided by Te Uira (1958).

Elders of Ngāti Mahuta, George Wetene and Trevor Armstrong, were consulted by Bulmer in the 1970s with regard to traditional knowledge of the area. According to local tradition Te Rauparaha's wife was buried under a canoe in the Wainui Stream. Beyond that, there was no traditional knowledge of any settlements which could be correlated with the recorded archaeological sites within the project area (Clough 2001).

The land of the Taharoa Ironsands Mine and the adjacent Keepa and Wetini blocks are owned by local families. Te Kooraha Marae is located to the north of the Mitiwai Stream on land adjacent to the northern part of the Taharoa C Block, and Ngāti Mahuta hold mana whenua for the area.

A large-scale survey of West Coast ironsands in 1949 identified that ironsands within the Taharoa area were of much higher quality than those closer to Taranaki. This, in combination with newer smelting technologies developed in Norway, earmarked Taharoa as an area prime for mining. However, Taharoa's relative isolation created problems as significant investment in infrastructure would be required. It was not until the mid-20th century that the necessary connections to Taharoa were created (NZ Steel 1974, 2015).

Mining commenced in 1972 by the New Zealand Government at the time, and the Mine currently covers an area of several hundred hectares. An early history of the development of the Taharoa Ironsands Mine can be found in Ingram et al. (1974). This briefly outlines the challenges associated with iron extraction from sand in New Zealand and the establishment of the Taharoa Mine by NZ Steel Ltd.

HISTORICAL SURVEY

Information from Early Maps and Plans

Early plans (and aerials, see below) show the changes to the Taharoa sand dunes. Several plans were examined for evidence relating to the previously recorded archaeological sites, historical sites and information regarding wāhi tapu (Figure 6) recorded in the area.

Land plans from the turn of the 19th century show a number of burial grounds (urupā) to the south of the Wainui Stream (and current mining areas). Three burial grounds are shown – the Rangitoto (named as the Tauwhare burial grounds in Figure 8), Kakara (Figure 8) and Tauwhare (Figure 9) urupā. These are all situated within demarcated reserves within the project area.

Plan ML 9601 (Figure 10), surveyed for the Native Land Court in 1916, shows a number of houses, gardens and an orchard around the back of the Central Block near Mitiwai Stream, to the north of the project area.

Three reserves relating in part to the urupā noted above have been identified in one of the early NZ Steel Ltd consent application plans from the late 1960s (Figure 11). These are all within the project area.

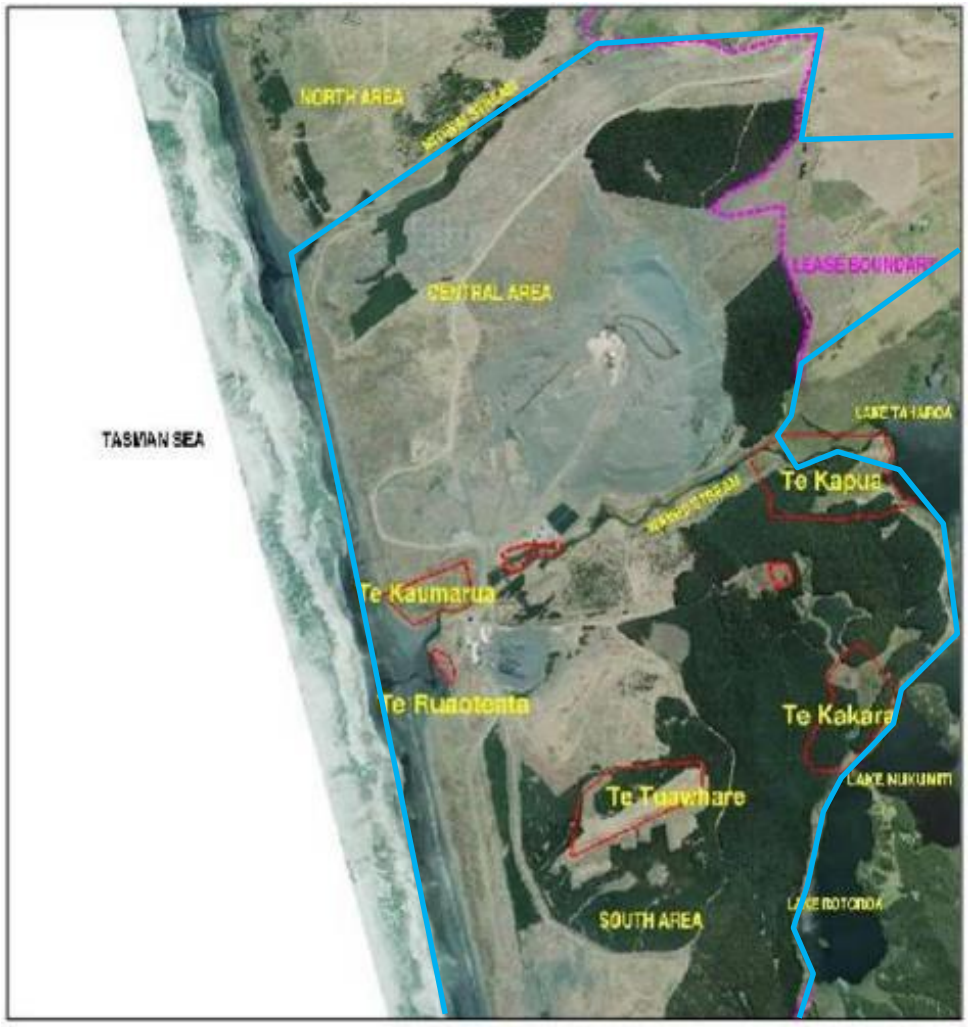

Figure 6. Wahi Tapu areas around the Mine site marked in red (Goh 2014: Figure 3.1), with approximate mining lease area indicated in blue

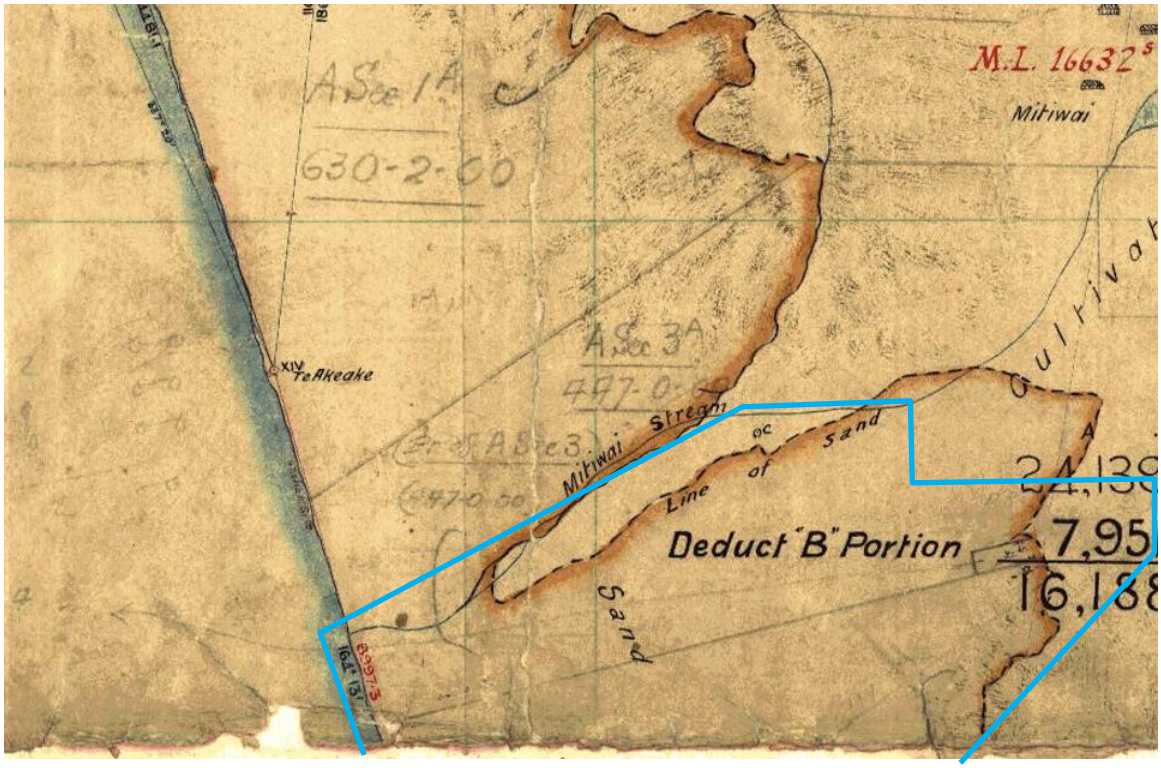

Figure 7. ML 6206 Sheet 1, dated 1894-1970, with approximate extent of mining lease highlighted in blue

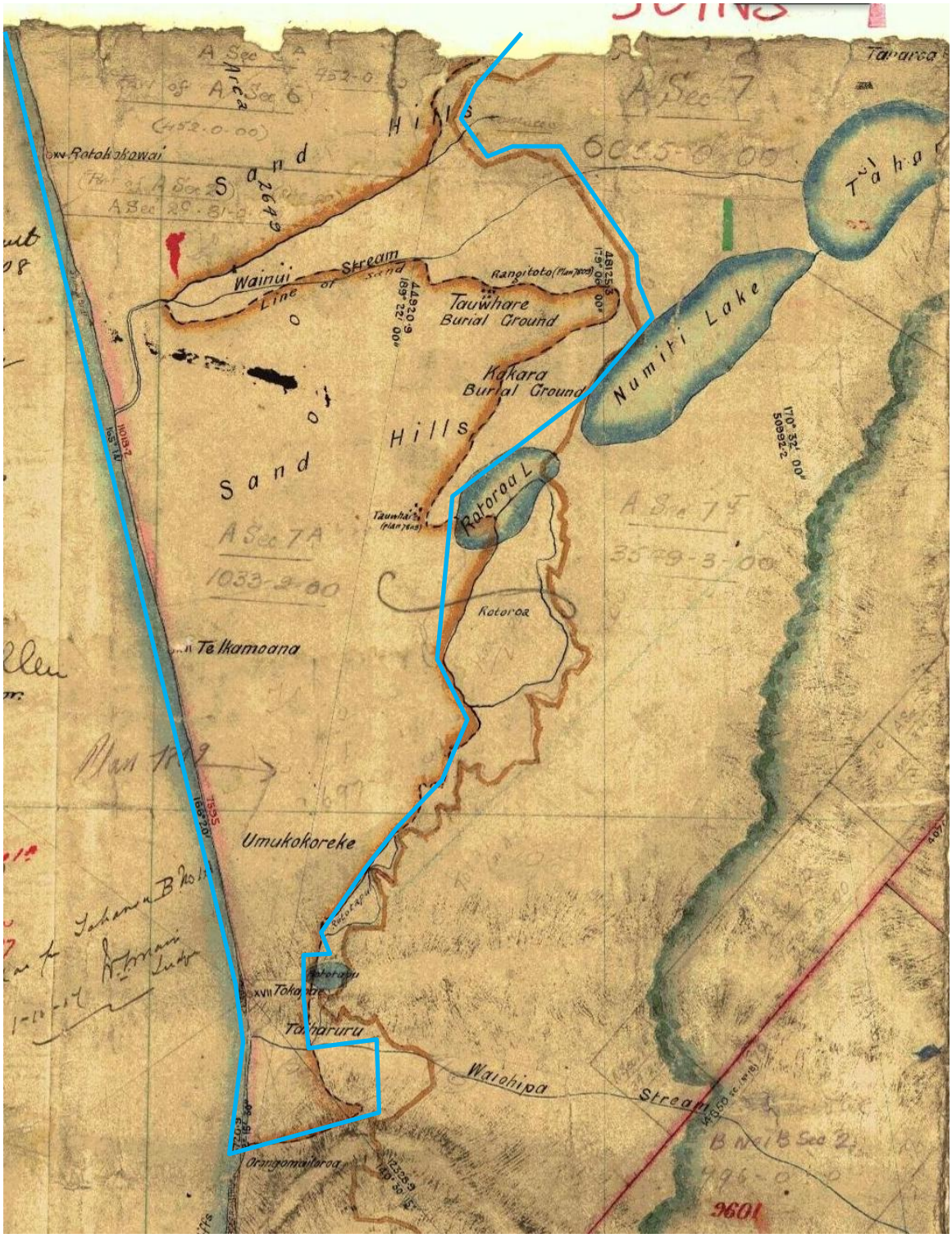

Figure 8. ML 6206, sheet 2, dated 1894-1910, showing Tauwhare and Kakara urupā, with approximate extent of mining lease highlighted in blue

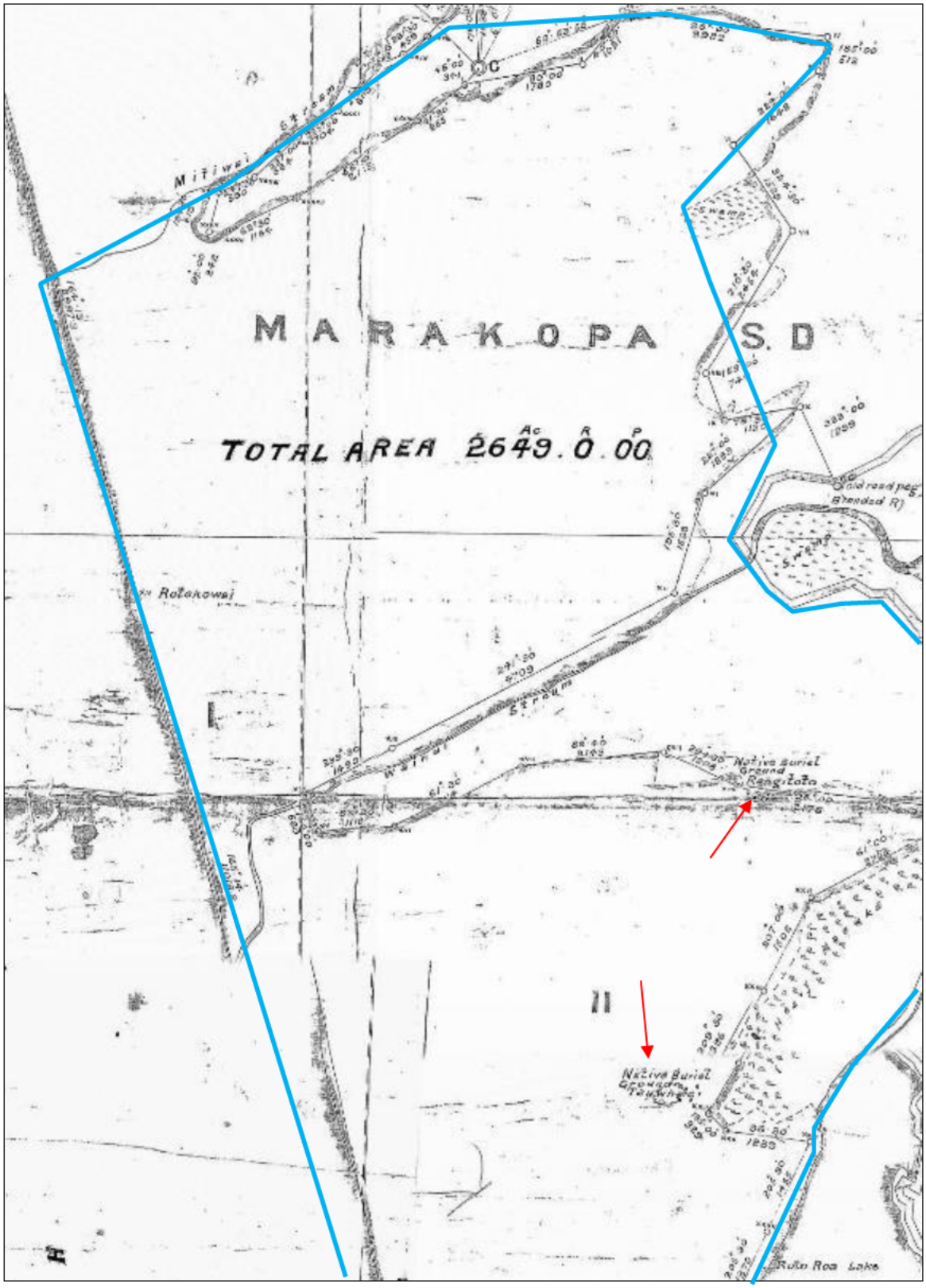

Figure 9. Close-up of project area on DP 7809 dated 1910 (LINZ), showing Rangitoto and Tauwhare urupā (red arrows), with approximate extent of mining boundaries in blue

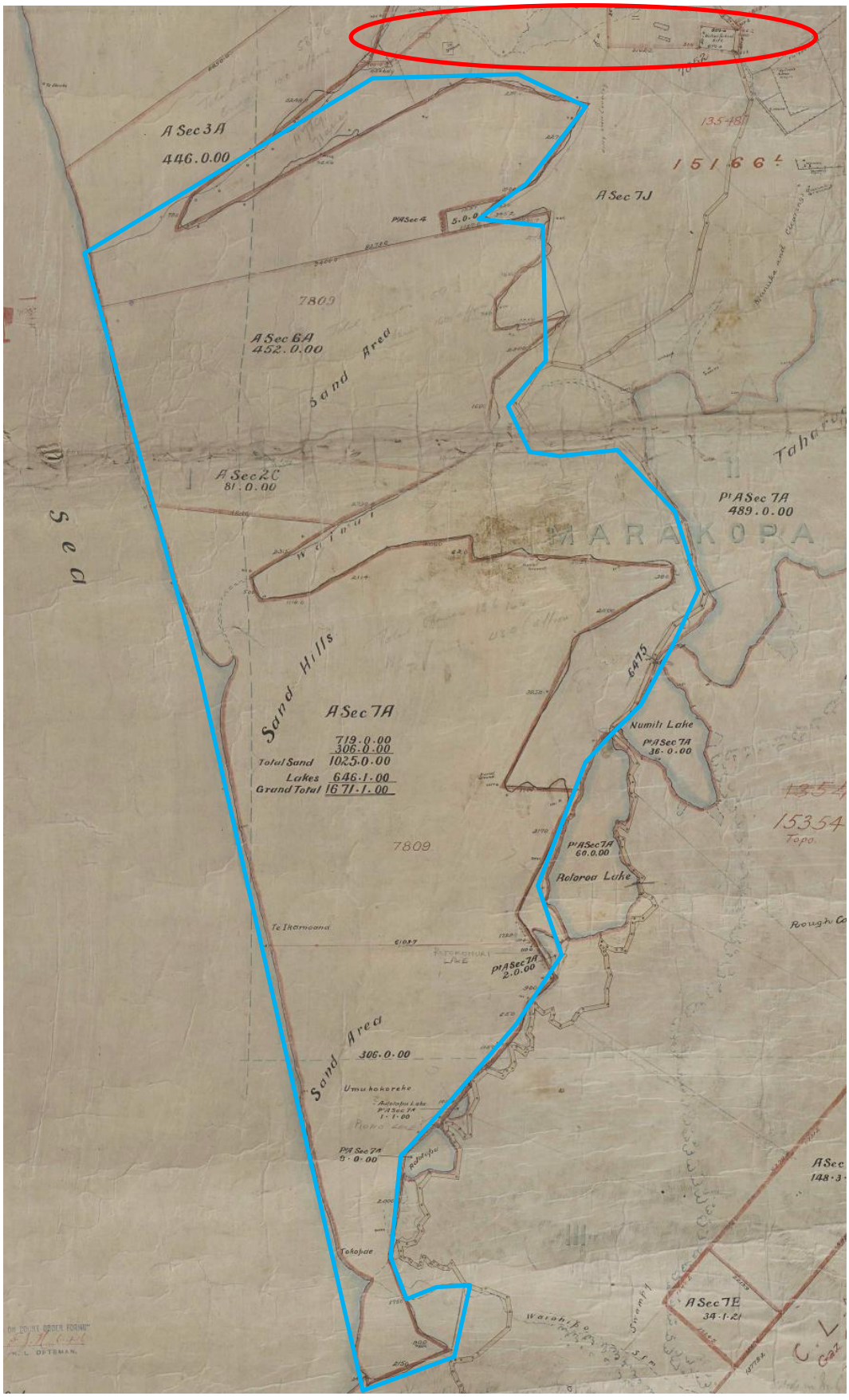

Figure 10. ML 9601 dated 1916, with area of houses, gardens and orchard near Mitiwai Stream circled in red (LINZ), approximate extent of the Central and Southern Block in blue

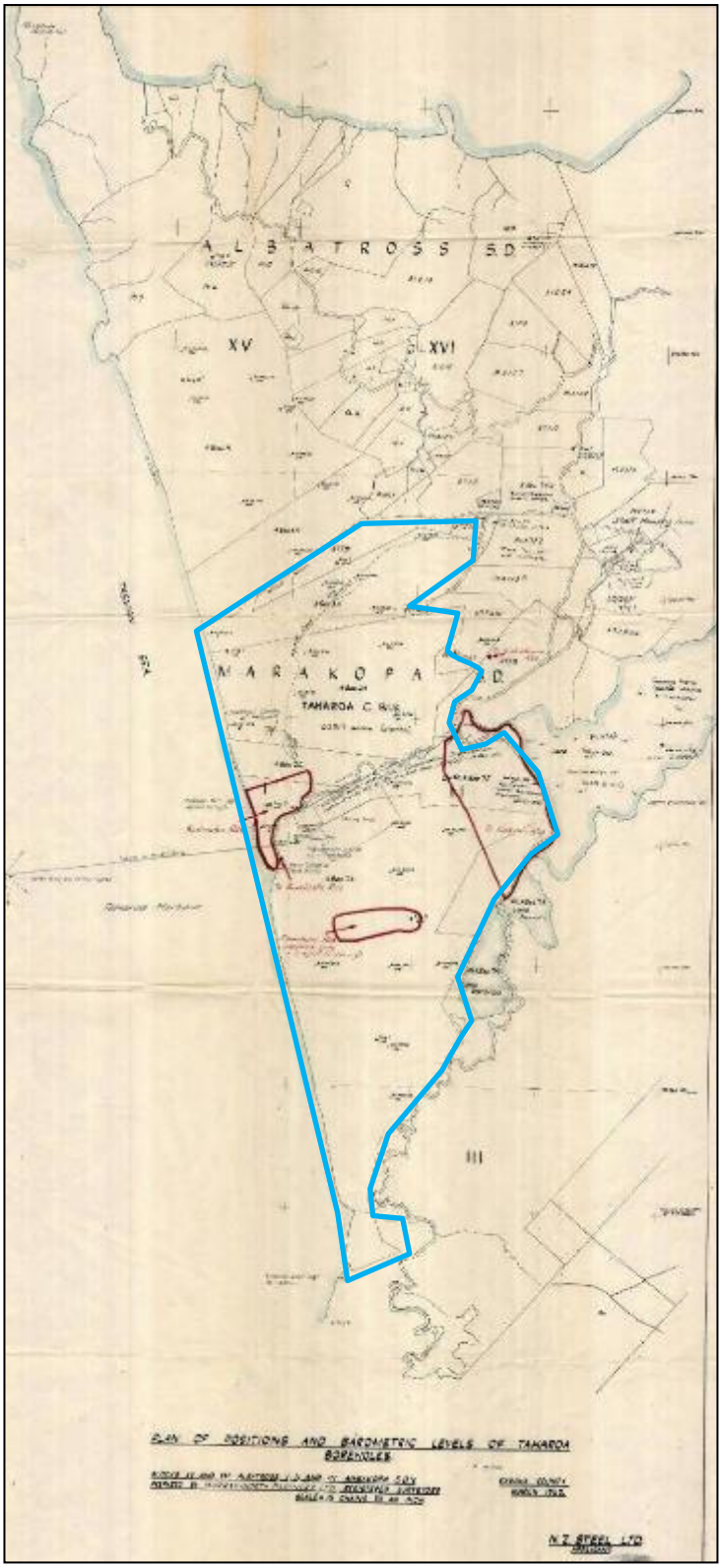

Figure 11. Reserve designation (red outlines) on NZ Steel Plan (dated 1969), showing the positions and barometric levels from boreholes, supplied by C. van Oosterom, with project area indicated in blue

Information from Aerial Photographs

Aerial photographs of the area show the natural and human-induced modifications that have occurred from the 1940s onwards, and are shown below with the recorded locations of archaeological sites overlaid.

In 1944 (Figure 12 and Figure 13) there is very little human modification of the dune environment, with no buildings or permanent vehicle tracks visible. Away from the dune environment there are cultivations, homes and community buildings present around the settlement of Taharoa. The dune environment is a combination of open active dunes and scrubby bush, with areas of bush most intact near the Mitiwai and Wainui Streams, and around the edges of the lakes.

In 1961 (Figure 14 and Figure 15) there were still no permanent markers of human modification across the dunes, although the vegetation cover had reduced fairly substantially, particularly along the coastline.

By 1974 the first impacts of the iron sand mining process are visible. A main access road with other connecting roads have been formed through the Central Area, with a small heliport facility (Figure 16). The Wainui Stream has been modified, through partial damming, as the stream alignment has changed and there are larger bodies of water along its length. In the Southern Area (Figure 17) the main mine facility has been constructed, with the dredge forming deep pits as it works to the east. The overall level of vegetation cover appears to have reduced even further.

There are few major differences between the 1974 and the 1976 aerials, apart from showing the speed at which the dredge moved through the landscape. The inland side of the active pit in 1976 is nearly 500m further inland from the face in 1974 (Figure 18 and Figure 19). Some additional structures have been erected at the heliport and around the main facility. Extended coverage further to the south also reveals the presence of a landing strip, with a plane parked nearby.

By 1983 the mining facility had been expanded, with some additional access roads to structures in the Southern Block (Figure 20). The mining dredge has extended its area of activity far to the east. The Central Block appears to be largely unmodified, but the aerial photograph is from a high altitude and the resolution is not great, however it is possible that forestry planting had been undertaken (Figure 21).

The plantation forest is clearly visible by 1997, with the growth of the vegetation the only visible change across the Central Area (Figure 22). The Southern Area, however, has seen substantial change (Figure 23). Plantation forestry has grown in some areas, particularly in the northern portion, along with the formation of a lake. This lake is still present today, and is likely that it is the remains of a dredging pit. The main dredging focus has shifted further to the south where a substantial area has been modified, with multiple access roads created to service this area.

By 2001 it appears harvesting of the forestry has begun, along with a small area of mining in the Central Area (Figure 24). In the Southern Block dredging and dry mining have extended across a large portion of the southern half of the Southern Area (Figure 25). The former landing strip appears to have been converted into an access road, with some other structures erected in the vicinity of the active mining area. Some additional areas of forestry have been planted within the Southern Block.

By 2013 the greater portion of the forestry within the northern area of the Central Block had been harvested, with mining having extended through the middle of the block (Figure

26). Associated structures and infrastructure had also been developed. In the Southern Block large areas of forestry were maturing across the formerly mined areas, with little active mining occurring across the block at that time (Figure 27).

By 2023 the plantation forestry in the Central Block had been harvested and mining operations were continuing, with dry mining, dredging pits and tailings piles all present (Figure 28). The Southern Block has also seen the development of further mining and tailings area, with the plantation forestry maturing along the eastern side (Figure 29).

