

WAIHI NORTH PROJECT - FAST TRACK APPROVAL: ASSESSMENT OF HISTORIC HERITAGE AND ARCHAEOLOGICAL EFFECTS

Prepared for Oceana Gold (New Zealand) Ltd

Document Number:

April 2025



By

Kim Tatton (MA Hons)

Rod Clough (PhD)

Clough
& ASSOCIATES LTD

321 Forest Hill Rd,
Waiatarua, Auckland 0612
Telephone: (09) 8141946
Mobile 0274 850 059
www.clough.co.nz

TABLE OF CONTENTS

Executive Summary	1
Wharekirauponga Mining Area.....	1
Willows Farm SFA (WUG)	1
Services Trench.....	2
Gladstone Open Pit (GOP), WUG Portal and Processing Plant areas	2
Tailings Storage Facility (TSF3).....	3
Northern Rock Stack (NRS).....	3
Māori Cultural Values.....	3
Summary of Historic Heritage Requirements under the RMA:.....	4
Summary of Historic Heritage Requirements under the HNZPTA:	4
Introduction	5
Project Background.....	5
Waihi North Project Description.....	5
Activities likely to be undertaken in Years 1-2.....	6
Activities likely to be undertaken in Years 3 - 16.....	7
Activities likely to be undertaken in Years 17-18.....	7
Methodology	7
Historical Background	12
Wharekirauponga Underground Mine (WUG)	14
The Proposal.....	14
Wharekirauponga Mining Area.....	20
Recorded Archaeological Sites	20
Information from Early Survey Plans and Aerials	25
Field Assessment.....	25
Willows Farm Surface Facilities Area (SFA)	34
Recorded Archaeological Sites	34
Information from Early Survey Plans and Aerials	39
Field Assessment.....	46
Service Trench	55
The Proposal.....	55
Recorded Historic Heritage.....	55
Gladstone Open Pit (GOP), MUG and WUG Portals, and Processing Plant areas	61
The Proposal.....	61
Recorded Historic Heritage.....	118
Tailings Storage Facility 3 (TSF3).....	126
The Proposal.....	126

Recorded Historic Heritage.....	128
North Rock Storage (NRS)	131
The Proposal.....	131
Recorded Historic Heritage.....	133
Summary of Results	136
Wharekirauponga Mining Area.....	136
Willows Farm SFA (WUG)	136
Services Trench.....	137
Gladstone Open Pit (GOP), WUG Portal and Processing Plant areas	137
TSF3	138
NRS	138
Māori Cultural Values.....	138
Survey Limitations	139
Archaeological Value and Significance	139
Assessment of Historic Heritage Effects and Mitigation.....	149
Wharekirauponga Underground Mine (WUG)	149
GOP.....	154
TSF3	160
NRS	161
Statutory Considerations	164
Resource Management Act 1991	164
Heritage New Zealand Pouhere Taonga Act 2014.....	171
Conservation Act 1987.....	172
Conclusions	174
Recommendations	175
WUG	175
GOP.....	175
TSF3	176
NRS	176
General Recommendations	177
Bibliography.....	178
Appendix 1 : NZAA Site Record Forms.....	180
Appendix 2 : Hauraki District Plan Historic Heritage Inventory.....	181
Appendix 3 : Recorded heritage Features at T12/681 / T12/1290 Royal Standard Battery, Gold Mining Area and Tramway	182
Appendix 4 : Union Hill (Waihi) Heritage Landscape Management Plan (Macready and Clough Jan 2016)	183

Appendix 5 : Oceana Gold Project Martha, Waihi: Part 1 Historical and Archaeological
Background (Brown et al. 2018)..... 184

EXECUTIVE SUMMARY

Wharekirauponga Mining Area

- Two previously recorded archaeological sites are located near the head of the Wharekirauponga Valley and the WUG resource, which is the Royal Standard Battery and Gold Mining Area (T12/681) and the Royal Standard Gold Mining Tramway (T12/1290) from Parawai Quarry Road to the Royal Standard gold mining area within the Wharekirauponga Valley. These sites covers the wider Royal Standard mining area from the 1890s, incorporating the battery and cyanide plant remains, adits and tunnels along with other gold mine workings, tramways and a water race, the site of previous mine buildings, and numerous pieces of machinery and artefacts.
- The Royal Standard Battery and Gold Mining Area, Wharekirauponga is also scheduled on the Hauraki District Plan – HAU271 Category B – Heritage Area, Regional or Sub-Regional Significance.
- A number of surface drilling rigs and a camp have previously been erected at the WUG orebody around and in close proximity to T12/681, but have been located away from known heritage features.
- The effects on heritage values from WKP exploratory drill sites, vent shafts and the four larger drill sites for hydrogeological purposes within proximity of the identified heritage features of T12/681 Royal Standard Battery and gold mining area and the Royal Standard Gold Mining Tramway (T12/1290) and/or the scheduled Heritage Area - Royal Standard Battery, Wharekirauponga HAU271 Category B, will need to be assessed individually as they are currently indicative only. The location of these will be determined / confirmed following the undertaking of a site selection protocol that will evaluate potential drill and vent sites against ecological, freshwater, landscape, heritage and recreational criteria. The intention is to avoid impacting on any heritage features if at all possible.

Overall the effects on historic heritage after recommended mitigation are likely to be minor in relation to the proposed Wharekirauponga Mining Area.

Willows Farm SFA (WUG)

- The proposed Surface Facilities Area (SFA) of the WUG mine will remove a section of the Mataura or Waihi Gold Mining Co. Water Race, which is a recorded archaeological site T13/961.
- The proposed temporary Rock Stack and helipad the SFA will remove part of one, possibly two, sections of the High-Level Walmsley Timber Tramway located above and south and west of the tunnel portal. This tramway has been recorded as T13/963 in the NZAA site record file, although it was likely constructed c. 1901.
- A small part of the previous Willows Timber Tramway alignment may be affected by the proposed activity where access to the main infrastructure site will be along

Willows Road and a small detention pond is proposed east of Willows Road. This tramway has been recorded as an archaeological site T13/962 in the NZAA site record file, although it is believed to have been constructed c. 1901.

Overall, the effects on historic heritage after recommended mitigation are likely to be minor in relation to the proposed WUG.

Services Trench

- The northern extent of the proposed Services Trench alignment follows Willows Road from the WUG main infrastructure site to SH25. Previously the Willows Timber Tramway (T13/962) followed much of what is now Willows Road, however, there is no visible evidence of the tramline in this area, having been removed and modified by road construction.
- To the north of the Processing Plant the alignment of the Services Trench intersects a small drive associated with the Silverton Gold Mining Complex T13/819 on Silverton Hill, and a drive associated with the Favona Mine T13/306. The Services Trench is unlikely to be of a scale or depth to have any impact on these deep subsurface features.

Overall, the effects on historic heritage after recommended mitigation are likely to be nil-less than minor in relation to the proposed Services Trench.

Gladstone Open Pit (GOP), WUG Portal and Processing Plant areas

- The Gladstone Open Pit will affect and remove part of the Winner Hill gold mining complex and pre-1900 historic workings (T13/820) and part of the Gladstone Hill gold mining complex and pre-1900 historic workings (T13/821). Other, so far unidentified, subsurface remains relating to mining activities are likely to be present and may be exposed as part of the proposed GOP.
- Two sections of Lower Level Water Race (T13/817) will be affected and removed by the proposed southern stockpile, Southern Spillway Channel and Western Spillway and Drainage Channel associated with the Gladstone Pit.
- Harvesting of mature pine trees on the southern extent of Winner Hill may impact on the Low Level Water Race (T13/817).
- No archaeological features of Māori origin have been identified on Gladstone Hill or Winner Hill, and within the proposed GOP. It is considered unlikely that any such features would have survived within the project area as a result of modern mining and farming activities.

Overall, the effects on historic heritage after recommended mitigation are likely to be minor in relation to the proposed GOP, WUG Portal and Processing Areas.

Tailings Storage Facility (TSF3)

- The proposed TSF3 will have no direct physical impact on any known archaeological or historic heritage items. It is highly unlikely that old underground workings exist in this area, or any other features associated with historical mining activity.
- There are no known pre-European Māori sites within the TSF3 footprint.

Overall, the effects on historic heritage after recommended mitigation are likely to be nil-less than minor in relation to the proposed TSF3.

Northern Rock Stack (NRS)

- The NRS and associated infrastructure will not directly impact on the Queen of Waihi Shaft but due to safety reasons, it will be backfilled and capped.
- Other, so far unidentified, remains relating to mining activities within areas of undergrowth or topsoil, may to be present and exposed as part of the proposed NRS.
- There are no known pre-European Māori sites within the NRS.

Overall, the effects on historic heritage after recommended mitigation are likely to be less than minor in relation to the proposed NRS

Māori Cultural Values

- This is an assessment of effects on archaeological values and does not include an assessment of effects on Māori cultural values. It considers and acknowledges Māori values identified within cultural impact assessments prepared for OceanaGold as they relate to archaeological values and sites. It is noted that an assessment of effects of Māori values should only be made by the 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. The rich resources of Ohinemuri attracted Māori to the area and occupation can be traced back over centuries, and is evidenced by the numerous archaeological sites (namely middens, pits, terraces, and pa) and associated place names throughout the district.
- Māori cultural values interests and associations with the project area, and the potential impacts of the Waihi North Project on these, have been identified through iwi led Cultural Impact Assessments received by OceanaGold.

Summary of Historic Heritage Requirements under the RMA:

- The assessment has determined that the Waihi North Project will not affect any scheduled item in the HDP. Any consent granted should include accidental discovery protocols, as a condition of consent.
- Resource consent would be required if historic heritage items within the scheduled Heritage Area - Royal Standard Battery, Wharekirauponga HAU271 Category B, are affected by the proposal.

Summary of Historic Heritage Requirements under the HNZPTA:

- The Waihi North Project will affect a number of recorded archaeological sites and therefore, a general Archaeological Authority is being applied for work to be carried out that may affect these sites. Other, so far unidentified, subsurface or near surface features relating to mining activities and the early history of Waihi township could also be exposed, therefore, all works undertaken for this project are included in this Authority application. Typically the archaeological Authority would be applied for under the Heritage New Zealand Pouhere Toanga Act 2014, but in this instance it is being sought as part of the Fast Track legislation.

INTRODUCTION

Project Background

Oceana Gold (New Zealand) Ltd (OGNZL) is proposing the Waihi North Project (WNP) to extend the life of its Waihi Operation at Waihi in the Waikato (Figure 1). OGNZL is proceeding to make a Fast-track application under the Fast-track Approvals Act as a Schedule 2A 'listed project,' which will seek approvals under the Resource Management Act 1991 (RMA), Heritage New Zealand Pouhere Taonga Act 2014 and other relevant legislation.

The WNP would comprise the Wharekirauponga Underground Mine (WUG), approximately 10km north of the Waihi Township, and associated Surface Facilities Area (Willows Farm SFA), the Gladstone Open Pit (GOP) and TSF, the Northern Rock Stack (NRS), Tailings Storage 3 (TSF3) and upgrades to the existing Processing Plant and Water Treatment Plant (Figure 2).

This assessment of heritage and archaeological effects was commissioned by OGNZL as the WNP has the potential to impact on various archaeological and historic heritage sites. These historic heritage sites largely relate to the extensive historic gold mining landscape in Waihi and the settlement that has developed around this. The assessment will also assess the significance of those impacts and provide recommendations on how adverse impacts can be appropriately remedied or mitigated.

This report has been prepared as part of the required assessment of effects accompanying an application under the Fast-track Approvals Act, which includes consideration of the heritage provisions of the District Plan (RMA) and the Authority to modify various archaeological sites under the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA). Recommendations are made in accordance with statutory requirements.

Due to the size and complexity of the project the Historical and Archaeological Background – outlining the historical background research, results of the site visit and assessment of historic heritage values, of the wider project area within its Waihi context is provided in Brown et al. May 2018, which is attached as an appendix to this report.

Waihi North Project Description

See the Assessment of Environmental Effects produced by Mitchell Daysh Ltd for a detailed project description accompanying the application. In brief the WNP will comprise (see Figure 2 - Figure 4):

- A new underground mine Wharekirauponga (WUG), located approximately 10km north-west of the current Processing Plant under land administered by the Department of Conservation (DOC) (Coromandel Forest Park). Site infrastructure supporting the mine will be located on OGNZL owned farmland located at the end of Willows Road. Minimal surface features within the forest will be on conservation land in the form of fenced vent raises, and at the WUG mine resource for investigation and exploration with associated infrastructure.

- The mining of GOP, located near the existing Processing Plant, centred over Gladstone Hill. This pit will be converted to a tailings storage facility once mining is complete;
- A new tailings storage facility to the east of existing TSF1A, called TSF3;
- A new rock stack (NRS) at the Northern Stockpile area adjacent to the existing TSF2;
- Upgrades of the existing Water Treatment Plant (WTP);
- Upgrades of the existing Processing Plant;
- Modifications to the existing overland and load out conveyors to allow rock loading and conveying to the NRS and return of rock to the mines for backfilling;
- Re-siting of some of the existing surface infrastructure is required due to proximity of the proposed GOP to the existing Favona portal; and
- Establishment of a new Willows Farm Surface Facilities Area (SFA) near the Willows Road portal will be required to support the tunnelling and subsequent mining at WUG. A new portal for ore delivery and rock return will be constructed close to the Processing Plant for servicing the WUG Mine via a tunnel extension to meet at the Willows Road vent raise (underground);
- A services trench between an existing Waihi Surface Facilities Area / Processing Plant and the proposed SFA.

OGNZL considers the proposed activities of the Waihi North Project can be separated into three sequences: works to be undertaken within the first two years of the project; works to be undertaken between years three and 16 of the project, and rehabilitation and closure activities to be undertaken in years 17 – 18 of the project.

Activities likely to be undertaken in Years 1-2

- Establish /drill the Willows Access Tunnel decline to the first vent shaft;
- Establish/install infrastructure associated with the Willows Access Tunnel, including the Willows Portal, the SFA and Services Trench (linking the existing WTP and SFA);
- Upgrade the existing WTP to double its treatment capability;
- Support WUG mine resource investigation and exploration, including:
 - Four exploration drill sites within the WUG requiring 150m² clearance each (total 600m²);
 - Four surface geotechnical exploration drill sites above the WUG Dual Tunnel alignment requiring 150m² clearance each (total 600m²);
 - One operational drill rig;
 - Two additional camps and messing facilities at existing or proposed drill sites (currently 2, resulting in 4);

- One helicopter pad;
- Two river pump sites;
- The ability to use a man-portable rig for up to 50 sites for drilling shorter (less than 100m) holes

Activities likely to be undertaken in Years 3 - 16

- All other activities included in the project description provided in the Substantive Application Report prepared by Mitchell Daysh Ltd, including within the Coromandel Forest Park;
- Four exploration drill sites above the WUG;
- Two operational drill rigs;
- Two camps and messing facilities;
- One heli-pad;
- Four exploratory drill sites with larger pads (up to 900m²) for hydrogeological pump test investigations and ventilation construction.

Activities likely to be undertaken in Years 17-18

- Mine remediation and closure activities.

Methodology

The New Zealand Archaeological Association's (NZAA) site record database (ArchSite), the Hauraki District Plan (2014) (HDP) schedules and the Heritage New Zealand Pouhere Taonga (Heritage NZ) New Zealand Heritage List/Rārangi Kōrero were searched to determine whether any archaeological or other historic heritage sites had been recorded on or in the immediate vicinity. Literature and archaeological reports relevant to the area were consulted (see Bibliography). Plans, maps and photographs from collections such as the Sir George Grey Special Collections (Auckland Libraries), Auckland War Memorial Museum, Alexander Turnbull Library, Archives New Zealand, and Land Information New Zealand (LINZ) were searched for material relevant to the project area. Certificates of Title and Residence or Business Site Licenses were searched through LINZ and Archives New Zealand to establish ownership of potentially affected sites in the project area. Aerial photographs dating from the 1940s and historical plans were also examined (and compared to present day aerials) to establish past activities and features within the project area that may no longer be extant.

Visual inspections of the project area were conducted on a number of occasions. The main fieldwork occurred during June 2017, when a study list for further research was compiled based on the fieldwork results, and in November 2017, when more detailed aspects of the proposal were being developed. Additional surveys were carried out between 2018 and 2021, and in 2024.

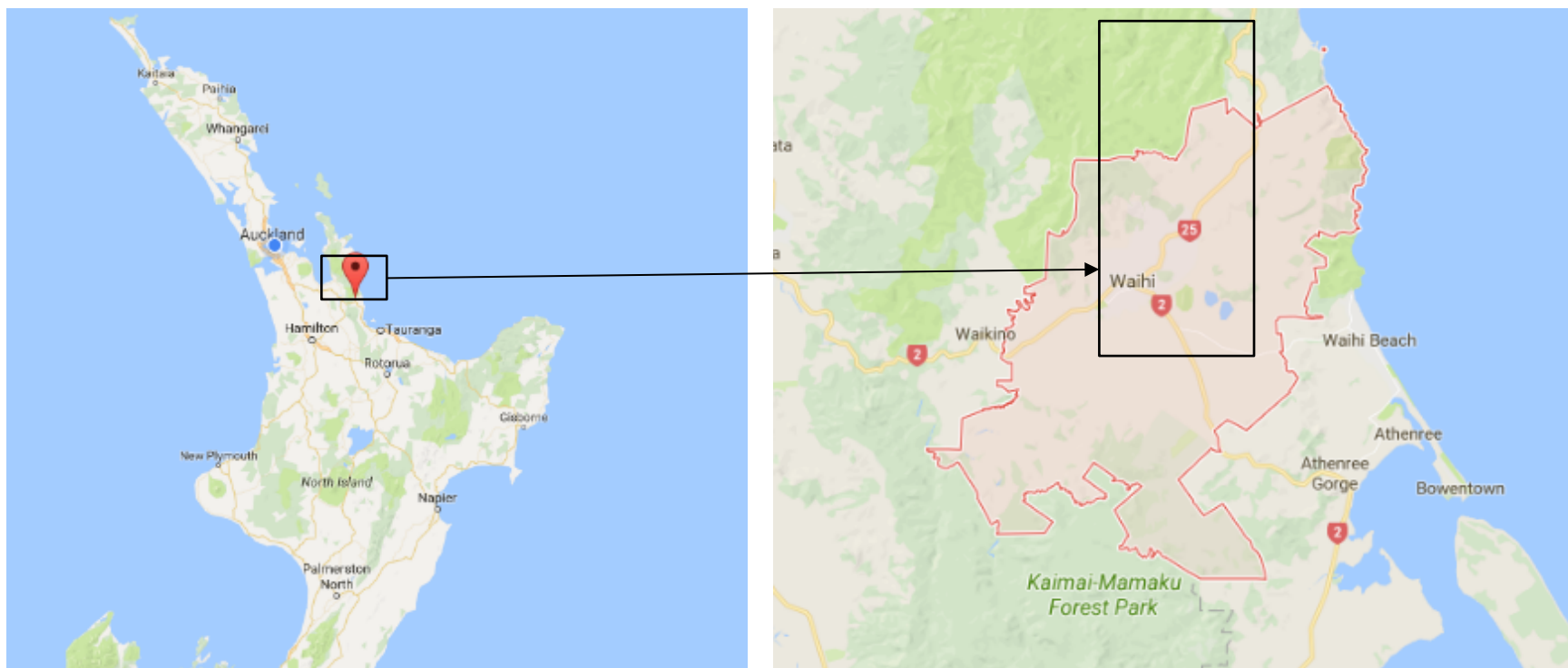


Figure 1. General location map showing the regional context for the Waihi North Project (source: Google Maps 2020)

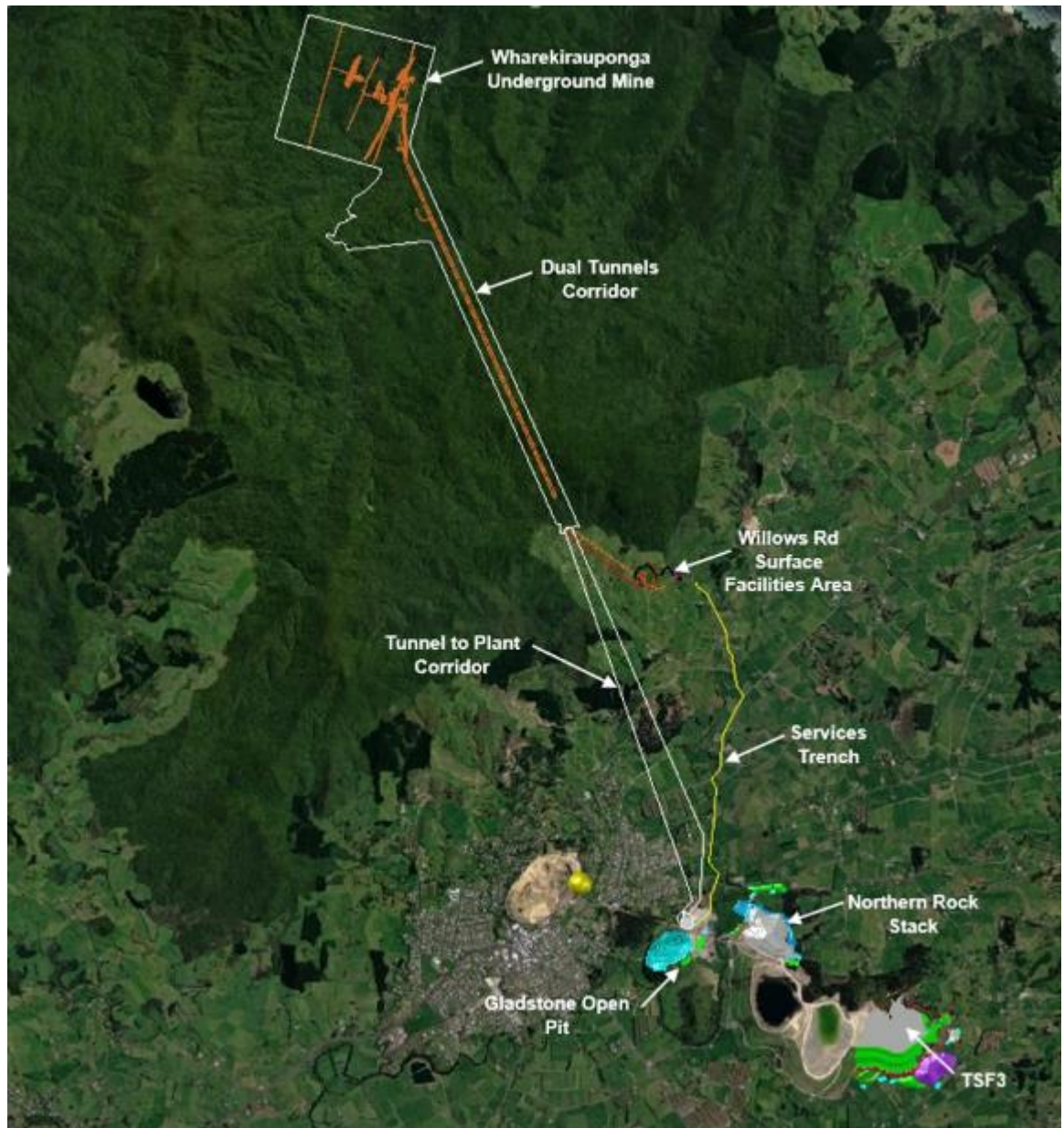


Figure 2. OGNZL's proposed Waihi North Project (source: Oceana Gold 2024)

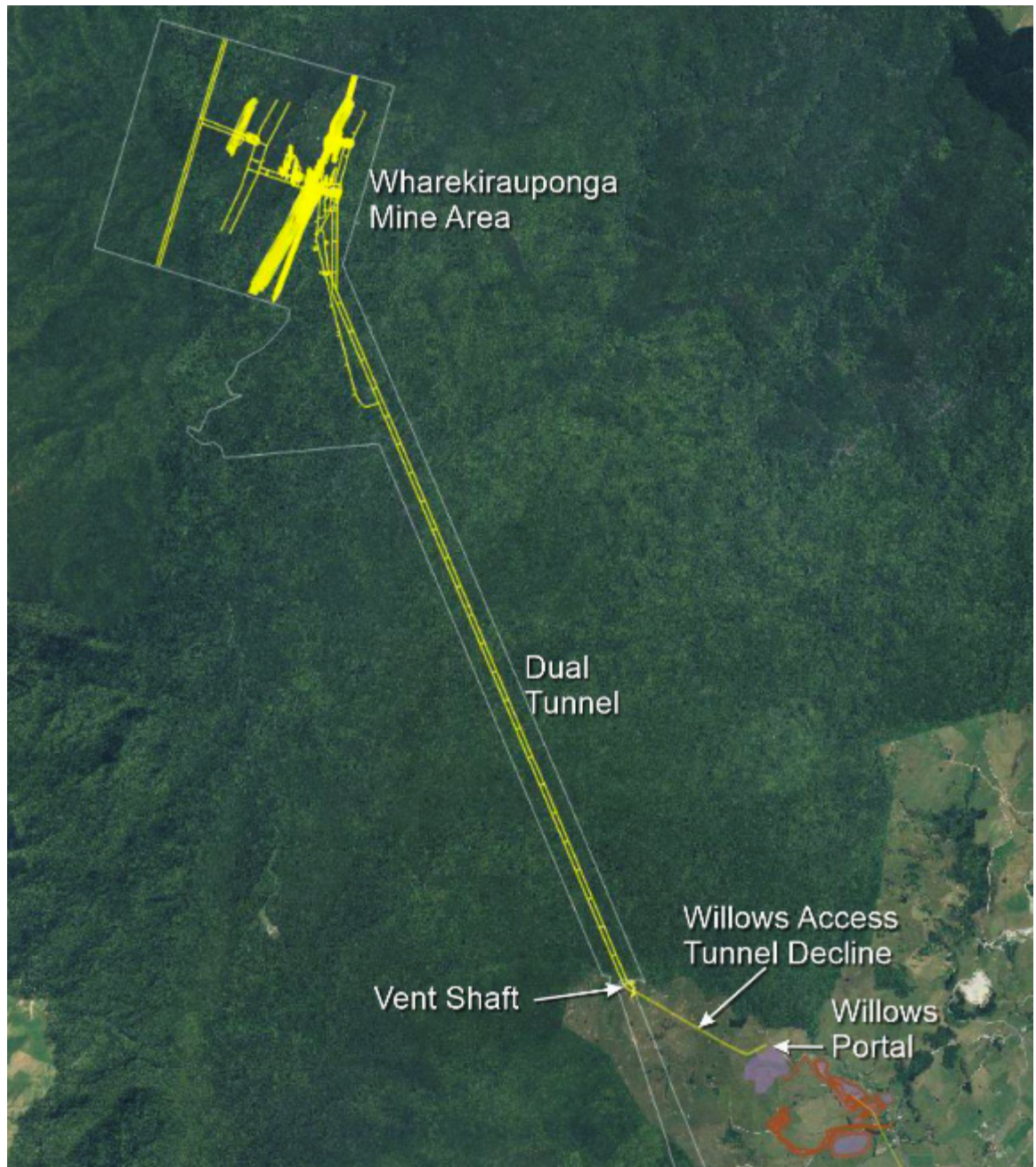


Figure 3. Location of Willows Access Tunnel Decline (source: Oceana Gold 2024)

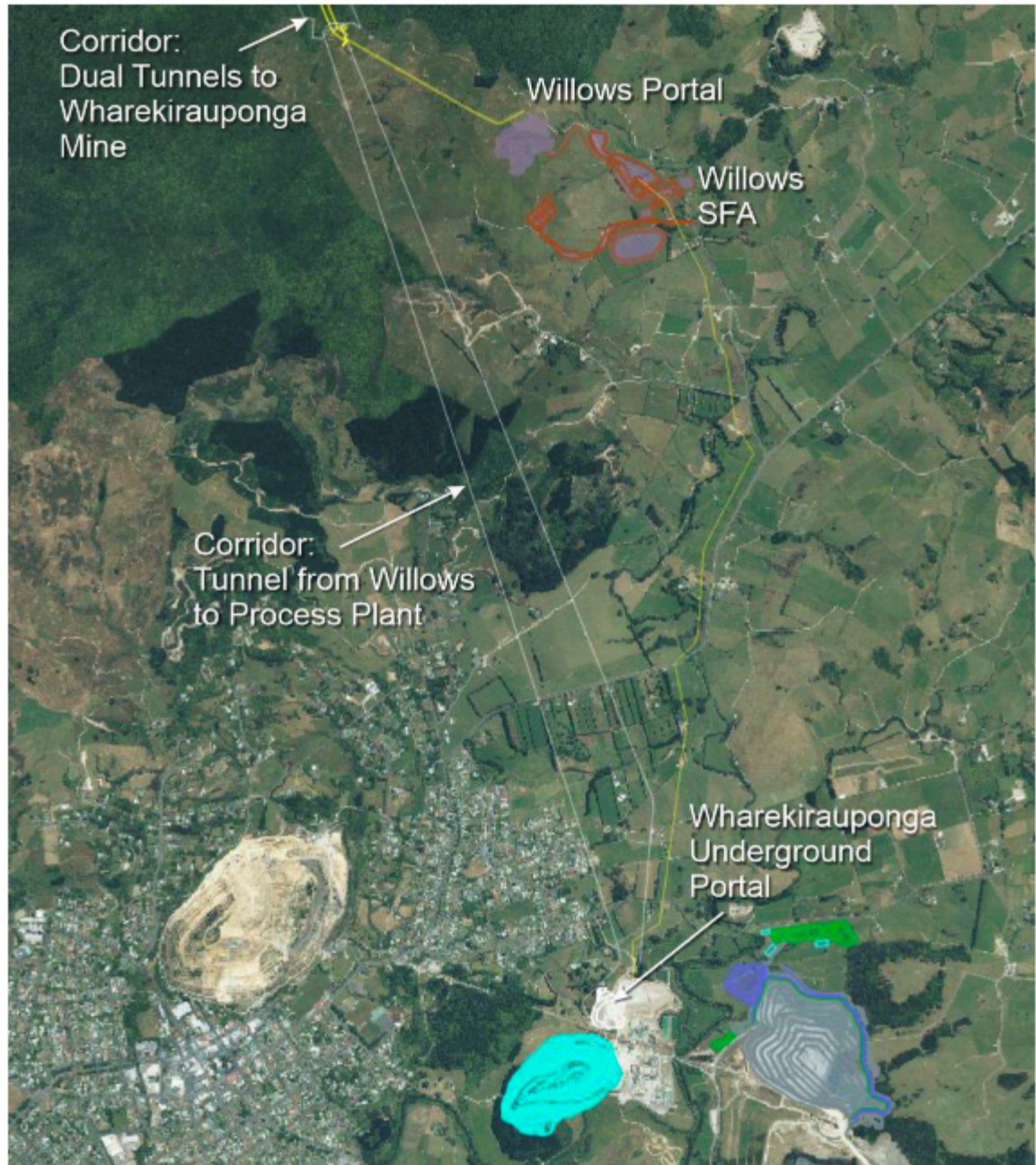


Figure 4. Location of the Willows Portal and SFA (source: Oceana Gold 2024)

HISTORICAL BACKGROUND

The accompanying report *Oceana Gold Project Martha, Waihi: Part 1 Historical and Archaeological Background* (Brown et al. 2018) (see Appendix 5) outlines the historical background research, results of the previous archaeological survey and assessment of historic heritage values within the wider project area within its Waihi context and should be consulted in conjunction with this assessment report.

In summary, the rich resources of Ohinemuri attracted Māori to the area and occupation can be traced back over centuries; evidenced by the numerous archaeological sites (namely middens, pits, terraces, and pa) and associated place names throughout the district. Several different iwi and hapu groups claim affiliation with the land including Ngāti Hako, Nga Marama, Marutuahu Tribes, Ngāti Koi, and Ngāti Tara, whose tribal territories commonly changed in response to warfare, migration or intermarriage.¹

Early Māori settlements throughout Hauraki were primarily established near shorelines and major rivers and were occupied either long-term, seasonally, or temporarily, according to the availability of food resources. Across the region areas of large-scale cultivatable land, able to support large village groups, were limited and many hapu were obliged to negotiate rights to access various resources across the district.² Changing alliances, migration and warfare resulted in a detailed system of customary land rights which was based on various factors such as ahi ka (continuous residence and cultivation), raupatu (conquest), tuku ('gift' or permission to occupy), and ancestral occupation.³ Kin groups were generally dispersed and mobile, maintaining claims in a number of areas; however, many parts of the region were regarded as 'whenua tautohe', contested between two or more claimant parties.⁴

Many pa were located on prominent sites across the Hauraki and Ohinemuri areas, including at Waihi where the ridge pa known as Motu Kehu was constructed on what is now Black Hill (NZAA T13/815).⁵ A pa may have also stood near the base of Pukewa (now Martha Mine) and the hill is known to have been used by Māori as an urupa, a sacred place to bury their dead.⁶ Nearby Gladstone Hill is also thought to contain urupa, and Māori burials are believed to have taken place within a number of caves across the site.⁷

Gold in the Martha Reef was discovered in 1878 by John McCombie and Robert Lee. Although they were initially told that their two-ton bulk sample was not payable, others such as William Nicholl were drawn to the area in 1880 to set up claims. The majority of these single party claims were amalgamated in 1883 to create the Martha Extended Gold

¹ While based on reliable documentary sources, this information should not be viewed as complete or without other context. There are a large number of iwi historically associated with the region and many other histories known to tangata whenua. Taimoana Turoa, Te Takoto o Te Whenua o Hauraki: Hauraki Landmarks, Auckland, 2000, p.194.

² Waitangi Tribunal, The Hauraki Report (Volume One) Wai 686, Wellington, 2006, p.42.

³ Ibid., p.44

⁴ Ibid

⁵ Note: This site is recorded by the NZAA as Motu Kehu (NZAA T13/815).

⁶ Turoa 2000, p.194; Caroline Phillips 2000. Waihi Gold Mining Drilling Extension. Archaeological report prepared for the Waihi Gold Mining Company, p.8.

⁷ Phillips 2000, p.8. C. Phillips notes that the slopes of hills in and around what became the Waihi township may have been utilised by Māori for gardening or other purposes to support settlement.

Mining Company of Auckland (McAra 1988). The Martha Mine continued to be unprofitable and was subsequently purchased by the London based Waihi Gold Mining Company (Waihi GMC). The Waihi GMC bought up many of the small mines during the early 1890s; with the exception of the Silverton Gold Mine which was worked by the Silverton Mining Company. The Waihi GMC also expanded the battery at the base of Union Hill during the early 1890s. The majority of the Waihi GMC's ore was tested at the Union Hill battery until the Victoria Mill at Waikino became fully operational. The Union Hill battery subsequently closed in 1912.

1902-1910 were the boom years for mining in Waihi, however, by the 1920s and early 1930s the boom had subsided and mining in Waihi began to slow down with the eventual closure of the Martha Mine in 1952. The Waihi GMC's Martha Mine was not only the most productive gold mine in New Zealand it also had the greatest longevity (Ritchie 1990: 19). Effectively being worked from 1881 through to 1952 and reopening in 1988 by the (new) Waihi Gold mining company.

Specific historical background as it relates to particular aspects of the WNP are provided below in the discussion of Recorded Archaeological Sites.

WHAREKIRAUPONGA UNDERGROUND MINE (WUG)

The Proposal

The Wharekirauponga orebody is located approximately 10km north of the township of Waihi (Figure 2). The resource lies beneath the Coromandel Forest Park within the Wharekirauponga Minerals Mining Permit (60541) area. OGNZL is proposing to construct an access tunnel system to access and mine the orebody. The project will comprise surface infrastructure, tunnel portals, a tunnelling system and the underground mine itself (Figure 3 and Figure 5).

The new Willows Farm Surface Facilities Area (SFA) for the project will be sited at the end of Willows Road on the Willows Road Farm over a total surface land area of 18ha, including the initial main access portal (Willows Portal), an office, workshop, carpark and helipad, lay down area for storage of equipment, development ore, rock stack and topsoil stockpiles extracted through the tunnelling process, sumps/ponds for both general surface water retention/settling and mine water and rock stack runoff collection, explosives magazine, an 8m wide haul road from the portal to the rock storage pad, with a connection to the workshop and heavy vehicle wash pad and a private road connection with Willows Road (Figure 5). The footprint of the surface infrastructure site at the end of Willows Road will first be stripped of topsoil, which will be stored in stockpiles covering an area of 2-3ha.