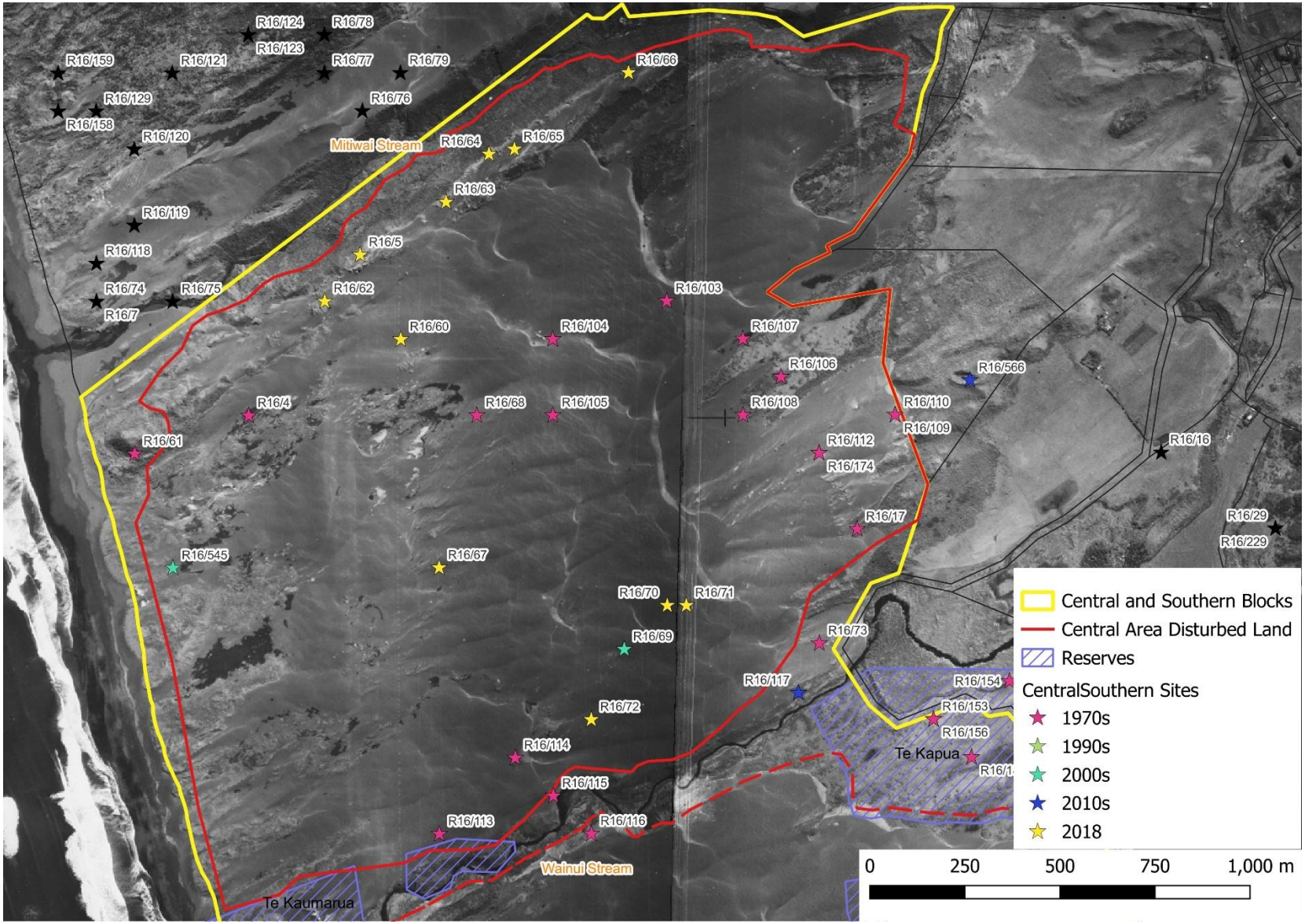

Figure 12. Georeferenced 1944 aerials in relation to the Central Area (source: Retrolens: SN266 847 2, 4, 849 2), with recorded sites marked by decade last visited

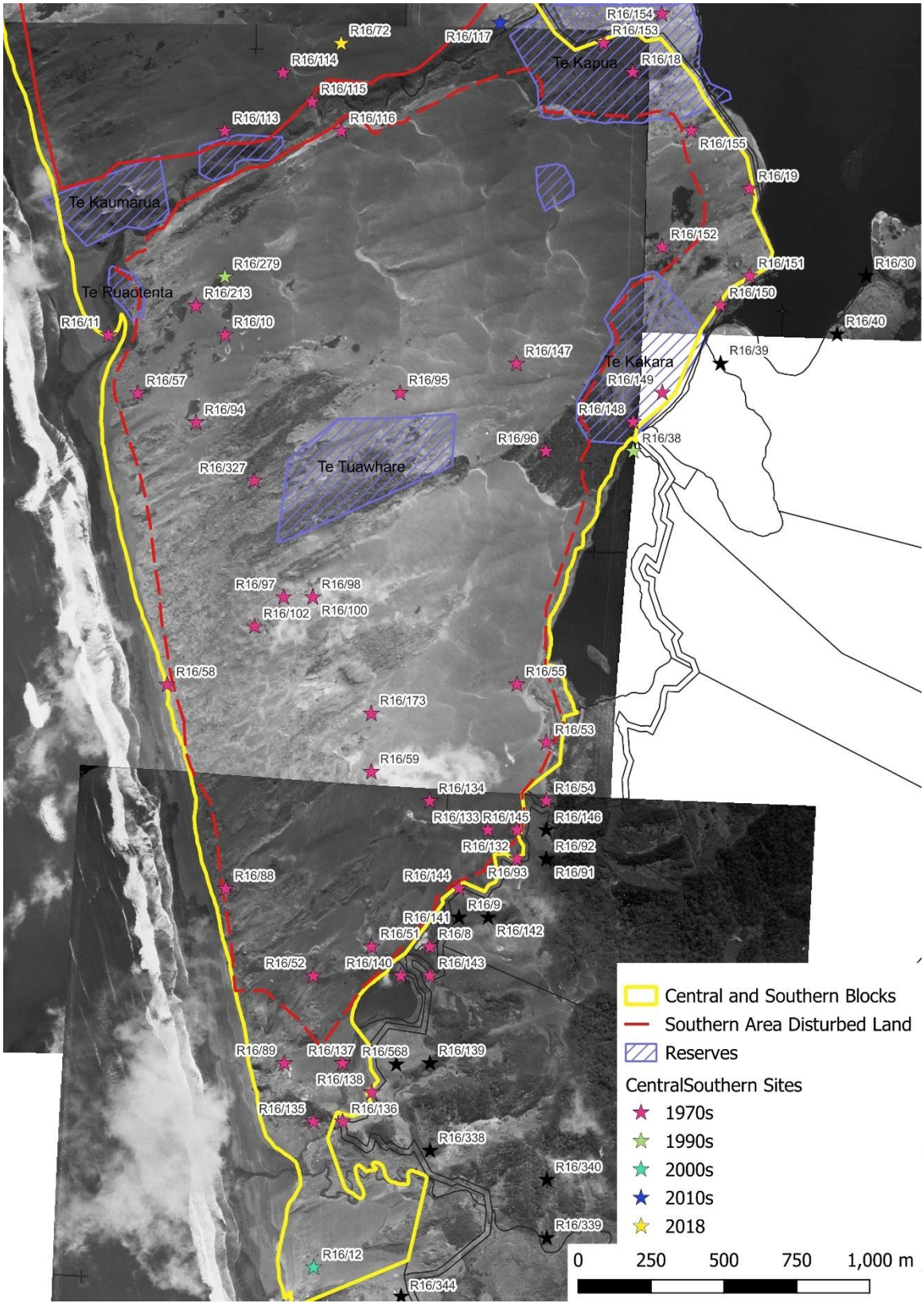

Figure 13. Georeferenced 1944 aerials in relation to the Southern Area (source: Retrolens: SN266 847 2, 4, 848 2, 849 2), with recorded sites marked by decade last visited

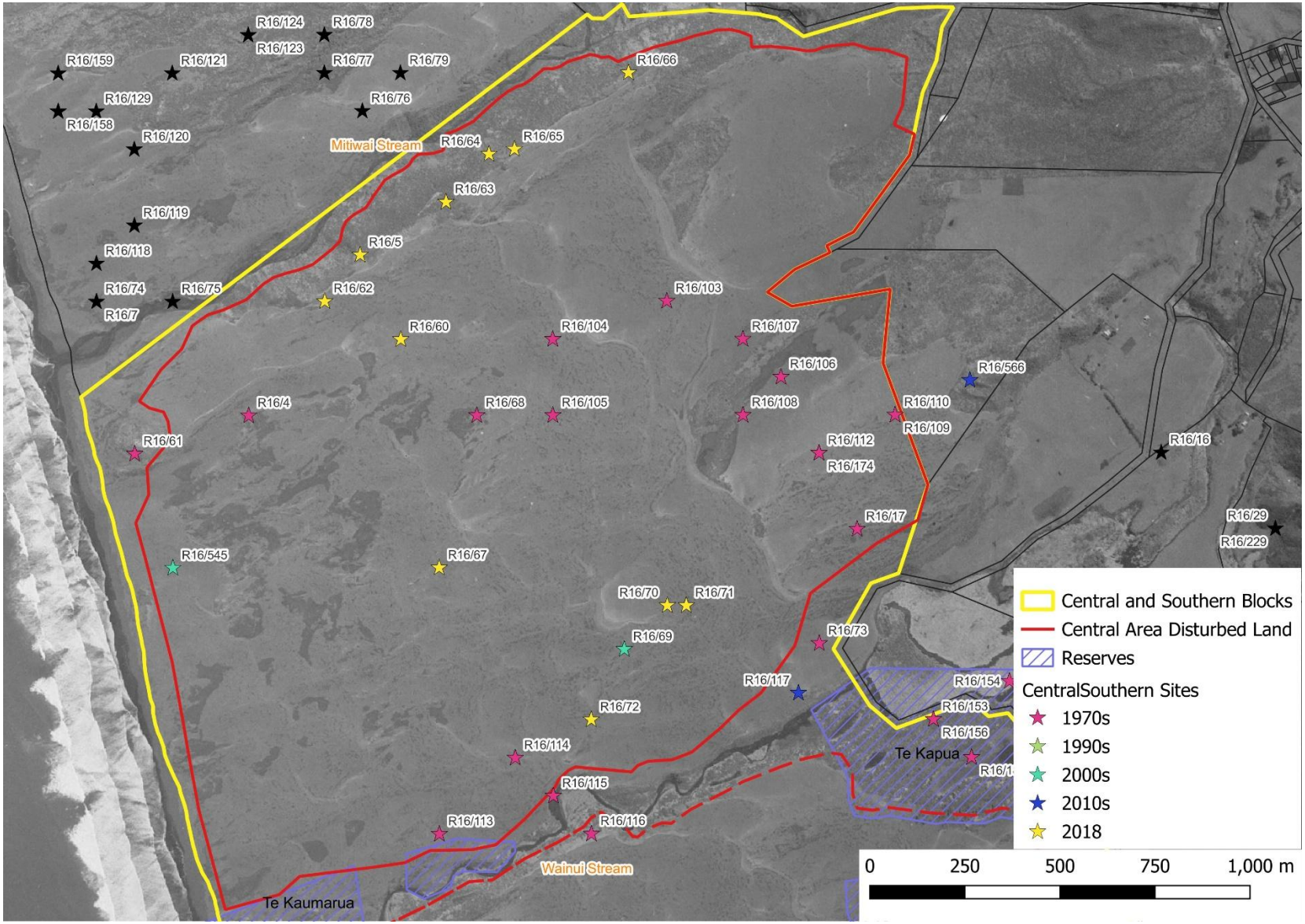

Figure 14. Georeferenced 1961 aerials in relation to the Central Area (source: Retrolens: SN1039 2624-1, 2625-2), with recorded sites marked by decade last visited

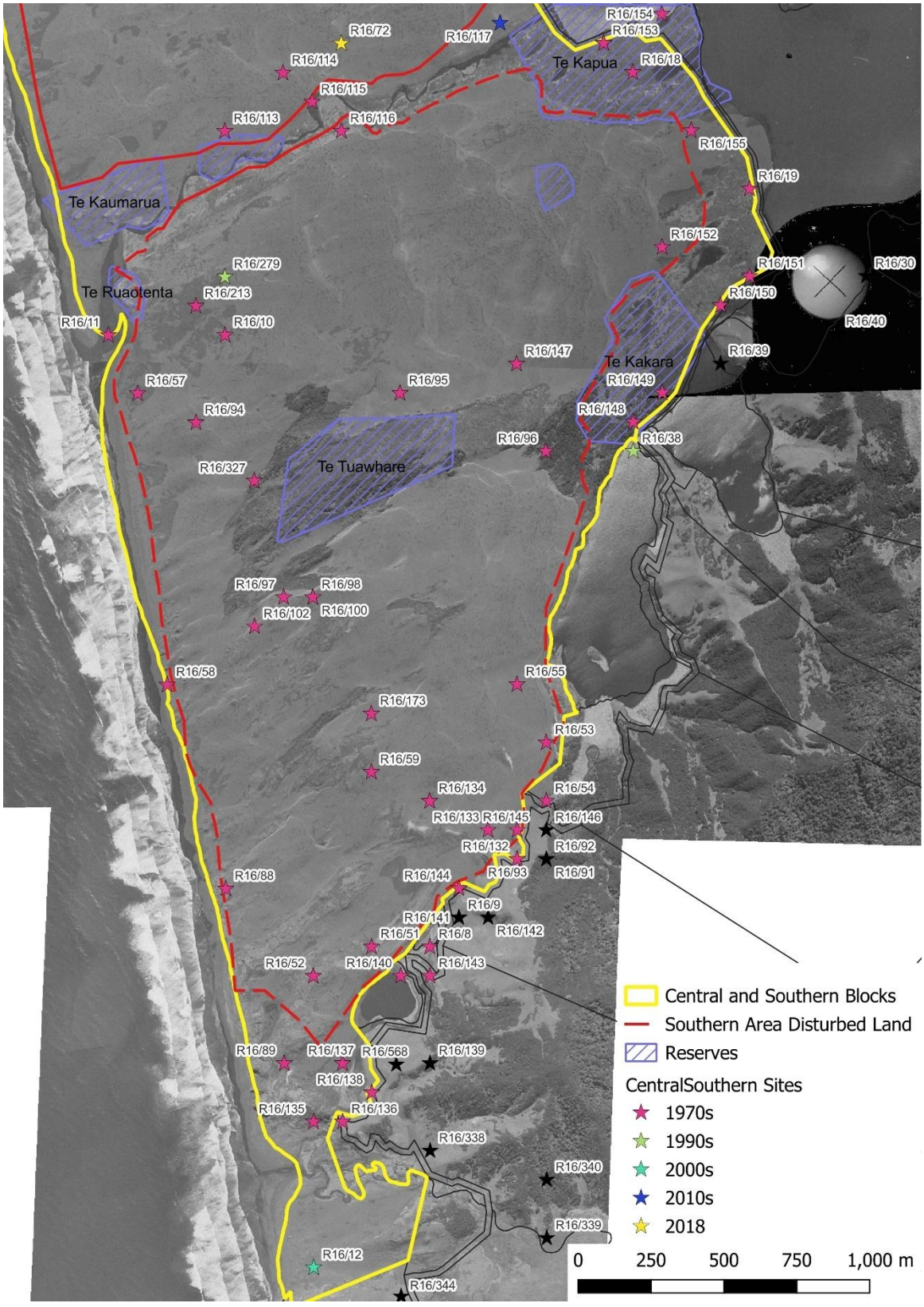

Figure 15. Georeferenced 1961 aerials in relation to the Southern Area (source: Retrolens: SN1039 2624-1, 2625-2), with recorded sites marked by decade last visited

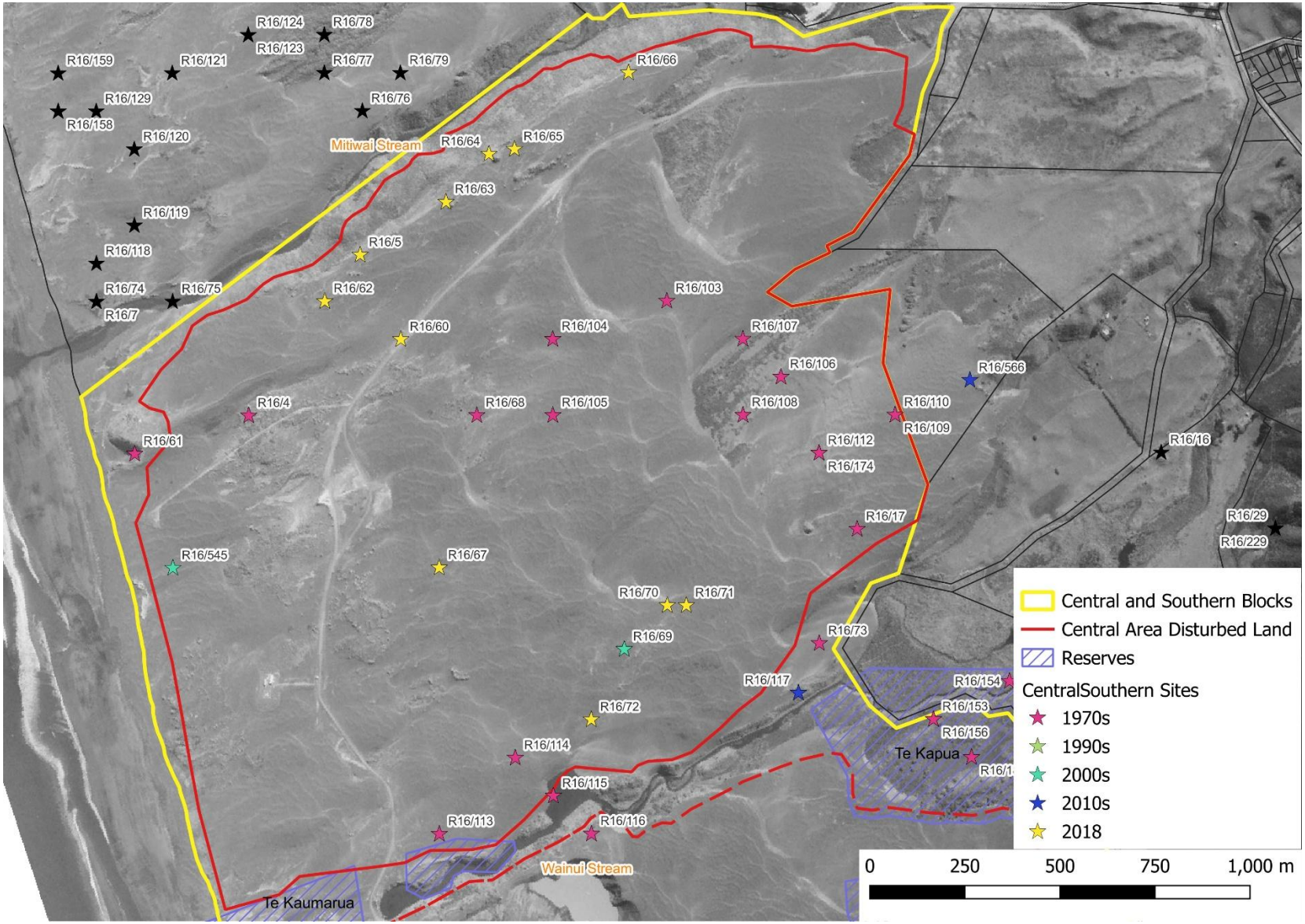

Figure 16. Georeferenced 1974 aerial in relation to the Central Area, with recorded sites marked by decade last visited

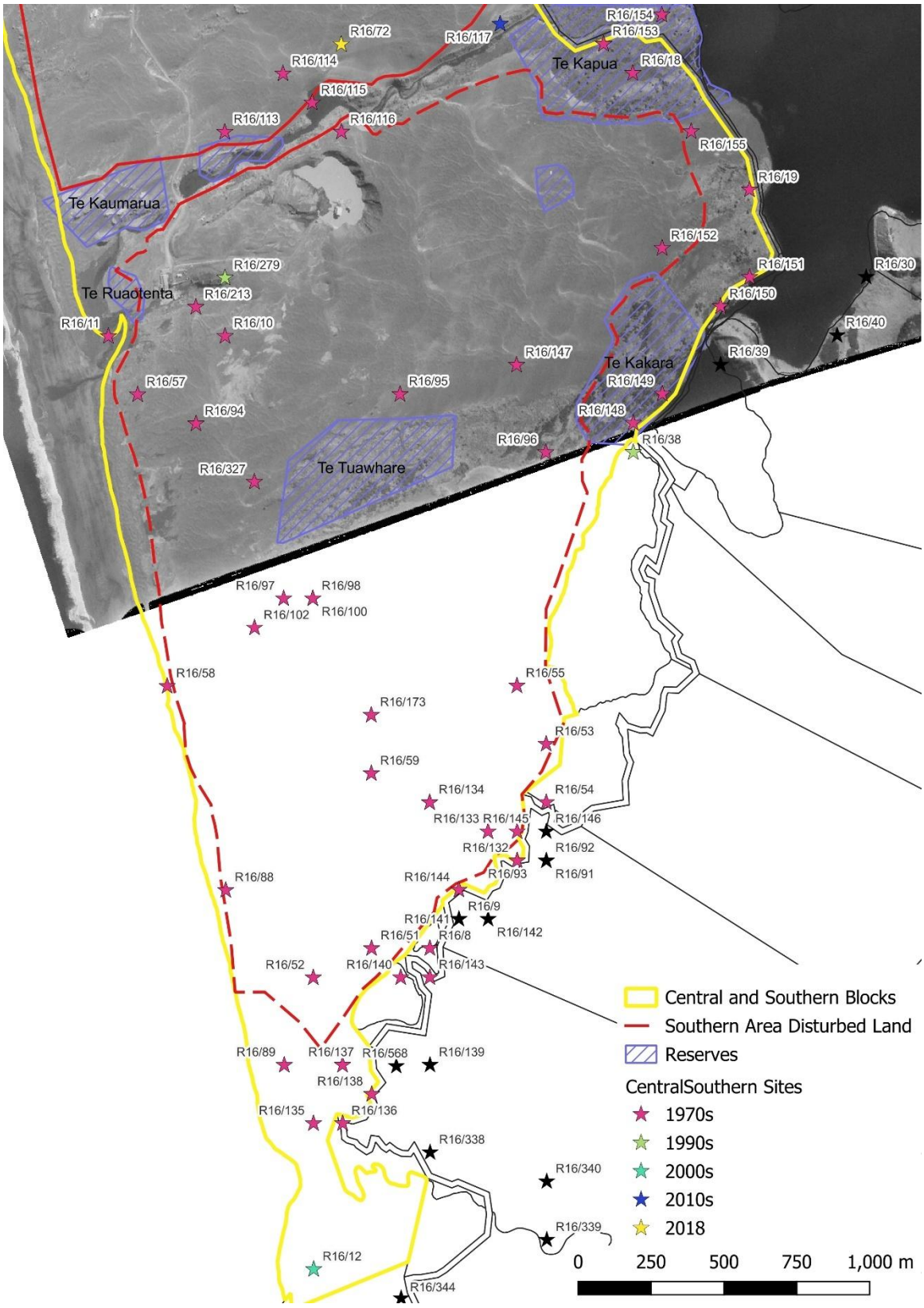

Figure 17. Georeferenced 1974 aerial in relation to the Southern Area (source: Retrolens: SN3730 E-1), with recorded sites marked by decade last visited

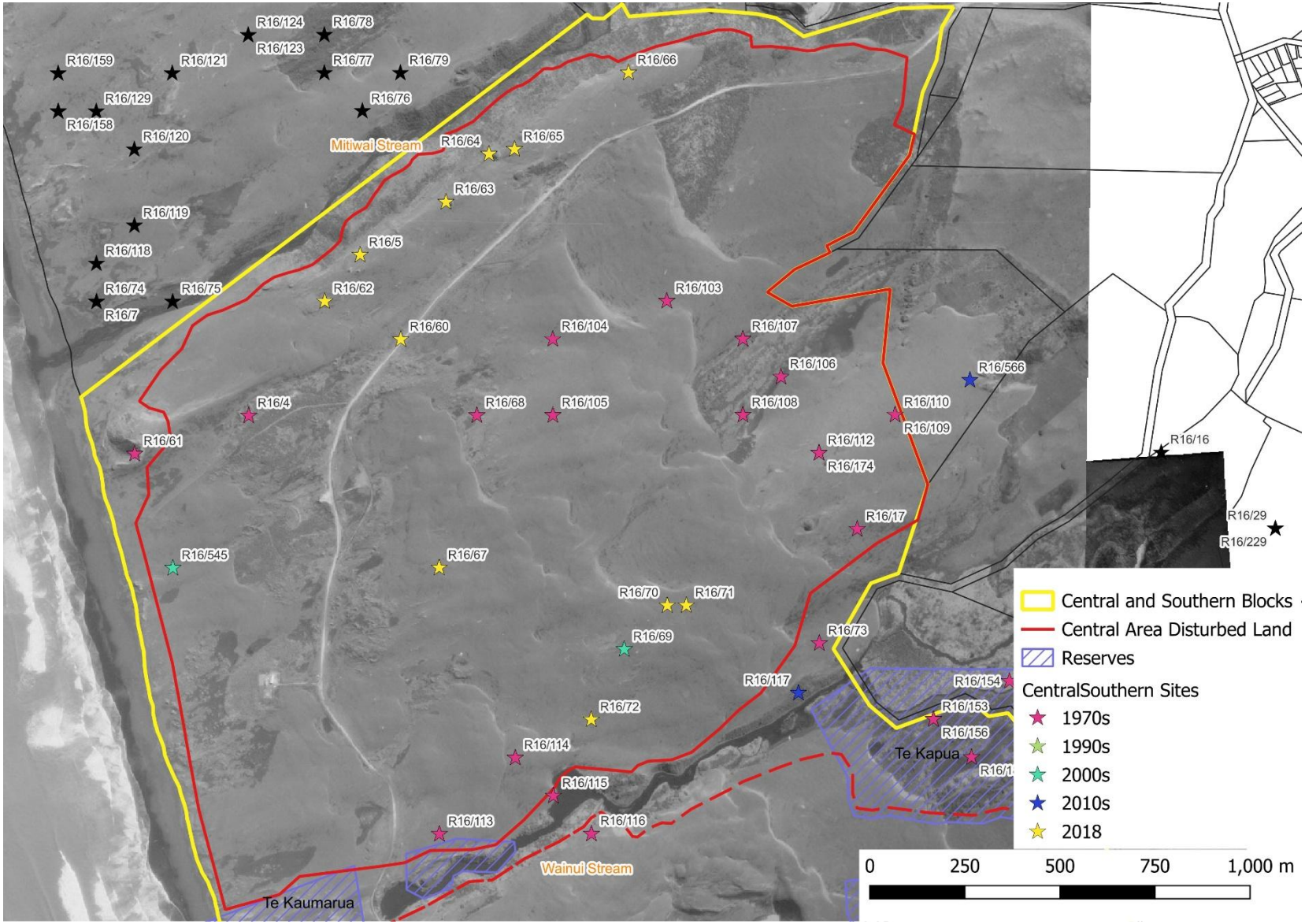

Figure 18. Georeferenced 1976 aerials in relation to the Central Area (source: Retrolens: SN2974 A-2, B-1), with recorded sites marked by decade last visited