From the access portal at the main infrastructure site a 6.8 km dual decline tunnel system will extend to the base of the WUG resource. Ventilation raises are required for air circulation and to provide emergency exit from the orebody tunnel. Four ventilation and one egress shaft (total of up to five shafts) are proposed which will have nominal diameters of up to 5.5m. The initial ventilation shaft will be located to the south of the Coromandel Forest Park along the tunnel alignment. The second through fifth shafts (inclusive) will be located above the Wharekirauponga orebody (a).

Construction of all shafts will be driven from the surface down. All material from the shaft will be removed via loaders/trucks from within the underground tunnel.

A 4.7km tunnel will also be constructed to the Waihi Processing Plant (the WUG Portal - Figure 4) that will be utilised for transport of ore out of the mine and waste back into the mine for stope backfilling.

To support exploration activities at the Wharekirauponga Mining Area, proposed activities include:

- The establishment of up to 20 investigation and exploration drill sites comprising:
- Eight exploration drill sites;
- Eight geotechnical investigative drill sites (four within the existing Access Arrangement area and four above the WUG Dual Tunnel); and
- Four hydrogeological investigative drill sites;
- The undertaking of investigative and exploration activities at / from these drill sites;

- The establishment of sites for hydrological testing;
- The taking of groundwater for drilling activities;
- The undertaking of monitoring activities;
- The establishment of marked access tracks;
- The establishment of fenced predator controlled areas; and
- The establishment of frog fences around drill sites.

The drill sites would be sized the same as existing operations at a maximum disturbance area of 150m² per site. Indicative locations for the proposed eight exploration drill sites are shown in Figure 7. The drill sites may be located at any eight of the proposed additional drill sites shown in Figure 7.

Four of the geotechnical investigative drill sites would also be located within the area outlined in Figure 7.

Four of the geotechnical investigation drill sites would be located within the WUG Dual Tunnel corridor as shown in Figure 6b.

The four hydrogeological investigative drill sites would be located to assist with hydrogeological testing, baseline data collection, and / ongoing groundwater monitoring. The location of these sites will be determined based on a site selection protocol which is set out in section later in this section.

Four pumping test sites will be located within the area outlined in Figure 6a. Up to four ventilation shafts associated with Wharekirauponga mining operations will be established within the area outlined in Figure 6a, with it possible that the ventilation shafts may be established on the same sites as the pumping test sites mentioned above. The ventilation shaft sites may be sized up to 900 m² per site. The location of the pumping test sites and ventilation shaft sites will be determined based on the Site Selection Protocol.

Further details of these proposed activities are provided in the Substantive Application Report prepared by Mitchell Daysh Limited.

The hydrogeological drill sites, the sites for the pumping tests and ventilation shafts will be carefully selected. The exact locations of these sites will be carefully determined, taking into consideration:

- The hydrogeological data requirements;
- The general area in which drilling is required from a technical perspective; and
- Heritage, ecological, freshwater, landscape, and recreational values in those areas.

A Site Selection Protocol will be used for determining these sites, which utilises a multicriteria assessment (“MCA”). Utilisation of the site selection protocol will ensure that sites are best located to provide the necessary data and avoid as far as practicable any harm to heritage, ecological, freshwater, landscape, and recreational values.

It is intended that this protocol will apply a cascading assessment approach whereby a short list of suitable sites is selected based on OGNZL's technical requirements, with each shortlisted site then subject to the MCA referenced above. The final sites will be those of the shortlisted sites which best meet technical requirements whilst also best aligning with the environmental outcomes, which in the archaeological and heritage context include: *Disturbance to, or interference with known or previously unidentified heritage features and / or sites is avoided; and Archaeological features and features of particular significance to iwi are avoided.*

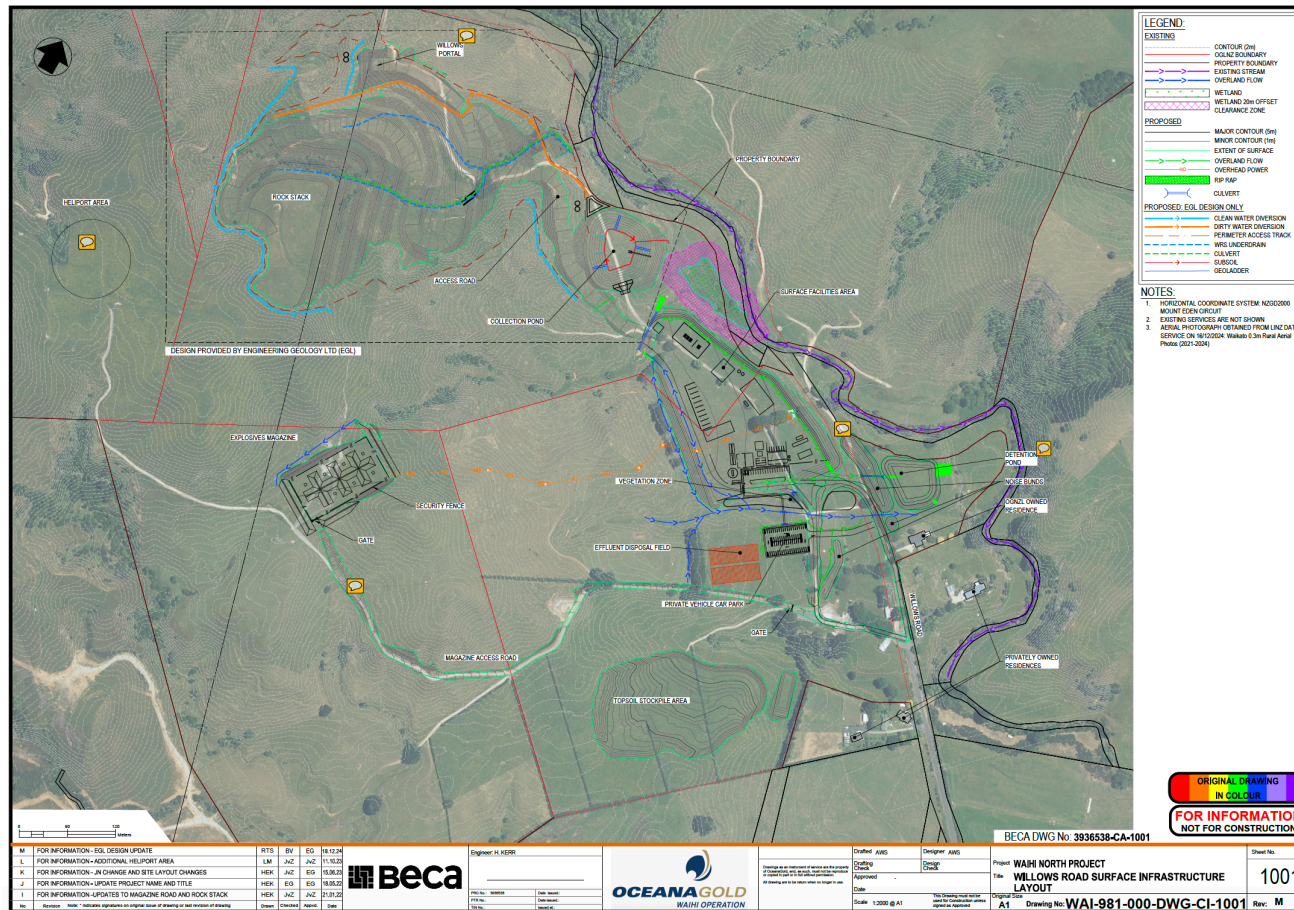


Figure 5. Waihi North Project Willows Road SFA Layout (source: OceanaGold 2024)

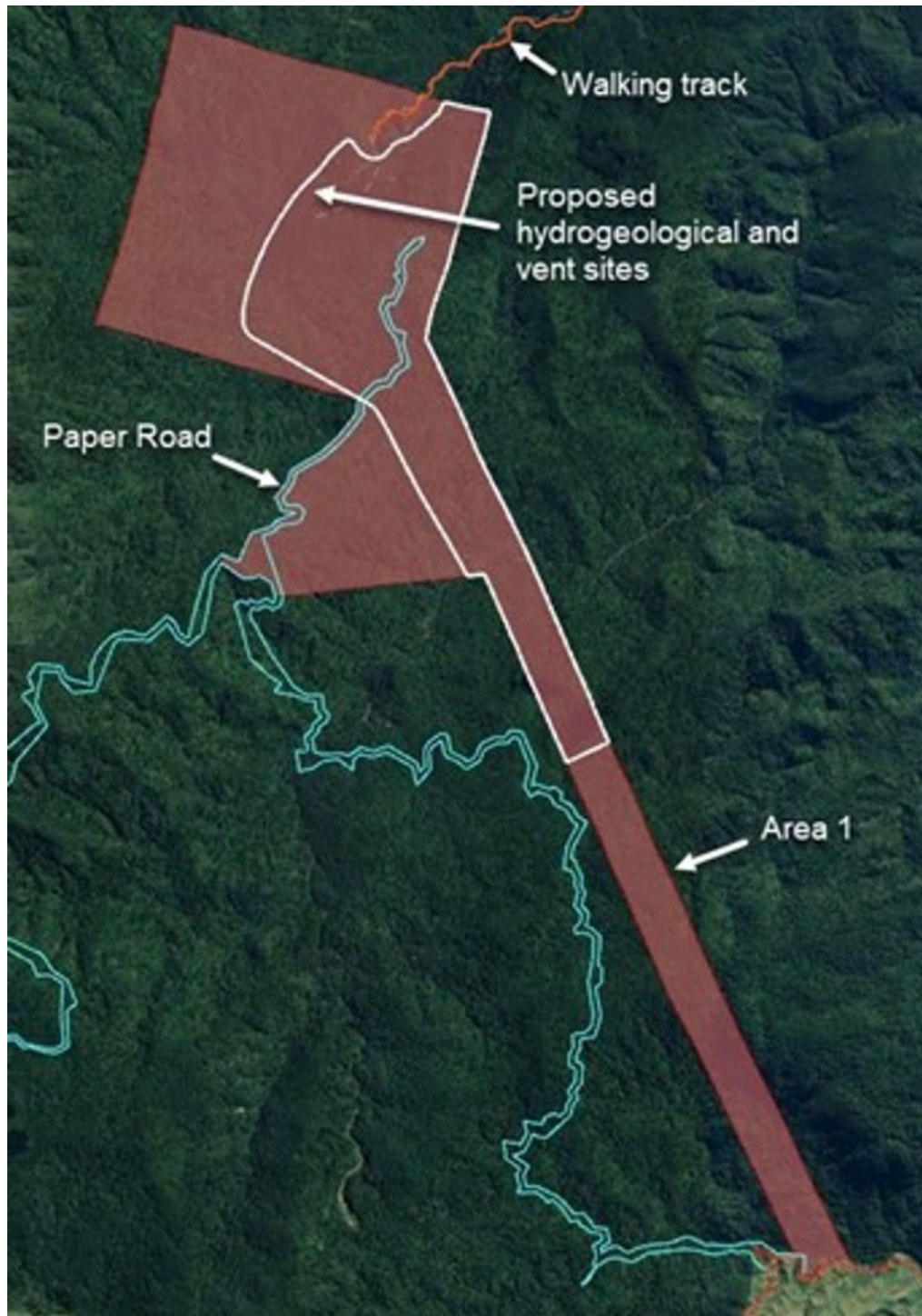


Figure 6a. Area in which vent sites and hydrological drill sites will be located



Figure 6b. Area in which the geotechnical investigation drill sites would be located within the WUG Dual Tunnel corridor

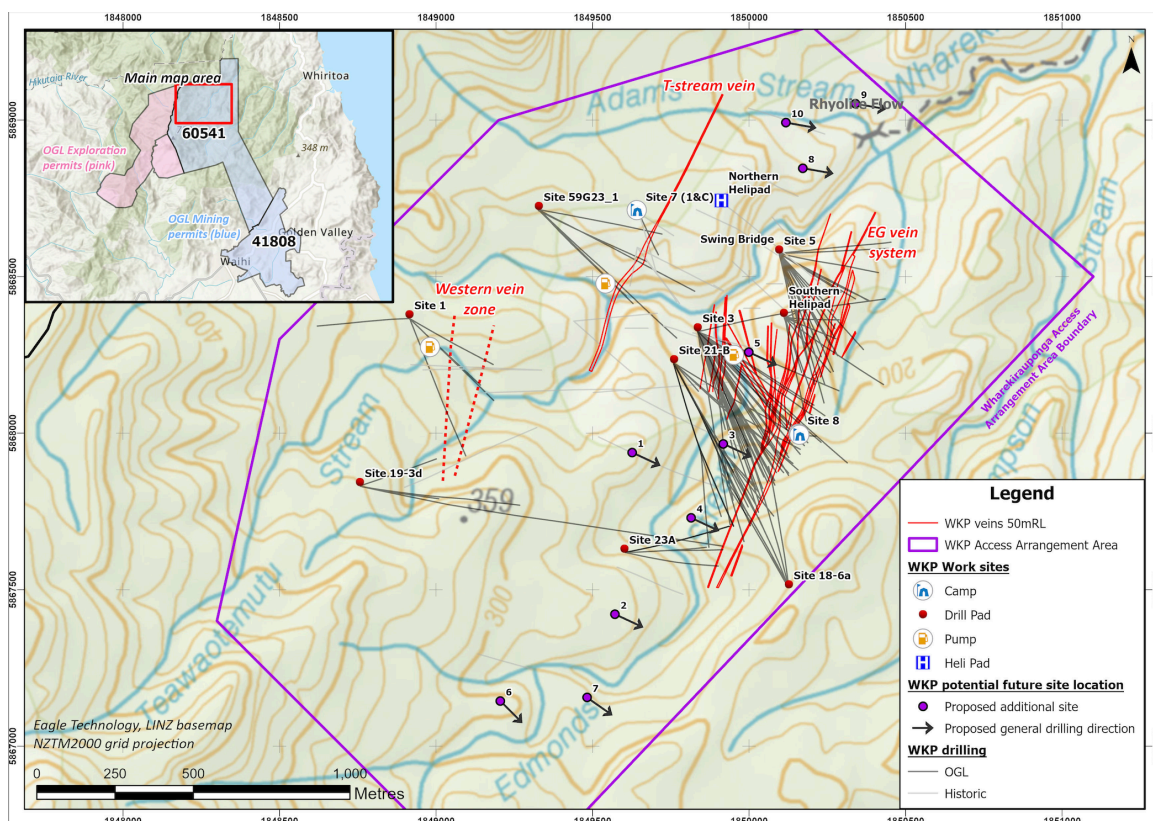


Figure 7. Indicative exploration drill site locations at the Wharekirauponga Mining Area (note the red lines are WKP veins and grey lines are underground drilling) (source: Oceana Gold 2024)

Wharekirauponga Mining Area

Recorded Archaeological Sites

Previous archaeological survey and the corresponding locations of recorded archaeological sites within the wider Waihi area has focused around the significant historic mining landscape associated with the settlement of Waihi township, and the Golden Cross gold mining area in the Waitekauri Valley to the west of the Project site. This is very apparent from the clustered distribution of recorded archaeological sites seen in Figure 8.

Two previously recorded archaeological sites are located near the head of the Wharekirauponga Valley and the WUG resource, which is the Royal Standard Battery and Gold Mining Area (T12/681) and Royal Standard Gold Mining Tramway (T12/1290) (see Figure 8, Table 1 and Appendix 1).

Table 1. Archaeological and other historic heritage sites recorded within the vicinity of the Wharekirauponga Mining Area.

NZAA Site No.	District Plan ref	HNZ List ref	Site Type	Location	NZTM Easting	NZTM Northing
T12/681	Historic Area		Royal Standard Battery and	Wharekirauponga Valley	1850383	5868875

	HAU 271 Cat B		Gold Mining Area			
T12/1290			Royal Standard Gold Mining Tramway and Gold Mining Area	Wharekirauponga Valley	1851476	5872549

Royal Standard Battery site Gold Mining Area and Tramway (T12/681, T12/1290)

The Royal Standard Battery site and gold mining workings (T12/681) covers the wider Royal Standard mining area from the 1890s, incorporating the battery and cyanide plant remains, adits and tunnels along with other gold mine workings, tramways and a water race, the site of previous mine buildings, and numerous pieces of machinery and artefacts. T12/1290 specifically covers the Royal Standard Gold Mining tramway and associated features from Parawai Quarry Road near Whangamata to the Royal Standard gold mining area within the Wharekirauponga Valley. Therefore, the site record for T12/1290 also incorporates and discusses the wider Royal Standard gold mining workings and heritage features along the tramway network.

The Royal Standard Battery and Gold Mining Area, Wharekirauponga is also scheduled on the Hauraki District Plan – HAU271 Category B – Heritage Area, Regional or Sub-Regional Significance (see Figure 9; Appendix 2). It is located within an area of Coromandel Forest Park public conservation land (PCL) at Wharekirauponga. The historic heritage sites associated with 19th century mining at Wharekirauponga have been identified as having moderate to high heritage values and have been prioritised in the Department of Conservation (DoC) land management system as an Actively Conserved Heritage Place.

Elsewhere on the Ohinemuri goldfield prospecting had been done as early as 1893 in the Wharekirauponga Valley near the head of the Wharekirauponga Stream some 10km to the north of Waihi township in the southern Coromandel Ranges. However, no claims were taken up until 1895, when a considerable number were pegged. In 1896 practically all the individual claims had been taken over by the Royal Standard Gold Mining Company of London (Moore and Ritchie 1996:122).

There was little underground mining actually undertaken at the Royal Standard, although the company spent a large sum of money constructing a horse drawn tramway 8km long down the valley to the Otahu Inlet just south of Whangamata, as there was no viable access in from Waihi to the south. They also purchased a battery with 80 stamps able to put through 2,400 tons in 24 days (Isdale 1984), constructed a water race to power the battery and built several buildings, including a manager's house, single men's barracks, a cook house, offices and a store house (Moore and Ritchie 1996:123).