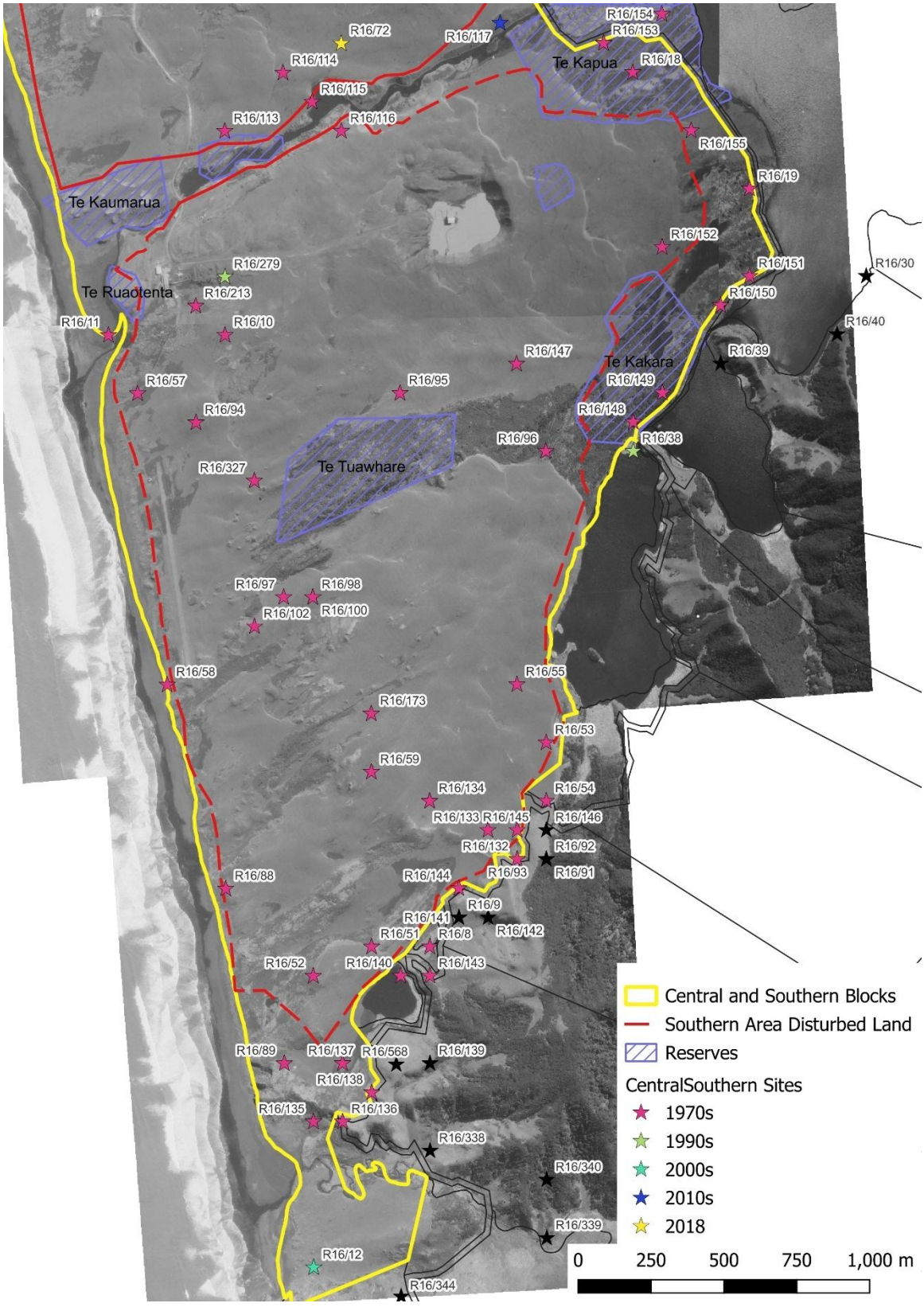

Figure 19. Georeferenced 1976 aerials in relation to the Southern Area (source: Retrolens: SN2974 A-2, B-1), with recorded sites marked by decade last visited

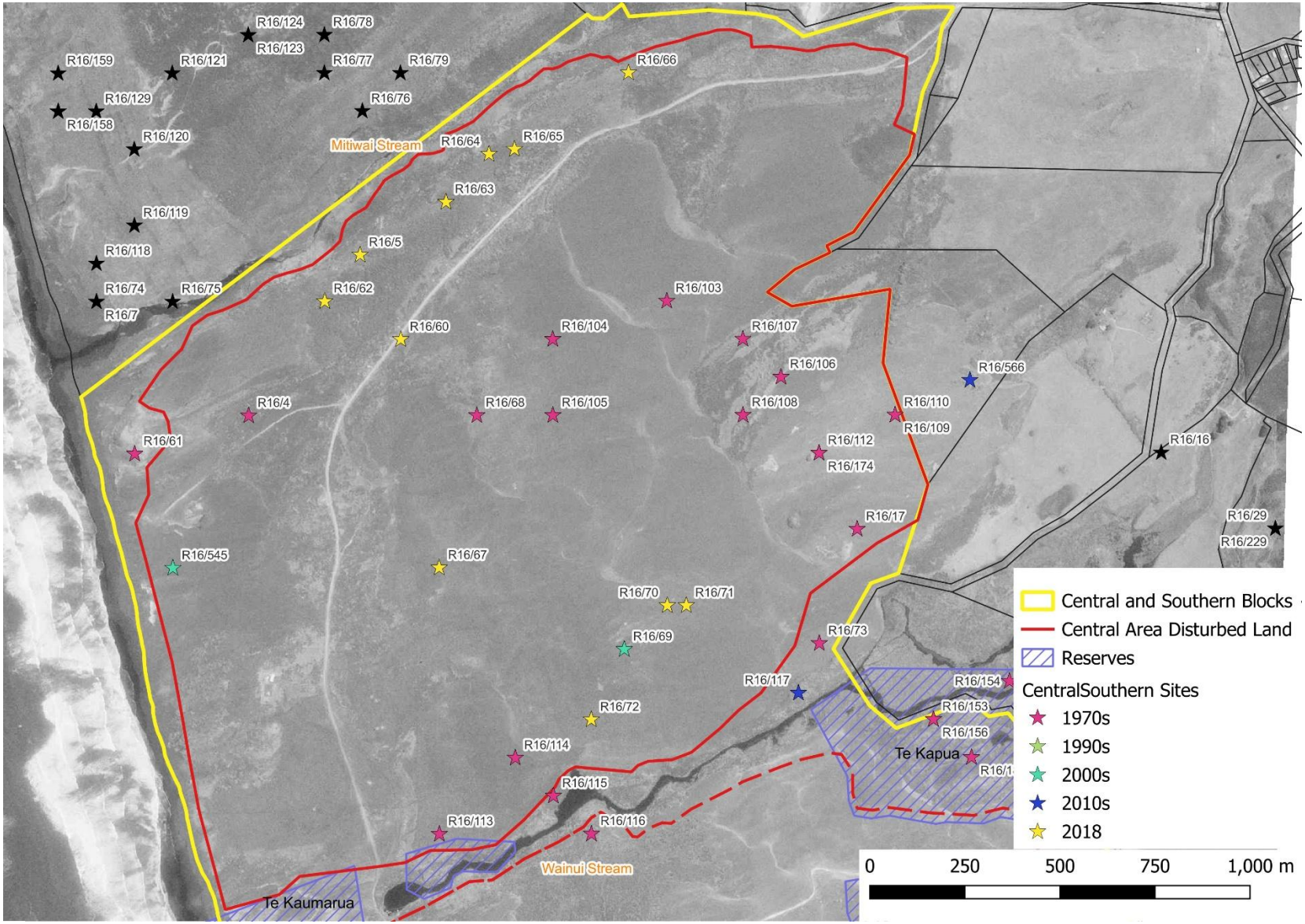

Figure 20. Georeferenced 1983 aerial in relation to the Central Area (source: Retrolens: SN8166 A-3), with recorded sites marked by decade last visited

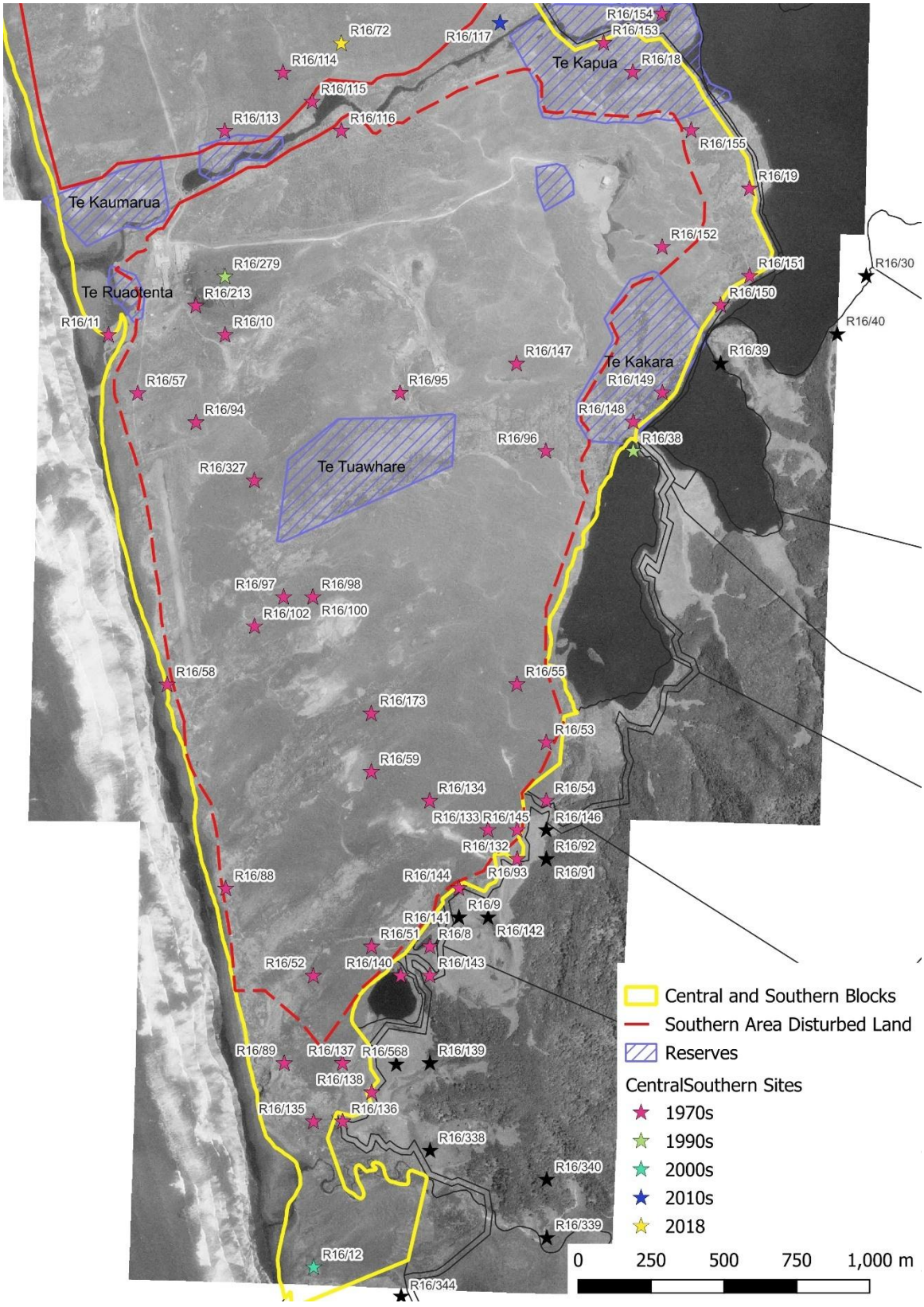

Figure 21. Georeferenced 1983 aerial in relation to the Central Area (source: Retrolens: SN8166 A-3), with recorded sites marked by decade last visited

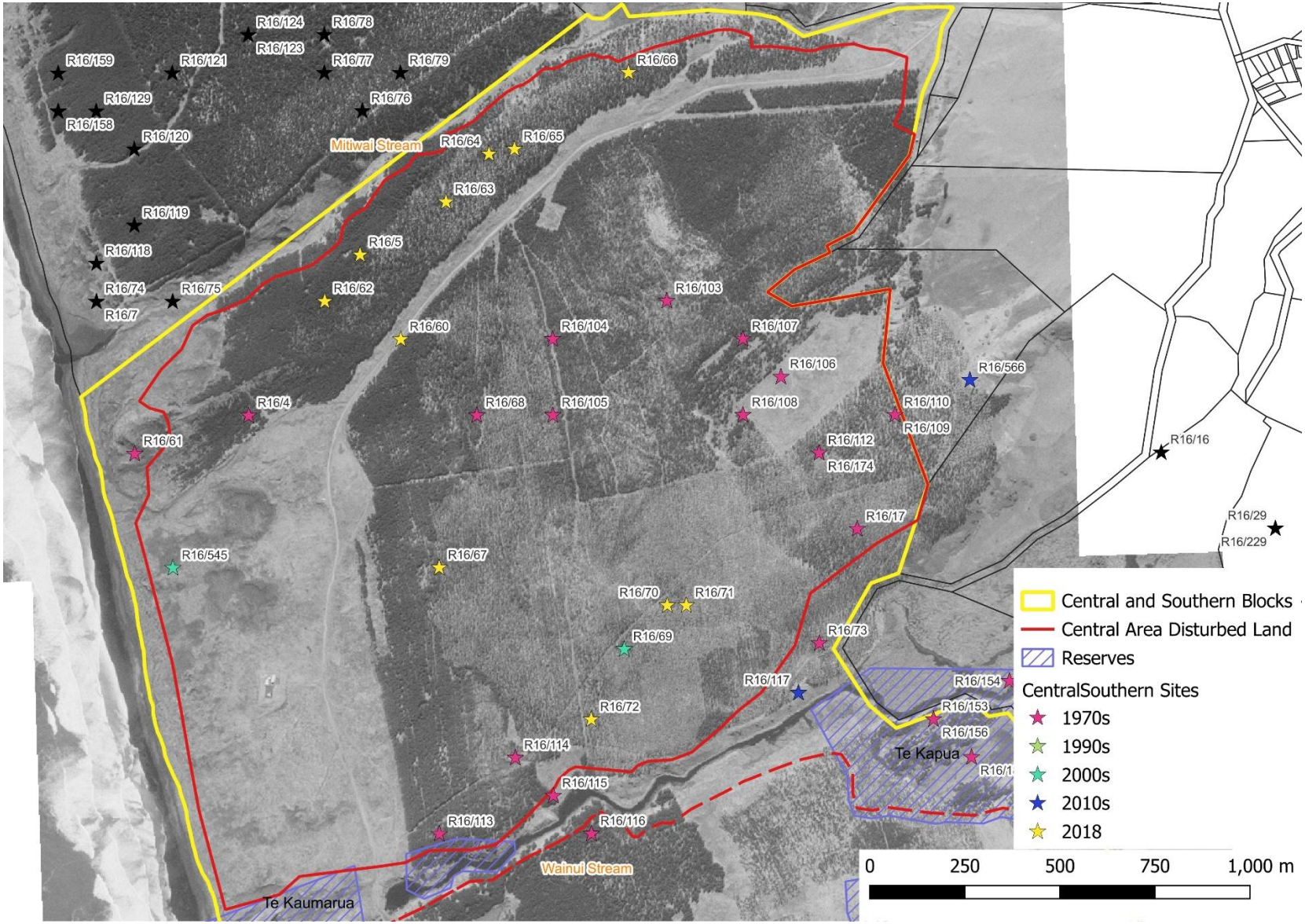

Figure 22. Georeferenced 1997 aerial in relation to the Central Area (source: Retrolens: SN9615 M-3), with recorded sites marked by decade last visited

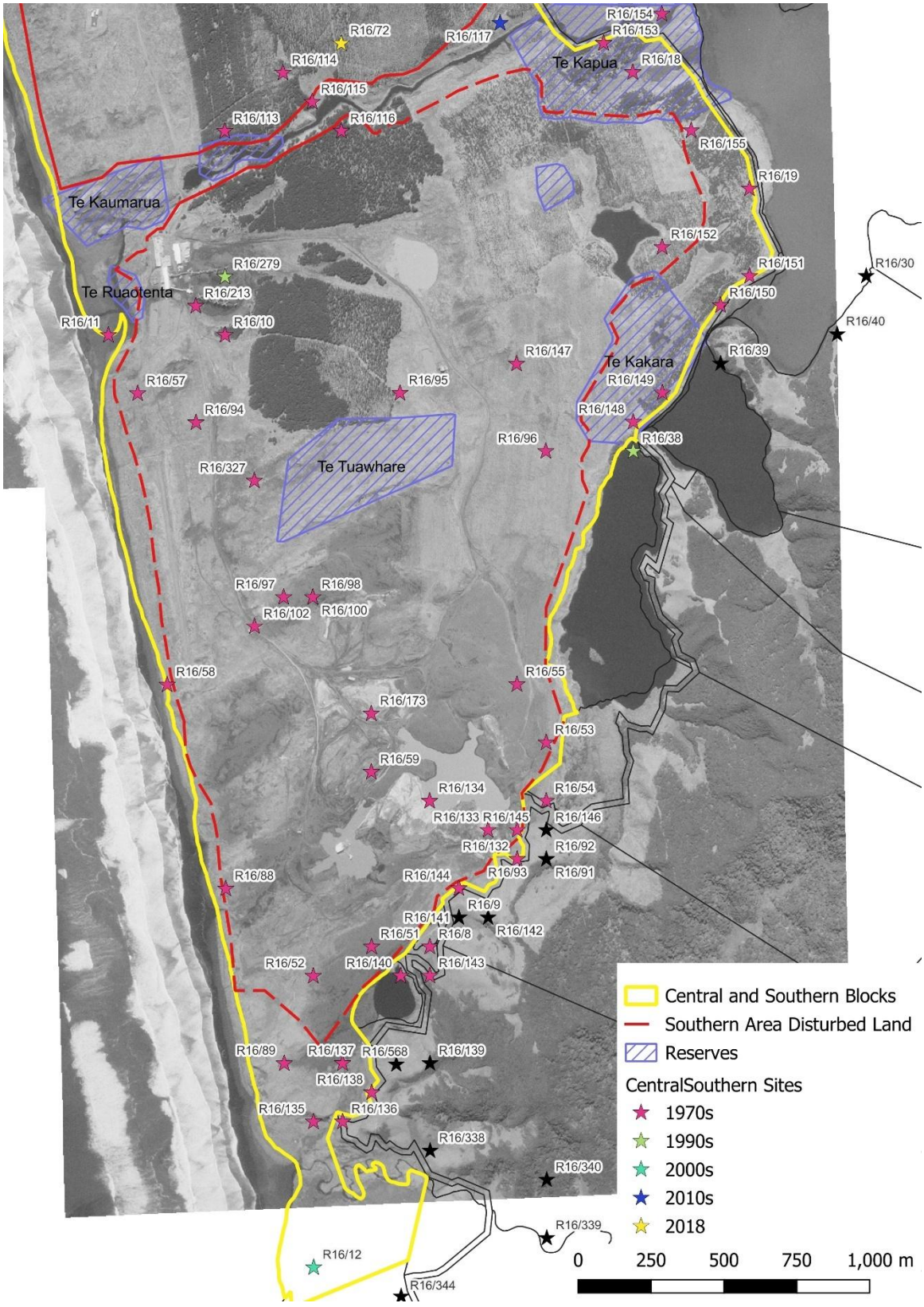

Figure 23. Georeferenced 1997 aerial in relation to the Southern Area (source: Retrolens: SN9615 M-3), with recorded sites marked by decade last visited

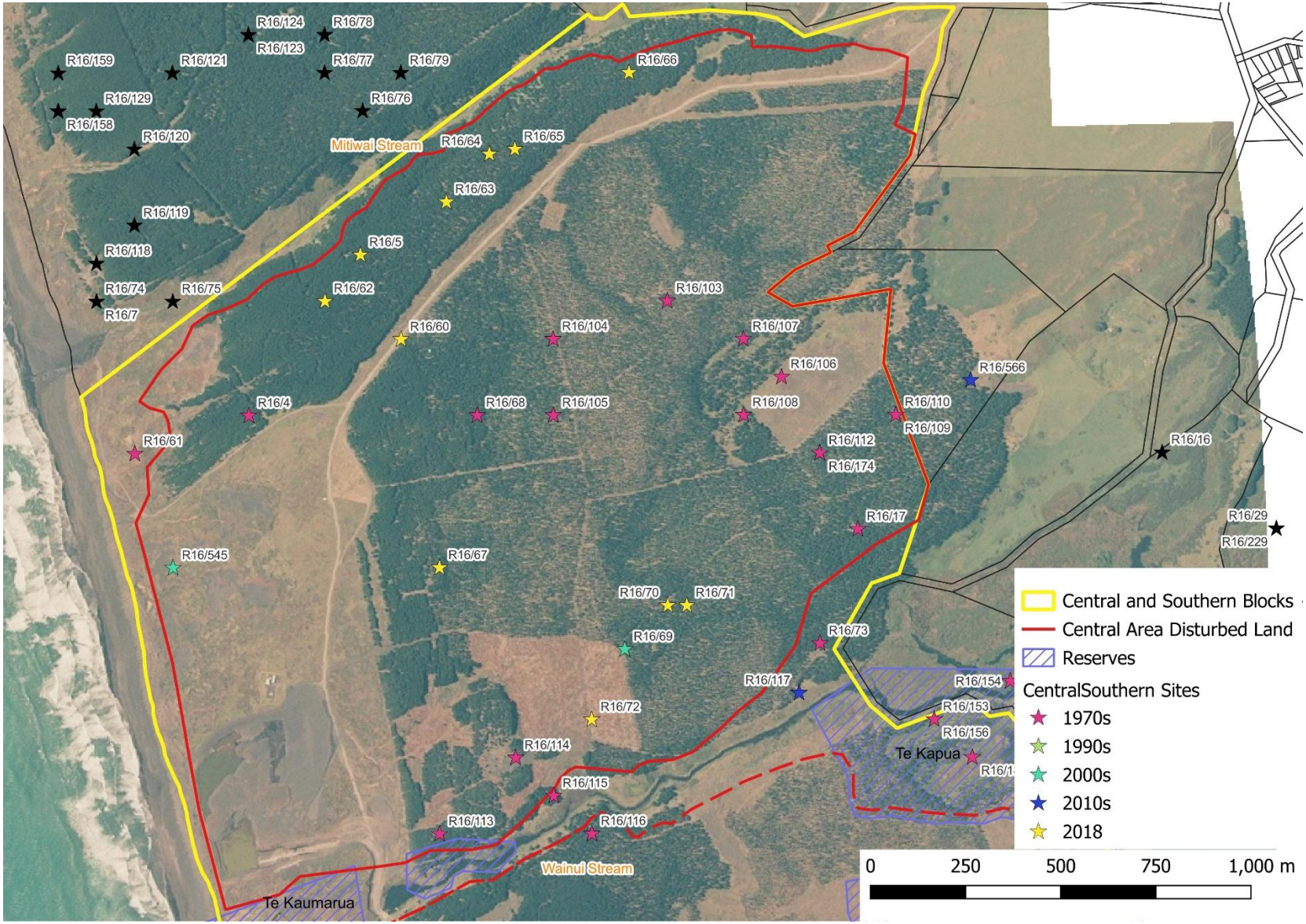

Figure 24. Georeferenced 2001 aerial in relation to the Central Area (source: Retrolens: SN5043 B-1), with recorded sites marked by decade last visited

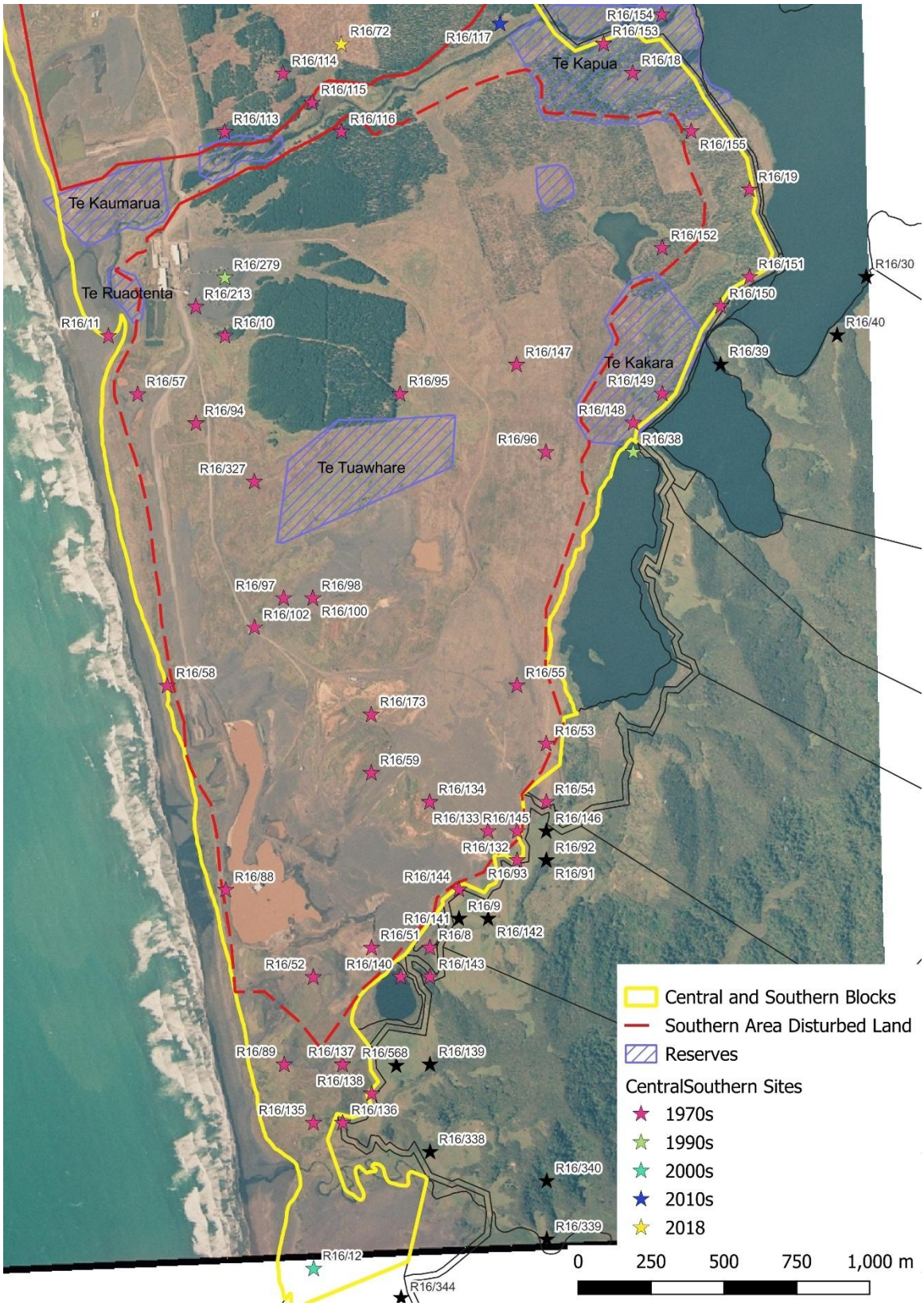

Figure 25. Georeferenced 2001 aerial in relation to the Southern Area (source: Retrolens: SN5043 B-1), with recorded sites marked by decade last visited