By 1897, the Royal Standard Mine employed 197 men, living on site (sources say up to 250 people living on site), sawmilling and undertaking construction. However, in 1897 a manager arrived from England, who at once recommended the directors to stop work as the gold was not worth the cost of extraction. By June 1897 40 men had been laid off, and

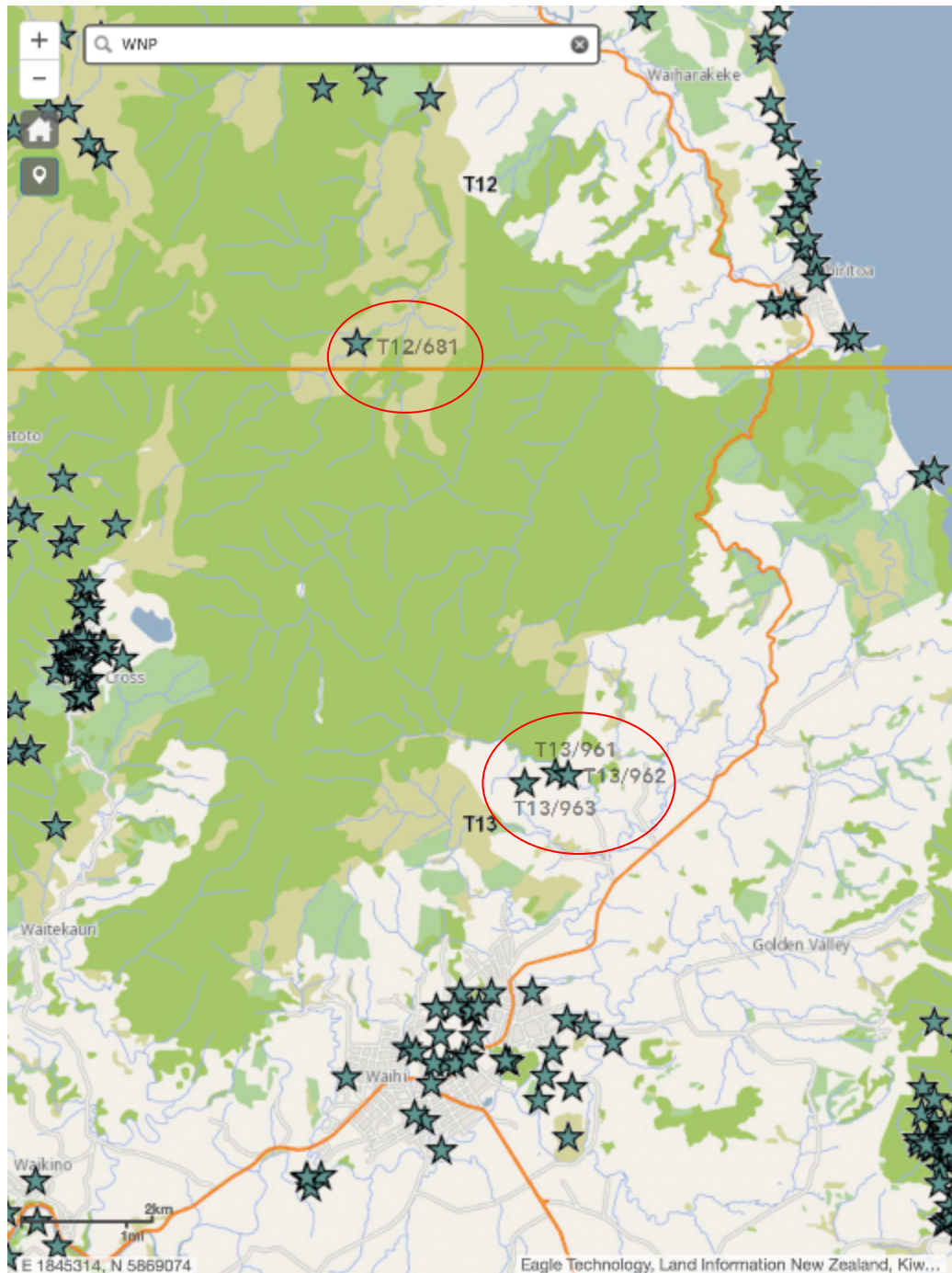


Figure 8. Location of recorded archaeological sites (stars) within the wider Waihi area. The location of T12/681 at the Wharekirauponga source and T13/961-963 at the WUG main infrastructure site are circled (source: NZAA ArchSite)



by April 1898 the mine was shut down and a further 80 men unemployed. The claims lay idle until 1899, when they were sold by public auction to Captain Hodge of Coromandel. Hodge did some small amount of work on several of the reefs to test their values and tried to raise further capital in England to continue operations. However, this was not successful and nothing of consequence has since been done on the ground (Downey 2002; Moore and Ritchie 1996:122).

While the foundation terraces for the battery were excavated at Royal Standard there is some conjecture as to whether the battery equipment was transported to site and what happened to it. Moore and Ritchie (1996) state that it was never transported to the mine and that the few pieces of machinery recorded on site are believed to date to the 1920s. Downey (2002:234) states that the battery was transported to ‘the locality’ but it was not specified whether this locality was the actual battery site or not. However, at some stage in the 1960s or early 1970s Mr Glen Mayclair of Waihi wrote to Mr Bert McAra (the Inspector of Mines for the Hauraki District until 1973) (McAra 1988) about the possibility of removing battery equipment from the bush to set up a private site. In the 1970s the NZ Forest Service granted clearance for Mayclair to remove the battery equipment.

Mayclair describes the battery machinery at the Wharekirauponga site as,

“The battery is made by Bowes, Scott and Western. It is not assembled, in fact scattered around the bush flat. There are several kingposts, various kingpost braces, a pile of stamps, two stamp boxes, cam shaft, Pelton Wheel (Prices of Thames) and a host of small bits and pieces”.

Several previous archaeological surveys in 1984, 1996 and 2008 (Winton 2008) had identified that the Royal Standard Battery site and gold mining area covers a large area of the Wharekirauponga Valley, which is primarily accessed from the Otahu River estuary area at Parakiwai Road near Whangamata. A Department of Conservation track now follows the original horse-drawn tramway route up to the mining area.

The main visible components of the site comprise of the Royal Standard Battery site, an area of previous associated mining buildings and houses, and numerous mine workings at various points along the Upper and Lower Tramways west of the Wharekirauponga Stream. Mine workings also extended along the true right (eastern) bank of the Wharekirauponga Stream, which has not been visited in past surveys (Wilton 2008). A tramway linked the Royal Standard workings and the main battery site and ran due south from the battery for approximately 2.4km. A Lower Tramway track leads to some of the old mine workings and a small gorge west of the Wharekirauponga Stream. An Upper Tramway track, which begins further south and also on the western side of the Wharekirauponga Stream leads directly to the main workings near the upper end of the gorge, but this is unmarked and largely overgrown. The area of main workings is considered to be of particular value (see Figure 10).

At one stage there were several hundred people living and working up the Wharekirauponga Valley and the physical evidence of this is extensive. It is likely that not all of the physical evidence of these activities has been identified to date.

Information from Early Survey Plans and Aerials

An examination of early survey maps and plans of the Project area identified one plan of the Royal Standard mining area (Figure 11). Four buildings labelled ‘store,’ and a ‘cook house’ are shown located on the eastern side of the Wharekirauponga Stream. The water ‘falls’ on the stream and a number of tracks on both sides of the stream are also shown. The recorded location of the Royal Standard Battery site has been marked on this map for reference.

Field Assessment

On the 22nd August 2024 archaeological field survey was carried out at the Wharekirauponga Mining Area and the location of Royal Standard Battery and Gold Mining Area (T12/681) and the Royal Standard Gold Mining Tramway (T12/1290) by Kim Tatton and Doug Gaylard accompanied by OceanaGold staff. The purpose of the survey was primarily to assess the location of existing WNP mining exploration activities, and where possible, to relocate previously recorded historic features and also record any newly identified historic features. However, the limited time available to access during the field survey and the density of the vegetation in this area means there is a high potential for other unrecorded heritage features to be located within the Wharekirauponga Mining Area.

The Wharekirauponga Mining Area includes the main components of the Royal Standard Battery and Gold Mining Area site as described above, from in the north where the original horse-drawn tramway route T12/1290 and access track splits into the Upper and Lower Tramways in the vicinity of the battery site. Today this area is covered in dense regenerating native bush, which is accessed by the Lower Tramway track on the true left (west) bank of the Wharekirauponga Stream. However, the Upper Tramway track is unmarked and largely overgrown. On the true right (eastern) bank of the Wharekirauponga Stream the area is largely overgrown except for a few informal tracks.

Many of the previously recorded historic features associated with the Royal Standard Battery and Gold Mining Area (T12/681 / T12/1290) were relocated during the current field survey and records updated. A number of newly identified historic mining features were also identified and recorded by GPS location (see Figure 12 - Figure 15). These features and any historic features identified on early survey plans are mapped on Figure 16. Appendix 3 includes a table of all previously and recently recorded historic features at T12/681 / T12/1290.

Figure 16 also shows the location of existing WKP exploratory mining activities (e.g. Figure 17), which have been located away from known heritage features, as well as possible additional WKP exploratory drill sites within the vicinity. Four additional drill sites at Stage 1, and four additional drill sites at Stage 2 for exploration drilling are proposed on the surface at the Wharekirauponga Mining Area, however, their proposed locations are only indicative at this time. The drill sites would be sized the same as existing operations at a maximum disturbance area of 150m² per site. Of the indicative sites all but two are located well clear of the Royal Standard Battery and Mining Area (T12/681 / T12/1290). Indicative locations P5 and P8 are also located within the HDP scheduled Royal Standard Battery HAU271 Category B – Heritage Area, Regional or Sub-Regional Significance (see Figure 16).

In addition the second through fifth vent shafts (inclusive) are to be located above the Wharekirauponga orebody and four larger drill sites (up to 900m² per site) for hydrogeological (pump testing) purposes could be located within the Royal Standard

Mining Area (T12/681 / T12/1290). The location of these will not be determined / confirmed until a later date and following the undertaking of a site selection protocol that will evaluate potential drill and vent sites against ecological, freshwater, landscape, heritage and recreational criteria.

Therefore, the effects on heritage values from any future additional WKP exploratory drill sites, vent shafts and the four larger drill sites for hydrogeological purposes within proximity of the identified heritage features of site T12/681 Royal Standard Battery and gold mining area and the Royal Standard Gold Mining Tramway (T12/1290) and/or the scheduled Heritage Area - Royal Standard Battery, Wharekirauponga HAU271 Category B, will need to be assessed individually through the Site Selection Protocol outlined above as they are currently indicative only.

One confirmed location was examined where it is anticipated that a ground water take will occur from an historic mining shaft (WP 406) (see Figure 16), which is currently full of water. This feature is a vertical shaft located on a small terrace (4.5 x 6m) immediately above (east) of the confluence of the Wharekirauponga Stream and Edmonds Stream. The shaft entrance measures approx. 3m x 2m. Collapsed bracing timbers are visible in the side of the shaft (Figure 18 and Figure 19). The take of ground water from this location will involve the placement of a submersible pump in the shaft and placing a generator beside the shaft on the terrace. This activity is unlikely to impact on the historic shaft but efforts should be made to not dislodge any timbers by the placement of the pump.

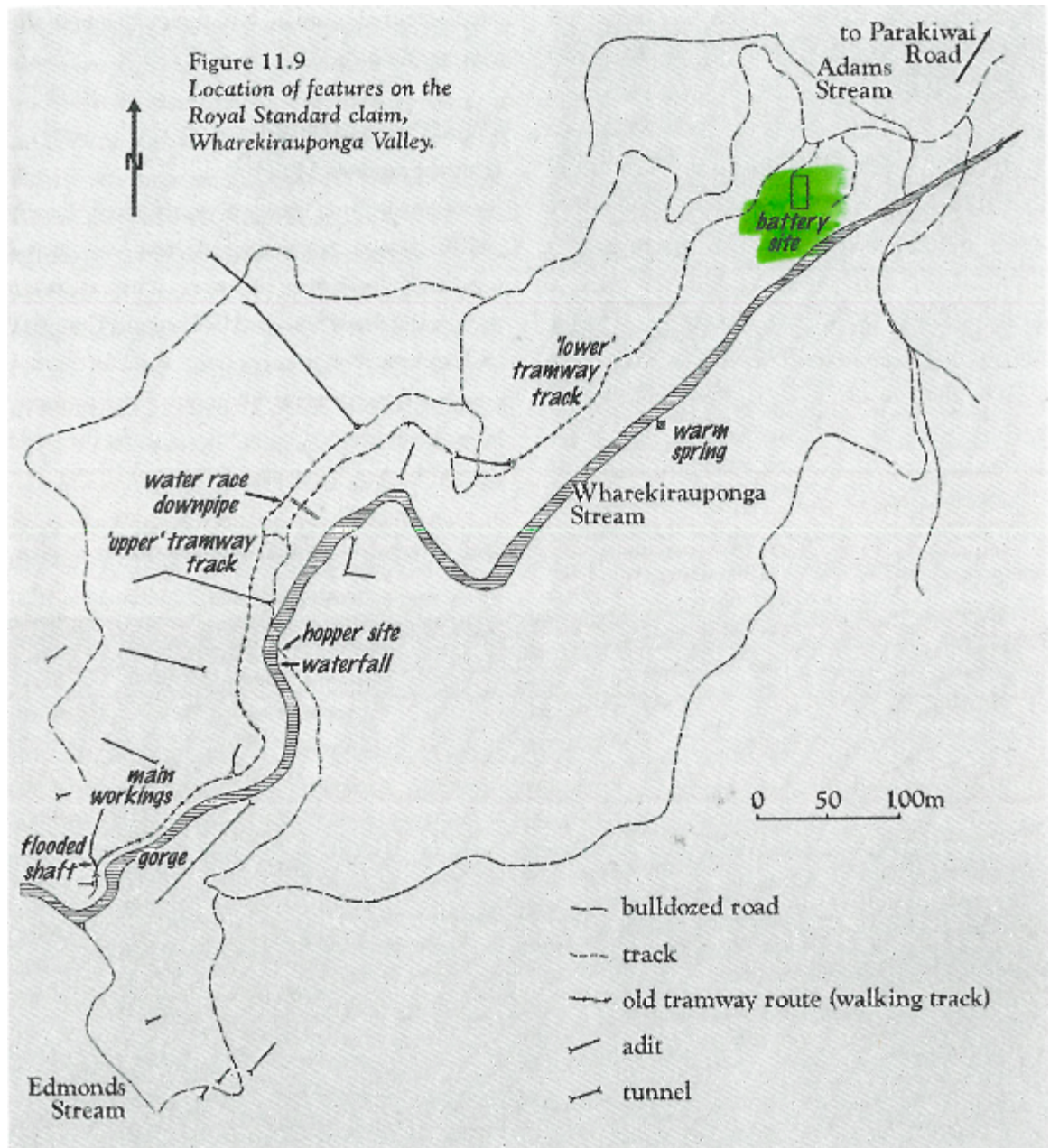


Figure 10. Location of previously recorded features on the Royal Standard claim, Wharekirauponga Valley (source: Moore and Ritchie 1996: Figure 11.9, Page 121)

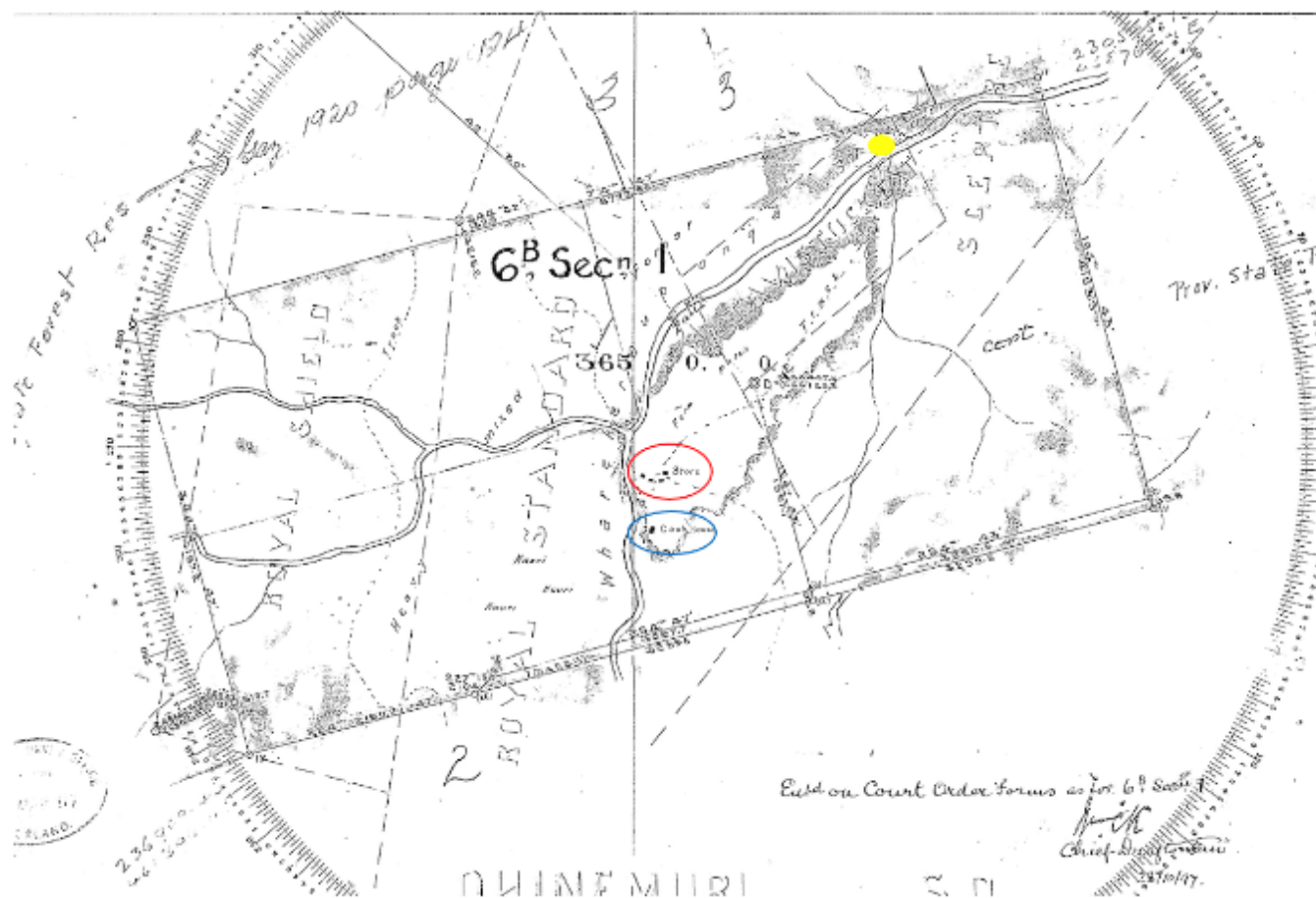


Figure 11. Detail from survey Plan ML 3836A (1897) 'Plan of Native Reserve No. 2 Whangamata No. 6B Block Section 1' showed the Royal Standard Mining area, with four buildings labelled 'store' (red circle), and a 'cook house' (blue circle) located on the eastern side of the Wharekurauponga Stream and a number of tracks (source: Quickmap). The approximate recorded location of the Royal Standard Battery is marked with the yellow dot



Figure 12. Deep cutting on the Lower Tramway Track (T12/681)



Figure 13. Waypoint 405a). Narrow miners track and multiple adits within the main workings on the western side of the Wharekirauponga Stream near the upper end of the gorge (T12/681)



Figure 14. Waypoint 299. Lower terrace of the Royal Standard Battery (T12/681)



Figure 15. Waypoint 219. Pressure vessel on the large terrace on the Lower Tramline Track above the battery site (T12/681)

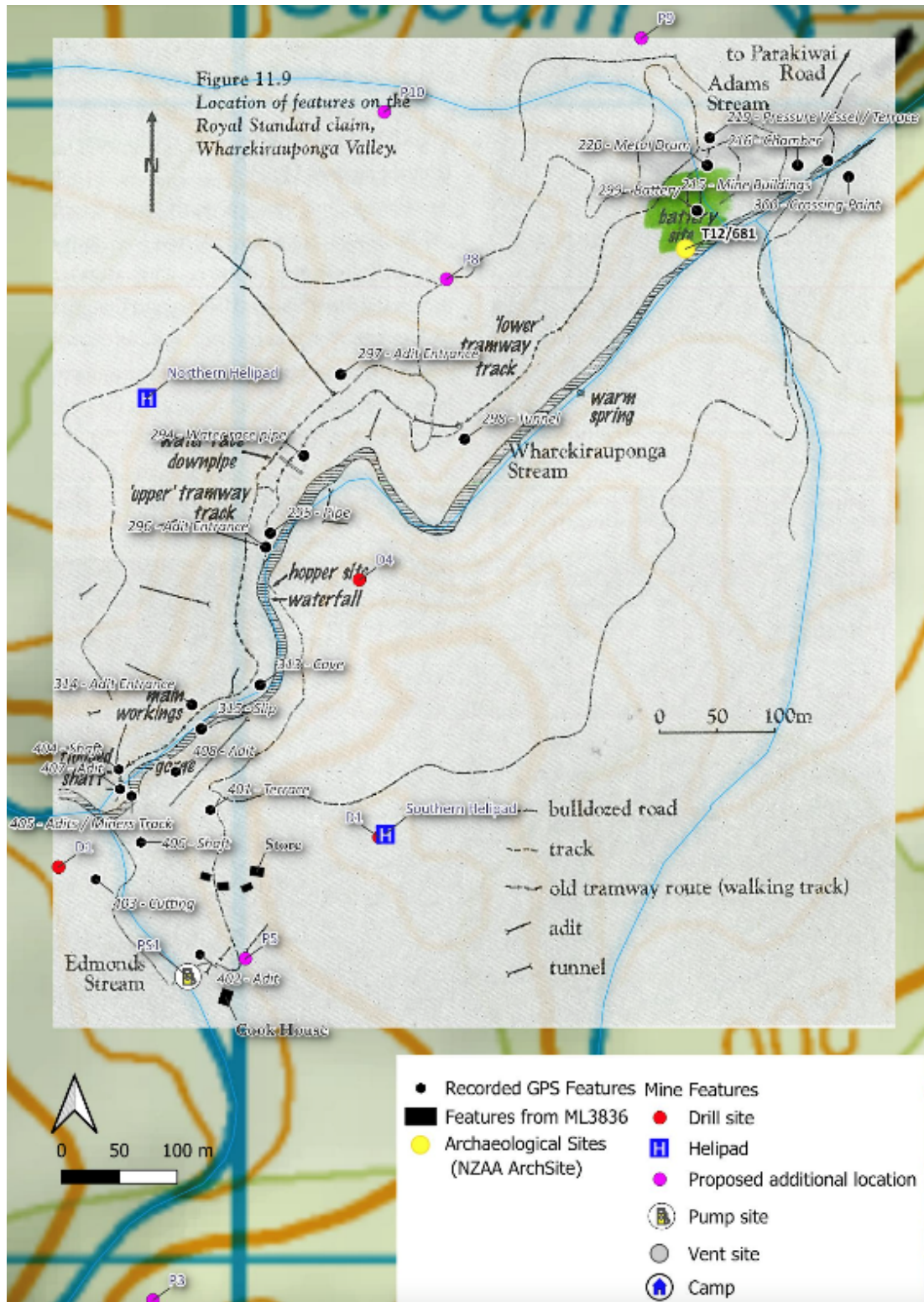


Figure 16. Overlay of Moore and Ritchie (1996) plan onto a topographic plan showing all previously and newly recorded features at the Royal Standard Mine Area T12/681 / T12/1290 within the proposed Wharekirauponga Mining Area (black dots with GPS Waypoint # - refer Appendix 3).

The location of the existing exploration drill sites are shown by the red dots. The location of indicative additional WKP exploratory drill sites by the pink dots (P5 and P8). The proposed surface abstraction site is from historic mining shaft WP406



Figure 17. Existing Drill Site 1 at the Wharekirauponga Mining Area



Figure 18. Mine shaft on a terrace at WP 406 and a proposed ground water take site



Figure 19. Mine shaft at WP 406 and a proposed ground water take site

Willows Farm Surface Facilities Area (SFA)

Recorded Archaeological Sites

Background research for this report also identified three other heritage sites located within or in close proximity to the Project's main infrastructure site at the end of Willows Road - the Mataura Water Race, the Willows Timber Tramline and the High-Level Walmsley Timber Tramway (Figure 8, Table 2 and Appendix 1).

Table 2. Archaeological and other historic heritage sites recorded within the vicinity of the proposed Willows Farm SFA. Sites that will be affected by the project are highlighted grey

NZAA Site No.	District Plan ref	HNZ List ref	Site Type	Location	NZTM Easting	NZTM Northing
T13/961			Mataura Water Race	Mataura Stream, Willows Road	1853346	5862458
T13/962			Willows Timber Tramway	Mataura Stream Valley	1853539	5862419
T13/963			High Level Walmsley Timber Tramway	Walmsley Stream Valley, Mataura Stream Valley	1852898	5862310

Mataura Water Race (part of the Waihi Gold Mining Co. High Level Water Race)

As part of this assessment the Mataura Water Race has been recorded as T13/961 in the NZAA site record file (see Figure 20 and Figure 21).

A reliable supply of water was a significant part of mining operations in Waihi and played an integral role in maintaining power supply (i.e. to Pelton wheels and steam engines) and processing the ore (i.e. wet crushing, washing, slimes, separation, cyanide and other processes) (Clough et al 2004:79).

Water races were channels cut across a hillside bringing water from streams to places where gold was mined or processed. They were, however, only part of what were often very complex hydraulic systems. The water was tapped, stored, distributed and disposed of in a variety of different ways, from simple ground sluicing early in the gold mining era, through to the operation of complex hydraulic elevating technology and ore-processing machinery, as well as the removal of tailings and other mining waste. As needs changed during the use-life of an individual race, that race could be altered, re-routed, enlarged and supplemented with ancillary dams and other engineering works (Jacomb et al. Aug 2011:3). The technology of race design and construction was introduced from the Californian and Australian gold-fields but the technology developed quickly in New Zealand gold fields and local innovations occurred rapidly.

Water for the Waihi gold mines was obtained from three main sources – the Mataura Stream, Ohinemuri River and Waitete Stream. The high level (or high pressure) race (also known as the Waitete water race) was completed by 1892 to deliver additional water to the mill from Waitete, Walmsley and Mataura Streams. A wooden intake dam was constructed

in the Mataura Stream near the edge of the current day bush line and the Mataura Water Race or Waihi Gold Mining Company Water Race was constructed around the contour of the hills and valleys on an easy grade for 5.593km to terminate on the banks of the Walmsley Creek. The Mataura Water Race would most likely have been an unlined earth channel cut into the slope of the hillside, although it may have had some timber fluming.

At Walmsley Creek a retaining dam was built and a further race, the Walmsley Water Race, was constructed to conduct water across to Bulltown and then by pressure pipe to the Pelton wheel via Pipe Lane and the Waihi Battery on Union Hill (Clough et al 2004:79; Robinson Jun 1974). Three Pelton wheels ran on this water and the races totalled 12 miles in length (AJHR 1892 C-03:46).

Progress on the construction of the race was reported in May 1891 by the *Thames Star* (18th May 1891:4):

‘The circular saw, which is humming away every day, is doing good work. Two experienced men from the Thames are working it, and they turn out from 5000 to 7000 feet daily. Five teams of horses are continually bringing timber from Waitekauri to keep the saw going, the timber arriving in junks or flitches. There are no less than 12 pair of sawyers breaking down and flitching. After being cut into suitable sizes by the circular saw, the timber is carted away for miles in every direction for the purpose of constructing fluming, building dams; and erecting trestle work. The water pipes which are to convey the water to the Pelton wheels for the new 30 head of stampers, are arriving daily on the ground. Messrs Price Bros., who have the contract for supplying and placing the same in position, are expected to commence the work in a week or ten days, or as soon as all the earthwork is completed. The pipes when laid will cover a distance of half a mile. They are 26 inches in diameter, and will give about 70lbs of pressure to the square inch, the fall being about 140 feet. After passing through two Pelton wheels the water will be carried into the present race and again utilised as motive power.’

Willows Timber Tramway (part of the Waihi Gold Mining Co. Timber Tramway)

As part of this assessment the Willows Timber Tramway has been recorded as T13/962 in the NZAA site record file (see Figure 20 and Figure 21).

Tramways were a convenient and economic solution to the problem of moving heavy materials, and a multitude of tramways ran across Waihi township and the surrounding areas. Horses were the early motive power, even when the rakeline (rail) from the Victoria Battery was commissioned and locomotives used, ore and wood were still hauled to the Waihi Battery by horse.

In the early mining days, timber was used for building and supports for the drives underground and was also burnt for roasting quartz at the new Battery kilns. This destroyed the sulphur content and when cool the quartz was crushed to powder. The demand for timber was insatiable but the densely clad hills north and east of the Waihi township provided a valuable source. Boilers were almost exclusively wood fired until the Paeroa to Waikino portion of the railway to Waihi was completed in 1904. Coal could then be cheaply railed to Waikino, and then sent from the Victoria Battery via the rakeline.

Firewood came from the Walmsley and Mataura Valleys via horse drawn tram lines along the Waihi Co. Tramway. Two of the earlier settlers who extracted timber were the Walmsley brothers, Horatio and Sheriff, who leased a block of Crown land at the end of what is now known as Walmsley Road. A tramline was constructed from the Waihi Co.

battery at Union Hill to the end of the lease approximately 3 miles long, now the watershed for the Borough water supply. By 1896 the bushland was well cleared and grassland was developing well below the Walmsley Water race. About 1901 the Waihi Co. secured another bush block on the opposite side of the range and built a side tram line to the Walmsley Valley Waihi Co. Tramway to Willows Road (Wharry Road) – the new contractors being Cambie and W. Cornes. This was the Willows Timber Tram (Robinson Oct 1969; Armour Oct 1968). It was 5.298km in length.

High Level Walmsley Timber Tramway

As part of this assessment the High-Level Walmsley Timber Tramway has been recorded as T13/963 in the NZAA site record file (see Figure 20 and Figure 21).

Located north of Reservoir Road and upper Walmsley Road this tramway was also constructed by the Waihi Gold Company for the Martha Mine to extract timber from the Walmsley and Mataura Valleys. It connected with another tramway on Reservoir Road north of Waihi by an incline. With a series of off shoots it was 6.745km long and is likely to date to a similar time as the Willows Timber Tramway.



Figure 20. Plan of Waihi with mapped GIS overlay showing the locations of various tramways and water races across the central Waihi area (source: Ohinemuri GIS, accessed via: <http://www.ohinemuri.org.nz/gis>). The route of the Mataura Water Race T13/961 is arrowed (blue), the Willows Timber Tram T13/962 arrowed (red) and the High Level Walmsley Timber Tramway arrowed (orange) with the location of the proposed WUG main infrastructure site marked in red

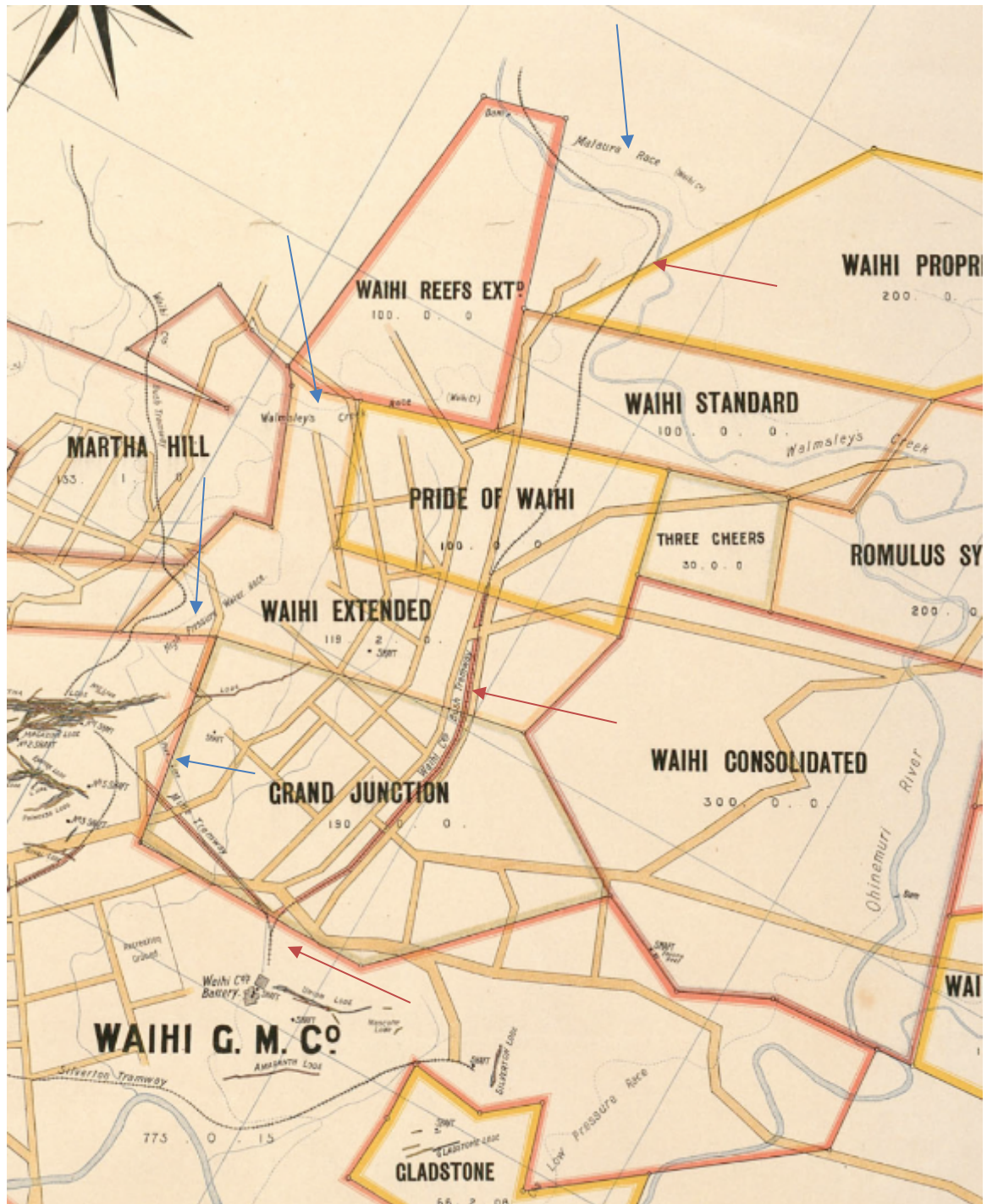


Figure 21. Close-up view of plan of the Waihi Goldfield, dated c.1900s, showing the various tramways and water races across the central Waihi area (source: Sir George Grey Special Collections, Auckland Libraries, NZ Map 197).

The Maitara Water Race T13/961 is arrowed (blue) where it terminates at the Walmsley Creek dam and continues as the Walmsley Water Race, and through a pressure pipe to the Waihi Battery on Union Hill. The Waihi Co. Timber Tramway from the Walmsley and Maitara Valleys is arrowed (red)

Information from Early Survey Plans and Aerials

An examination of early survey maps and plans of the Project area identified both the Mataura Water Race and Willows Timber Tramway. As early as 1900 a plan of Section 2 Block XII Ohinemuri under the Mining District Land Occupation Act 1894 by Henry Alexander Fritch shows the 'Waihi G. M Cos' Water Race' and intake dam on the Mataura Stream. A bend in the race is surveyed out of Section 2 and the plan refers to '... access to firewood tram' crossing Section 2 also (Figure 22).

Detail from survey plan SO 18876 (Plan of Section 28 Block XII Ohinemuri Feb 1918) shows the 'tramway' follows the surveyed alignment of the unformed paper road on the eastern side of the Mataura Stream and the 'Waihi G. M. Cos Water Race' alignment surveyed on the western side of the stream from its dammed intake. Interestingly the area is described as 'Partially felled' and in 'Fern and Blackberry' by this time (Figure 23).

The 1939 NZMS13 Topographic plan shows the surveyed corridor of the Mataura 'Water Race' from its source in the Mataura Stream to 'Walmsley Stream, and then its continuation into Waihi as the Walmsley Water Race. It also shows the Willows 'Tramway' which predominantly follows the alignment of Willows Road reserve (Figure 24).

Survey plan SO 33214 Plan of Sec 42 Blk XII Ohinemuri (May 1946) shows the unformed public road at the end of Te Kowhatu Road (now Willows Road), which corresponds to the alignment of the Willows Timber Tramway. It refers to an 'Abandoned Formation,' which likely relates to the tramway (Figure 25).

Recent survey from 1976 illustrates that the corridor of the Mataura Water Race from its intake across Sections 70 & 71 of the Ohinemuri Survey District was still a separate title as 'Crown Land Reserved from Sale Sec 58 Land Act 1948' (Figure 26).