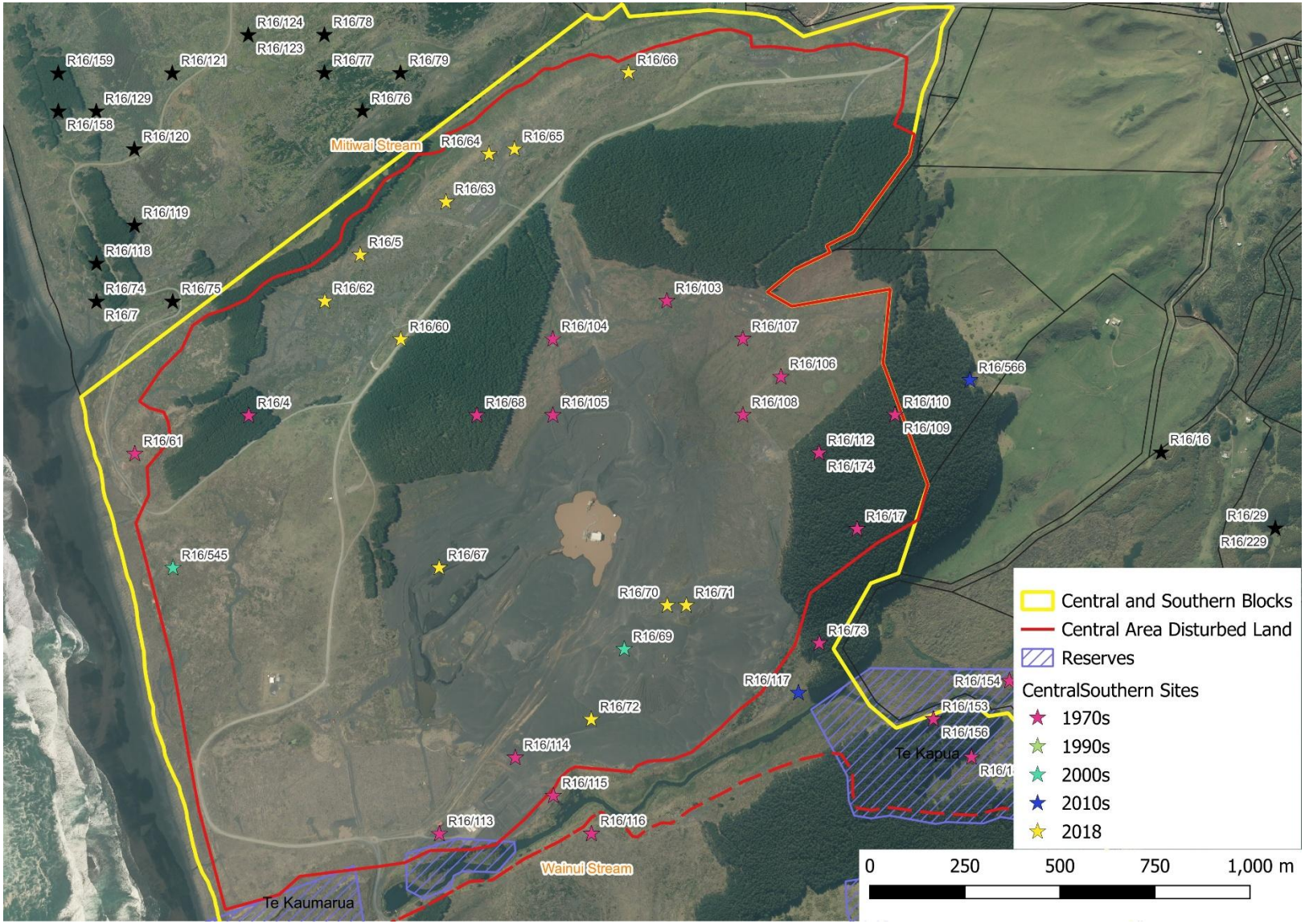

Figure 26. Georeferenced 2013 aerial in relation to the Central Area (source: LINZ: Waikato 0.5m Rural Aerial Photos), with recorded sites marked by decade last visited

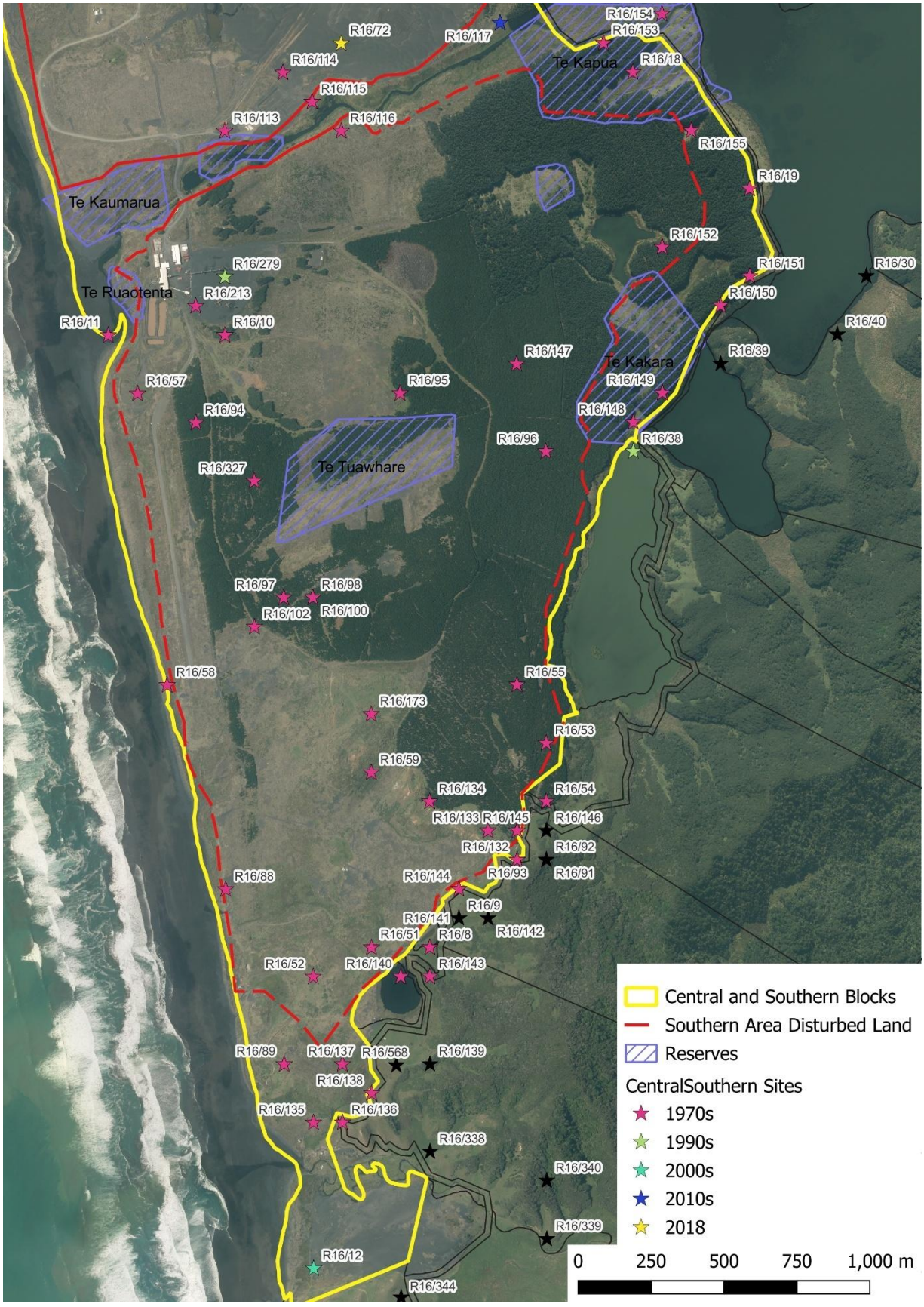

Figure 27. Georeferenced 2013 aerial in relation to the Southern Area (source: LINZ: Waikato 0.5m Rural Aerial Photos), with recorded sites marked by decade last visited

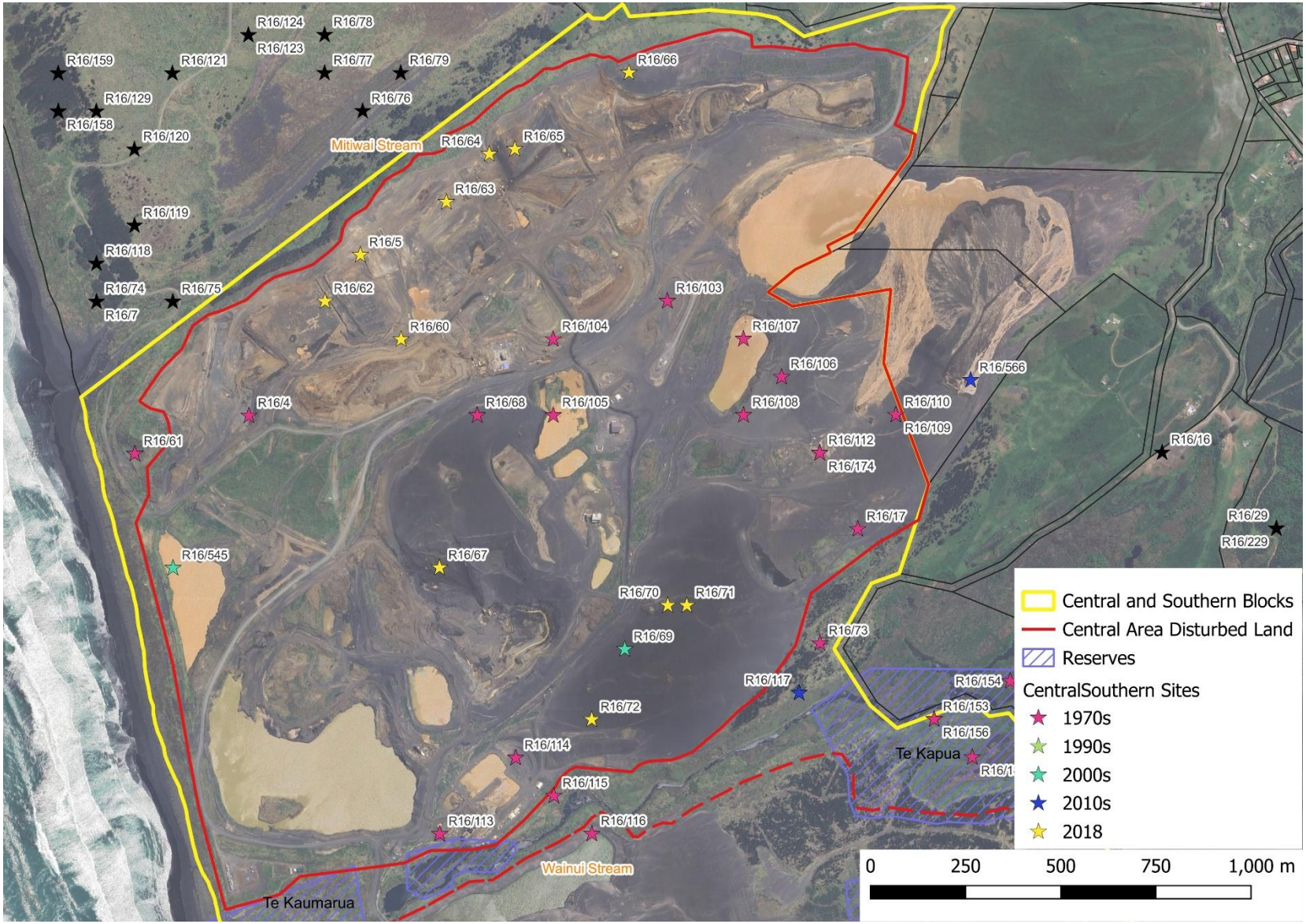

Figure 28. Georeferenced 2023 aerial in relation to the Central Area (source: Google Earth), with recorded sites marked by decade last visited

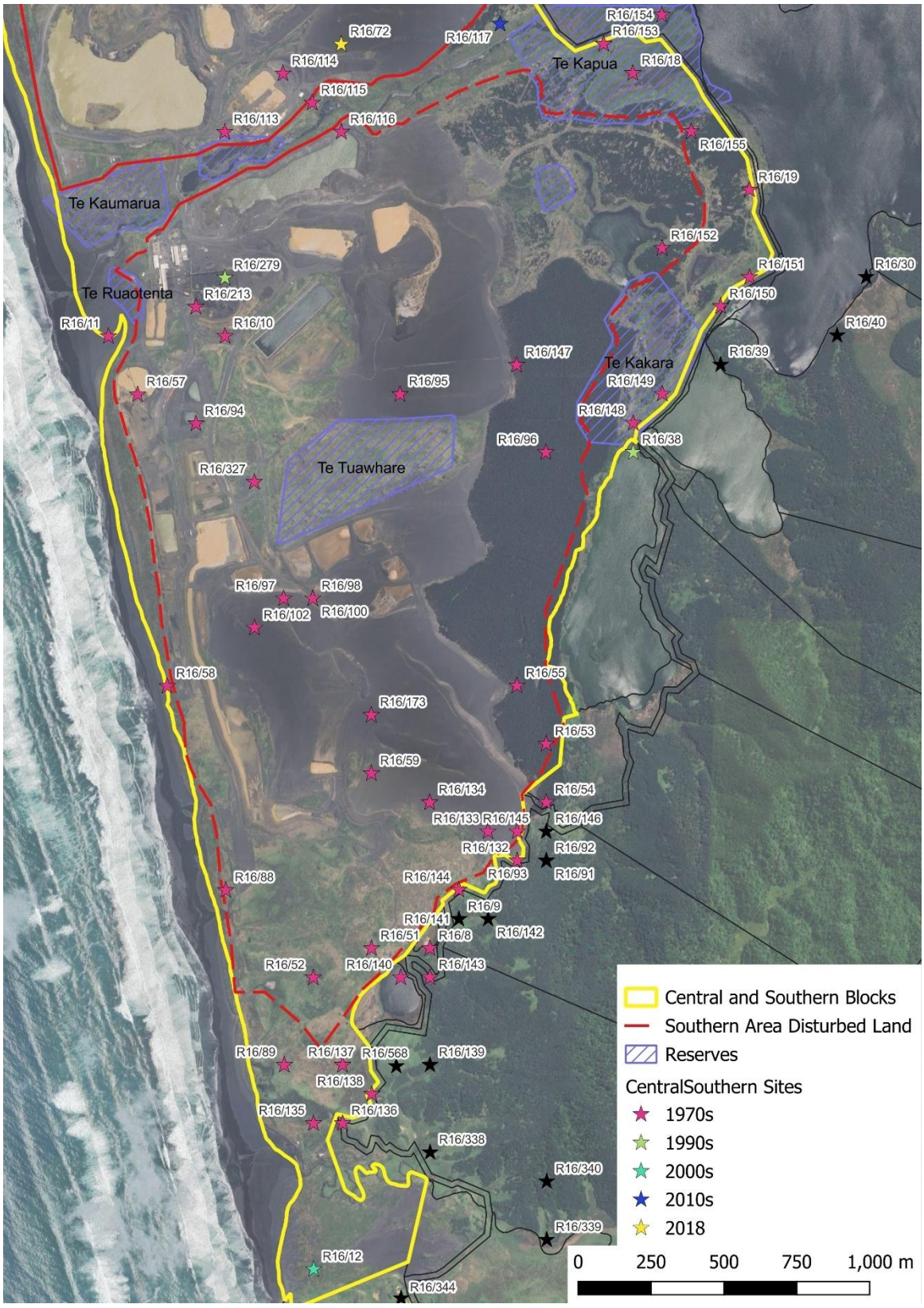

Figure 29. Georeferenced 2023 aerial in relation to the Southern Area (source: Google Earth), with recorded sites marked by decade last visited

ARCHAEOLOGICAL BACKGROUND

Previous Archaeological Work

Early archaeological investigations within the Taharoa area were undertaken by Jim McKinlay around the mouth of the Wainui Stream in 1970-72. McKinlay's work largely focussed on the excavation of a number of pits and associated habitation locations (R16/10 and R16/279). However, as Wilkes (1994) notes, McKinlay's notes were neither fully written up nor published. Wilkes does reference an unpublished and unfinished typescript prepared by McKinlay which he appears to have read, however it is unclear what happened to that document. The site record forms indicate that R16/10 consisted of a number of shallow pits along a ridge, with a large shell midden. Artefacts such as chert, obsidian and an argillite adze were also present. R16/279 was a midden and lithic working floor, with obsidian, chert and greywacke flakes present. Several radiocarbon determinations were produced from this excavation.

Subsequent excavations were undertaken by Harry Allen in 1976, prompted largely by the discovery of human remains and habitation material (Bulmer 1978). This work also appears to have never been published, although site record forms R16/94 and R16/327 reference a 1977 report by Allen on these works, this has not been able to be sourced (Allen, H. May 1977. Archaeological Sites in Taharoa Ironsands Deposit: Report and Recommendations.). Clues from the site records indicate that he examined at least four areas, two of which were part of R16/94, and another at R16/327. The location of the last is unclear. Allen's work identified Taharoa to be of considerable archaeological interest, and the future impact of iron sand mining upon these sites resulted in a more in-depth archaeological survey by Susan Bulmer in 1978.

It was Bulmer's project that saw much of the archaeology of the area recorded during a survey of the Taharoa C Block, carried out by the University of Auckland in 1978 (Bulmer 1978). The drivers of the survey were the recognition of the numbers of sites, their size and apparent antiquity coupled with the knowledge that all of the sites were to be completely destroyed. In all, 129 sites relating to Māori occupation were recorded, ranging from discrete midden sites to the remains of pā and larger settlements. There were indications that some of the sites might relate to the 'archaic' or early period of settlement in New Zealand. The density of sites is a reflection of the resources of the area, in particular the extensive lakes, wetlands, streams and ocean that would have supported a considerable population. Bulmer points out that all of the sites are continually subjected to the unstable environment of the dune system; the lighter organic elements such as charcoal and probably fishbone being blown away, while the heavier constituents of stone and shell gradually form deflated concentrations. It was also suggested that the extent and antiquity of the deposits could provide important archaeological information regarding the settlement of the area (Bulmer 1978).

A later survey by Owen Wilkes (1994) reviewed the Taharoa sites and noted that many had been destroyed during the mining process. His survey identified a continuous pattern of settlement, with most sites being located with 1km of the coast. Wilkes notes a major difficulty in using the old records, with large discrepancies between the old one mile to the inch map grid and then 1:50,00 map grid he was using. The discrepancies were generally in the order of 200m out, but in some cases differences of 800m were noted. Subsequent surveys for the mining activity have continued to document the disappearance of archaeological sites at Taharoa. These include surveys around the Mine site (Clough 2000,

2001, 2003; Baquié et. al. 2008; Baquié and Clough 2011; Bickler et al. 2015) and in the wider area (Clough 2005).

In the Taharoa sandhills (segments 109-116) about 117 sites were discovered by Bulmer and others in about 13 square kilometres of sand-dune country. The average site density here was therefore about 8.5 sites per square kilometre, or about three times the overall average of 2.5 sites per square kilometre in the rest of the study area. Assuming for the moment that this country was no more attractive for Māori settlement than other areas of the coast, then the higher site density here is presumably due to a higher than usual proportion of sites being rendered visible, thanks to wind erosion. Supporting this conclusion is the fact that normally visible site types, in particular fortified sites and storage sites, were not found in greater numbers in and near the sandhills than on the rest of the coastline. It is only the usually less visible site types – undefended habitations, middens, etc – which were recorded at much higher densities in the Taharoa area. However, it is of course possible that the original site density here was higher than is usual along the King Country coastline, being made more attractive by the several lakes and wetlands along the inland edge of the sand dunes.

Even after clearance of the pine trees in 2001 and 2003 none of the recorded sites in the Taharoa C Block could be identified, although a few shells were noted exposed in the dunes. Baquié et al. (2008) did find remnants of one site (R16/69), which had once been a large site but consisted then only of deflated debris. A resurvey carried out in 2013 for mine expansion (Bickler et al. 2015) indicated that very few of the recorded sites remained intact due to dune deflation, forestry activity and mining, and only three previously identified sites were relocated (R16/63, R16/64 and R16/117). A new site, consisting of possible pit features (R16/566) was also recorded just outside the mine site area to the east.

The original site descriptions suggested that more permanent settlement had been around the lakes, while sites closer to the coast and within the mining lease area were predominantly midden and probably more short-term in nature (Bickler et al. 2015). Previous assessments argued that sensitive areas could be defined as those close to the Mitiwai and Wainui Streams, which would have been the obvious routes from the coast to the lakeside settlements farther inland.

A recent archaeological investigation was carried out prior to mining occurring in the north of the Central Block in the area known as the Te Ake Ake area adjacent to (but setback a minimum of 30m from) the Mitiwai Stream (Larsen and Clough 2022), which exhibited evidence of a heavily disturbed landscape. Seven archaeological sites were originally recorded in the mining area; however, only two were rediscovered during the investigation prior to TIL mining of that area (R16/5 and R16/64). Much of the previously recorded archaeology on the high dune had been lost to erosion. The two sites investigated indicate that the high dune and the wider dune plain was where resources, in particular shellfish, were processed. They reflected temporary stops towards more permanent occupation sites in the hills and to the south around the lakes. Radiocarbon estimates indicate that the two sites are likely to date to the 17th century, slightly later than the other dated site on the Taharoa dune plain.

Recorded Sites

A total of 88 archaeological sites have been previously recorded within the Central and Southern Areas of the Taharoa Ironsands project area (Table 1). The bulk of these recorded sites are represented by marine shell midden and oven sites. These sites are typically

clustered around areas that, prior to mine operations, would have been easily accessible dune systems, waterways, or lakes.

Earthworked archaeological features (i.e. pā, pits, terraces, ditches and platforms) are generally clustered in areas where landforms are higher, or outside of the sand dune environment. The southern extent of the Site, which displays the least modification, contains the highest distribution of these sites, particularly around the boundary. This is likely attributable to this area containing a number of relatively steep ridgelines, locations where these archaeological features are typically found, that are not favourable for other activities, including mining.

Of the 88 sites, a total of 70 (79.5%) of the site records have not been updated since the 1970s, with two sites updated in the 1990s, three in the 2000s, and the remaining 13 updated since 2010.

The historic records for these 88 sites indicate that they consisted primarily of midden/oven deposits (N=69, 78.4%), with the next most common sites being pit/terrace sites (N=11). There were also three working areas, two pā sites, one horticultural site, one burial site, and finally one unknown site (the record states that the original form was lost prior to being entered into to the record in the 1970s).

The sites were in very poor condition even when originally recorded in the 1970s, when most of the dune environment was active and devoid of vegetation cover. Most of the site record forms note the deflated nature of the deposits, and Bulmer observed rapid deterioration of the sites once exposed on the surface of the dunes, with wind whipped sand abrading materials such as bone and lifting all but the heaviest of objects. With such a low baseline condition, a number of other later activities have also impacted upon preservation. The main activities are the development and subsequent harvest of plantation forestry and mining. Forestry activities are generally focussed above ground, however the surface vegetation cover is very thin and once that is damaged the movement of heavy machinery, logs, slash, or stumps can all have a significant impact. The mining works impact on the surface is on the scale of meters to tens of meters deep and effectively removes evidence of previous occupation. Notes on the condition of the sites based on an assessment of these impacts are also added to Table 1.

The description of these sites is presented below in the Field Assessment section. The original description of the sites is presented, organised by Area, with the site record forms (SRFs) provided in Appendix A.

Table 1. Recorded archaeological sites and their present condition within the survey area based on the field survey results (next section). Sites highlighted in blue are situated within demarcated reserves, while those highlighted green are either clearly or most likely situated outside of the project area, the site highlighted in orange is a missing record. Unhighlighted sites are remaining sites within the project area, without otherwise modifying conditions. See aerial overlays in Figure 12–Figure 29 for the recorded locations of the sites

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/4	Midden/Oven	1749306	5775094	1978	Destroyed. Likely destroyed by forestry works post 2013.
R16/5	Midden/Oven	1749599	5775516	2018	Destroyed. Excavated under Authority 2017/334 in 2018. Heavily damaged by forestry works undertaken between 2001 and 2013.
R16/8	Pit/Terrace	1750511	5771195	1970	Unknown. Outside of project extent. No mining or forestry noted.
R16/10	Pit/Terrace	1749808	5773294	1970	Destroyed. Excavated by McKinlay in the early 1970s. Mined prior to 1978. In forestry until sometime between 2013-2018.
R16/11	Working area	1749408	5773294	1970	Unknown/Within Reserve. No mining or forestry noted.
R16/12	Midden/Oven	1750112	5770095	2000	Unknown/Intact. No mining or forestry noted.
R16/17	Midden/Oven	1750906	5774796	1970	Destroyed. Forestry harvest between 2013-18, site not able to be relocated during Authority works in 2018, area was subsequently mined.
R16/18	Pā	1751207	5774196	1970	Intact/Within Reserve. No mining, forestry harvest in 2018.
R16/19	Midden/Oven	1751608	5773796	1978	Destroyed. Forestry planting and subsequent harvest in 2018, forestry regrowing.
R16/38	Pā	1751209	5772896	1978	Intact. Outside of project extent. No forestry noted.
R16/51	Midden/Oven	1750311	5771195	1978	Destroyed. Mining activities in 2001.

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/52	Midden/Oven	1750111	5771095	1978	Unknown. Mining activities in the vicinity but recorded location appears unaffected.
R16/53	Midden/Oven	1750910	5771896	1978	Destroyed. Mining activities in 1997 – 2001.
R16/54	Pit/Terrace	1750910	5771696	1978	Destroyed. Possible mining activities in 1997 – 2001.
R16/55	Midden/Oven	1750810	5772095	1978	Destroyed. Mining activities in 1997 – 2001. Forestry since then.
R16/56	Midden/Oven	1750510	5771695	1978	Destroyed. Mining activities in 1997-2001.
R16/57	Midden/Oven	1749509	5773094	1978	Destroyed. Mining activities in 2001.
R16/58	Midden/Oven	1749610	5772094	1978	Partially Intact. Possibly modified by mining in 1997-2001.
R16/59	Midden/Oven	1750310	5771795	1978	Destroyed. Mining activities in 1997-2001.
R16/60	Midden/Oven	1749706	5775294	2018	Destroyed. Forestry harvesting prior to 2013, mining activities by 2018. Recorded as destroyed in 2018 following monitoring under Authority 2017/334.
R16/61	Midden/Oven	1749006	5774993	1978	Unknown. No forestry or mining activities.
R16/62	Midden/Oven	1749506	5775394	2018	Destroyed. Forestry harvesting prior to 2013. Recorded destroyed in 2018 following monitoring under Authority 2017/334.
R16/63	Midden/Oven	1749825	5775655	2018	Destroyed. Forestry harvesting prior to 2013. Recorded as destroyed in 2018 following monitoring under Authority 2017/334.
R16/64	Midden/Oven	1749938	5775781	2018	Destroyed. Forestry harvesting prior to 2013. Recorded as destroyed in 2018 following monitoring under Authority 2017/334.

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/65	Midden/Oven	1750005	5775794	2018	Destroyed. Forestry harvesting prior to 2013. Recorded as destroyed in 2018 following monitoring under Authority 2017/334.
R16/66	Midden/Oven	1750305	5775995	2018	Destroyed. Forestry harvesting prior to 2013. Recorded as destroyed in 2018 following monitoring under Authority 2017/334.
R16/67	Midden/Oven	1749807	5774694	2013	Destroyed. Forestry harvesting and mining prior to 2013. Recorded as destroyed in 2013.
R16/68	Midden/Oven	1749906	5775094	1978	Destroyed. Forestry harvest between 2013 and 2018, with mining activity continuing after.
R16/69	Midden/Oven	1750294	5774480	2007	Destroyed. Mining activity prior to 2013.
R16/70	Midden/Oven	1750407	5774595	2013	Destroyed. Mining activity prior to 2013.
R16/71	Midden/Oven	1750457	5774595	2013	Destroyed. Mining activity prior to 2013.
R16/72	Midden/Oven	1750207	5774295	2013	Destroyed. Mining activity prior to 2013.
R16/73	Midden/Oven	1750807	5774495	1978	Destroyed. Forestry harvest between 2013 and 2018, with substantial heavy machinery tracks. No mining.
R16/88	Midden/Oven	1749811	5771394	1978	Partially Intact. Adjacent mining activities 1997 – 2001. Coastal erosion.
R16/89	Midden/Oven	1750012	5770794	1978	Unknown. No mining or forestry activities.
R16/93	Pit/Terrace	1750811	5771495	1978	Intact. No mining. Regenerating scrub.
R16/94	Midden/Oven	1749709	5772994	1978	Destroyed. Archaeological investigation in 1976 suggests it was destroyed. Mining in the 1980s. In forestry by 2013. Mining activities since 2018.
R16/95	Midden/Oven	1750409	5773095	1978	Destroyed. Mined prior to 1983.

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/96	Midden/Oven	1750909	5772896	1978	Destroyed. Mined prior to 1997.
R16/97	Midden/Oven	1750010	5772394	1978	Destroyed. Mining activities 1997 – 2001.
R16/98	Midden/Oven	1750110	5772395	1978	Destroyed. Mining activities 1997 – 2001.
R16/99	Midden/Oven	1750110	5772395	1978	Destroyed. Mining activities 1997 – 2001.
R16/100	Midden/Oven	1750110	5772395	1978	Destroyed. Mining activities 1997 – 2001.
R16/101	Midden/Oven	1750110	5772395	1978	Destroyed. Mining activities 1997 – 2001.
R16/102	Midden/Oven	1749910	5772294	1978	Destroyed. Mining activities 1997 – 2001.
R16/103	Midden/Oven	1750406	5775395	1978	Destroyed. Probably by forestry harvest prior to 2013, mining activities thereafter.
R16/104	Midden/Oven	1750106	5775295	1978	Destroyed. Probably by forestry harvest prior to 2013, mining activities thereafter.
R16/105	Midden/Oven	1750106	5775095	1978	Destroyed. Mining activities prior to 2013.
R16/106	Midden/Oven	1750706	5775195	1978	Destroyed. Probably by forestry harvest prior to 2013, mining activities thereafter.
R16/107	Midden/Oven	1750606	5775295	1978	Destroyed. Probably by forestry harvest prior to 2013, mining activities thereafter.
R16/108	Midden/Oven	1750606	5775095	1978	Destroyed. Probably by forestry harvest prior to 2013, mining activities thereafter.
R16/109	Pit/Terrace	1751006	5775096	1978	Destroyed. Forestry harvest and mining between 2013 and 2018.

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/110	Midden/Oven	1751006	5775096	1978	Destroyed. Forestry harvest and mining between 2013 and 2018.
R16/111	Midden/Oven	1750806	5774995	1978	Destroyed. Forestry harvest and mining between 2013 and 2018.
R16/112	Midden/Oven	1750806	5774995	1978	Destroyed. Forestry harvest and mining between 2013 and 2018.
R16/113	Midden/Oven	1749807	5773994	1978	Unknown/Within Reserve. In forestry until 2024-25.
R16/114	Midden/Oven	1750007	5774194	1978	Destroyed. Mining activities prior to 2013.
R16/115	Midden/Oven	1750107	5774095	1978	Unknown/Stream Edge. Forestry harvest prior to 2013.
R16/116	Midden/Oven	1750207	5773995	1978	Unknown/Stream Edge. Forestry harvest prior to 2013.
R16/117	Midden/Oven	1750752	5774365	2013	Scatter of shell partially Intact. Adjacent to Wainui Stream but subject to forestry harvest prior to 2013.
R16/132	Midden/Oven	1750811	5771495	1978	Destroyed. Mining activity by 1997.
R16/133	Midden/Oven	1750711	5771595	1978	Destroyed. Mining activity by 1997.
R16/134	Midden/Oven	1750510	5771695	1978	Destroyed. Mining activity by 1997.
R16/135	Pit/Terrace	1750112	5770595	1978	Intact. Outside of project extent. No mining or forestry.
R16/136	Pit/Terrace	1750212	5770595	1978	Likely Intact. Outside of project extent. No mining or forestry.
R16/137	Midden/Oven	1750212	5770795	1978	Likely Intact. Outside of project extent. No mining or forestry.

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/138	Māori horticulture	1750312	5770695	1978	Intact. Outside of project extent. No mining or forestry.
R16/140	Pit/Terrace	1750411	5771095	1978	Likely Intact. Outside of project extent. No mining or forestry, under gorse.
R16/143	Pit/Terrace	1750511	5771095	1978	Likely Intact. Outside of project extent. No mining or forestry, under gorse.
R16/144	Midden/Oven	1750611	5771395	1978	Destroyed. Likely by mining activity prior to 1997.
R16/145	Pit/Terrace	1750811	5771595	1978	Destroyed. Mining activity 1997 – 2001.
R16/147	Midden/Oven	1750809	5773195	1978	Destroyed. Mined in the 1970s.
R16/148	Midden/Oven	1751209	5772996	1978	Intact/Within Reserve. Forestry harvest between 2013 and 2018.
R16/149	Midden/Oven	1751309	5773096	1978	Intact/Within Reserve. Forestry harvest between 2013 and 2018.
R16/150	Midden/Oven	1751508	5773396	1978	Intact. On site boundary but subject to forestry harvest between 2013 and 2018.
R16/151	Midden/Oven	1751608	5773496	1978	Intact. On site boundary but subject to forestry harvest between 2013 and 2018.
R16/152	Midden/Oven	1751308	5773596	1978	Destroyed. Mining activity in 1980s.
R16/153	Midden/Oven	1751107	5774296	1978	Unknown. Forestry harvest between 2013 and 2018. Possibly mining on periphery in the 1970s.
R16/154	Midden/Oven	1751307	5774396	1978	Unknown. Modified by a bulldozer in the 1970s. Forestry harvest between 2013 and 2018. No mining.

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Date last visited	Condition Notes
R16/155	Midden/Oven	1751407	5773996	1978	Unknown. Forestry harvest between 2013 and 2018.
R16/156	Midden/Oven	1751107	5774296	1978	Destroyed. Recorded as bulldozed in 1978. Forestry harvest between 2013 and 2018. No mining.
R16/173	Unknown	1750310	5771995	1978	Missing Record/Destroyed. Mining activity 1997 – 2001.
R16/174	Midden/Oven	1750806	5774995	1978	Destroyed. Forestry harvest and mining between 2013 and 2018.
R16/213	Working area	1749708	5773394	1970	Destroyed. Mining activities 1976 – 1983.
R16/279	Working area	1749808	5773494	1993	Destroyed. Excavated by McKinlay in the early 1970s. Mining activities by 1974.
R16/327	Burial/ cemetery	1749909	5772794	1976	Unknown/Within Reserve. Bones removed for burial in 1976. Vegetation removal by 2001, forestry planted following this, and harvested between 2013 and 2018. Some mining activities outside of the reserve.
R16/545	Midden/Oven	1749107	5774693	2000	Destroyed. Mining activity prior to 2018.
R16/566	Pit/Terrace	1751203	5775187	2013	Destroyed. Outside of project area.

FIELD ASSESSMENT

Physical Environment

The Taharoa Ironsands Mine is situated south of Kawhia Harbour in a coastal dune environment. The western edge of the mine area meets the coast and beach, and heading inland it is buffered to the east, north and south by lakes, wetlands and streams. The geology of the area is dominated by the large ironsand dunes resulting from the coastal erosion of volcanic deposits, which are now the focus of mine activities. The sparsely vegetated ironsand dunes are visible along the coastal plain, being bisected by the Mitiwai and Wainui Streams, with the Waiophipa Stream at the southern end.

The project area has had at least one rotation of pine planting, possibly two in areas. The landscape has generally been heavily disturbed by planting, harvesting, dry mining and dredging, along with the construction of various haul roads.

Field Survey Results

A field survey was carried out over 1-3 April 2025 by a team of four. Survey conditions were generally clear and visibility was good. The survey team visited the recorded locations of archaeological sites within the Taharoa Ironsands Mine footprint (Figure 28–Figure 30). Subsurface probing was undertaken in areas where the likelihood of surviving *in situ* archaeological remains was unable to be definitively established. Areas currently subject to covenants were not assessed.

For the purposes of this assessment the survey area has been into three geographically distinct zones, labelled Northern, Central and Southern. These areas are detailed below and within Figure 31:

The Central Block:

Encompassing the area from southern edge of Mitiwai Stream to the northern edge of Wainui Stream.

The Southern Block (Northern Zone):

Encompassing the area from the southern edge of Wainui Stream to the extent of the current mining activity in the south of the mine footprint.

The Southern Block (Southern Zone):

Encompassing the area from the extent of current mining activity across the largely unmodified farmland, ridgelines, and dune system to the extreme south.

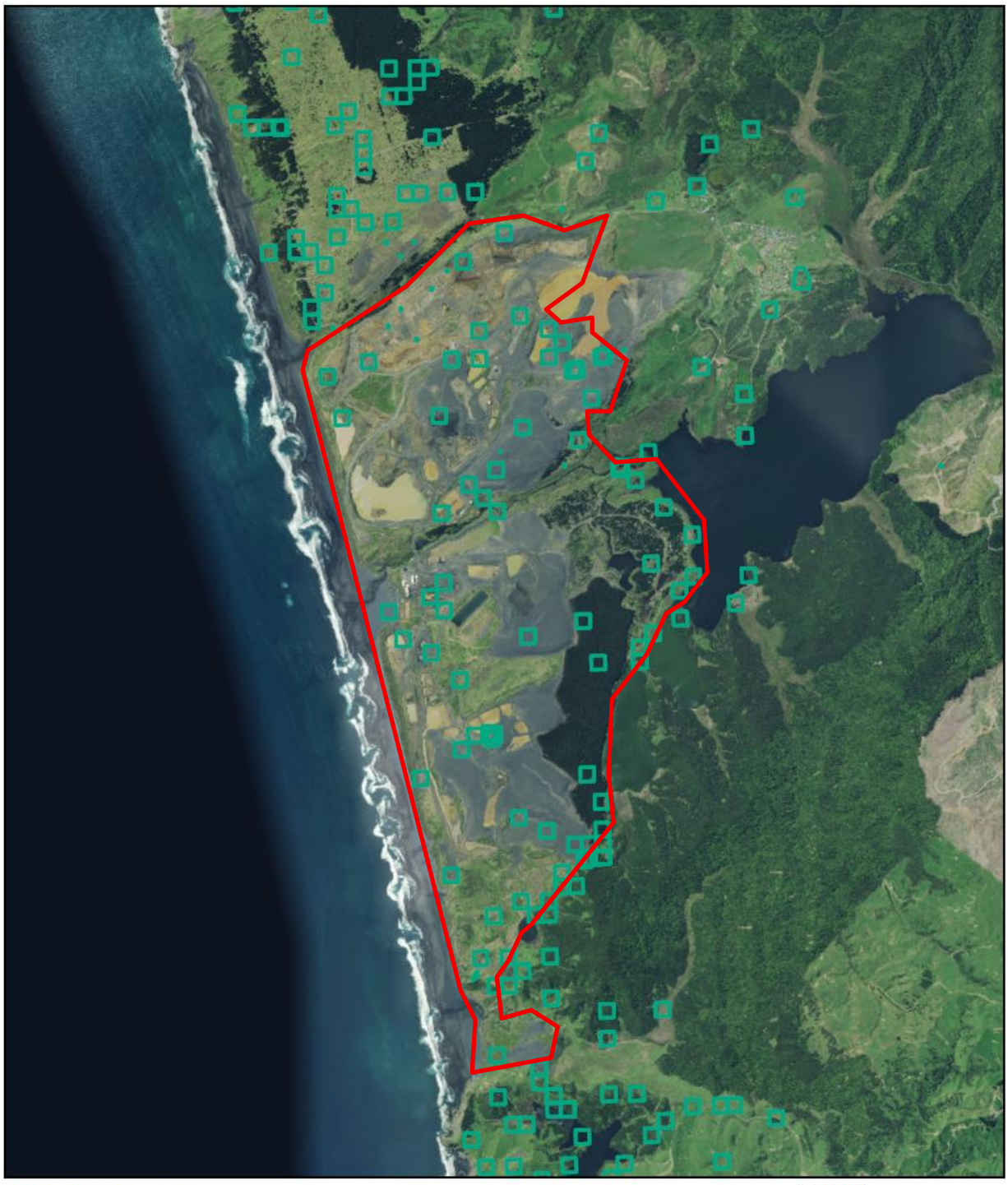

Figure 30. Distribution of recorded archaeological sites in relation to the survey area (indicated by the red outline)

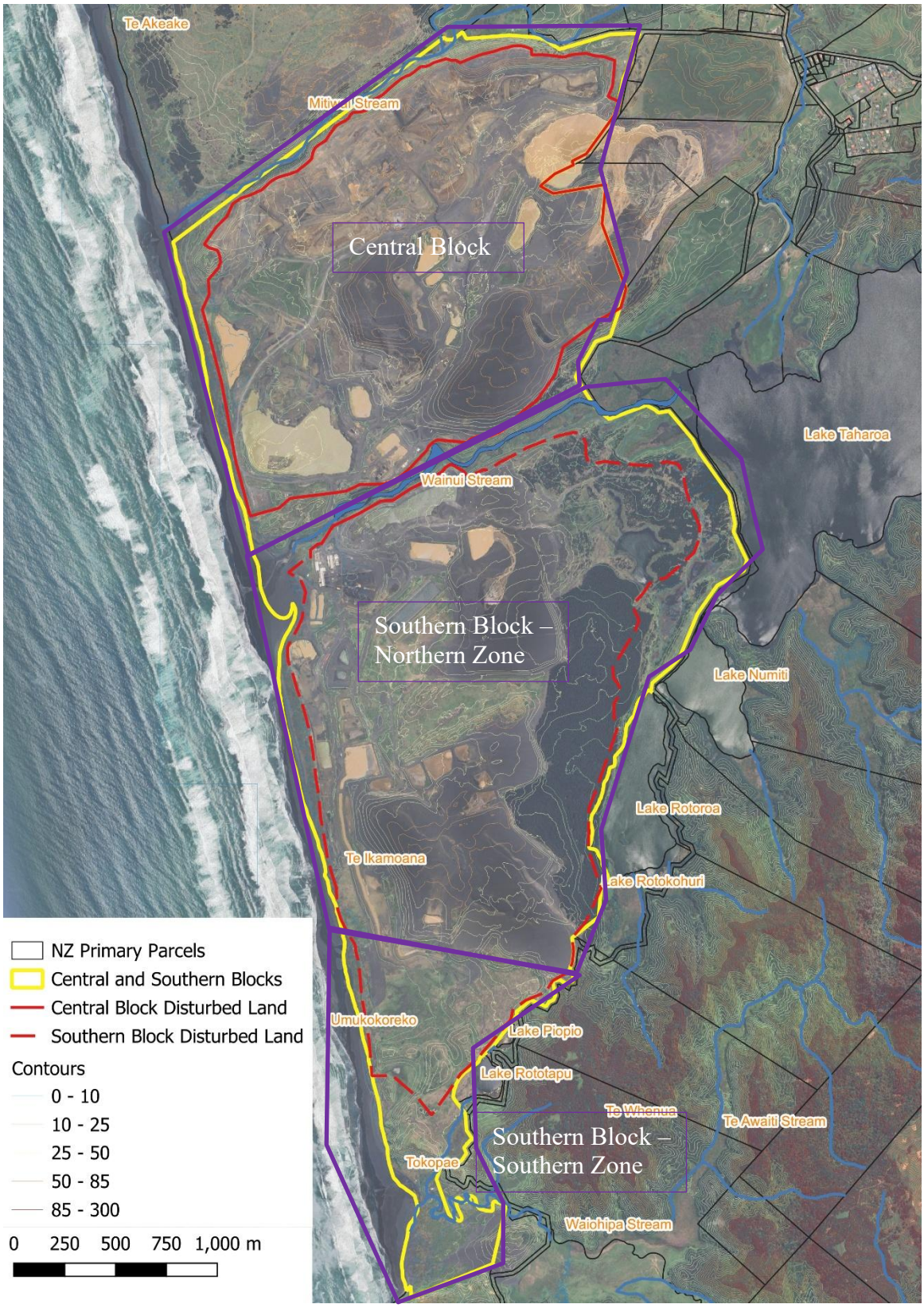

Figure 31. Detail of survey areas

The Central Block

There are a total of 35 recorded archaeological sites in the Central Block. This area is the locus of much of the current mining activity and previous modifications, as well as modification in progress. Areas immediately adjacent to Mitiwai Stream show considerable modification, as do areas within the southeast of this area. A number of large tailings ponds occupy prominent positions within this area. Additionally, a large contoured mine tailing pile occupies a position in the southeast of this area. Some areas of the large tailing pile have been covered in coconut matting and recent planting as part of rehabilitation efforts. The northern edge of Wainui Stream has also been subject to rehabilitation efforts with recent – although relatively established – native planting readily observable.

R16/4

Identified in 1970 by McKinlay as a midden deposit some 200-300 yards (c.183-274m) from the coast, the record was updated in 1978 to be about 600m from the beach. The midden was described as extensively eroded with scree midden down the sides; however, there was a remnant midden on top of the hillock including a considerable block measuring 4-5m², containing a high proportion of shell and a large number of hāngi stones and obsidian flakes. The hillock was described as being covered in lupin within an ironsand area. The site had not been revisited since. This midden has now been destroyed as the result of forestry and mining activity (Figure 34).

R16/5

Identified in 1970, this site was located on top of a large dune to the south of the Mitiwai Stream, close to the edge of the stream valley. The midden comprised a large heap with eroded scatter on the sand. A large amount of obsidian, hāngi stones and fish bone were observed. A number of artifacts including a 1A adze, two greenstone chisels, an adze fragment and a sandstone grinder fragment were collected and held by the NZ Historic Places Trust (now Heritage NZ Pouhere Taonga). In 2018 during the expansion of the mine the site was relocated (further to the north) on the southern face of a small dune crest, the deposit had been disturbed by a 4x4 track associated with the forestry works. The shell, primarily cockle with some tuatua and occasional mud snail, was c.100mm deep over an area 8m x 3m. The deposit was subsequently archaeologically investigated. Radiocarbon dates suggest the site was occupied between 1530 and 1790 AD (Larsen and Clough 2022). The site has now been destroyed (Figure 35, Figure 36).

R16/17

Identified in 1970 by Swadling, the site is described as an extensive area of scattered hāngi stones, located about ¼ mile north of the Wainui stream. A type 2B adze was recovered during that survey. The site had not been revisited since initial recording. A forestry harvest took place between 2013-18, with the site unable to be relocated during Authority works. The recorded location of this site is now beneath a considerable amount of mine tailings and is assumed to be destroyed as a result (Figure 37).

R16/60

Originally recorded in 1978, this site was described as an extensive area of scattered hāngi stones, c.130m along a gully and c.160m across the gully. There were areas of fragmented midden with frequent chert and obsidian on the slope, with a major midden at the top of the slope on the western side. The site was identified as subject to considerable erosion. The SRF was updated in 2023 following a site visit in 2018 (Clough and Larsen 2022),

noting the site could not be relocated, and had likely been destroyed by a combination of bike and 4x4 vehicle tracks, forestry works and ongoing deflation. The area has been subject to mining and this site is now assumed to have been destroyed (Figure 35, Figure 36, Figure 38).

R16/61

Recorded in 1978, this site was located on the end of a headland immediately to the south of the Mitiwai Stream. The headland was sand dune subject to ongoing erosion. A large number of fire cracked rocks, obsidian and some chert fragments were found on an exposed soil layer. Some shell scatter was observed on the southern slope. On the northern side of the bluff facing the stream, approximately half-way down the slope a large number of hāngi stones were observed on an exposed soil layer. The site had not been revisited (Figure 39). No deposits were identified during the current field survey.

R16/62

Recorded during the 1978 survey, this site was located on the crest of a dune south of the Mitiwai Stream about 900m from the mouth of the stream and 300m northwest of site R16/60. The midden on top of the slope contained cockle, mudsnails, and rocky shore species, along with hāngi stones and fish bone. On the slope on the southern side a large number of obsidian flakes and chert were identified. The SRF was updated in 2023 following a site visit in 2018, noting the site was not relocated, and had likely been destroyed by a combination of bike and 4x4 vehicle tracks, forestry works and ongoing deflation. The most recent site visit has confirmed the findings of the previous survey and this site has now been destroyed (Figure 35, Figure 36, Figure 38).

R16/63

Identified during the 1978 survey, this site was described as a totally deflated scatter of hāngi stones and very broken midden, with some obsidian and chert observed. The site was located 200m east of R16/62, along a dune ridge south of the Mitiwai Stream. In 2013 the site was revisited with the site described as being visible across an area of around 10m x 10m but mostly concentrated in a small mound; a small area to the north was also identified but much of the upper surface of that area had been modified and the degree of intact material was unknown. In 2018 the site was considered destroyed by 4x4 vehicle tracks, forestry works and ongoing erosion with only scattered shell observed over an area measuring 10m x 8m. The deposit has now been destroyed, with the area substantially modified by mining (Figure 35, Figure 36, Figure 38).

R16/64

Recorded in 1978, the site was located approximately 150m east of R16/63 along a sand dune ridge south of the Mitiwai Stream. The site was described as a midden lens running through a sand mound and eroding around the perimeter with some chert and obsidian, and a single argillite adze flake noted. The site was revisited in 2013 where shell was visible in the western slopes with fragments visible around the dune; however, probing did not suggest much intact material remained. The site was subsequently investigated prior to the expansion of the sand mine (Larsen and Clough 2022). The investigation recorded that an intact deposit of R16/64 was found on a remnant dune hill 6m high. The midden was near the top and measured 6 x 4m and was up to 170mm thick. Samples indicated the deposit was composed of tuatua and cockle with rare small gastropods. Occasional oven stones were observed in the immediate area. Radiocarbon dating of tuatua indicated the site dated between 1540 and 1820 cal AD at 95% probability (Larsen and Clough 2022). The deposit

was excavated in 2018, under Authority 2017/334 and mine expansion and associated activity has destroyed this site (Figure 35, Figure 36, Figure 38).

R16/65

Initially recorded in 1978, the site was located on top of a sand dune on the south side of the Mitiwai Stream, about 75m east of R16/64. The site was described as a scatter of oven stones with some obsidian. The site was not relocated during the 2018 survey prior to the expansion of the Taharoa Ironsand Mine. It was potentially destroyed by a combination of bike or 4x4 tracks and deflation under Authority 2017/334. The current survey has confirmed destruction of this site, with the area completely modified by mining (Figure 35, Figure 36, Figure 38).

R16/66

Recorded in 1978 on a dune ridge south of Mitiwai Stream approximately 100m east of R16/65. The site was totally deflated and existed as a surface scatter of hāngi stones with a large number of obsidian flakes. The scatter spread c.25m across the ridge top and stretched over c.250m as areas of hāngi stones with sand drifts in between. Basalt flakes, an adze fragment, hoanga and sandstone pieces were identified. The site was not relocated during the 2018 survey prior to the expansion of the Taharoa Ironsand Mine. It was recorded as destroyed in 2018 following monitoring under Authority 2017/334. It was potentially destroyed by a combination of bike or 4x4 tracks and deflation. Later surveys were not able to relocate this deposit and the current survey has confirmed that this deposit, with the area completely modified by mining (Figure 35, Figure 36, Figure 38).

R16/67

Identified in 1978 downslope and east of the visitors parking lot across the road from a monument, about 250m east of the road and 900m from the beach. The site was described as a scatter of hāngi stones and midden, measuring 30m x 37m but the extent remained uncertain due to active dune system. The shell (pipi) was in two main patches with some scatter. No obsidian or chert was noted. A 2013 survey of the area showed the site had already been destroyed by mining operations and subsequent stockpiling of tailings.

R16/68

Recorded in 1978, the location was noted as about 100m south of the road to the mine and 1.1km from the beach. The site was described as a very large hāngi, working floor and midden, extending over 200m E-W and 80-100m N-S. The midden was concentrated to the east end, and the scatter contained abundant obsidian. A working floor and hāngi area was on the west end. There were three main shell clusters with cockle being the predominant species observed. Samples recovered included rat bones, argillite, obsidian and chert flakes. The site had not been revisited. Based on the review of aerial photographs it is concluded that this site was destroyed as the result of the forestry harvest and mining activities which took place between 2013 and 2018 (Figure 40).

R16/69

Initially recorded in 1978 as being in the hollow of dunes located about halfway between the road and Lake Taharoa and about 500m north of Wainui Stream. The SRF reported that cultural deposits were observed over the whole surface for 100m x 50m including intact fireplaces, abundant obsidian, and several midden deposits with fishbone. An argillite adze fragment, obsidian and a net weight were collected. Human remains were observed but reburied during a sandstorm. The site was not relocated in 2003, however a 2007 survey following the removal of a pine plantation relocated a small surface deposit of shell and

cracked hāngi stones over an area measuring 6m x 4m. The shell was primarily cockle with some pipi present. This site is now below a considerable deposit of mine tailings and is assumed to have been destroyed by mining activities prior to 2013 (Figure 41).

R16/70

Recorded in 1978 on the north side of a dune hollow from R16/69, about halfway between the road and Lake Taharoa, and 500m north of Wainui Stream. The site was described as a small area of large hāngi stones. No midden was observed in the area. The 2013 survey noted the site was in an area which had been mined for sand some time previously and as a result R16/70 was considered destroyed (Figure 41).

R16/71

Recorded in 1978 as a mound in the middle of the sand dunes, about halfway between the road and Lake Taharoa, and 500m north of Wainui Stream, lying c.50m east of R16/70. The mound of shell was described as predominantly cockle with abundant hāngi stones. The 2013 survey indicated the site has been destroyed. The area is now beneath a considerable deposit of mine tailings and assumed to be destroyed as a result of this and mining excavations (Figure 41).

R16/72

The site was recorded in 1978 as a series of midden patches, hāngi stones, and obsidian flakes over an area of 100 x 50m. A 2013 survey identified the archaeological deposits in this area as having been destroyed by mining activity (Figure 41).

R16/73

Identified during the 1978 survey, the site was located south of R16/68-R16/71, about 250m north of Wainui Stream and about halfway between the road and Lake Taharoa. The site stretched 100m x 50m and contained clumps of scattered midden on old soil. Each patch had hāngi stones with some obsidian. The largest intact midden was almost entirely cockle shell, but other midden patches also included hard shore species. During the 2013 survey the site was found to have been destroyed by sand mining, although the site record form was not updated with this information. The location of this site was visited during the 2025 survey, and the area appears heavily hummocked with evidence of pine planting and harvesting. The site was unable to be relocated and consistent with the 2013 survey conclusion, this site is therefore assumed to have been destroyed by the earlier mining activity (Figure 42).

R16/103

Identified during the 1978 survey, the site was located c.50m south of the road to the “mill” from Taharoa village, east of R16/104, about 1.6km to the east of the beach and 700m south of the Mitiwai Stream. The site was described as dense shell midden c.10m N-S x c.6.5m E-W, consisting mainly of cockle and pipi, with some oven stone fragments. The site was noted to be disturbed and deflated. The site had not been revisited since. The area was modified by the forest harvest prior to 2013, and subsequent mine activity. This site was destroyed by these activities prior to 2018.

R16/104

Located west of R16/103, about 1.3km east of the beach and 700m south of the Mitiwai Stream. The site was described as a large midden area just under the edge of large dune (to the west), including oven stone fragments and a few bits of obsidian. A shell midden mound was present at the south end of the midden area. The site had not been revisited.

The 1978 Bulmer survey identified this site as a large area of midden beneath sand dunes. This deposit also included oven stone fragments and obsidian flakes. The area was modified by the forest harvest prior to 2013, and subsequent mine activity. This site destroyed by mining activity prior to 2018 (Figure 43).