From examination of early aerial photographs from 1942 the alignment of the Mataura Water Race is still visible on the ground from its intake on the Mataura Stream and across the proposed infrastructure site and surrounding area (Figure 27). The alignment of the Willows Tramway was not clearly visible but has been marked on the aerial based on other maps of the tramway alignment.

41

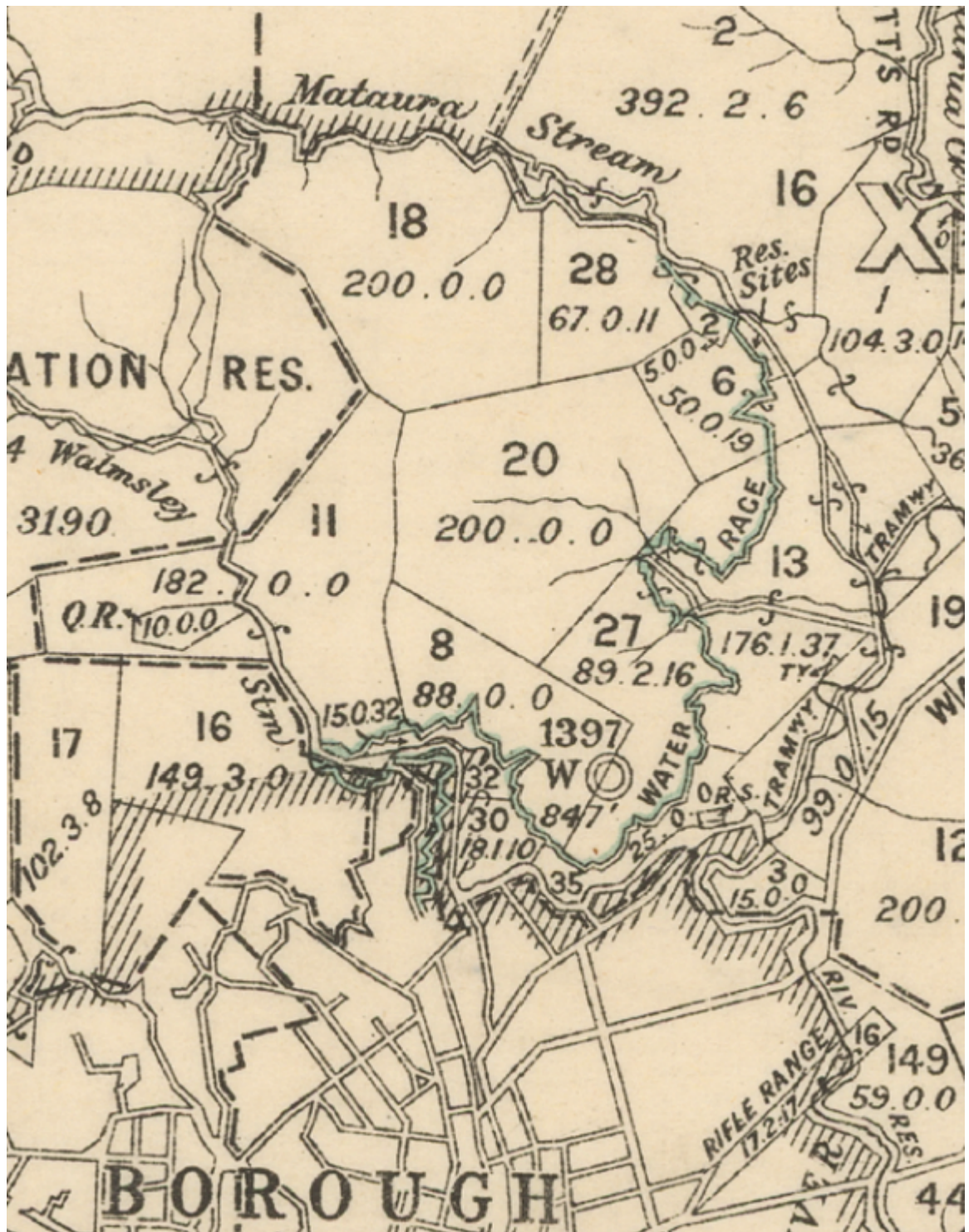
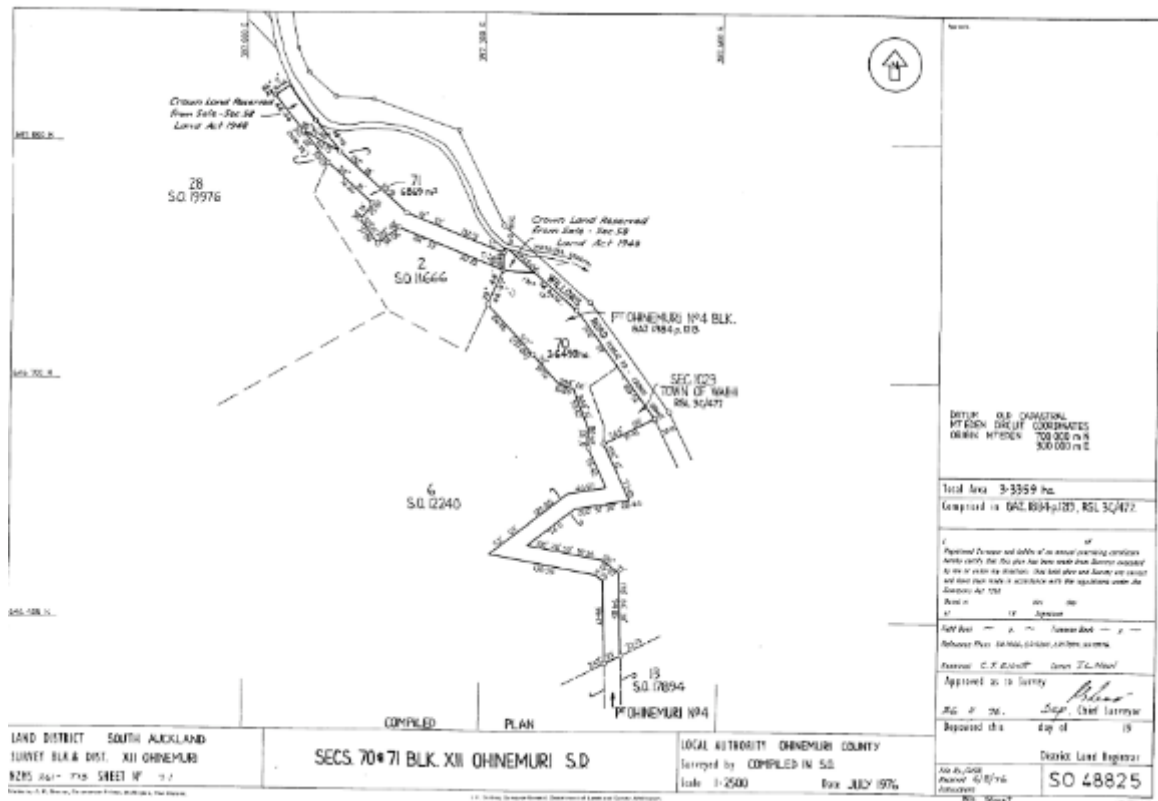


Figure 24. Topographic plan showing the alignment of the Mataura Water Race from its source at the Mataura Stream to its termination at Walmsley Creek (highlighted in blue) (source: NZMS13 1939 Topographic Map www.mapspast.co.nz)



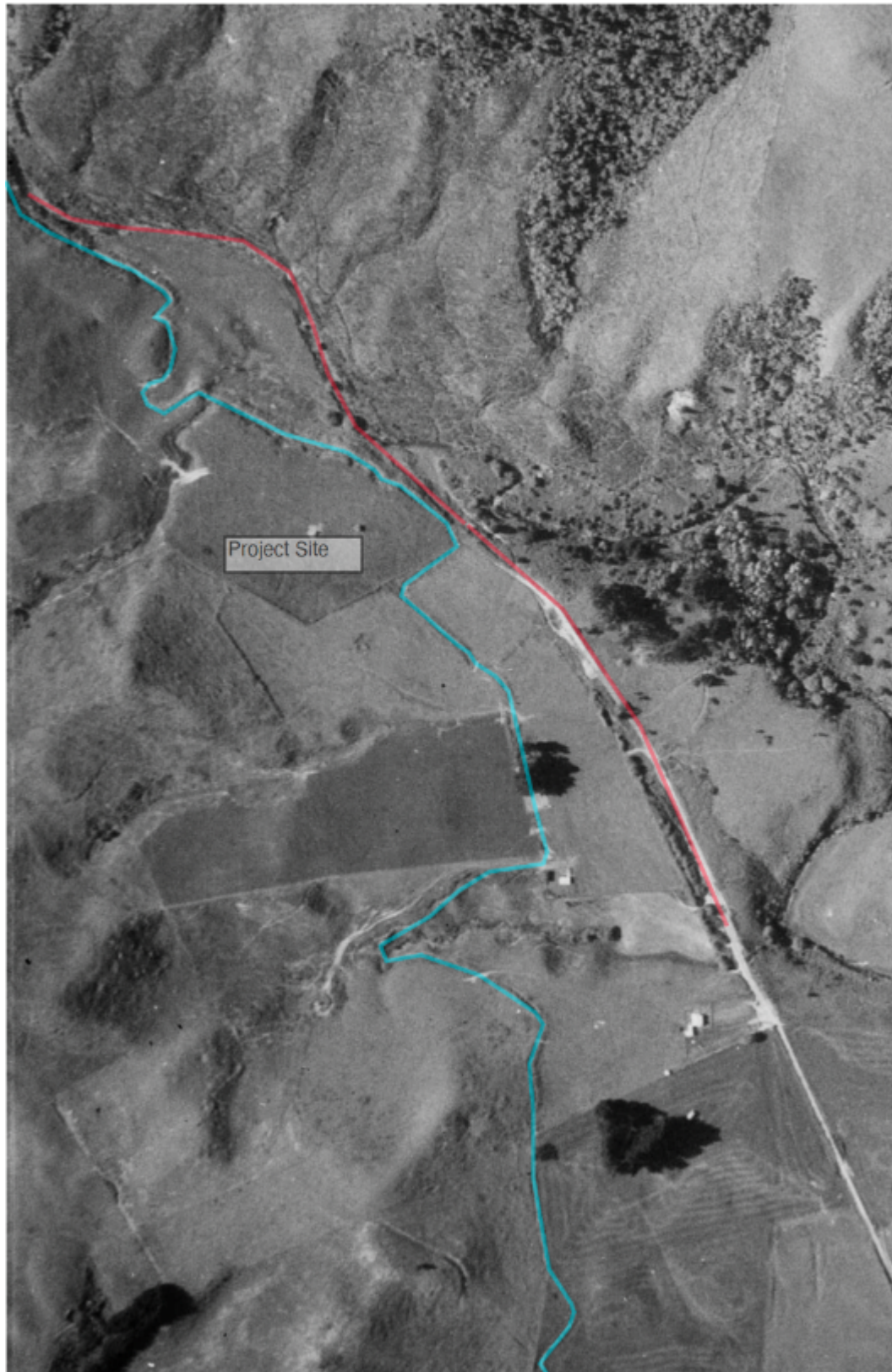


Figure 27. 1942 aerial photograph with the visible alignment of the Matura Water Race (blue) and the estimated alignment of the Willows Timber Tramway (red). The general location of the proposed WUG Surface Facilities Area is labelled (source: <http://retrolens> SN229, Run 484, Photo 35)

Field Assessment

The proposed Willows Farm SFA is located on the stream flats at the end of Willows Road within a large rural property currently used for grazing. The terrain of the property rises on either side of the stream valley to moderately steep hills and valleys to the west and east (Figure 28 and Figure 29). To the north these hills rise steeply into the bush clad Coromandel Ranges and DoC reserve.

The remains of the Maitara Water Race alignment (T13/961) were identified during the field survey running through the property and the proposed main infrastructure site near its original intake from the Maitara Stream (Figure 30). The race was likely to have originally been an open earth channel, however, it has been significantly modified within the subject site. It retains literally none of its original profile, having been infilled and levelled so that it appears merely as a gently graded levelled bench running across the stream flats and cut in the slope of the hillsides. In many places the race alignment has been widened to form farm tracks and farm races, and in other sections it is no longer visible at all (see Figure 30 - Figure 36). Except for one very small section (c.10m long) that appears to retain a modified profile or outer bank near the intake of the race (Figure 31). However, it too was being in-filled with farming debris at the time of the inspection. This section appears to be located within Crown owned marginal strip along the Maitara Stream.

Based on plans of the main infrastructure site provided by Oceana Gold the Willows Farm SFA will affect and remove several remnant sections of the Maitara Water Race over approximately 600m at its northern extent (Figure 40). The one small remnant section of the race that retained a modified profile or outer bank near the intake of the race (c.10m long) appears to be outside the proposed infrastructure footprint and could possibly be avoided. However, a spillway for the collection pond may need to be constructed through this area.

The alignment of the Willows (Waihi Co.) Timber Tramway (T13/962) essentially follows what is now Willows Road, and there is no visible evidence of the tramline in this area. At the end of Willows Road and in the vicinity of the main infrastructure site the tramway alignment would have followed the unformed road reserve and farm track. It then crossed over the Maitara Stream to the eastern (opposite) side. No visible remains of the tramway alignment (i.e. benching) or associated structural remains such as rails or sleepers are present today with the main infrastructure site having been removed by roading. It was also common practice to remove structural items for reuse once a tramway was no longer functional. In this case some of the rails from this tramway appear to have been used for structural beams in the barn on the property (Figure 37).

Based on plans of the infrastructure site a small part of the previous Willows Timber Tramway alignment T13/962 may be affected by the proposed activity where access to the main infrastructure site will be along Willows Road and a small detention pond is proposed east of Willows Road (see Figure 40). However, in these areas there is no surviving evidence of the tramway alignment or associated structural remains.

The remains of another bush tramway alignment, part of the High-Level Walmsley Timber Tramway (T13/963), were identified during the field survey above and west of the proposed portal and main infrastructure site. All that remains of this tramway is a gently graded levelled bench cut into the slope of the hillside in places, and in sections the bench has been widened to form a farm track. No associated structural remains such as rails or sleepers are present today (Figure 38 and Figure 39).

Based on plans of the Willows Farm SFA site the end of one of the branches of this tramway may be affected by the proposed rock stack, which will fill in the valley to the west of the main infrastructure site, and another section of the tramway alignment possibly affected for the proposed construction of a helipad (see Figure 40).

No other archaeological or other historic heritage sites were identified during the field survey within the proposed Willows Farm SFA site.



Figure 28. Looking southeast across the main infrastructure site in the valley below



Figure 29. Similar view to Figure 28 from a lower elevation in the area of the proposed rock stack. The Mataura Stream is located in the bush lined valley (centre)



Figure 30. Mataura Water Race alignment near its intake on the Mataura Stream visible as a levelled or benched track



Figure 31. Mataura Water Race surviving modified remains of the race profile. Mataura Stream (left)



Figure 32. The water race alignment as a levelled and infilled track (alignment highlighted in blue) in the vicinity of the proposed retention pond



Figure 33. Water race alignment highly modified by farming activity and motor bike trails



Figure 34. Water race alignment visible as a levelled or benched track alongside the Mataura Stream



Figure 35. The approximate alignment of the water race ran down this fence line but no surface evidence of the race survives. This is the proposed location of the noise bund within the main infrastructure site



Figure 36. Water race alignment visible as a levelled or benched track behind the milking shed and south of the main infrastructure site (alignment highlighted in blue)



Figure 37. Interior of the barn with structural beams made of tramway rails from the Willows Timber Tramway



Figure 38. Looking along the High Level Walmsley Timber Tramway alignment above the portal (alignment highlighted in white)



Figure 39. Looking along a section of the High-Level Walmsley Timber Tramway alignment above and west of the portal. This section has been widened as a farm track (alignment highlighted in white)

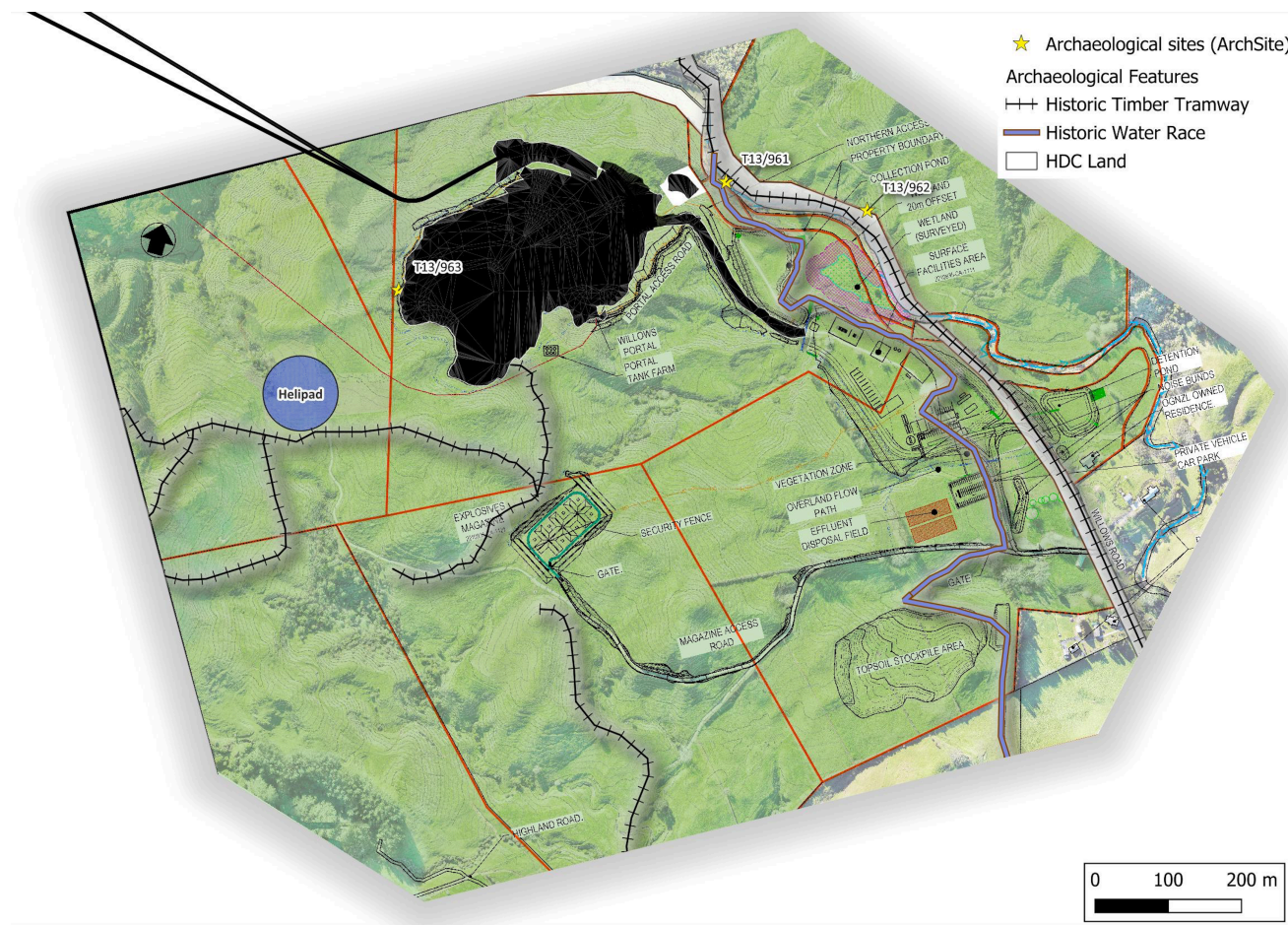


Figure 40. The layout of the proposed Willows Farm SFA elements in relation to the Matura Water Race T13/961 (purple), the Willows Timber Tramway T13/962 (right) and the High-Level Walmsley Timber Tramway T13/963 (left) - sourced from NZAA ArchSite and <http://www.ohinemuri.org.nz/gis>

Table 3. Archaeological and other historic heritage sites recorded within the vicinity of the proposed Service Trench.