R16/105

Identified during the 1978 survey, this site was located south of the road from Taharoa to the mine, and about 1.3km east of the beach and to the southwest of Lake Taharoa. The site was described as an area of scattered midden measuring 12m N-S by 19m E-W lying on a clay substratum. A small amount of shell was observed, and obsidian and argillite flakes and oven stones were recorded. Obsidian scrapers were collected by the surveyors. The site had not been revisited since its initial recording. A review of aerial photographs indicates the area was modified by the forestry harvesting between 2001 and 2013, which may have destroyed the site. Mining also occurred across this area prior to 2013, and the location now lies adjacent to a large sluicing pond created as a result of mine operations. It is concluded that the site was destroyed prior to 2013 (Figure 44, Figure 45).

R16/106

Identified in 1978 this midden was located south of the road from Taharoa to the mine, southeast of R16/105, on relatively flat ground. The scatter of midden measured c.9m (N-S) by 8m (E-W), lying on a clay substratum. Surveyors noted charcoal, oven stones, a small amount of obsidian and shell fragments to be present. The site had not been revisited since the initial recording. A review of aerial photographs indicates the area was modified by the forestry harvesting between 2001 and 2013, which may have destroyed the site. Mining took place after 2013 and was well underway by 2018. It is concluded that the site was destroyed prior to 2018 (Figure 46).

R16/107

In 1978 this site was located on the slope of a ridge facing northwest, 1.3km southwest of Taharoa Village. The entire ridge side, c.140m in length, was covered in scattered midden. There were many concentrations of midden with scatters in between. Shell, obsidian and oven stones were noted. At the crest of the hill to the southwest, a shell mound measuring 6m by 8m was recorded. A further concentration of midden was located on the hilltop above the slope. The site had not been revisited since initial recording. The recorded location of this site is within an area that was modified by forestry harvesting prior to 2013, with mine activity in the area underway prior to 2018. This site is now adjacent to a large sluicing pond. It is concluded that the site was destroyed by the forestry operations and mining prior to 2018 (Figure 47).

R16/108

Recorded in 1978, this midden was located on a flat ridge top, south of R16/107. The shell mound measured c.12m (N-S) and 17m (E-W), lying on a dark soil horizon. The site had not been revisited since initial recording. The recorded location of this site is within an area that was modified by forestry harvesting prior to 2013, with mine activity in the area underway prior to 2018. It is concluded that the site was destroyed by the forestry operations and mining prior to 2018 (Figure 46).

R16/109

Recorded in 1978, this site was located on a flat ridge top about 100m east of R16/108. The shell mound was described as measuring c.18m (N-S) x 40m (E-W) with oven stones and obsidian. Some obsidian flakes were collected at the time. The substratum had been eroded but showed the remains of four rectangular pits and it was thought other pits may originally have been present but lost to erosion. No measurements of the pits were provided. The recorded location of this site is within an area that was modified by forestry harvesting prior to 2013, with mine activity in the area underway prior to 2018. It is concluded that the site was destroyed by the forestry operations and mining prior to 2018

R16/110

This midden site was recorded in 1978, and was located on a small hillock at the eastern end of a flat top ridge c50m northeast of R16/109. The site description is brief, noting the midden layers on the hillock contained shells, obsidian and oven stones. The site has not been revisited since initial recording. A review of aerial photographs shows that forestry harvesting and subsequent mining took place between 2013 and 2018. This site is now assumed to have been destroyed, as its recorded location is within an area displaying heavy modification from mining (Figure 48).

R16/111

This midden mound was recorded in 1978 and was located west of R16/108-110 on a flat-topped ridge. The shell mound was described as being c.16m in diameter with oven stones, shell fragments and some obsidian. Shell species identified included cockle, pipi and mudsnail. The day after the initial survey a dog mandible was collected. The site had not been revisited. The 2025 archaeological survey has identified this area as having been destroyed by mining activity, with the forestry harvest and mining taking place between 2013 and 2018 (Figure 49).

R16/112

Recorded in 1978 and located c.50m south of R16/111 and 30m southwest of R16/174, at the western end of a flat ridge top southwest of Taharoa Village. The site was described as a large area of oven stone concentrations with a hillock in the middle. The shell midden mound was slightly to the southwest, downhill from the hillock. The shell observed was mixed species, with a large proportion of pipi and some muddy shore harbour species. The site had not been revisited. As with many sites in this area of the mine, intensive modification is apparent having been modified by the forestry harvest and mining activities between 2013 and 2018. It is therefore assumed this site has been destroyed.

R16/113

Recorded in 1978 the site was located east of the road from Taharoa to the mine, 50m along the north bank of the Wainui Stream. The site consisted of three concentrations of midden: one 25m in diameter, one measuring 1.5m across, and one further concentration lying 50m to the east. No measurements were provided for this last concentration. The site had not been revisited since initial recording. This site was not able to be located during the 2025 survey and its condition is unknown (Figure 50, Figure 51). The record suggests it may be located within a reserve situated along the Wainui Stream, however the upper bank exhibits modification from bunding and the pine cover had recently been cut down.

R16/114

Recorded in 1978, this site was located north of a large pond in the Wainui stream, c.150m east of the road. The site comprised a thin scatter of oven stones and pebbles over an area measuring c.28m x 50m with very rare shell fragments. The site had not been revisited since initial recording. The recorded location of this site is within an area of intensive mining activity which began prior to 2013, and it is assumed to have been destroyed (Figure 52).

R16/115

This site, recorded in 1978, was located to the north of the pond in the Wainui Stream, southeast of R16/114, c.160m east of the road. The site was described as a large habitation area c.112m in length (N-S). There was very little obsidian or chert observed. A shell midden mound measuring c.2m in diameter was located at the north end, with chert, fishbone and shell observed. Shellfish species were primarily cockle with pipi. There was a dense concentration of oven stones at the southern end measuring c.55m x 42m. At the time of survey in 1978 one obsidian drill point and one chert drill point were collected. The site had not been revisited. This site was unable to be relocated and is assumed to have been heavily modified (Figure 53). It is possible some of the site extended down the bank towards the Wainui Stream, however an extensive examination of the area failed to find any archaeological remains.

R16/116

Located southeast of R16/115 and next to the north bank of the Wainui Stream. This site identified in 1978 was described as a large occupation site c.210m long (E-W) and 30m wide (N-S). There was a dense concentration of oven stones at the northern end of the site, with a second heap of oven stones to the northeast of the general midden scatter. Surveyors noted abundant obsidian and charcoal. Four obsidian flakes and one adze flake were collected. The site had not been revisited. Subsurface probing and visual inspection were unable to relocate this site and its present condition is unknown (Figure 54). The site is likely situated within the vegetated area on the northern side of the stream, and outside of the mining extent.

R16/117

Identified in 1978 on a flat area on the north bank of the Wainui Stream, at the southern base of the flat topped ridge on which R16/109 is located, overlooking the swampy area next to the lakes. At the time of observation the habitation ran 75m from the bank of the stream and c.150 along the stream, and running under dunes to the northwest. Some obsidian, shell fragments and oven stone scatters were common where dune sand was not present. Small round pebbles possibly used for cooking were recorded. One piece of obsidian and an adze were collected by the surveyors. During a survey in 2013 by Bickler and Baquié the site was described as being at the end of the forested area on a small rise in the southeast corner of the current mine site. An update to the site record at that times that the features of this site were not obvious, and states in separate places that midden was both visible and not visible. The 2025 survey was also unable to identify surface archaeological features, although a minor scatter of shell was noted (Figure 55, Figure 56). The site is considered to be partially intact.

R16/174

Located 50m southeast of R16/111 on a flat ridge top southwest of Taharoa Village. The 1978 SRF briefly describes the site as a midden mound comprising shell, oven stones, chert and obsidian flakes. No measurements were provided. The site had not been revisited. The recorded location of this site shows substantial modification, with both a forestry harvest

and mining activities occurring between 2013 and 2018. The site is therefore assumed to be destroyed.

R16/545

Recorded in December 2000 the large pebble scatter was located approximately 450-500m from the BHP helipad. The pebble scatter is described as revealed within recesses between small sand hills, spread thinly. The area was in maram grass at the time of the 2000 survey. The site had not been revisited. This area was substantially modified by mining activities prior to 2018 and the site is considered to be destroyed.

R16/566

Originally recorded in 2013, this site was located at the edge of the forested area at the eastern end of the Taharoa Sand Mine, approximately 20m east of a vehicle track. The site is located outside of the Central Block and therefore outside of the project extent. The site was described as situated on a small dune mound and consisted of two pits. Other possible flattened areas were noted as suggestive of a small occupation site. Probing did not detect any shell remains. The site was considered to be in poor condition. This site is believed to have been destroyed by mining activity (Figure 57).

The Southern Block (Northern Zone)

The Southern Block (Northern Zone) represents the administrative heart of Taharoa Ironsands, with a large collection of administration and service buildings clustered within the northwest of this area. The remainder of the Southern Area (Northern Zone) represents a variety of activities. Much of the zone contains dune systems that have previously been mined, and these have now been contoured and access roads have been created. Many areas have begun to naturally revegetate with grasses, while others are represented by large piles of mine tailings. A large tract of planted pine forest exists within the extreme east of this zone, with the northeast of this area planted in a mix of established and establishing pine forest. A total of 40 sites are recorded in the zone.

R16/10

Recorded in 1970 by McKinlay the site was located over 200-300 yards (c.183-274m) on a low ridge or outcrop of brown sandy/iron sand material running roughly parallel to the beach about ½ mile inland from the mouth of the Wainui Stream. There was no vegetation on the ridge and it was severely windswept with erosion difficult to assess. On the flat area of the ridge there were several clusters of shallow pits, each cluster having between 3 and 7 pits with some additional minor features. Surveyors indicated the pits were 10-15cm deep and likely affected by wind erosion. A large shell midden was located at the northern end of the line of pits. The entire site was covered with hāngi stones, chert, and obsidian. A piece of an argillite adze was recovered. The site had not been revisited. This site has been heavily modified, with mining of the area underway by 1978, and is considered destroyed (Figure 58).

R16/11

Recorded in 1970 by McKinlay, this site was located slightly south of a small hut on the bank of the Wainui Stream and just north of the dry watercourse into the Wainui where it straightens for its run across the sand to the sea. The site was described as a large area of heaped midden and hāngi stones, with abundant chert (including drill points), obsidian and adze flakes. Some moa bone was also identified. Surveyors noted the spread of the site

from the mouth of the stream inland to the sand dunes. The site had not been revisited. The description places the site in the dunes on the south side of the stream, which may indicate it is inside one of the reserves in this area. The current survey identified an area of deflated stones, but did not identify any shell or charcoal in the vicinity. Therefore, the current condition of the site is unknown, but it may still exist in part (Figure 59, Figure 60).

R16/18

Recorded by Swadling in 1970, this site is described as a potential swamp pā covered by dense vegetation. The site appears to have been recorded from some distance away and was based on the level of vegetation. The site was never inspected to check if this was a natural feature or a real site, and it remains unclear. Pine forestry was harvested from this area in the 2000s, which appears to have resulted in tracks being cut through this location. This site was unable to be accessed during the 2025 survey, and as a result the status of this site remains unclear. This site is situated within the Te Kapua reserve, and will therefore be protected.

R16/19

Recorded during the 1970 survey, the site comprised three shell heaps, each 5-6m in diameter, 1.5m in height, and spaced approximately 15m apart, composed predominantly of cockle, with some pipi, tuatua, mudsnail and mussel. Between each midden heap scattered oven stones, shells and a small number of grey obsidian flakes were noted. The site is located on a dune approximately 75m west of the edge of Lake Taharoa and 100m east of a swamp. The SRF also notes a scattered midden over 4-50m containing hāngi stones to the west of the westernmost mound, measuring approximately 10m across and bordering the swamp. The site was revisited during the 1978 Bulmer survey. The recorded location of this site is now within a tract of pine forest, having had a previous round harvested in 2018. A visual inspection and subsurface probing was unable to relocate the site. This site is assumed to have been modified or destroyed either through pine forest planting or harvesting (Figure 61).

R16/38

Identified in 1978, this pā site is located on a peninsula between Numiti and Rotoroa Lakes, and situated outside of the Taharoa C Block, and therefore outside of the project area. Raupo was growing around the western shoreline of the peninsula. Several features were noted. Four ditches were recorded: the southernmost measuring 17m across the peninsula x 2m (A); two ditches on either side of a terrace (C) measuring 17m and 19.4m long (B and D); and one ditch near the end of the peninsula measuring 13m across the headland (M). Six terraces were recorded along the length of the peninsula, with each terrace from the south to the north measuring: 15m x 8m (C); 17m x 7m with 5m scarp to south and 10m scarp to east (E); a terrace running along the northeast side of the pā c.2m above the lake level measuring 6m at widest part (F); 7.5m x 3.7m with a 0.5m scarp located immediately north of E (G); 9.5m x 9m with a 1m scarp to north (I); and 12m x 2m located to the east 6m below I (J). Three banks were identified. One bank (H) located between terraces G and I was 2.5m high to the south and 0.5m high to the north, and measured 4m long x 0.5m wide. The second bank (L) was located south of ditch (M) and north of a raised rim pit (K) and measured 4.3m wide with a 4m drop into the ditch to the north (M). The remaining bank (N) near the end of the peninsula was 0.7m high on the south, 0.5m high on the west, having a width of 1m. The raised rim pit (K) measured 4.6m x 4m with the rims measuring 1m wide, and 0.3m high on the west and east sides. The pā site had not been revisited. The site was not accessible during the survey, however the site is visible on both aerials and LiDAR and is intact.

R16/53

This midden site was located on a remnant clay ridge running north-south in dunes between Lakes Rototapu and Taharoa. Further location information describes the ridge being between a grassy hill and site R15/54. The midden consisted of a few scattered hāngi stones and a thin layer of shell, likely periodically covered and uncovered with sand. The site had not been revisited since it was first surveyed in 1978. This area was mined in the 1990s and is now within a large tract of pine forest. Subsurface probing was unable to relocate this site and it is assumed to have been destroyed either through sand mining or planting of the pine forest (Figure 62).

R16/54

This pit and midden site was located on a remnant ridge in the dunes to the north of R16/53, however the current grid coordinates places these sites the other way around. At the time of survey in 1978 an NZ Survey peg marked BM LVIII was within the site. A small cabbage tree was noted on site. The site contained a row of seven rectangular pits (A-H on the SRF). No individual pit measurements were recorded. Pit G is located at the northern end while pit A is the southernmost. Pit H is located to the east of pit E and was the most indistinct. Pits D – H were located within a general midden scatter with abundant hāngi stones and a few shells. Underneath the major hāngi area was a grey burned area with shells and bones incorporated. Occasional pieces of obsidian and chert were noted. The site had not been revisited. A visit to the recorded site location during the 2025 survey found it covered in pine forest and adjacent to a large pile of mine tailings. Mining activities took place in the area between 1997 and 2001. Subsurface probing and visual inspection were unable to relocate the site and it is assumed to be either modified or destroyed (Figure 63).

R16/55

Located c.200m north of site R16/54 and 150m west of the south end of Lake Rotoroa, the midden was approximately 30m in diameter with a prominent cone of midden. The cone was c.1m high and the top had a 2m x 2m area of intact midden, mainly freshwater mussel, rocky shore species and cockle. The southern side of the midden contained abundant chert with three points noted, along with obsidian and some argillite. The survey indicated the midden possibly continued south under sand. The site had not been revisited since 1978. The area appears to have had mining activities in the 1997 and 2001 aerial photographs. The location of this site is now within pine forest and neither the shell midden, nor its prominent cone, were able to be observed. It is likely this site has been destroyed (Figure 64).

R16/56

Recorded in 1978, this midden site was located c.500m west of the southern end of Lake Rotoroa and about 250m west of site R16/54, and about 100m north of site R16/133. The midden was described as totally deflated, measuring less than 4m² in total, being spread over two areas 5m apart. Shell species included mainly freshwater mussels. There were numerous hāngi stones and some obsidian fragments. One obsidian adze flake was identified which showed evidence of reuse. The site had not been revisited. The area was mined in the 1990s, and therefore this site has been destroyed (Figure 65).

R16/57

Recorded in 1978, these small clusters of hāngi stones were scattered in an ironsand area on a sand dune eroded by wind. The site location at that time was described as to the north of the NZS landing strip. The location appears to be within or adjacent to sluice pond with

mining activities present from 2001. The site is assumed to have been destroyed during these activities (Figure 66).

R16/58

Recorded in 1978, this site was located immediately to the south of the NZS landing strip. The site was described as a totally deflated old beach surface in an ironsand area to be quarried. The site measured 200-300m (N-S) and was covered with water rolled pebbles with scattered hāngi stones and occasional patches of clustered hāngi stones. The midden observed was mostly Amphidesma (likely tuatua) but was considered recent. The site had not been revisited. The current survey identified some deflated and scattered deposits of shell at this location, but no deposits matching those described on the 1978 site recorded form. This site is assumed to have been heavily modified through deflation and possibly mining operations which were present in the wider area in 1997 and 2001 (Figure 67).

R16/59

Located in 1978 on the southern side of a long sandy drift about 600m from the beach, west of the south end of Lake Rotoroa. The site was deflated and in an ironsand area to be quarried. The site was described as a diffuse scatter of hāngi stones with occasional shell and obsidian flakes. The site was associated with two old soil layers which disappeared into the dune in the south. The site had not been revisited. The recorded site location was dredged in the 1990s and is now covered by a large deposit of mine tailings, and the site is assumed to be destroyed as a result (Figure 65).

R16/93

Recorded in 1978, this site was located on the ridge running out into the sand dunes from the hills to the southeast of the ironsands on which site R16/90 is situated. The site is just below the foot of the hill where the ridge changes to horizontal. The site was described as a series of six pits on a clay ridge about 30m below and north of the terraces of R16/90, all aligned in a row in a NE-SW orientation. Midden was thinly scattered downhill from the ridge to the southwest, and some midden just below the ridge top appeared to be undisturbed. The pits were filled with a black sand matrix, with the midden including oven stones and a few shells and some rubbly clay. The midden scatter measured approximately 50m east to west. The site had not been revisited. The current survey was unable to relocate this site (Figure 69). However, the 2021 LiDAR coverage shows a group of pits on a ridge situated just outside of the mining lease extent, which are considered likely to be the recorded features. The area is now covered with regenerating scrub and gorse.

R16/94

Visited by Harry Allen in 1976, this site was located about 250m ENE of the north end of the airstrip, in a hollow on the summit of a sand dune. Allen described the site as a probable archaic/moa hunter habitation area with burials. The main site was labelled Sub Area 4, a site on an exposed clay surface. The surface had a number of fireplaces, scattered fish and possible moa bones, flaked pieces of obsidian, and fragments of firestones and broken adzes. Allen noted one of the adze pieces showed the remnants of a shoulder, and another was possibly argillite. Allen suggested the site could potentially be hundreds of years old. Sub Area 3 consisted of three burials which had been removed prior to Allen's site visit and taken for reburial elsewhere. The bones were reported to be well preserved. Originally the three had been buried together in a crouched position and a piece of worked wood was placed over them. Staining on the sand suggested the bones had been covered with ochre. An update to the SRF by Bulmer in 1978 indicates that the site had been entirely destroyed by mining by 1976. This site is well within the footprint of past mining activity, and the

surrounding landscape bears no resemblance to that described within the site record form. Consistent with Bulmer's conclusion, this site is therefore assumed to be destroyed (Figure 70, Figure 71, Figure 72).

R16/95

Located on a narrow clay ridge north of the eastern section of the burial reserve, southeast of the mine and south of the wet dredge pond (as at 1978), 750m from the beach and 750m from Lake Numiti. The site was in a deflated and disturbed ironsand area to be quarried. The site was described as a large number of scatters of broken oven stones, with very little shell. No bone or flakes were observed. The site had not been revisited. This area was mined in the 1980s and the location is now under a large deposit of mine tailings (Figure 73). The site is concluded to have been destroyed.

R16/96

Four middens are recorded in this location, approximately 200m west of Lake Rotoroa and 1.5km from the beach, at the eastern end of a burial reserve (likely the reserve now identified as Te Tauwhare) at the edge of dunes. The four midden scatters from east to west are described as; midden 1 12.8m x 20m (E-W) with much obsidian including small waste flakes and large utilised flakes, midden 2 2m x 3m (E-W) with some shell, midden 3 4m x 4m (E-W) with some shell and midden 4 being a thin scatter. The site had not been revisited since 1978. The recorded location of this site was visited, however subsurface probing and visual inspection were unable to relocate the midden scatters. The area was dredged in the 1990s and is now within pine forest (Figure 74). It is considered most likely that the site has been destroyed.

R16/97

This site, recorded in 1978, is part of a large habitation complex, 130m west of R16/98, to the south of the burial reserve and to east of a short southern section of vegetation. Lake Rotoroa is located c.1km to the east. The site was deflated and wind disturbed in an ironsand area to be quarried. The site was described as an area of scattered charcoal, stone flakes, oven stone fragments, pebbles, with a thin scatter of windblown shells to the east. The site had not been revisited. This site was unable to be relocated as the area has been completely modified by mining operations, with dredging taking place in 1997-2001. Therefore, the site is considered to be destroyed (Figure 75).

R16/98

Located 130m east of R16/97, south of the burial reserve. The site is within a deflated and disturbed ironsand area to be quarried. The site was described as oven stone fragments in a thin scatter. The site had not been revisited since recording in 1978. This site was unable to be relocated as the area has been completely modified by mining operations which were underway in 1997, and therefore the site is considered to be destroyed.

R16/99

Located in a gully immediately to the east of R16/97 and c.50m to the east/southeast of R16/98, south of the burial reserve. The site was within a deflated and disturbed area of ironsand to be quarried. The site consisted of a scatter of oven stones and some obsidian flakes. The site had not been revisited since the survey in 1978. This site was unable to be relocated as the area has been completely modified by mining operations which were underway in 1997, and therefore the site is considered to be destroyed (Figure 76).

R16/100

This site was located immediately to the north and upslope of R16/99, although a handwritten notation indicates it lay 30m to the east of R16/99. The site was described as a thin scatter of oven stones on a slope, in a deflated and disturbed area of ironsand to be quarried. The site had not been revisited since the survey in 1978. This site was unable to be relocated as the area has been completely modified by mining operations which were underway in 1997, and therefore the site is considered to be destroyed.

R16/101

Located to the east of R16/99 and c.100m to the east of R16/98. The site was described as a thin scatter of oven stone fragments, shell and obsidian in a deflated and disturbed area of ironsand to be quarried. The site had not been revisited since the survey in 1978. This site was unable to be relocated as the area has been completely modified by mining operations which were underway in 1997, and therefore the site is considered to be destroyed (Figure 76).

R16/102

Located in between southern and main section of reserve vegetation, about 400m from the beach and 1km west of Lake Rotoroa. The site was described as a thin scatter of oven stone fragments in deflated and disturbed ironsand to be quarried. The site had not been revisited since recording in 1978. The location of this site was subject to mining by 1997 and it is now below a large deposit of mine tailings and is assumed to be destroyed (Figure 75).

R16/132

Located 44m north of R16/93, along the same ridge that runs northwest from the edge of the hills into the ironsand. The site was described a knoll with shell midden spilling down from the top of the knoll towards the southwest. A thin scatter of shell was observed on dunes to the east, possibly the result of being windblown. Shells and hāngi stone fragments were the primary contributors to the site, although some chert and obsidian flakes were present. The site had not been revisited since recording in 1978. The 1978 site record form indicates this area was to be mined, and it seems likely that this site was situated within the area of mining undertaken in the 1990s. The current survey was unable to relocate this site. It is assumed to now be destroyed.

R16/133

Located on a knoll to the north of R16/132 on a ridge running northwest from the edge of the hills into the southern side of the ironsands. The site was described as more disturbed than R16/132 and within an ironsand area to be quarried. The site was described as having oven stone fragments with little shell and no chert or obsidian. The SRF indicated another knoll on the same ridge section to the north had a midden scatter toward the northwest, down the slope of the ridge, the scatter being c.40m in diameter. The site had not been revisited since 1978. This area was mined in the 1990s and is now a large pile of mine tailings. The midden area extends into an area outside of the mining, however this has been modified by access tracks and forestry harvesting. The site is assumed to be destroyed.

R16/134

Located on a knoll north of R16/133, on a ridge running northwest from hills at the southeastern edge of the ironsands. The site was described as a scatter of oven stone fragments on the northern side of the knoll in an ironsand area to be quarried. The site had not been revisited since the survey in 1978. The area was mined in the 1990s, and the site location is now beneath a large pile of mine tailings; therefore this site is assumed to be destroyed.

R16/145

Situated on a small narrow ridge leading out into the ironsands, 200m south of Lake Rotoroa. The narrow ridge is between two larger ridges and there was a raised rim pit about 15m up from the sand on a small terrace area. The northwest side of the pit had eroded away and the rims were present on the northeast and southwestern sides, 0.5m in height and 0.7m wide. A second small terrace measuring 4.5m x 0.3m was located 20m above the pit to the east and on the northern side of the ridge. A second pit was located within the swale between the ridge and a larger ridge to the north, and 9m north of Pit 1. The second pit measured 3m x 4m and was an open pit with a depth of 0.5m. The site had not been revisited since recording in 1978. The site description places it in an area outside of the mining activity. However, some mining activity took place in 1997-2001 and it is therefore assumed to be destroyed. Later a bulldozed access track did loop around this area following the forestry harvesting around 2021. This track is visible on the 2021 LiDAR, however, it has now been buried beneath mine tailings (Figure 69). It is possible the site still exists, if the track missed it, but is buried beneath tailings.

R16/147

Identified during the 1978 survey as located 100m north of the dredge pond, observed in the face of the dredge excavation. The site was described as a scatter of broken oven stones below a layer of charcoal. A very small amount of broken shell, pieces of green and grey obsidian. The layer was 1-2m below the surface at that time, and continued around the whole dredge pond. The site is likely to have been destroyed by dredging shortly after recording, and had not been revisited. The area was mined into the 1980s, and site is now within planted pine forest and was unable to be located. It is considered likely that this site was destroyed (Figure 79).

R16/148

This site is located on a bank west of pā site R16/38, 25m north of the pā and 10m above the shore of the lake. The area was in grass at the time of the survey in 1978 and had been exposed by animal disturbance. The midden measured 1m x 1m, consisting of loose broken shell, possibly pipi or tuatua. The 1978 Bulmer survey identified this site as being at risk of being destroyed by mining operations, although it was still intact during the 1993 revisit. It seems likely that this area is just outside the edge of the mining, and although the area has had its forestry coverage harvested. It is now within a reserve (Te Karaka). During the current survey a 25cm thick deposit of fairly sparse midden was identified some 35-40cm below the surface (Figure 80).

R16/149

This midden site is located 20m up the west bank of Lake Numiti, northeast of R16/148 and pā site R16/38. The midden was exposed in a sheep track in a grassed area with occasional manuka trees. The midden was c.10cm deep, consisting of whole and broken shell, and fairly compact. Pipi and mussel shell were observed. The length of the midden was unknown and could potentially be greater in length, concealed by grass. The site had not been revisited since 1978. The 1978 survey identified this site as being at risk of destruction, however this area is outside the mining extent. During the 2025 survey the deposit was identified over an area of approximately 3m by 2.3m, and was up to 15cm thick (Figure 81). Some forestry disturbance in the area will have damaged the site.

R16/150

This shell midden was identified in 1978 on the bank opposite the western tip of pā site R16/39 between Lakes Taharoa and Numiti, 50m north of the end of the pā and 25m in a

direct line from the lake shore. The midden was eroding out of the bank, 10cm below the grassed surface, measuring 10cm long by 2cm deep, consisting of broken mussel and pipi shell. The site had not been revisited. The current survey identified minor surface evidence of shell midden, covering some 2m by 0.4m, but probing of the area was inconclusive. It is possible in situ remains of this deposit are intact subsurface (Figure 82, Figure 83).

R16/151

Located 200m north of pā R16/173, on a north facing bank with a south facing bank 30m to the north. The midden was located in a grassed area exposed over an area measuring 5m x 2m. The midden consisted of loose broken shell with pipi being the primary species. A swamp encroached 20m to the northwest and also lined the shore of Lake Taharoa, with raupo reported. The midden had not been revisited since the survey in 1978. The current survey identified intact remains of this deposit within the scarps on either side of a vehicle access track, measuring some 2m by 1.3m, and up to 150mm deep (Figure 84).

R16/152

Recorded in 1978, the location at that time was described as being 40m southwest of the southwest corner of a fence surrounding planted marram grass, at the base of a high dune. Additional location information reports the site being 300m from Lake Taharoa to the east, 150m from the swamp to the southeast and c.2km inland from the sea to the west. The extensive midden measured 50m x 20m containing abundant broken hāngi stones, many worked pieces of obsidian and other flakes, a single green adze (possibly argillite), a chert flake, and pieces of cut bone. There were a few areas of scattered pipi, tuatua and cockle along with charcoal. Most of the material including the adze, bone, chert and charcoal was noted to be at the northwestern end of the site. Modern European rubbish in the form of vehicle parts was also noted in this area. The site had not been revisited. The location of this site was mined in the 1980s and is now within planted pine forest. Subsurface probing and visual inspection were unable to identify site, and it is considered likely to be destroyed (Figure 85).

R16/153

Located 100m south of the Wainui Stream and 200m west of Lake Taharoa, an area of approximately 150,000m^2 of broken hāngi stones with a small amount of obsidian and argillite. Four distinct deposits of shell midden were also noted at this site. The middens were described as: Midden A, 2m x 2m mainly oven stone and cockle with some tuatua; Middens B and C were both 1.5m x 1.5m containing mostly cockle with some tuatua, pipi and oven stones; Midden D measured 4m x 10m, primarily tuatua with some cockle, dosinia, bone and hāngi stones. The site had not been revisited since the survey in 1978. The original site record indicates this site was at risk of destruction from dredging. The 2025 survey team were not able to safely access the recorded location of this site, thus its current condition is unknown; however, this area does not appear to have been dredged, although it is possible that it was located further to the west, but the area has been subject to forestry modifications. It is considered quite possible that the site is at least partially intact within the Te Kapua reserve. Any elements outside of that are likely to have been mined.

R16/154

Located c.150m from the mouth of the Wainui Stream on the southern bank. The midden was exposed in the southern bank cut through by a bulldozer approximately 3m from the edge of the stream. The midden is described as mostly mussel fragments, hāngi stones and charcoal. All along the southern bank there were scatters of shell, primarily cockle, in the

loose earth and occasionally a shell layer in the bank, generally c.30cm long and 3cm deep. The site had not been revisited since the survey in 1978. The 2025 survey team were not able to safely access the location of this site, and so its current condition is unknown. The site is situated within the Te Kapua reserve.

R16/155

Recorded in 1978, this midden was located in a bulldozer track profile at the edge of the scrub where it meets the sand and the edge of Lake Taharoa. The midden consisted of hāngi stone and charcoal, but mainly pipi and mussel shell. The observed shell was mostly highly fragmented and not very densely packed. The midden layer within a dark grey sand matrix was 20cm thick, overlying slipped earth and beneath 15cm of grey sand. The site had not been revisited. The recorded location of this site is now within planted pine forest which shows signs of modification in the form of pronounced hummocking (Figure 86). The lake edge was also examined but no traces were observed. Visual inspection and subsurface probing were unable to locate this site and its current condition is unknown.

R16/156

Recorded in 1978, this midden was identified on the south side of Wainui Stream, where there is a Y-shaped intersection of the stream near the western edge of the swamp. The midden was at that time considered destroyed by a bulldozer making a track; the spoil spread by the bulldozer, with shell consisting mainly of tuatua and some cockle. The site had not been revisited. The 2025 survey team were not able to safely access the location of this site. The site is situated within the Te Kapua reserve, however based on the original description of the site it is considered destroyed.

R16/173

Information regarding this site was entered from an aerial photograph only, as the original site record has been lost. The site, of unknown description, is recorded as being situated halfway between the beach and Lake Rotoroa, about 1.8km south of the Wainui Stream. The site is described as being within an ironsand area to be quarried. The site had not been revisited since the survey in 1978. The area was mined in the 1990s and is now a considerable deposit of mine tailings and therefore the site is assumed to be destroyed (Figure 65).

R16/213

Recorded in 1970, this site was located about 250 yards (229m) inland from the mouth of the Wainui Stream, about at the headwater area of the watercourse which flowed into the elbow of the stream where it crossed the sand. The working floor site was described as a large area of dune with abundant hāngi stone and with a large quantity of greywacke flakes from adze manufacture. Obsidian, chert, sandstone grinders and files, several adze pieces, a small argillite adze and several chert drill points were also noted. On the side nearer to the Wainui Stream was a surface rectangular arrangement of large stone blocks. This site was a short distance from R16/10. The site had not been revisited. The recorded location of this site is within an area of the mine that shows considerable modification in addition to mine infrastructure, with initial mining activity underway in 1976. This site has been destroyed (Figure 87, Figure 88).

R16/279

Recorded by Wilkes in 1993 from information within an excavation report for R16/10 (c.1970), the site was located c.150m north of site R16/10 and 250m inland from the mouth

of the Wainui Stream. An unpublished map dated 1978, however, shows the site to be located to the west of R16/10. The SRF includes the description from the excavation report: 'Midden working floor…it is an area of dune littered with hāngi stones and flakes of greywacke, obsidian and chert, and fragments of stone artefacts.' The SRF further notes that the site has likely been destroyed by dredging. The 1993 site record from notes that this site has been destroyed (Figure 89).

R16/327

This site was recorded in 1994 from information in a 1977 report by Harry Allen. The location of the site was described as about 320m slightly southeast of the northern end of the Taharoa airstrip, south of the Taharoa ironsand plant. The site at the time of visitation by Allen in 1976 was wind eroded with material possibly covered and uncovered and shifted over the years; it was denoted as Sub Area 1. The remains were described as 'a confused scatter of human and other bones uncovered by movement of a north-westward facing dune. Bone was scattered over a radius of about 20 metres. There were two or three concentrations within this area. In the centre there was a broken human femur, scattered fragments of pelvis and the lower section of a vertebrae column. These were still partly in articulation and partly in situ. Eroded pieces of bone lay scattered around without any visible pattern. There were the remains of at least four individuals including one very small child. These may have been different burials but it is impossible to say… The bones were collected by elders for reburial elsewhere.' The site was revisited in 1978 by Sue Bulmer; however, the burial site was not relocated. This site was unable to be relocated during the 2025 survey, due to a combination of excavation and mining operations (Figure 90, Figure 91). However, it is thought that the grid coordinates are not accurate and that a more accurate placement would have this site situated slightly further to the east, just within the Te Tauwhare reserve. It appears that the purpose of the formation of this reserve was to protect this site, and the burial ground marked on historic plans.

The Southern Block (Southern Zone)

Of the three zones surveyed, the Southern Block (Southern Zone) displays the least amount of modification. Currently the northern extent of the Southern Area (Southern Zone) is a mix of scrub covered ridgelines and dune systems covered in grazing pasture. Low swampland occupies an eastern position within this zone, at the base of high ridges to the east. The area is bisected centrally by a steep ridge running in an east/west orientation. To the south of this bisecting ridge is a small stream, and two small dwellings occupy an area near the stream outlet to the Tasman Sea. The extreme south of this area is represented by a largely unmodified dune system, where the only visible signs of modification are narrow vehicle tracks used to access the coastline. A total of 14 sites are recorded in the zone.

R16/8

Recorded in 1970, this site is situated on a grassy ridge at the northern end and just to the east of Lake Piopio. A wind eroded edge facing the sand dunes showed a layer of compact midden. The terrace behind the edge showed continuation of the midden and some possible shallow pits. The site had not been revisited. This site was unable to be accessed during the 2025 survey due to thick vegetation, therefore its current condition is unknown (Figure 92). The original description places the site on the northeastern side of Lake Piopio, and therefore the site will be outside of the mining lease extent.

R16/12

Identified in 1970, this site is located to the south of the mouth of the Waiohipa Stream flowing into Orongomaitoroa Bay. The site was extensive, covering some 300m x100m. The 1970 site visit recorded large quantities of obsidian and chert flakes, cores and points. The surveyors noted a shell dump high up on the dunes but did not inspect it. A brief site visit in 1992 described the site as eroded badly and probably being fossicked. The report noted in situ hāngi near the seaward margin and shell midden near the inland margin, with a kuri jawbone identified. The site was again revisited in 1993, when dozens of in situ ovens were noted, generally c.60cm in diameter. There were larger lumps of stone scattered across the site with some clustering at various locations, with one cluster having abundant obsidian in the vicinity. The update notes that oven stones were densest in the upper part of the site and were generally associated with iron pan outcrops. Of note in this record is a notation that an aerial photograph used in a 1978 survey has a 'burial ground' marked on the steep lee slope of the sandhill. The SRF has no associated notes from 1978. The site was again revisited in 2000, when large amounts of material were observed. The last site visit was undertaken in 2002, when the crest and beachward slope were covered by a thin and fairly continuous layer of waterworn pebbles. Several intact ovens were noted and middens were small and thinly spread, containing tuatua, white rock shell, mussel, paua, and crab. Obsidian was fairly common around the slopes and ovens with both green and grey obsidian present. Dark argillite flakes were also noted. Chert was observed but not in numbers seen in the original site record, suggesting fossicking may be ongoing. Since those visits much of the dune has been stabilised with vegetation, which reduces visibility. This site was unable to be relocated during the current survey and its present condition is unknown, but it is considered likely to be intact (Figure 93 and Figure 94).

R16/51

Recorded in 1978, this site is located to the north of a large dune, northwest of Lake Rototapu, about 500m from the beach. The site was described as a small scatter of small and broken burned stones. No shell or bones were observed. The site may be the remains of a hāngi on the bottom of a deflated surface. The site was within a blowout channel in the dunes and was likely to be covered and uncovered periodically. The site had not been revisited. The site was unable to be relocated during the current survey, and therefore its current condition is unknown (Figure 95, Figure 96). While this area is outside of the extent of dredge mining it appears that the area was heavily tracked over by mining machinery during the late 1990s and early 2000s, and is considered to be destroyed.

R16/52

This site is located along the crest of a large dune c.100m northwest of Lake Rototapu, and about 400m from the beach. The crest of the dune is a flattened area c50m wide with patches of hāngi stones, some up to 20m x 20m. Some area contains a number of obsidian pieces and there were shells on the seaward slope. The record notes at least one adze has been collected by the public in the past. The record also notes that this site may be the same as site R16/89, as the dune is advancing northwards and site R16/89 may represent the complete deflation of matrix. The site had not been revisited since the survey in 1978. At the time of recording the area was an active dune; however, it is now covered with vegetation. Visual inspection and subsurface probing were unable to relocate this site and its current condition is unknown. While mining activities did take place in the vicinity around 2001, the record locations appears to have not been impacted.

R16/88

Recorded in 1978, this site is located in a washout area from the dunes down to the beach. The site was immediately behind the driftwood scatter where there were areas of burned and broken stones, very much scattered. The site was completely deflated in sand. There had been no visit to the site since. The 2025 survey identified isolated but sparse instances of shell, which may possibly be remains of the original site, but no oven stones were observed.

R16/89

Recorded in 1978, this site is located on a flat area behind the beach ridge, next to a hill named Tokapae, between swampy ground to the south and high dunes to the north. The site is on the seaward side of the lakes, about 200m from the beach and 300m south of Lake Rototapu. The site was deflated and disturbed, with an extensive scatter of broken oven stones, some bone and shell. There were six groups of oven stones with thin scatters between each group. This site was potentially associated with R16/52. No site visits had been made since original recording. The area is now covered by dense gorse and vegetation. Visual inspection and subsurface probing of the recorded site location was unable to relocate this scatter and its current condition is unknown. The area has not been modified by either forestry or mining.

R16/135

Recorded in 1978, this site is located on the north side of Waiohipa Stream, and to the east of the waterfall gut, about 50m up a ridge. The site is described as two pits on a ridge with a terrace running around the south side 1.7m at its widest point. Pit 1 was measured at 2.3m x 3.6m and 0.5m deep on the northeast side. Pit 2 measured 3.9m x 2.6m and 0.4m deep on the east side. The accompanying diagram suggests a third pit may be present southeast of Pit 2. It also depicts a ditch which is noted as part of R16/138. This site was relocated during the current survey and is in reasonable condition (Figure 102, Figure 103). The site is situated outside of the mining lease extent.

R16/136

Sited east of R16/135 about 500m east of Tokapae Hill along a ridge. The site is on a knoll where the ridge changes direction to the north. The site comprises three rectangular terraces, each measuring 2m x 2m, all on the west side. The site had not been revisited since the survey in 1978. The ridgeline where this site is located is appears to be unmodified and while the site was not able to be relocated, it is assumed that remains of the pits are intact subsurface (Figure 103). The site is situated outside the mining lease extent.

R16/137

Recorded in 1978, this site is located on the northwest slope of a knoll at the south end of Lake Rototapu. The site consisted of five terraces, three of which had pits. The uppermost terrace (T1) had no identified features. T2 had three pits recorded from West-East identified as Pits B, A and C. Pit A measured 5m x 4m x 0.25m deep, whilst pits B and C measured 5m x 4m x 0.2m deep. T3 contained three pits from West-East labelled D, E and F. All three pits measured 5m x 4m x 0.25m deep. T4 contained no visible features. T5 contained a single pit identified as G. Pit G measured 5m x 4m x 0.25m deep. A single midden measuring 40cm in length with a depth of 3cm lay to the southeast of Pit D on T3. This midden was exposed in section by sheep activity. It was covered by 30cm of redeposited soil, possibly originating from Pit D. A shallow ditch ran along the east side of the site, associated with R16/138. Shell species identified included cockle, tuatua and mussel. The

site had not been revisited. The description appears to match quite closely with site R16/568, and these sites may be the same, or it is possible that R16/137 refers to features slightly further down the slope. The current survey examined the features relating to R16/568. The pits and terraces are in fair condition and in addition surface shell midden was also identified during the survey (Figure 99, Figure 100, Figure 101). The site is situated outside of the mining lease.

R16/138

This ditch site is located at the south end of Lake Rototapu. The ditch was recorded as between 10 and 20cm deep and 5cm wide. No length is reported but it appeared to pass across or alongside sites R16/135 and R16/137. The 1978 SRF records that the ditch ran straight up the knoll at its west end, along the east side of the ridge, and then straight down the slope to the southern end of Lake Rototapu. The site had not been revisited. The location of this site was visited during the 2025 survey. Sections of this feature were observed, with large sections clearly visible on aerials and LiDAR. The site is intact and is situated outside of the mining lease (Figure 104, Figure 105)

R16/140

Identified during the 1978 survey, this terrace site is located on top of a spur at the northern end of Lake Rototapu. The terrace is described as being small, measuring 5m x 3m on top of the tip of the spur. The site had not been revisited. A site visit was undertaken as part of the current survey, however the area is covered with gorse which restricted access and visibility. The area has had little modification and it is therefore suggested that this feature remains intact (Figure 106). The site is situated outside of the extent of the mining lease.

R16/143

This pit and terrace site is located on a spur leading upward to the southeast from Lake Piopio. Five terraces (B – F) and one pit (A) were identified on a fairly steep slope above Lake Piopio and at the edge of the sand dunes. The pit measured 4m x 2m x 0.7m deep and was towards the south near terrace E, which measured 12m x 5m. To the north a group of four terraces were recorded with terraces B and C being higher up the slope of the group with terrace D to the northwest of terrace C, and terrace F to the west of terrace D. Terrace B measured 6m x 3m, terrace C measured 8m x 3m, terrace D measured 5m x 3m and terrace F measured 10m x 3m. At the bottom of the slope is Lake Piopio and on each side of the lake is swampland. The site had not been revisited since the survey in 1978. This site was not able to be accessed during the 2025 survey due to thick vegetation. It is likely this site remains intact and is situated outside of the extent of the mining lease (Figure 92).

R16/144

This midden site is located c.40m out into the sands at the base of the spur which is immediately to the north of Lake Piopio. The midden was eroding out of the sand and measured at 1m in diameter, with much of the midden being loose. Shell was described as generally whole and mainly tuatua. The site had not been revisited since the survey in 1978. The site description would place the site further west than the grid coordinates, which would situate the site within an area of dredge mining in the 1990s. The current survey was unable to relocate this site and its condition is unknown, but it is considered likely to be destroyed (Figure 77, Figure 78)

R16/572

This was a new site identified during the current survey. It comprises 4-5 terraces clustered around the northwestern side of the peak of a prominent hill (Figure 107). The area encompasses some 50m x 50m, with the terraces eroding away.

Summary

Eight-eight sites have previously been recorded in the survey area, and one new site was identified during the field survey and recorded as R16/572. The new site consisted of 4-5 terraces clustered around the peak of a prominent hill in the Southern Block (Southern Zone).

Based on the results of the field survey, 58 of the 89 recorded sites are considered to be destroyed, one has a missing record but has likely been destroyed, 18 are considered to be at least partially intact, and the status of the remaining 12 sites is not known. The sites whose status is not known are primarily recorded as being in places that would not be affected by mining, such as on the edges of streams, and were not able to be identified during the survey.

In all, 30 sites are either intact/partially intact, or their status is unknown and they may still be present. These are listed in Table 2 and Figure 32 and Figure 33 show the locations of the sites.

Table 2. Sites still present or potentially present within the survey area. Sites highlighted in blue are located within reserves and sites highlighted in green are likely to be outside the project area, unhighlighted sites are those sites whose status is considered to be either unknown or intact/partially intact

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Condition
R16/8	Pit/Terrace	1750511	5771195	Unknown
R16/11	Working area	1749408	5773294	Unknown/Within Reserve
R16/12	Midden/Oven	1750112	5770095	Unknown/Intact
R16/18	Pa	1751207	5774196	Intact/Within Reserve
R16/38	Pa	1751209	5772896	Intact
R16/52	Midden/Oven	1750111	5771095	Unknown
R16/58	Midden/Oven	1749610	5772094	Partially Intact
R16/61	Midden/Oven	1749006	5774993	Unknown
R16/88	Midden/Oven	1749811	5771394	Partially Intact
R16/89	Midden/Oven	1750012	5770794	Unknown
R16/93	Pit/Terrace	1750811	5771495	Intact

NZAA Site Number	Site Type	NZTM Easting	NZTM Northing	Condition
R16/113	Midden/Oven	1749807	5773994	Unknown/Within Reserve
R16/115	Midden/Oven	1750107	5774095	Unknown/Stream Edge
R16/116	Midden/Oven	1750207	5773995	Unknown/Stream Edge
R16/117	Midden/Oven	1750752	5774365	Partially Intact
R16/135	Pit/Terrace	1750112	5770595	Intact
R16/136	Pit/Terrace	1750212	5770595	Likely Intact
R16/137	Midden/Oven	1750212	5770795	Likely Intact
R16/138	Māori horticulture	1750312	5770695	Intact
R16/140	Pit/Terrace	1750411	5771095	Likely Intact
R16/143	Pit/Terrace	1750511	5771095	Likely Intact
R16/148	Midden/Oven	1751209	5772996	Intact/Within Reserve
R16/149	Midden/Oven	1751309	5773096	Intact/Within Reserve
R16/150	Midden/Oven	1751508	5773396	Intact
R16/151	Midden/Oven	1751608	5773496	Intact
R16/153	Midden/Oven	1751107	5774296	Unknown/Within Reserve
R16/154	Midden/Oven	1751307	5774396	Unknown/Within Reserve
R16/155	Midden/Oven	1751407	5773996	Unknown
R16/327	Burial/ cemetery	1749909	5772794	Unknown/Within Reserve
R16/572	Pit/Terrace	1750025	5770725	Intact

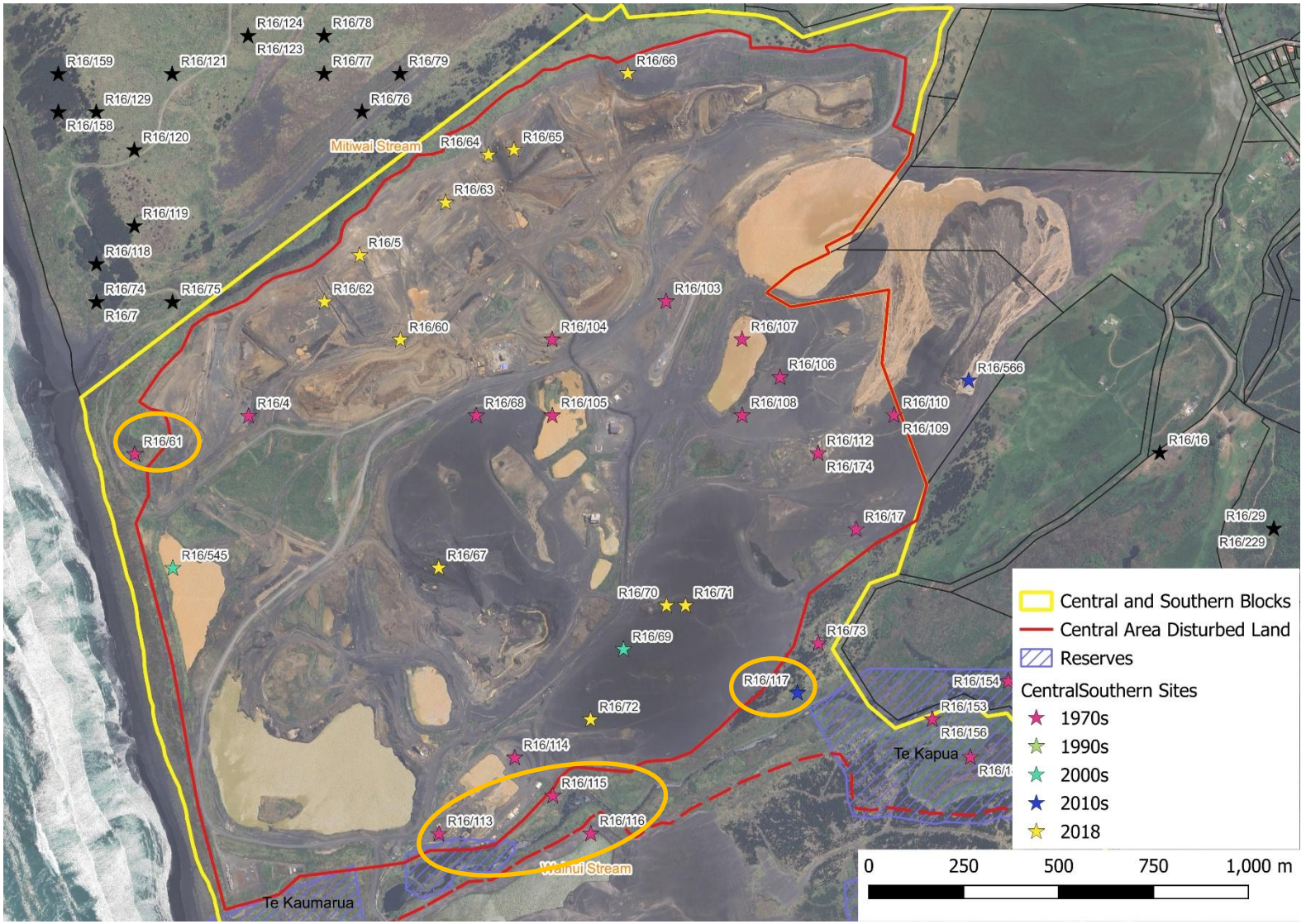

Figure 32. Georeferenced 2023 aerial in relation to the Central Area, with recorded sites marked by decade last visited (source: Google Earth). Those sites that are intact, partially intact or may be intact but their condition is unknown are circled

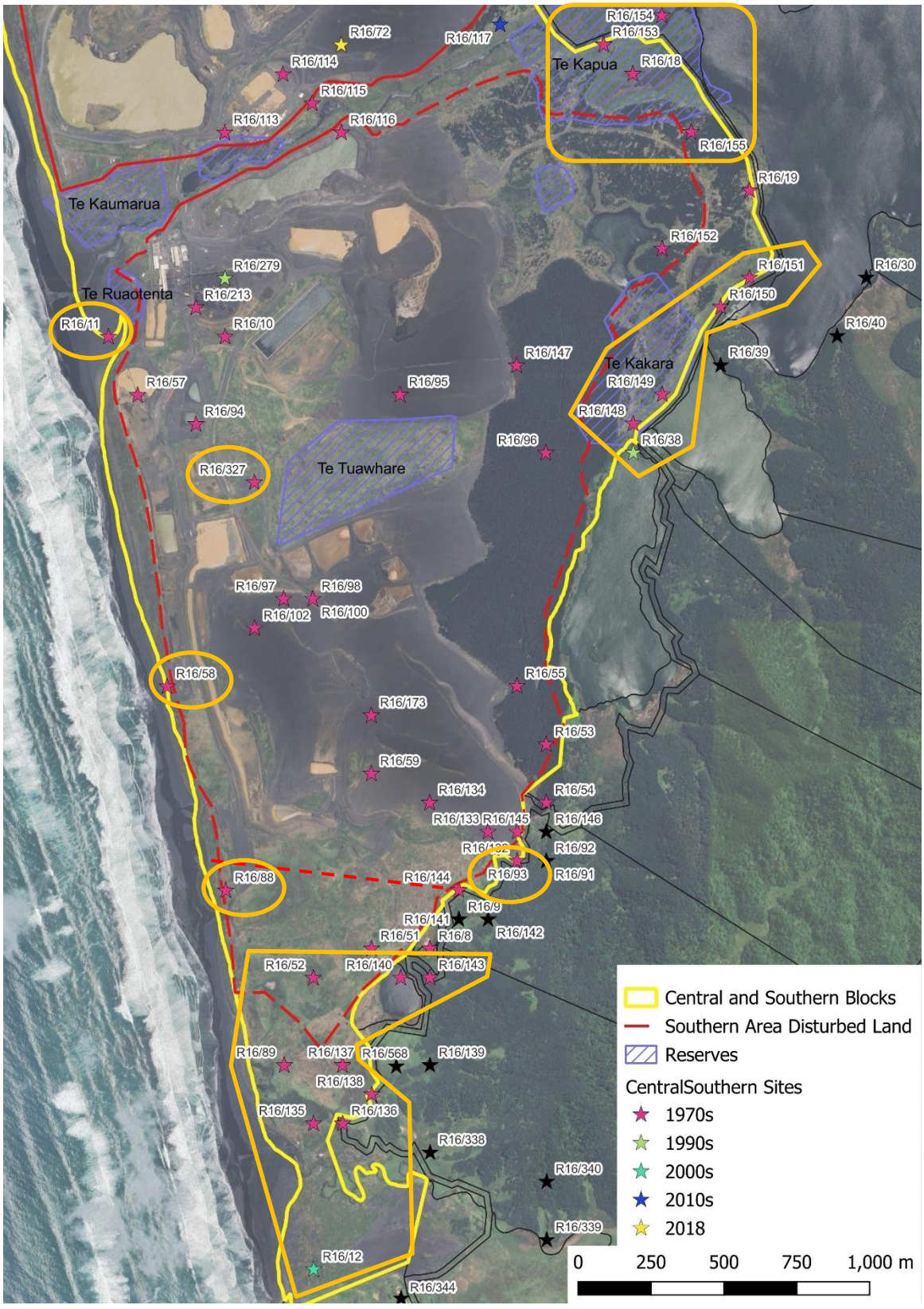

Figure 33. Georeferenced 2023 aerial in relation to the Southern Area (Northern and Southern Zones), with recorded sites marked by decade last visited (source: Google Earth). Those sites that are intact, partially intact or may be intact but their condition is unknown are circled. R16/572 is also intact, but not shown

DISCUSSION AND CONCLUSIONS

Summary of Results

The background research and field survey carried out for this assessment have established that within the Central and Southern Blocks of the Taharoa Ironsands Mine there are a total of 89 recorded archaeological sites. This includes one site identified during the course of the survey and recorded as R16/572. Site recording dates back to the 1970s - two sites were revisited in the 1990s, three in the 2000s, and 13 were updated since 2010. The remaining 70 sites had not been revisited or reconsidered since the 1970s. Given the extensive modifications of the dune environment by wind erosion, mining, and forestry operations since the 1970s there was a clear need to reassess the sites and update their conditions.