NZAA Site No.	District Plan ref	HNZ List ref	Site Type	Location	NZTM Easting	NZTM Northing
T13/962			Willows Timber Tramway	Willows Road	1853539	5862419
T13/817			Waihi Low Level Water Race	Ohinemuri River to Union Battery; Winner Hill	1853816	5858685
T13/819			Silverton Hill gold mining complex and Battery	Silverton Hill	1853308	5858302
T13/306			Favona Old and New Shaft	Golden Valley Road	1853523	5858766

Willows Timber Tramway (part of the Waihi Gold Mining Co. Timber Tramway) (T13/962)

As previously discussed, the alignment of the Willows Timber Tramway (T13/962) essentially followed what is now Willows Road (Figure 20). However, there is no visible evidence of this tramline in this area, having been removed and modified by road construction. Therefore, there should be no impact to this site by the services trench along Willows Road.

South of SH25 the proposed services trench crosses an arrow shaped block of land ending at Mataura Road described as the 'Rifle Range'. This is shown on early survey plans and was gazetted for this purpose in 1901.

Ohinemuri - Waihi Low Level Water Race (T13/817)

The Ohinemuri-Waihi Low Level Water Race was designed to feed water from the Ohinemuri River to the Martha Mine Union Battery and was constructed in 1889-1890 (see Figure 20). Its original dimensions are described as 3ft. 6in on the bottom, 9ft across the top and 2ft. 9in in depth and was 3.854km long (AJHR 1889). The race operated until 1913, when processing operations for the Martha Mine switched to the Victoria Battery site at Waikino. A detailed history of the race and its significance are provided in Hooker 2003. The Ohinemuri-Waihi Low Level Water Race is considered to be of local importance.

The dam for the water race is located some 1.5 km upstream from the Golden Valley Road bridge over the Ohinemuri River. From this point the race line ran through paddocks and is not now discernible until just before Golden Valley Road. Here a bench runs along a steep bank for some 50 metres until it presumably ran through a tunnel under the ridge crest (under Golden Valley Road). Hollows in the paddock just east of the road suggest tunnel subsidence's. Immediately south of Golden Valley Road, road works (filling and drainage) have modified the area for some 100+ metres and the water race cannot be

identified until the bluff above the flats is reached (south east side of Favona Hill). Around this bluff to the gully (some 250m) the race comprises a benched-in, circa 2-2.5 metre wide by <1 metre deep profile with a broad (1m+) outer bank clothed with scrub. The race is breached by a gully at the end of the bluff. Just east of this gully there is a drive on the north side of the race with c. 20 metre long tailing fans below the race.

From the gully the race is well defined for some 100 metres through scrub until it enters open pastureland. From this point to the existing Processing Plant site fence line, the race is in-filled and poorly defined. Odd pine trees on the uphill side mark the line. The section of race line through the mine process site was modified when the Processing Plant was built in mid 1987. A further 300m section of the race was also investigated and destroyed to develop a waste rock stockpile area at the southern end of the services trench (Hooker May 2006).

At its southern extent the alignment of the services trench avoids the water race alignment, although it comes within close proximity to the north and south of Golden Valley Road, before entering the Processing Plant, where the water race alignment was previously destroyed. North of the Processing Plant the water race angles sharply east and this is the closest point to the proposed service trench. The service trench alignment at this point is along an existing farm track and will have no effect on the water race. Figure 42 shows the surveyed alignment of the Low Level Water Race (grey line) and the proposed services trench alignment in green.

T13/306 Favona Shaft(s)

At its southern extent the alignment of the services trench crosses near and east of the Old and New Favona Shafts in a property at 808 Golden Valley Road. This site consists of infilled shafts, a mullock heap and concrete building/machinery foundation (15 x 7m). The alignment of the services trench avoids any surface features associated with this site, but crosses a recorded subsurface drive (Figure 42 and Figure 43). The service trench is unlikely to be of a scale or depth to have any impact on this subsurface feature.

T13/819 Silvertown Hill Goldmining Complex and Battery

The Silvertown Hill gold mining complex is an area of goldmining centred on Silvertown Hill south of Barry Road – Golden Valley Road. To the east of the main Silvertown mining complex and north of the Processing Plant the alignment of the services trench crosses an area of slumping on a slope, which corresponds with the line of two small drives Feature b) and c) recorded by Phillips in 2000 (Figure 42 and Figure 43). The service trench is unlikely to be of a scale or depth to have any impact on these subsurface features.

However, a magazine and a ‘dam-like’ feature were also recorded by Phillips (2000) in this area. The foundations of the magazine, of unknown date, on a large artificial mound and cut into the scarp appears to have been made of brick and measures approximately 12 x 17m. The ‘dam-like’ feature was described as 9 x 6m on the eastern slopes of Silvertown Hill, but it was unconfirmed whether this was a recent farming feature or a mine related one.

The previously recorded dam could not be relocated during the recent survey and its location is within the stockpile area of the current mine and was likely destroyed during the previous expansion. The mine drives previously recorded on the route of the trench

showed no evidence on the surface and are likely too deep to be affected by the proposed works. The recorded location of the magazine was on the farm track (Moore Street). No evidence of the artificial mound was observed in the area nor the brick magazine base (see Figure 43).

Other 20th century farming features

A pile of brick rubble was encountered to the north of the proposed route south east of the house at 779 Golden Valley Road (Figure 43). The rubble was spread over 5 x 3m and was pale yellow to pale red well-formed brick with white inclusions, even fired, and wire cut. Some appeared to be finished with plaster. It is unclear what the rubble was from as there was no other evidence of structural remains in the area but a potential source is a demolished chimney from a nearby building that was moved. The age of the bricks is unclear.

A 10 x10 m pit with 2 m raised rim was encountered north of Golden Valley Road. This is likely associated with farming activity (Figure 43).

A concrete race was identified running from a small pond eastward towards Ohinemuri River (Figure 43). This was rough concrete with angular well sorted stone inclusions, 400 mm wide, 250 mm deep, 11 m long, although much of the race was broken. It ran into a pit and culvert beneath a concrete bridge. This is most likely associated with farming activity.



Figure 42. Recorded archaeological and other historic heritage sites within the vicinity of the Gladstone Pit (purple) and stockpile (green), WUG Portal (brown north of pit) and southern extent of the services trench (green line). The alignment of the Low Level Water Race T13/817 is shown as a grey line – sourced from NZAA ArchSite, HDP 2014 Map K4, Phillips 2000 (Features) and <http://www.ohinemuri.org.nz/gis>

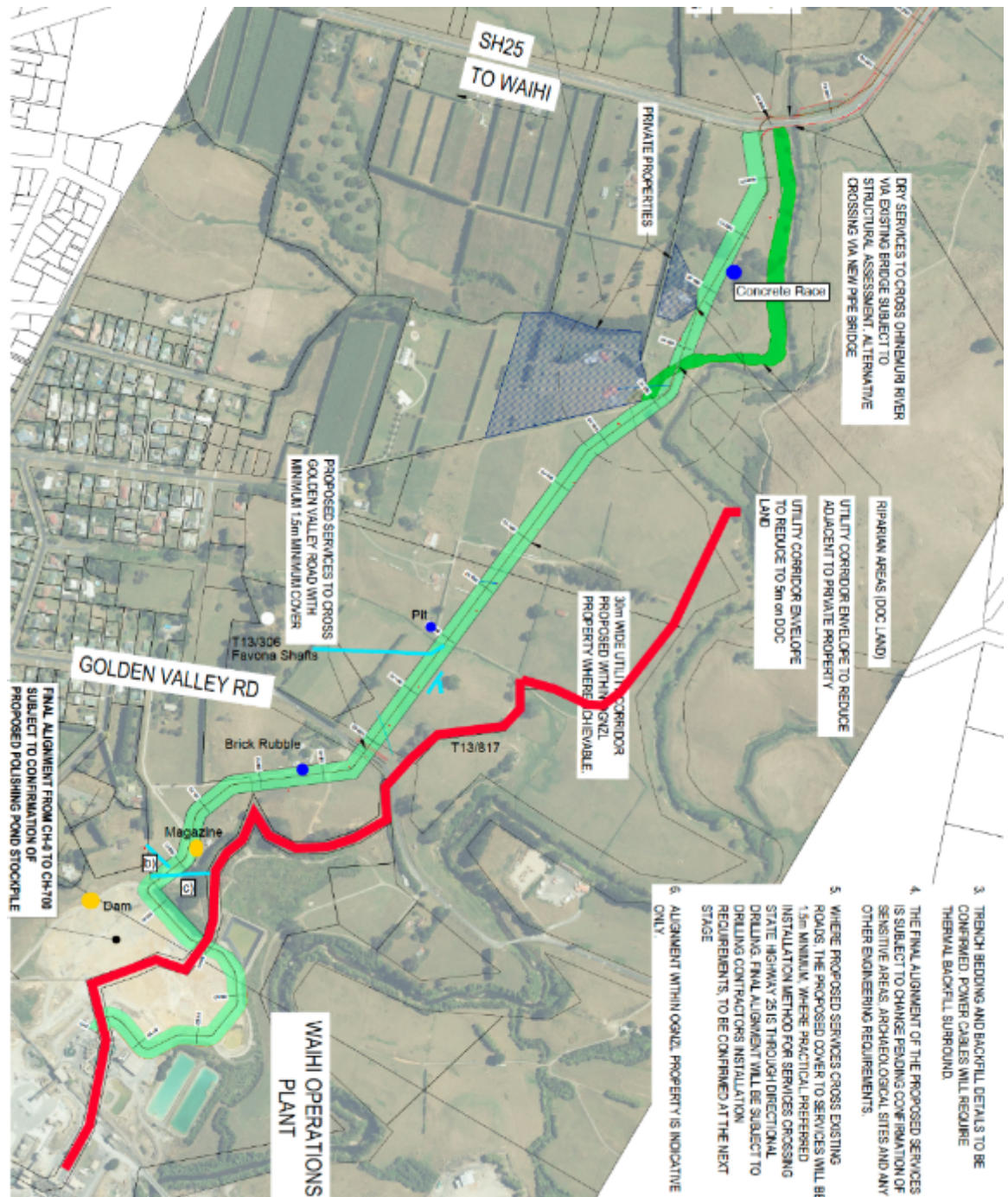


Figure 43. Southern end of Services Trench with archaeological features (the alignment of the Low Level Water Race T13/817 shown by the red line), and other 20th century farming features (blue dots) in the vicinity.

GLADSTONE OPEN PIT (GOP), MUG AND WUG PORTALS, AND PROCESSING PLANT AREAS

The Proposal

The proposed GOP involves open pit mining situated predominantly over Gladstone Hill and part of Winner Hill from development and production through to closing of the pit as a tailings storage facility. The pit will disturb an area of around 18.7ha, will be 95m deep, 375m wide and 625m long. This area is located in rolling farmland / pasture with a small pine plantation to the southwest (see Figure 2, Figure 44 and Figure 45).

The mining of GOP comprises:

- Pre-stripping of topsoil from the pit footprint and storage at Southern stockpile (capacity: 52,500 m³);
- Harvesting of pines on Winner Hill;
- Relocating the existing Favona portal and associated infrastructure within GOP (two options);
- Installing a new crusher and interconnecting conveyor for transporting waste rock to the NRS;
- Establishing a new Portal “WUG Portal”;
- Realigning the gravel road from the end of Clark Street to access the motocross track;
- Hauling and storing ore and/or waste rock at the existing polishing pond stockpile, if required; and
- Construction of noise bunds or screens around the pit rim, and elsewhere, where required.



Figure 44. Proposed expanded Waihi operations – Gladstone Open Pit (GOP), Processing Plant, Northern Rock Stack (NRS) and TSF3 Storage Facility (source: Oceana Gold)

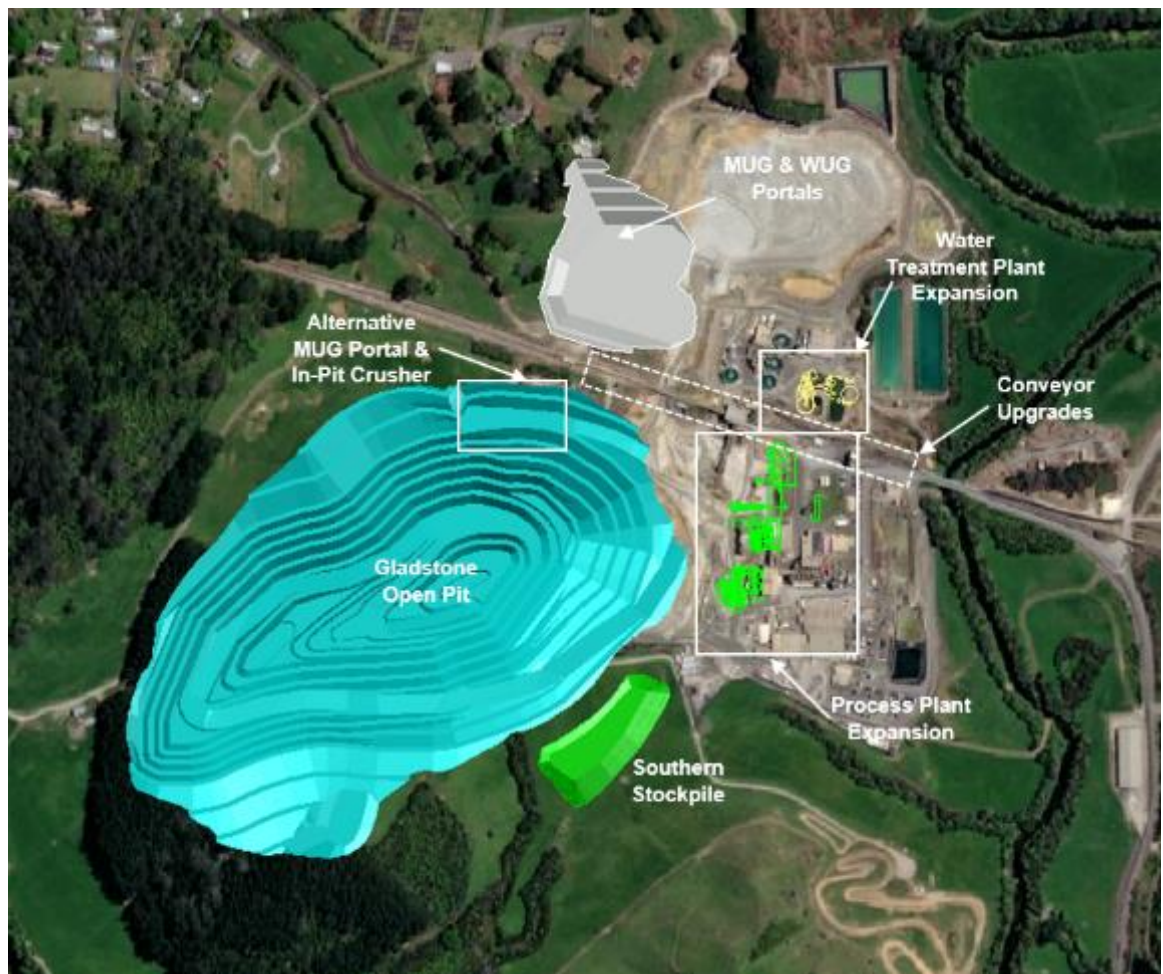


Figure 45. Gladstone Open Pit and surface infrastructure (source: Oceana Gold)

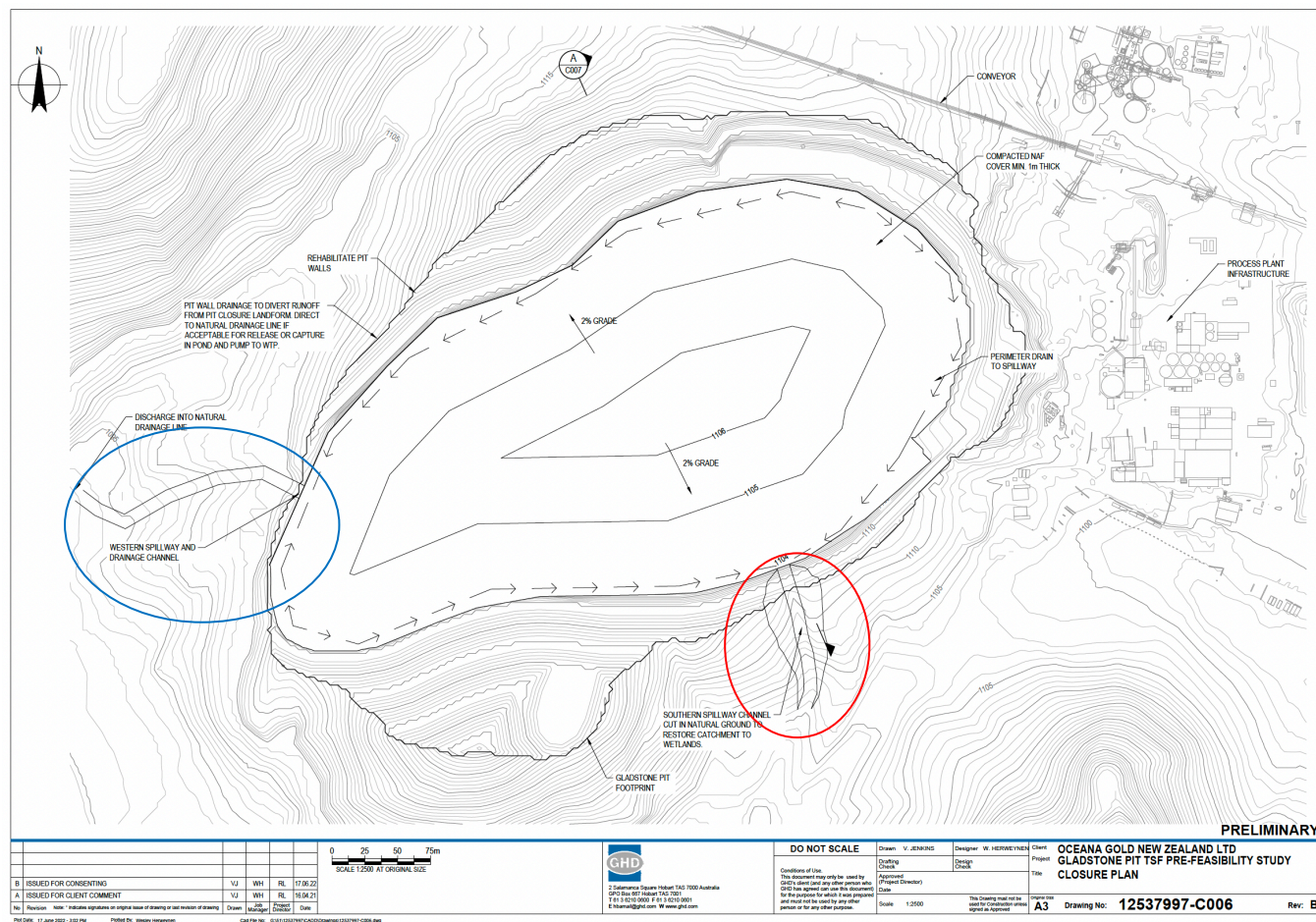


Figure 46. Plan of Gladstone Pit Closure Plan showing the location of the Southern Spillway Channel (red circle) and Western Spillway and Drainage Channel (blue circle) (source: GHD)

Recorded Historic Heritage

The mining of claims within the United Silverton Amaranth Mine area, including Winner mine were initially held by small companies. All claims were then acquired by Waihi Gold Mining Company in 1887 (excluding Silverton Mine which was added to the company in 1889) and placed under a wholly owned subsidiary named Union-Waihi Gold Mining Company who continued to work the claims until 1902 when mining ceased. The Winner Hill Claim was prospected prior to 1889 (Morgan 1924; McAra 1978).

During 1885 – 1902 only about £100,000 worth of bullion had been produced from these mines, almost half of which came from the Silverton Mine, which had mainly been worked independently by the Silverton Gold Mining Company (McAra 1988:49-51). The years 1902 – 1910 were the boom years of mining at Waihi but by the 1920s and 1930s ore reserves were on the decline. This, in combination with other factors led in 1952 to the cessation of mining in the area (McAra 1988:26-27). Later prospecting took place on Union, Winner and Gladstone Hills from the 1970s until 1999, with most drill holes excavated after 1987 (Phillips 2000:9).

An archaeological survey of the proposed Gladstone Pit project area was carried out in 2000 as part of a field survey of Silverton Hill, Winner Hill and Gladstone Hill (Phillips 2000). As a result of this assessment a more recent survey of historic heritage sites has been carried out. The accompanying report *Oceana Gold Project Martha, Waihi: Part 1 Historical and Archaeological Background* provides a detailed summary of the history of mining in this area and previous archaeological investigations within the project area and nearby (Brown et al. 2018).

Further research and modelling has been carried out by Buxton-Blue (Resource Development Geologist for Oceana Gold) to identify pre-1900 historic workings within Gladstone Hill and Winner Hill as part of the proposed Gladstone Pit.

There are five recorded archaeological sites either within or in close proximity to the proposed Gladstone Pit, WUG Portal and associated infrastructure, and two of these sites are scheduled HDP heritage sites – Gladstone Battery and gold mining complex (T13/821; HAU245 Cat C), Winner Hill gold mining complex (T13/820), Silverton Hill goldmining complex (T13/919, the Lower Level Water Race (T13/817) and a tramway (T13/818; HAU246). Table 4 summarises these recorded historic heritage sites and Figure 42 shows the location of these sites.

During 2000 Phillips undertook field survey and subsurface testing over Winner, Gladstone and Silverton Hills. Phillips was informed that traditionally burials were placed in caves on Gladstone Hill. Phillips did not identify any archaeological features of Māori origin, but concluded that there was potential for such features to survive on unmodified areas on the high points of Union Hill, Winner Hill and Gladstone Hill. However, further recent archaeological survey for the previously proposed Project Quattro did not identify any archaeological features of Māori origin on Gladstone Hill and within the proposed Gladstone Pit. These areas clearly having been affected by numerous drill hole collar shafts excavated as part of modern gold prospecting, mainly between 1987-99, particularly over Gladstone Hill where over 30 were dug (Phillips 2000:22).

Table 4. Archaeological and other historic heritage sites recorded within the vicinity of the proposed Gladstone Pit and WUG Portal. Sites that will be affected by the project are highlighted grey

NZAA Site No.	District Plan ref	HNZ List ref	Site Type	Location	NZTM Easting	NZTM Northing
T13/817			Waihi Low Level Water Race	Ohinemuri River to Union Battery; Winner Hill	1853816	5858685
T13/818	264 Cat C		Tramway	Silverton Hill to Clarke Street; Union Hill	1853595	5857759
T13/819			Silverton Hill gold mining complex and Battery	Silverton Hill	1853308	5858302
T13/820			Winner Hill gold mining complex	Winner Hill	1853105	5857575
T13/821	245 Cat C		Gladstone Battery and gold mining complex	Gladstone Hill	1853204	5857925

T13/819 Silverton Hill and Battery

The Silverton Hill gold mining complex (discussed above) is an area of goldmining remains centred on Silverton Hill, including a complex overlay of shafts and drives, possible terraces (Feature a) recorded by Phillips, the most hazardous of which are fenced off today.

The proposed WUG Portal could intersect and impact on a subsurface mining shaft associated with the Silverton Mining complex on the southern slope of Silverton Hill (see Figure 42).

T13/820 Winner Hill Gold Mining

The Winner Hill gold mining complex is an area of goldmining remains over Winner Hill, including drives, shafts, terraces and tailings. The proposed Gladstone open pit will partially remove the 12m Winner Winze at 1110RL in the south west of the pit shell and several other pre-1900 historic level drives to the south and east of the proposed pit (Figure 42). These relate to surface Feature b) recorded by Phillips (2000), an area of spoil near the summit of the hill, and another pre-1900 historic drive with an exposed entrance and mining debris in the gully below recorded as surface Feature e), located in the southeast of the proposed pit.

The Winner Hill gold mining site has already been affected by modern gold prospecting from the 1970s until 1999 and the planting of a pine plantation across Winner Hill. The possibility of additional subsurface remains in relation to past mining activities cannot be ruled out and would also be destroyed by the proposal. The remains of the Winner Hill

gold mining complex are pre-1900 in date so any impacts will require mitigation under a general Archaeological Authority that will be applied for to cover the entire Gladstone Pit project to identify and record any pre-1900 archaeological remains.

No archaeological features of Māori origin were identified in 2000 by Phillips or during recent survey for the WNP. If these features were to have once existed, it is considered unlikely that any such features would have survived on Winner Hill as a result of historic and modern mining, and farming activities.

Gladstone Battery and Gold Mining T13/821; HDP schedule HAU245 Cat C

The site of the Gladstone Battery and goldmining complex is an extensive area of collapsed drives, terraces, mullock heaps and tailings, which extend from the summit down to the north and west slopes, associated with historic gold mining on Gladstone Hill.

The Gladstone Battery and its associated shaft is a Category C Heritage Item in the HDP (HAU245) (Figure 47). Erected in 1904 on the northern slopes of Gladstone Hill adjacent to the Gladstone Shaft, it was the smallest of the five stamper batteries in Waihi. It appears that the company saved their tailings in a small gully near the battery, and remains of the retaining bund remain today (Figure 48 and Figure 49). These tailings were uplifted and reprocessed at the Union Battery in late 1911 and 1912. The shaft has been infilled, and is hard to make out, but a concrete machine mount remains, though it may not be in its original position (www.ohinemuri.org.nz/research/waihi-gladstone-battery).

Much of the Gladstone gold mining complex has already been affected by modern gold prospecting from the 1970s to 1999. Those features within the pit footprint that will be affected are Feature a), an isolated prospecting drive located near the summit with an area of tailings radiating out from the now blocked drive entrance; and Feature b), a fenced off shaft. However, the Gladstone Battery and its associated shaft, Feature c), a disturbed area dissected by the access road where tailings appear to have been utilised for a platform in one corner, and a square concrete foundation block with steel rods protruding from it in front of a collapsed drive (this may have been part of a mill site; and Feature d), a shaft at the base of the hill, are located outside the footprint of the proposed Gladstone pit and will not be affected.

Several other shafts and drives shown on the Company map are now not visible on the surface (Figure 42). The Gladstone Open Pit will interact with sub-surface pre-1900 historic workings in two locations on Gladstone Hill. Pit excavation will entirely remove the 25m prospecting drive located on the summit of Gladstone Hill (Feature a) and partially remove historic drives accessed from a shaft between 1132RL and 1108RL in the north west of the pit shell.

The proposed open pit mining will remove the majority of Gladstone Hill, however, much of the site has already been affected by modern gold prospecting. The possibility of additional subsurface remains in relation to past mining activities cannot be ruled out and would also be destroyed by the proposal. Many of the remains associated with the Gladstone gold mining complex are pre-1900 in date so any impacts will require mitigation under a general Archaeological Authority that will be applied for to cover the entire Gladstone Pit project to identify and record any pre-1900 archaeological remains.

No archaeological features of Māori origin were identified in 2000 by Phillips or during recent survey for this project. If these features were to have once existed, it is considered

unlikely that any such features would have survived on Gladstone Hill as a result of historic and modern mining, and farming activities.

Ohinemuri-Waihi Low Level Water Race T13/817

The Ohinemuri-Waihi Low Level Water Race (described above) can also be picked up as an earth channel in places running southwest around Winner Hill, approximately parallel to a modern farm race, and is between 2 - 3.3m in width (Figure 42 and Figure 53). Much of the route of the race is in farmland and already modified or affected by modern gold mining, tracking and planted in pines around Winner Hill.

One section of the water race route to the southeast of Winner Hill is located under the proposed South-East stockpile and Southern Spillway Channel (see Figure 42, Figure 45 and Figure 46) and will be destroyed. However, this section of the race has been mostly infilled and obscured by farming activities so appears only as a depression c.2m wide across the open paddock.

Another section of the water race to the southwest of Winner Hill is located within the proposed Western Spillway and Drainage Channel (see Figure 42 and Figure 46) and will be destroyed. However, this section of the race is already crossed by the farm track off Clarke Street and by mountain bike trails around the western edge of Winner Hill (Figure 53 and Figure 54). No definitive surface evidence of the race could be identified. It would appear that both formal and informal development of a network of mountain trails have either removed or highly modified any surface evidence of the water race by incorporating any surface form and alignment into trails. This area is also covered in dense low undergrowth and pine forest. The proposed associated drainage channel from the spillway will be formed in a natural undulation in the open paddock west of Winner Hill and drain into a natural drain line (Figure 52).

The Ohinemuri-Waihi Low Level Water Race is considered to be of local importance. The sections of the race through the proposed spillways and stockpile have been infilled and modified by mountain bike trails and a farm track, and are not readily recognisable and, therefore, considered to have low historic values. In 2003 other remaining sections of the race around the southern edge of Winner Hill were reported to be in better condition and used as part of a walking / biking track (Hooker May 2003). A semi-intact section of water race being used as a track was identified in this area in 2019 (Figure 53).

Mature pine trees growing on the southern extent of Winner Hill require removal. This is necessary given the age of the trees irrespective of the proposed mining activity. Harvesting operations could impact on the Low Level Water Race but a harvesting plan developed as part of an Archaeological Authority application will be developed to avoid or minimise any effects.

The Low Level Water Race is pre-1900 in date so any impacts from the proposed stockpile, spillways or removal of pines will require mitigation under a general Archaeological Authority that will be applied for to cover the entire Gladstone Pit project to identify and record any pre-1900 archaeological remains.

Tramline T13/818

A section of an historic tramline T13/318 runs along the south-eastern and eastern side of Union Hill. This tramline is also a Category C Heritage Item in the Hauraki District Plan (HAU264) (Figure 42).

The tramline brought firewood to fire the ore-roasting kilns on Union Hill and sometimes ore from the Waihi mines to the larger Victoria Battery at Waikino. The NZAA site record states that modification of the land at the northern end of the tramline near the conveyor belt has erased evidence of the tramway here.

The remaining alignment of this historic tramline is located to the west of the proposed Gladstone Pit project and will not be affected.

Silverton Hill Gold Mining Complex and Battery T13/819

The Silverton Hill gold mining complex (discussed previously) is an area of goldmining remains centred on Silverton Hill south of Barry Road – Golden Valley Road. To the east of the main Silverton mining complex a ‘dam-like’ feature is recorded that may be associated with the Silverton mining complex (see Figure 42). The construction of the WUG Portal and the polishing pond stockpile may impact on this feature if it was not already removed as part of the previous expansion of the processing plant in 2006.

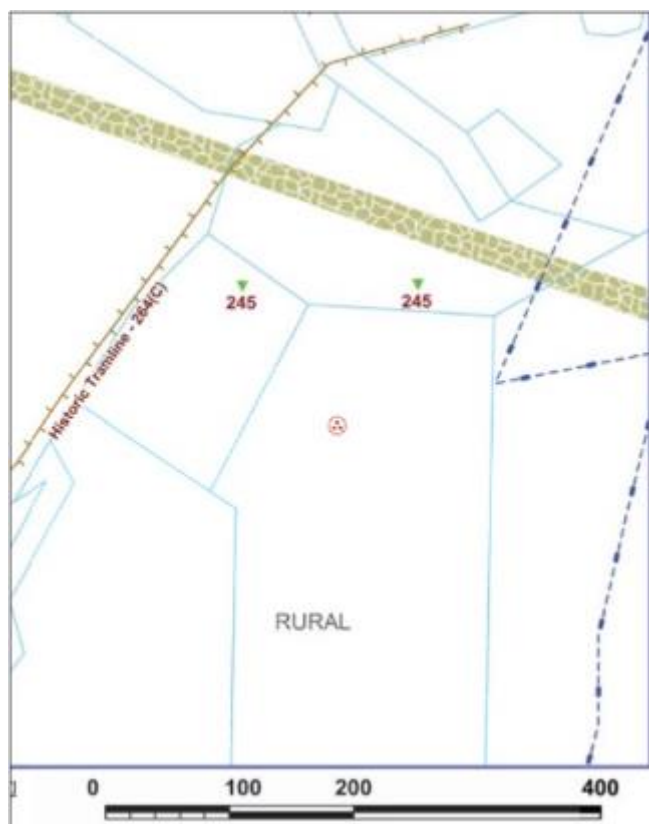


Figure 47. Gladstone Battery and gold mining complex (T13/821; HAU245 Cat C) and Historic Tramway (T13/818; HAU264 Cat C) recorded in the Hauraki District Plan (source: detail from HDP 2014 Map K4)



Figure 48. The approximate location of the Gladstone Battery and shaft, and area of disturbed tailings (Feature C) in relation to the proposed Gladstone Pit



Figure 49. Area of disturbed tailings (Feature C) west (left) of the access road at T13/821. The ore conveyor belt crosses this area in the middle distance (Jan 2019)



Figure 50. View facing north along the farm track showing the vicinity where the Western Spillway will cross the Lower Level Water Race T13/817 alignment



Figure 51. Mountain bike trail in the location of the proposed Western Spillway and Lower Water Race T13/817 alignment



Figure 52. View facing west showing the natural undulation in the open paddock west of Winner Hill that the drainage channel for the Western Spillway will follow



Figure 53. An intact section of the Lower Level Water Race T13/817 running around the southern edge of Winner Hill (Jan 2019)

TAILINGS STORAGE FACILITY 3 (TSF3)

The Proposal

The proposed TSF3 will provide the tailings storage for the WNP in addition to that provided by the proposed GOP TSF. TSF3 is a downstream earth and rockfill embankment structure, like TSF1A and 2, and forms an impoundment to store the discharged slurry tailings pumped from the Processing Plant. The proposed crest height for the embankment is RL155, forming a 46m high embankment above the existing ground at the downstream toe (RL109).

The layout of TSF3 to RL155 is shown in Figure 54 and Figure 55. This shows the TSF3 downstream embankment constructed between the existing TSF1A embankment and the rising hills to the east which wrap around to the north and behind TSF1A to form the impoundment. The impoundment partially covers the existing East Stockpile area.

The total footprint of TSF3, including the extent of the stockpile and uphill diversion drain, is approximately 115ha. Of this area 20ha is already part of the existing footprint of TSF1A and East Stockpile. The new footprint is therefore 95ha. This area includes the stockpile areas, the new embankment and impoundment areas, collection ponds, the uphill diversion drain and area between the impoundment and the uphill diversion drain.

A haul route will be established down the East Stockpile. This will extend the existing haul route behind TSF1A and 2, linking those areas to the existing stockpiles and conveyor loadout. Topsoil stripping will be required over an area of approximately 80ha. This includes approximately 5ha on the existing TSF1A embankment. Stripping of topsoil will be undertaken in stages as required.

Clean run-on water from the hills above the TSF will be diverted around the facility to the Ruahorehore Stream. This diversion will be an extension to the existing Southern Uphill Diversion Drain which currently starts behind TSF1A and runs behind the East Stockpile. The length of the new section of Southern Uphill Diversion Drain is approximately 2950m.