The overall results show that of the 89 sites a total of 58 are considered to be destroyed, with 18 considered to be at least partially intact. One site has a missing record but has likely been destroyed and the status of the remaining 12 sites is unknown. These sites are primarily situated in places outside of mining impact, such as on the edges of streams, but were not able to be identified during the survey.

The level of past impacts on sites within the Central and Southern Blocks has varied. The Central Block has seen the greatest level of impact – it contains 35 recorded sites, of which 30 are considered to have been destroyed. The status of four sites is unknown, and there is only one site that appears to be partially intact. The partially intact site and the unknown sites are all situated either within reserves or adjacent to the coast or Wainui Stream.

The Southern Block (Northern Zone) has a total of 40 recorded sites, with 26 of these considered destroyed. Eight are at least partially intact, the status of a further five is unknown, with a single missing site record (though the site is likely to have been destroyed based on its location). This follows a similar pattern to the Central Block, with the intact sites situated on the lake edges, reserves, or even outside of the mining lease.

The small Southern Block (Southern Zone), which has a number of clay ridges and less sand, has seen no mining and very little forestry activity and exhibits the greatest level of preservation. We understand that no mining is proposed in this area. Of the 14 recorded sites just two sites are considered to be destroyed (being situated right on the edge of the mining extent and subject to heavy vehicle movements). This contrasts with the preservation of 8 of sites, with the status of 4 remaining unknown.

Māori Cultural Values

This is an assessment of effects on archaeological values and does not include an assessment of effects on Māori cultural values. Such assessments should only be made by tangata whenua. Māori cultural concerns may encompass a wider range of values than those associated with archaeological sites.

The historical association of the general area with the tangata whenua is evident from the recorded sites, traditional histories and known Māori place names.

A Māori cultural values report, prepared by the Māori landowner, the Proprietors of Taharoa C Block, is provided with this Assessment. It notes that:

> *In line with our values, the accidental discovery protocols and the ability to exercise our own tikanga within these protocols have now been formalised into a draft*

Archaeological Management Plan. The continuation of these protocols and regular mining plan updates maintains integrity of the relationship between TIL and the Proprietors of Taharoa C Incorporation. This will ensure that the significant cultural values associated with the Taharoa C Block are recognised and provided for and the adverse effects of ongoing mining excavation activity on those values are mitigated and appropriately managed.

Survey Limitations

It should be noted that archaeological survey techniques (based on visual inspection and minor sub-surface testing) cannot necessarily identify all sub-surface archaeological features, or detect wāhi tapu and other sites of traditional significance to Māori, especially where these have no physical remains.

Effects of the Proposal

Taharoa Ironsands Limited proposes to re-excavate and dredge mining areas in the Central and Southern Areas of the Taharoa C Block (Figure 4 and Figure 5). The proposal would see ironsand mining undertaken at higher RLs using dry mining units and at lower RLs using dredges (which can intersect with the groundwater table).

The proposal to rework the mining pits and dredge in the Central Block will encompass a total of 32[1] of the 35 previously recorded archaeological site locations across the whole of the Central Block. The three avoided sites (R16/113, R16/115, and R16/116) are situated either within a reserve or are within 30m of the Wainui Stream. Thirty of the sites are considered to be destroyed. Of the remaining two sites (R16/61, and R16/117), the former has an unknown status, while the latter is at least partially intact. These two sites may therefore be impacted by mining works.

The proposal to mine in the Southern Block will include:

(a) the development of three pits in areas that have previously been dredged, in the Northern Zone of the Southern Block. This area includes a total of 13 recorded archaeological sites[2]. Twelve of these are considered to be destroyed, with the remaining site being the missing record, though based on its recorded location it is also likely to have been destroyed.

(b) three further pits in locations that have not been mined.

   a. The first of these is on the eastern side of the Northern Zone, being primarily within forestry. A total of four sites are recorded within this area, R16/53, R16/55, R16/96 and R16/147. All are considered likely to be destroyed.

   b. The second is situated to the west of Te Tauwhare Reserve, in the Northern Zone. This area encompasses three recorded sites. Two of these are considered to be destroyed (R16/57 and R16/94), with the third R16/327, having an unknown status. It is thought that the grid coordinates are not accurate, and that a more accurate placement would have this site situated

[1] R16/4, R16/5, R16/17, R16/60, R16/61, R16/62, R16/63, R16/64, R16/65, R16/67, R16/68, R16/69, R16/70, R16/71, R16/72, R16/73, R16/103, R16/104, R16/105, R16/106, R16/107, R16/108, R16/109, R16/110, R16/111, R16/112, R16/114, R17/117, R16/174, and R16/545.
[2] R16/56, R16/59, R16/95, R16/97, R16/98, R16/99, R16/100, R16/101, R16/102, R16/133, R16/134, R16/145, and R16/173.

just within the Te Tauwhare Reserve. R16/327 is a burial site, recorded from work by Harry Allen in 1976, and at that time the bones were collected for reburial elsewhere. It is understood that kōiwi are the reason for the formation of the Te Tauwhare Reserve.

c. The third extension includes a portion of the Southern Block to the very south of the Site (Southern Zone). A total of four recorded sites are within the proposed extent. One of these sites is considered to be destroyed (R16/51), with another two having an unknown status. The two sites of unknown status, R16/52 and R16/89, have the potential to be affected. A sparse scattering of shell was observed in the vicinity of R16/52, but R16/89 was not observed during the field survey. The fourth site, R16/137 is considered to be intact. The existing record places the site within the project area, however its location is actually some 90m to the east, within a neighbouring property.

(c) ancillary mining related activities in locations outside of the excavation areas (but within the site boundary). This encompasses a further 18 sites, of which eleven are considered to be destroyed[3]. The other seven sites (R16/12, R16/58, R16/88, R16/150, R16/151, R16/155, and R16/572) are either partially intact or have an unknown condition. All except R16/12, which is situated near the far southern boundary, may be impacted by ancillary operations and works.

The proposed activity therefore has the potential to affect 11 sites of either intact or unknown status (R16/52, R16/58, R16/61, R16/88, R16/89, R16/117, R16/150, R16/151, R16/155, R16/327, and R16/572). If any intact remains of these sites have survived they could be destroyed by future works. The value of these sites is further explained below.

In any area where archaeological sites have been recorded in the general vicinity it is possible that additional unrecorded subsurface remains may be exposed during development. While this is quite possible in dune environments, where sites may be both exposed and covered over time, for most of the local context the history of mining and forestry activities has substantially modified the landscape.

Archaeological features and remains can take the form of burnt and fire cracked stones, charcoal, shell midden, pits, artefacts of Māori and or human burials. Midden remains are the most likely to be exposed by the works.

Most of the sites were recorded as consisting of areas of shell midden and oven stones, often with artefacts. R16/572 is a pit/terrace site with a cluster of 4-5 terraces, while R16/327 consisted of the bones of a minimum of four individuals. No other features or elements were noted.

Archaeological Value and Significance

The sites recorded on the high dune and the wider dune plain are remnants of locations where resources, in particular shellfish, were processed and which often contained evidence of artefact manufacture and use. Generally, these reflect short-term occupations, although many such occupations may have occurred at each site. The small number of pit and terrace sites indicates that there was some longer-term occupation; however, these do not reflect the primary use of the plain. The sites should be seen in the context of a wider

[3] R16/10, R16/19, R16/53, R16/55, R16/96, R16/132, R16/147, R16/152, R16/213, and R16/279.

landscape system where people moved through the resource-rich landscape of the coast and coastal plain towards the inland, more permanent occupation sites.

Eleven sites may remain within the proposed future mining pits or extensions (R16/52, R16/58, R16/61, R16/88, R16/89, R16/117, R16/150, R16/151, R16/155, R16/327, and R16/572). As noted above, sparse scatters of shell were observed in the vicinity of sites R16/52, R16/58, R16/88, R16/117, R16/150, and R16/151, and R16/572 was identified as a cluster of terraces, but no remains were identified at any of the recorded locations of the other sites. These were potentially obscured by vegetation, although in the case of R16/327 the site may actually be situated further to the east, within a reserve.

The Waikato Regional Policy Statement (RPS) identifies several criteria for evaluating the significance of historic heritage places. In addition, Heritage NZ has provided guidelines setting out criteria that are specific to archaeological sites (condition, rarity, contextual value, information potential, amenity value and cultural associations) (Heritage NZ 2019: 9-10). Both sets of criteria have been used to assess the value and significance of the archaeological sites/potential sites within the project area (see Table 3 and Table 4), based on the information in the site record forms, as only limited intact remains of the sites were identified during the current field survey. A Māori cultural values assessment has been prepared.

The archaeological value of sites relates mainly to their information potential, that is, the extent to which they can provide evidence relating to local, regional and national history using archaeological investigation techniques, and the research questions to which the site could contribute. The surviving extent, complexity and condition of sites are the main factors in their ability to provide information through archaeological investigation. For example, generally pa are more complex sites and have higher information potential than small midden (unless of early date). Archaeological value also includes contextual (heritage landscape) value. Archaeological sites may also have other historic heritage values including historical, architectural, technological, cultural, aesthetic, scientific, social, spiritual, traditional and amenity values.

Overall, sites R16/52 (midden/oven), R16/58 (midden/oven), R16/61 (midden/oven), R16/88 (midden/oven) R16/89 (midden/oven), R16/117 (midden/oven), R16/150 (midden/oven), R16/151 (midden/oven), R16/155 (midden/oven) are considered to have limited archaeological and historic heritage value. Radiocarbon dating of shell material can be used to provide information on how Māori settlement patterns developed over time in the area and in the broader Taharoa area. However, midden are a very common site type, and these sites have little amenity value. R16/572 is a terrace site on geology that is less modified by the erosion and movement of sand and therefore has a greater potential of intact archaeological deposits to be present. The archaeological value of the site is considered to be limited to moderate. Site R16/327 is a burial site where kōiwi were removed and reinterned elsewhere. However, if any burial remains are still present their primary values would be cultural, though archaeological information may be recovered from kōiwi, if tangata whenua request it. As noted above, it is understood that this site is likely just within the Te Tauwhare Reserve.

Table 3. Assessment of the historic heritage significance of sites R16/52 (midden/oven), R16/58 (midden/oven), R16/61 (midden/oven), R16/88 (midden/oven) R16/89 (midden/oven), R16/117 (midden/oven), R16/150 (midden/oven), R16/151 (midden/oven), R16/155 (midden/oven), R16/572 (pit/terrace) and R16/327 (burial) based on the Waikato Regional Policy Statement (Section 10A Table 10.1). Note that this assessment is based on the original site records, as the current status of the sites has not been confirmed

Archaeological Qualities	
Information	Sites R16/52, R16/58, R16/61, R16/88, R16/89, R16/117, R16/150, R16/151, and R16/155 consisted of deflated shell with scatters of oven stones. A number of artefacts were also present when the sites were originally recorded, all of which have limited potential to provide some information about occupation and trading connections, while dating information could add to the understanding of Māori settlement in the area over time. R16/572 is a cluster of terraces, the excavation of which may provide information about the occupation of the lands peripheral to the dune environment, including radiocarbon dating. R16/327 was identified as a deflated scatter of human bone, which was collected for reburial by local kaumatua. If additional burial remains are present, analysis of such material could potentially inform on the lifestyle and health of those buried, should such permission be given.
Research	Few investigations have been carried out in the Taharoa area and the settlement and occupation patterns are not well understood. The sites have limited potential to add to knowledge of the local area and how it fits within the broader settlement patterns in the Taharoa region.
Recognition or Protection	The sites are included in the NZAA Site Recording Scheme and as pre-1900 archaeological sites they are protected under the provisions of HNZPT Act 2014.
Cultural Qualities	
Sentiment	The sites are not currently important as a focus of spiritual, political, national or other cultural sentiment. The Māori cultural value of the sites should be determined by tangata whenua. Site R11/327 would have high cultural value to Māori if human remains are still present. A cultural values assessment has been prepared.
Identity	The sites are not currently a context for community identity or sense of place and does not provide evidence of cultural or historical continuity.
Amenity or Education	Limited, as the sites are below the ground surface or covered by vegetation.
Historic Qualities	
Associative Value	The sites do not have any known direct association with, or relationship to, a person, group, institution, event or activity that is of historical significance to Waikato or the nation.
Historical Pattern	If appropriate midden material is present for dating purposes, it could be used to provide information on temporal patterns of Māori settlement in the Taharoa area.
Scientific Qualities	

Information	The sites do not have any particular potential to contribute information about an historic figure, event, phase or activity aside from broadly informing on past Māori subsistence.
Potential Scientific Research	The research potential of the sites is of an archaeological nature and is addressed under Archaeological Qualities (above)
Technological Qualities	
Technical Achievement	The sites do not exhibit any particular technical achievement

Table 4. Assessment of the archaeological values of sites R16/52 (midden/oven), R16/58 (midden/oven), R16/61 (midden/oven), R16/88 (midden/oven) R16/89 (midden/oven), R16/117 (midden/oven), R16/150 (midden/oven), R16/151 (midden/oven), R16/155 (midden/oven), R16/572 (pit/terrace) and R16/327 (burial) based on Heritage NZ criteria (Heritage NZ 2019: 9-10). Note that this assessment is based on the original site records, as the current status of the sites has not been confirmed

Value	Assessment
Condition	The landscape has undergone considerable modification through natural erosion, substantial mining works, and approximately 30 years of forestry operations. Natural erosion had already substantially affected the sites when recorded in the 1970s and this would have continued through to the present. It is possible that all of the kōiwi associated with R16/327 were lifted for reburial in the 1970s. The sites were not relocated during the survey and a definitive assessment of their current condition cannot be made. R16/572 is a terrace site that is situated on the periphery of the sand dune environment. The reduced impacts from natural processes such as wind erosion suggest that site has a greater chance of preservation.
Rarity	Middens are very common site type in the area, with burial sites less common.
Contextual value	The sites are an aspect of a broad archaeological landscape associated with Māori occupation that stretches from the Ocean to the settlements in the foothills east of the dune plain.
Information potential	The midden sites have potential to provide information on Māori subsistence, lithic production and use. Few investigations have been carried out in the Taharoa area and the settlement and occupation patterns are not well understood. R16/52 (midden/oven), R16/58 (midden/oven), R16/61 (midden/oven), R16/88 (midden/oven) R16/89 (midden/oven), R16/117 (midden/oven), R16/150 (midden/oven), R16/151 (midden/oven), R16/155 (midden/oven), R16/572 (pit/terrace) and R16/327 (burial) have the potential for radiocarbon dating if suitable material is present, which could add to the understanding of these processes. If any kōiwi are still present at R16/327, any analysis would depend on the wishes of tangata whenua.
Amenity value	The sites are situated on private land and the sites are subsurface or covered with vegetation and hence are not visible.
Cultural associations	The sites have Māori cultural association. The cultural significance of the sites is for tangata whenua to determine. A cultural values assessment has been prepared.
Other	No other values have been identified.

Resource Consent Requirements

In considering a resource consent application under the Fast-track Approvals Act 2024, the panel must take into account the purpose of the FTAA, the provisions of parts 2, 3, 6, and 8 -10 of the RMA to the extent that they direct decision making on an application for resource consent (but excluding section 104D) and relevant decisions of any other legislation that directs decision making under the RMA. The purpose of the FTAA is to be given the greatest weight.

Section 6 of the RMA (which sits in Part 2) and section 104 (which sits in Part 6) are relevant in relation to this report.

Section 6 of the RMA recognises as matters of national importance: '*the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga' (S6(e)); and 'the protection of historic heritage from inappropriate subdivision, use, and development*' (S6(f)).

All persons exercising functions and powers under the RMA are required under Section 6 to recognise and provide for these matters of national importance when '*managing the use, development and protection of natural and physical resources*'.

Historic heritage is defined in (S2) of the RMA as '*those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, deriving from any of the following qualities: (i) archaeological; (ii) architectural; (iii) cultural; (iv) historic; (v) scientific; (vi) technological*'. Historic heritage includes: *'(i) historic sites, structures, places, and areas; (ii) archaeological sites; (iii) sites of significance to Māori, including wahi tapu; (iv) surroundings associated with the natural and physical resources'*.

Section 104(1)(b) of the RMA requires the decision-maker to have regard to relevant planning provisions. Regional, district and local plans contain sections that help to identify, protect and manage archaeological and other heritage sites. The Operative Waitomo District Plan 2009, the Proposed Waitomo District Plan, and Waikato Regional Coastal Plan 2005 are relevant to the proposed activity.

The Operative Waitomo District Plan (Chapter 21, Schedule 3) holds a record of archaeological sites within the district. This is derived from the ArchSite database, and records no additional sites of interest. The Proposed Waitomo District Plan records sites of heritage significance in Schedules 1 – 5. Schedule 3, *Sites and areas of significance to Māori*, identifies two sites as being within the Central and Southern Blocks of the Taharoa C Block. The site SSM074-A is identified as a wāhi tupuna or ancestral location within the Central Block. Site SSM113-A is identified as a takotoranga, or area associated with burial practices. The location of this corresponds to the Kaumarua Reserve at the mouth of the Wainui Stream. While both of these sites are situated within the project area, both are outside of the proposed future mining areas.

This assessment has established that the proposed activity has the potential to affect sites R16/52, R16/58, R16/61, R16/88, R16/89, R16/117, R16/150, R16/151, R16/155 and R16/327, and R16/572. These sites are not scheduled in the District Plan. It also has the potential to affect unidentified subsurface archaeological remains that may be exposed during development.

Section 104(1)(a) of the RMA requires the decision-maker to have regard to any actual and potential effects on the environment of allowing the activity. Any adverse effects on archaeological deposits or features are considered to be minor and can be appropriately mitigated through archaeological investigation and recording to recover information relating to the history of Taharoa, or in the case of any surviving burial remains at R16/327, through appropriate action as directed by tangata whenua.

TIL is seeking an authority under the FTAA alongside its resource consent application for the Central and Southern Blocks.

TIL's existing Accidental Discovery Protocol was reviewed and found to be generally robust and appropriate. However, several refinements were recommended to ensure compliance with Heritage New Zealand guidelines. Following consultation with iwi, the Protocol was amended. The amendments ensure that iwi are notified at an early stage in the event of the discovery of kōiwi and are included in the distribution of archaeological reports.

Heritage New Zealand Pouhere Taonga Act 2014 Requirements

The HNZPTA protects all archaeological sites whether recorded or not, and they may not be damaged or destroyed unless an Authority to modify an archaeological site has been issued by Heritage NZ (Section 42).

An archaeological site is defined by the HNZPTA Section 6 as follows:

> '**archaeological site** means, subject to section 42(3), –
>
> (a) any place in New Zealand, including any building or structure (or part of a building or structure) that –
>
> (i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and
>
> (ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and
>
> (b) includes a site for which a declaration is made under section 43(1)'

Authorities to modify archaeological sites can be applied for under the HNZPTA or under the FTAA for listed or referred projects either in respect to archaeological sites within a specified area of land (as described in section 44(a) of the HNZPTA) or to modify a specific archaeological site where the effects will be no more than minor (as described in section 44(b) of the HNZPTA). An application for an archaeological authority for the purpose of conducting a scientific investigation or to carry out an exploratory investigation of any site or locality to confirm the presence, extent and nature of a site or suspected site may only be made under the HNZPTA.

As the proposed ironsand mining development has the potential to affect sites R16/52, R16/58, R16/61, R16/88, R16/89, R16/117, R16/150, R16/151, R16/155, R16/327, R16/572, and possibly additional unrecorded subsurface archaeological remains, an archaeological authority (under section 44(b) of the HNZPTA) is required from Heritage NZ before any work can be carried out that may affect the specific sites. TIL is seeking an authority under the FTAA alongside its resource consent application for the Central and Southern Blocks, primitively to address damage or destruction to sites R16/52, R16/58, R16/61, R16/88, R16/89, R16/117, R16/150, R16/151, R16/155, R16/327, and R16/572

and any other unidentified sites discovered as part of the project works. This assessment is provided in support of that application.

Conclusions

A total of 88 sites have previously been recorded within the area, with a new site found during the field survey.

Based on the results of the 2025 field survey, of the 89 recorded sites, a total of 58 are considered to be destroyed (65.2%), with 18 (20.2%) considered to be at least partially intact. One site has a missing record, but its recorded location indicates that it has probably been destroyed, and the status of the remaining 12 (13.5%) sites is unknown.

The proposed reworking of mining pits and dredging across the Central and Southern Blocks will potentially affect eleven recorded archaeological sites, though the status of all of these could not be confirmed. Two are located in the Central Block, both of which hare midden. Nine sites located in the Southern Block. One of these (R16/327) is in the northern zone of the Southern Block and is a Māori burial site where kōiwi tangata (human remains) were recorded in the 1970s and removed for reburial by local kaumatua. It is assumed that all known kōiwi were re-interred in the nearby reserve at that time. The other sites consist of midden (R16/52, R16/58, R16/88, R16/89, R16/150, R16/151, and R16/155) and a terrace site (R16/572). The remaining sites which are still present or potentially present within the study area are located outside the areas affected by the proposed works.

The potentially affected midden sites are considered to have limited archaeological value, with the terrace site considered to have limited to moderate value, and any effects can be appropriately mitigated through archaeological investigation and recording to recover information relating to the settlement history of the area, under the provisions of the HNZPTA. If any kōiwi tangata associated with R16/327 are still present, their primary values would be cultural, and they should be appropriately managed as directed by tangata whenua and Heritage NZ.

Overall, the potential adverse effects on archaeological values are considered to be minor, due to the limited/moderate archaeological values of the recorded sites.

RECOMMENDATIONS

- An Authority to modify archaeological sites within the proposed development area is to be applied for under 43(3)(i) of the Fast-track Approvals Act 2024 prior to any works in the vicinity (within 100m) of the recorded locations of sites R16/52, R16/54, R16/58, R16/61, R16/73, R16/88, R16/89, R16/117, R16/150, R16/151, R16/155 and R16/327.
- Because it is possible that additional unrecorded sites may be exposed during earthworks, the Authority application should include any additional sites that may be discovered when works are under way.
- As the potentially affected sites relate to Māori settlement, tangata whenua have been consulted, in accordance with requirements for substantive applications under the FTAA, including those that require an application for an archaeological authority. Continued engagement with iwi is recommended throughout the application process.

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APPENDIX A: SITE RECORD FORMS

Presented in a Separate Document

APPENDIX B: FIELD SURVEY PHOTOGRAPHS

Central Block – Survey Photographs

Figure 34. View northwest over recorded location of R16/4

Figure 35. View north over the recorded locations of R16/5, R16/60, R16/62, R16/63. R16/64, R16/65 and R16/66

Figure 36. View northwest over the recorded locations of R16/5, R16/60, R16/62, R16/63. R16/64, R16/65 and R16/66

Figure 37. View southwest over recorded location of R16/17

Figure 38. View northwest over the recorded locations of R16/60, R16/62, R16/5, R16/63. R16/64, R16/65 and R16/66

Figure 39. View east over recorded location of R16/61 (within covenanted area)

Figure 40. View southeast over recorded location of R16/68

Figure 41. View east over recorded locations of R16/69, R16/70, R16/71 and R16/72

Figure 42. View north over recorded location of R16/73

Figure 43. View east over the recorded location of R16/104

Figure 44. View southwest over recorded location of R16/105

Figure 45. View northwest over recorded location of R16/105

Figure 46. View west over recorded locations of R16/106 and R16/108

Figure 47. View north over recorded location of R16/107

Figure 48. View northwest over recorded location of R16/110

Figure 49. View southeast over recorded location of R16/111

Figure 50. View west over recorded location of R16/113

Figure 51. View east over recorded location of R16/113

Figure 52. View north over recorded location of R16/114

Figure 53. View northeast over recorded location of R16/115

Figure 54. View southwest over recorded location of R16/116

Figure 55. View west over recorded location of R16/117

Figure 56. Exposed surface shell at recorded location of R16/117

Figure 57. View east over recorded location of R16/566

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Figure 58. View northeast over recorded location of R16/10

Figure 59. View northeast over recorded location of R16/11

Figure 60. View northeast over recorded location of R16/11

Figure 61. View northeast over recorded location of R16/19

Figure 62. View south over recorded location of R16/53

Figure 63. View south over recorded location of R16/54

Figure 64. View southwest over recorded location of R16/55

Figure 65. View northwest over recorded location of R16/56, R16/59 and R16/173

Figure 66. View north over recorded location of R16/57

Figure 67. View south over recorded location of R16/58. Note deposit of shell in centre of image

Figure 68. Marine shell at recorded location of R16/58

Figure 69. View southeast over recorded location of R16/93 and R16/145

Figure 70. View east over recorded location of R16/94

Figure 71. View northeast over recorded location of R16/94

Figure 72. View southwest over recorded location of R16/94

Figure 73. View northeast over recorded location of R16/95

Figure 74. View southwest over recorded location of R16/96

Figure 75. View southwest over recorded location of R16/97 and R16/102

Figure 76. View east over recorded location of R16/99 and R16/101

Figure 77. View southwest over recorded location of R16/144

Figure 78. View southeast over recorded location of R16/144

Figure 79. View southwest over recorded location of R16/147

Figure 80. View showing R16/148 in a test pit

Figure 81. View of R16/149

Figure 82. View of R16/150

Figure 83. Exposed midden deposit R16/150

Figure 84. View west over eroding deposit R16/151

Figure 85. View east over recorded location of R16/152

Figure 86. View south over recorded location of R16/155

Figure 87. View east over recorded location of R16/213

Figure 88. View southeast over recorded location of R16/213

Figure 89. View northeast over recorded location of R16/279

Figure 90. View north over recorded location of R16/327

Figure 91. View southeast over recorded location of R16/327

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Figure 92. View west towards recorded locations of R16/8 and R16/143

Figure 93. View southeast over recorded location of R16/12

Figure 94. View facing south across Waiohipa Stream and the area of R16/12

Figure 95. View northwest over recorded location of R16/51

Figure 96. View southeast over recorded location of R16/51

Figure 97. View north over recorded location of R16/89 (centre right of image)

Figure 98. View south over recorded location of R16/52

Figure 99. View northwest over recorded location of R16/137. This is probably also the location of R16/568

Figure 100. View southeast over recorded location of R16/137

Figure 101. Exposure of midden deposit R16/137

Figure 102. View southeast over recorded location of R16/135

Figure 103. View northwest over recorded location of R16/136, with R16/135 arrowed at right

Figure 104. View southeast over recorded location of R16/138

Figure 105. View northeast over recorded location of R16/138

Figure 106. View southeast towards recorded location of R16/140

Figure 107. View southwest over site R16/572